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Did you get enough of racing luges, dare-devil aerial acrobatics, head-spinning ice dancing, or breakneck bobsleigh? Probably; the recent amazing 2014 Winter Games provided us with daily thrills as we marveled at our athletes' incredible courage and expertise in their respective fields. But here, offering a possible diversion, another display of skill and expertise is presented to you in IRRODL's February 2014 issue 15.1.

Using the popular "by the numbers" convention, I note that this issue offers a wonderful geographical variety: Four out of the five inhabited, researching continents are represented, as are 12 countries, and one grouping of countries – the Balkans. The 15 articles in this issue comprise the efforts of 38 researchers, including the largest writing team of six contributors (Balkans) and four singleton authors. Three writers adopted a case-study approach.

Journal editors seek to make sense of an issue's offerings in ways that are interesting and useful to our readers. The numbers above, while whimsically interesting, don't tell the story you really want to hear. Knowing what you DO want to hear is the challenge. As a qualitative researcher, I enjoy "themes and memes": What has intrigued these writers from four continents? What has motivated them to embark on the arduous research road to publication?

Several topics emerged in this issue's selection of articles. The first, in pieces from Canada, the UK, Korea, and Saudi Arabia, considers aspects of open and distributed learning on culture, learning, and knowledge. Simon, Burton, Lockhart, and O'Donnell open up this theme by examining the experiences of students in a rural First Nation in Atlantic Canada. Next, the UK's Baxter and Haycock contemplate MOOCs' sense of community and identity at the Open University. K.P. Joo, using cultural-historical activity theory, presents findings that show that KNOU's efficiency-oriented model has not effectively facilitated students' learning, highlighting a tension within its distance higher education system. And Hamdan from Saudi Arabia approaches her cultural study

through the gender lens, considering the impact of ODL on female learners in that country.

A second topic, the increasingly popular open movement, is further explored by Mtebe and Raisamo as they look at African instructors' use and adoption of OER. And from Katy Jordan comes a wide-ranging study that presents the results of a study that draws together MOOC enrolment and completion data from courses across the major MOOC platforms. Jordan included statistical analyses that explore trends in the data.

Thirdly, and not surprisingly in any ODL journal, South African, Balkan, Chinese, and Taiwanese researchers give us the results of their investigations into the use of specific distance learning tools. From Unisa in South Africa, Archer, Chetty, and Prinsloo share their findings, based on a socio-critical model for understanding student success and retention, from a pilot project that benchmarked successful students' habits and behaviours using a tool (Shadowmatch®) that is used in business settings. Reporting on a project involving 15 universities in nine countries, Budimac, Putnik, Ivanović, Bothe, Zdravkova, and Jakimovski focused on assessment while studying the delivery of a collaborative software engineering course in a range of different physical environments. Kuo, Walker, Belland, Schroder, and Kuo, in a case study approach, investigated learner-instructor interaction, internet self-efficacy, and satisfaction in synchronous online learning with the use of the web-based videoconferencing tool Interwise, while Luo, Liu, Kuo, and Yuan considered the effective use of instructional technology used in an international trade education course in China.

Finally, reflecting our evolving field's continuing interest in the critical issue of what constitutes effective teaching and learning at a distance, several writers offer their answers to that question from a variety of perspectives. One of the most popular approaches to "what works" over the years has been the measure of student satisfaction. The relationship of satisfaction to learning is, of course, its own topic, also often researched. In this issue, however, Lee investigates the impact of human and design factors on graduate student satisfaction, specifically in the affective and cognitive domain, and comes down on the side of human factors. Similarly, Emelyanova and Voronina give us the results of their look at perceptions of online learning at a Russian university, also extolling the importance of the "human factor" – the positive impact of instructor presence. And in two less-mainstream studies, the UK's Harrison, Gemmell, and Reed considered graduate students' satisfaction with online supervision and Grau-Valldosera and Minguilló, citing Tinto's (1975) classic study, researched the idiosyncracies of drop-out over 26 semesters at Spain's Open University of Catalonia, Universitat Oberta de Catalunya (UOC), and found that program, semester, and timing within the semester were all critical factors in students' decision-making. Lastly, Cheryl Kier, a Canadian colleague, presents a study on plagiarism, concluding through research conducted in a psychology course that students have a poor ability to understand this serious breach of academic conduct and, correspondingly, a poor ability to prevent themselves from falling victim to plagiarism due to an inability to effectively present ideas in their own words.

The academic performances outlined above constitute another Olympian IRRODL effort, brought to you by our managing editor, Brigette McConkey, and a host of backstage volunteers – IRRODL reviewers – contributing generously from locations all over the world. And now the pitch: We need more reviewers! Reviewing is a never-ending constant, an especially demanding activity for a huge journal such as this one, with its large number of articles per issue and many issues published each year. While we try not to overburden our reviewers' time and energy, effective reviewing based on content expertise requires many bodies. Please step to the podium and volunteer to help our community in this effort! To do this, please register as a reviewer at http://www.irrodl.org/index.php/irrodl/user/register and indicate your specific areas of interest within the field. Your effort will ensure IRRODL's gold medal standard.

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Post-Secondary Distance Education in a Contemporary Colonial Context: Experiences of Students in a Rural First Nation in Canada

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Abstract

Post-secondary distance education gives students and their families living in remote and rural regions the option to stay in their communities while they study instead of moving closer to the universities in cities. Post-secondary distance education is an option in many rural and remote First Nation (Indigenous) communities in Canada; however there are many challenges to successful adoption in these communities. There are also many opportunities for post-secondary institutions to expand their abilities and capacity in developing and delivering appropriate content supporting these unique, self-governing environments in Canada. We explore the experiences of students from a rural First Nation in Canada with post-secondary distance education, focusing on how different delivery methods offer both opportunities and challenges for community-based students. The study is situated in the context of contemporary colonialism in Canada.

Keywords: Post-secondary distance education; videoconference; web-based; learner preferences; First Nation; Indigenous; Aboriginal; communities; rural; Canada; colonialism

Post-Secondary Distance Education in a Contemporary Colonial Context : Experiences of Students in a Rural First Nation in Canada

Simon, Burton, Lockhart, and O'Donnell

Introduction

The Political Context of Post-Secondary Distance Education in First Nations

Post-secondary distance education gives students and their families living in remote and rural regions the option to stay in their communities while they study instead of moving to the cities where the institutions are based. Families that stay contribute to their community's social and economic capital. Ensuring that appropriate post-secondary distance education is available becomes an important element in the long-term sustainability of remote and rural communities. This research reports on the post-secondary education experiences of students in a rural First Nation and the need for appropriate learning opportunities in the Canadian contemporary colonial environment.

First Nations are politically autonomous Indigenous communities in Canada. With most of the more than 600 First Nations located in rural or remote areas, distance education would seem in theory to offer considerable benefits to community members. The Assembly of First Nations (AFN), the main political organization representing the more than 600 First Nation Chiefs, supports post-secondary education as a priority essential to the sustainable development of First Nations although it has no specific policy on post-secondary distance education (AFN, 2010a).

In 1972, First Nations outlined the requirements for their own education system in their "Indian Control of Indian Education" paper. This document was updated by the AFN to be *First Nations Control of First Nation Education* (AFN, 2010b). Key requirements for a First Nations education system include First Nations languages, cultures, histories, philosophies, worldviews and values (AFN, 2010b). These objectives ensure that First Nations people will be leading the development and operation of their schools and education programs.

The need for First Nations to control their education systems and processes is rooted in the contemporary colonial relationship between First Nations and the Canadian state. More than a decade ago, the Canadian government's most extensive Royal Commission of inquiry found that the historical treaties between the Crown and First Nations were replaced with Canadian policies intending to remove Aboriginal people from their homelands, suppress Aboriginal nations and their governments, undermine Aboriginal cultures, and stifle Aboriginal identity (Royal Commission on Aboriginal Peoples, 1996). Government policies continue to have an explicit goal to remove First Nations from remote and rural regions so that the lands and resources can be exploited for commercial industries such as mining and forestry (Alfred, 2009; Coulthard, 2007; Palmater, 2011).

In this context, distance education can mitigate the destructive effects of government

policies designed to remove remote and rural First Nations people from their lands. Distance education using broadband networks allows First Nations to assert their sovereignty over their lands and resources and develop their communities with residents staying local (Beaton & Campbell, in press). Post-secondary distance education has also been characterized as an opportunity to "decolonize cyberspace" (McAuley & Walton, 2011).

McMullen and Rohrbach (2003) have identified "politics" as a primary barrier to distance education in remote First Nations. The political barriers include government underfunding of First Nations education and miring education programs in unnecessary bureaucracy. Within the university institutions, politics also plays a role in how educational programs are shaped to meet the needs of the instructors rather than the learners.

A second key barrier to distance education in remote First Nations is access to appropriate technology and delivery models (McMullen & Rohrbach, 2003). By researching the needs of the students in First Nation communities and "adapting curriculum and technology to meet those needs, it is possible to correctly incorporate the appropriate technology" (McMullen & Rohrbach, 2003, p. 61). However the political context just mentioned – including underfunding educational programs and designing programs to meet the needs of the institutions rather than the students – can present considerable constraints to successful distance education programs in remote and rural First Nations.

Distance Education in Elsipogtog First Nation

The current study explores how these issues play out in a rural First Nation in Canada. The Canadian provinces bordering the Atlantic Ocean are among the most rural regions of the country. Almost 50% of the residents of one of these provinces, New Brunswick, live in small rural communities (Statistics Canada, 2006). In this province there are 15 First Nation communities. Currently several universities in New Brunswick, as well as the neighbouring province of Nova Scotia and further afield, offer distance education to the First Nation community members. The courses are offered through videoconferencing or the web for individuals and groups in community classrooms. These different course delivery methods offer both opportunities and challenges for students who choose to study in the community where they live and work.

This exploratory study considers some of these opportunities and challenges. The study is based on interviews with community members of Elsipogtog First Nation in New Brunswick. Most community members interviewed had taken post-secondary courses by distance education while living and working in their community. The focus of the discussion is their experiences of distance education, in particular with videoconferencing and online web-based course delivery systems.

The Elsipogtog First Nation study is part of a long-term research project investigating how remote and rural First Nations in Central and Eastern Canada are using broadband networks and information and communication technologies (ICT). This study is the first community-based research the project has conducted in the Atlantic region. Other communities that have collaborated with the project include Kitigan Zibi First Nation in Quebec (Whiteduck, Tenasco, O'Donnell, Whiteduck, & Lockhart, in press; Lockhart, Tenasco, Whiteduck, O'Donnell, in press); Fort Severn First Nation in Ontario (Carpenter, Gibson, Kakekaspan, & O'Donnell, in press; Gibson, Kakekaspan, Kakekaspan, O'Donnell, Walmark, Beaton, & People of Fort Severn First Nation, 2012; O'Donnell, Kakekaspan, Beaton, Walmark, Mason, & Mak, 2011), and Mishkeegogamang First Nation in Ontario (Gibson, Coulson, Miles, Kakekakekung, Daniels, & O'Donnell, 2011; Gray-McKay, Gibson, O'Donnell, & People of Mishkeegogamang, in press).

Research on First Nation Students and Post-Secondary Distance Education

Given that many First Nations are located in remote and rural areas of the country, distance education at post-secondary level is currently a hot topic for educators and their institutions wanting to understand how to best deliver courses and successfully engage students living in these communities. A comprehensive literature review conducted in preparation for this study found several overview reports and dozens of specific studies related to Aboriginal peoples in Canada and post-secondary education (Woodman Simmonds, Wasacase, & O'Donnell, 2011).

In their review of distance education programs across the country, McMullen and Rohrbach (2003) found several innovative initiatives delivering high school and post-secondary education programs by distance delivery that have achieved dramatic success. However, few education institutions and education directors know of these successful models and few have been able to learn from these experiences. The best practices presented in their book are based on successfully developed and delivered distance education courses. These practices include the involvement of on-site tutors, flexible delivery models, and the need to develop personal relationships between the students and instructors.

A study conducted by Davis (2000) assesses distance education in Aboriginal communities in Canada and highlights future research possibilities. Her recommendations include: being clear on what distance education means; First Nations control over the distance education content and delivery of courses in their communities; and ensuring delivery modes with higher levels of interactivity (such as two-way audio and TV-conferencing) that support learning for students who prefer that mode. First Nation communities need to define their own educational priorities and determine the values and perspectives informed by their educational experiences.

A comprehensive report on Aboriginal learning by the Canadian Council on Learning (2009) underscores the importance of broadband networks for providing distant education opportunities for people living in remote and rural First Nations. The report notes that no statistics are available to indicate the number of remote and rural First Nation community members who are taking distance education courses. The CCL report also highlights the importance of informal learning opportunities and learning styles that allow First Nation community members to share information and learn as a collective.

Much of the research on post-secondary distance education in Aboriginal communities highlights the need for it as well as the benefits (Ambler, 1999; Archibald, Hampton, & Newton, 1995; Benham & Stein, 2003; Carter & Rukholm, 2009; Davis, 2000; Deer & Hakansson, 2005; Downing, 2002; Epstein, 1995; Facey, 2001; Fahy, Steel, & Martin, 2009; Faith & Sturrock, 1990; Freeman & Morore, 2007; Ives & Aitken, 2008; Keast, 1997, 1995; McMullen & Rorhbach, 2003; Rice-Green & Dumbrill, 2005; Robinson, 1992; Russell, Gregory, Hultin, Care, & Courtenay, 2005; Sanchez, Stucky, & Richard, 1998; Sharpe, 1992; Sisco, 2010; Spronk, 1995; Spronk & Radtke, 1988; Stonechild, 2006; Voyageur, 2001; Zapf & Bastien, 2000). The primary benefit is obvious: Studying in the same community where you live with your families and work has many advantages over leaving the community to study elsewhere. The option to leave their community removes yet another person and continues the colonial aspiration of making the First Nations disappear.

Most of the studies reviewed are evaluations of university or college courses; several have considered the broader perspectives of First Nation students living in their communities. For example, Ives and Aitken (2008) discuss the outcomes of delivering social work education at a distance to community services staff members in Kahnawake First Nation near Montreal. Two courses were offered through the McGill School of Social Work via McGill's MyCourse website. The approaches and technologies included readings, audio and video clips, reflection logs, quizzes and downloadable toolkits, and instructional support via email and videoconferencing. The authors concluded that communities need to be involved in curriculum development and course materials need to be adapted for First Nation communities otherwise social work could contribute to continued cultural imperialism and colonization. Many other studies that consider the wider social and political contexts of First Nations have come to the same conclusion.

In another example of research based on course evaluations, Russell, Gregory, Hultin, Care, and Courtenay (2005) studied the experiences of Aboriginal nursing students participating in an online nursing university degree program at the University of Manitoba. The courses used various delivery modalities, including videoconferencing, a web-based conferencing system, and email. Researchers emphasized the overall positive student experiences of remaining in their home communities for their educational programs. They also found challenges such as a loss of personal interaction with instructors, leading to diminished respect for the instructor, learners perceiving they were

not learning but merely being programmed, and faculty members' lack of familiarity with the unique culture of distant sites (Russell, Gregory, Hultin, Care, & Courtenay).

In a more recent study of Aboriginal post-secondary distance education based on course evaluations, McAuley and Walton (2011) looked at a novel M.Ed. program delivered only to Inuit students. Four of the 11 courses were delivered exclusively online. Technical challenges made it almost impossible to deliver the courses using synchronous videoconferencing because the bandwidth was not adequate and so the online component was asynchronous web-based delivery. A unique web platform was developed: Nunavut MEd Knowledge Forum environment. The student evaluation of this new platform was extremely positive. The authors attribute its success as a learning tool to its ability to share knowledge among learners and teachers in a seamless environment.

A comprehensive study that included 165 residents of four northern remote communities in Alberta included the participants' self-reported learning experiences and preferences, including their views of available delivery formats (Fahy, Steele, & Martin, 2009). The authors concluded that the delivery of distance education to adult learners needs to respect the needs and preferences of the learners rather than asking them to make the most adjustments to the delivery methods, and that the delivery of distance learning needs to be compatible with their personal, family, and work-related realities (Fahy, Steele, & Martin). Students taking post-secondary distance courses benefit from local support, primarily support from family members (Steele & Fahy, 2011).

There has been limited community-based research conducted in First Nation communities to understand their members' experiences and course delivery preferences. In one of the few studies found of this kind, Johnston (2001), in an unpublished master's thesis, examined the experiences of Aboriginal women completing a full-time college program by computer-based distance learning. The analysis concluded that for these women to be successful in their distance education courses, education must not only be community-based, flexible, and holistic but also foster and nurture relationships between and among students and instructors. Teachers of successful students are themselves respectful of Aboriginal values and work to create interpersonal connectedness using the technology to bridge the geographical distances.

The current study of Elsipogtog First Nation community members explores their experiences of and perspectives on various distance education options such as videoconferencing and web-based systems. This exploratory article is based on an analysis of interviews with Elsipogtog First Nation community members. We plan to expand on this study in future papers to consider more issues raised by First Nation community members related to their experiences with distance education.

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Profile of Elsipogtog First Nation and Education Levels of Community Members

Elsipogtog First Nation, formerly called the Big Cove Band, is the largest Mi'kmaw First Nation in New Brunswick, Canada with a current population of almost 2,000 residents. Their community and traditional lands are part of the unceded territories covered by the Peace and Friendship treaties entered into in the 1700s with the colonial powers and their settlers. Elsipogtog or L'sipuktuk means *River of Fire*. The community and its members operate many community services – elementary school, Health and Wellness Center, Alcohol and Drug Treatment Center, recreational facility with an arena, youth centre with public computer access, community church, daycare and head start programs, Royal Canadian Mounted Police detachment, Gas Bar and Motor Inn, and a restaurant – as well as offering a variety of other activities to Elsipogtog First Nation community members.

The Elsipogtog First Nation territory is nine kilometres west of the village of Rexton and about 170 kilometres (a two to three-hour drive) east of Fredericton, the provincial capital that is home to two English-language universities, the University of New Brunswick and St. Thomas University.

The 2006 census recorded 1,285 adults (15 years of age and older) living in Elsipogtog First Nation. Of these community members, 65 had completed a university degree, 20 had a university certificate, and 385 had a trades or non-university certificate. The number of university graduates in 2006 was up 30% from the 2001 census which had recorded a population of 1,100 adults. By any standards, this is a significant increase in completion of university studies. Clearly there is a keen interest and capacity in the growing Elsipogtog First Nation community for post-secondary education at both university and college levels. (Note: Data on educational levels for Elsipogtog from the 2011 Census were not released.)

Study Methodology

Our exploratory study was conducted in collaboration with Elsipogtog First Nation and in partnership with Atlantic Canada's First Nation Help Desk, Mi'kmaw Kina'matnewey, in Membertou First Nation, Cape Breton, Nova Scotia. The researchers visited Elsipogtog First Nation in November and December 2011 and interviewed 12 community members living and working in the First Nation. Most had experience with post-secondary distance education; several without this experience provided their views on the topic. In January 2012, researchers continued the study with eight Elsipogtog First Nation community members living in Fredericton who were students at either the University of New Brunswick or St. Thomas University. Several had experience with distance education and the others discussed why they had left the community for their

university education. In total 20 Elsipogtog First Nation community members participated in interviews for the study.

To identify the research participants for the study, the researchers worked with a community research associate who selected participants via a convenience sample, community members known to the associate to be willing to participate in the study with experience of university education. The interviews followed a structured interview guide with 38 questions including prompts for discussion. The average interview time was 30 minutes and the interviews were recorded with the consent of participants. Sample interview questions include: What did you like about these distance education courses? Can you think of any way that the course could have been improved to increase your engagement with other students? Of the distance education courses you have taken how involved did you feel in the life of the classroom? The interview recordings were transcribed and the transcripts analyzed using N-Vivo software to look for common themes, primarily the experiences of students with different types of course delivery.

The research protocols were reviewed by the research ethics board of the researchers' home institution and follow the ethical guidelines for conducting research with First Nation communities outlined in the Tri-Council Policy Statement, TCPS2 (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2010).

Students' Experiences with Post-Secondary Distance Education in Elsipogtog First Nation

Overview: Current Use of Post-Secondary Distance Education in the Community

The overall number or percentage of Elsipogtog First Nation community members taking courses by distance education is unknown. As previously discussed, most of the current study participants had personal experience taking university courses via distance education. The universities they mentioned were St. Thomas University and the University of New Brunswick in Fredericton, New Brunswick, and Dalhousie University and Mount St. Vincent University in Halifax, Nova Scotia. These universities are located in the Atlantic region and so their program offerings would be familiar to community members seeking a university education. Also mentioned was the University of Arizona in the United States.

Popular bachelor degree programs that the study participants are or were enrolled in include Bachelor of Social Work (BSW), Bachelor of Education (B.Ed), and Bachelor of Nursing (BN). In addition to the main subject areas, these programs include courses such as English, mathematics and history among other subjects. Several students have

taken courses in technology and Aboriginal education. In addition to post-secondary distance education, Elsipogtog First Nation works closely with New Brunswick Community College in both Moncton and the Miramichi to help students obtain their high school diploma via distance education.

Distance education in Elsipogtog First Nation is delivered through the use of two main technologies: web-based online courses and videoconferencing. Each is discussed in the next sections.

Experiences with Course Delivery via Web-Based Online Systems

The four universities in the Atlantic region that offer courses to the study participants use several web-based online systems for distance education. The most common one mentioned by Elsipogtog First Nation students is WebEx, a technology allowing live video and visual exchange via a computer and audio exchange (voice) using a computer or phone connection. Everyone connected to a session sees the same thing on the screen while someone is talking. Anyone who wants to appear visually to others will require a webcam connected to their computer. Community members also mentioned using Blackboard and Moodle, both learning management systems (LMS), the latter an open-source platform. These systems are accessed via the internet using desktop or laptop computers.

Some Elsipogtog First Nation students described WebEx as a 'virtual meeting place' that provides more flexibility than videoconferencing since it allows them to work from the comfort of their own home and have more control over scheduling the time that they work on courses. Some students explained that the convenience of WebEx technology was that they did not have to commute to get to the videoconferencing set up in a community classroom and could have more time with their family: "So at home you can just…it's you and your computer and there's no distractions around you" (Elsipogtog First Nation Community Member).

Others explained that they were able to participate in peer working groups by meeting in a computer lab designated for distance education set up in a community resource centre. In this lab students are able to utilize SMART board technology (an electronic blackboard) along with WebEx to create a classroom environment where they are able to work with and support one another with specific courses.

WebEx can be difficult to use by students with few computer skills and little or no computer training. For those who struggle with using computer technology because of their inexperience with it, taking courses in this way can be extremely challenging.

> I was so alone. Oh my, I was so alone. Sitting by the computer and by the phone and, you know. No, I was literally sick to my stomach, that's how much I…I'm not

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> a computer learner at all. (Elsipogtog First Nation Community Member)

> There's no face-to-face. There's six people in that course I'm taking now. It's impersonal, I guess. (Elsipogtog First Nation Community Member)

Experiences with Course Delivery via Videoconferencing

Videoconferencing technology involves real-time exchange of audio and video streams over broadband networks. The type of videoconferencing referred to in this article uses dedicated room-based units rather than videoconferencing on a personal computer. This set-up allows students and professors to participate in face-to-face visual and audio contact. In most situations, the videoconferencing system is connecting a university with one or more First Nations communities. In each community students are together in a classroom and the professor is located at a distant university or at a First Nation location from where the professor is delivering the course content. Typically the visual connection is through a television and camera set up at the front of the classroom in all the community classrooms and the one university classroom. One or more microphones in each site allows for audio exchange among the students in different classrooms and the professor.

These room-based videoconferencing systems require technical support to monitor the bridge – the unit that connects the different sites with each other. Technical support is also required to be on-call at each site in case of connectivity or troubleshooting problems. However the systems themselves are generally easy to use by someone with minimal training.

Students who self-identified as 'visual learners,' requiring more interaction with professors and classmates, preferred videoconferencing over web-based learning. Videoconferencing also allows students to be engaged via live video and audio with students from multiple communities, thereby creating a good networking and support system.

Students' perceptions of and experiences of videoconferencing were mixed. Some liked it and some did not, as illustrated by the following quotes.

> To me we were closer in videoconferencing so more of community than [WebEx] because ... Like we're all doing the same thing... we were closer. Like WebEx, to me, there's space there blocking. It's not as personal I don't think. (Elsipogtog First Nation Community Member)

> The courses just seemed as though I was on my own for the whole thing-the whole six years. When it came time for....Thank God for one my classmates for math because

> that was one of my worst experiences-taking a math class through videoconferencing as I have a really hard time with math and the professor was really rude, for one. But, you know, he didn't take it into consideration that we were all adult students and who haven't been in school for years and didn't take into consideration that some of us had trouble with math. (Elsipogtog First Nation Community Member)

The set-up for videoconferencing also has its difficulties if there is a lack of technical support to facilitate the interaction. Some students shared that their experiences with videoconferencing were sometimes unpleasant and annoying due to delays. One community member noted "it depends on your Internet signal. If it's not good, then you're going to get a lot of pauses in between or the professor will sound different" (Elsipogtog First Nation Community Member).

Input to Course Delivery Methods and Perceptions of Control of the Process

None of the students believed they or other community members had any input into the way the courses were delivered or had any control over the process of post-secondary distance education. One student said:

> Oh that would be excellent if they [the university] actually came and asked us. If they responded to our emails, even... because nobody ever really asked us for our input, like 'how could we make this better; how could we better serve you'. (Elsipogtog First Nation Community Member)

Several of the students interviewed believed that if the community members had more input into the course delivery, the community would feel more ownership of the process, and more community members would be taking the courses and be more comfortable using computers. One explained:

> It's the same with children, if you get them involved in a process of developing it, they're more anxious to get involved. So I think if they had a say in how it's going to be delivered or what's going to be delivered, I think they would feel more like ownership towards [the courses]. (Elsipogtog First Nation Community Member)

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Discussion and Conclusions

The Elsipogtog First Nation community members who participated in our study had different learning styles and preferences. For some, the convenience of web-based systems worked well, especially if they had family responsibilities. Others who wanted more group interaction preferred a classroom setting connected by videoconference. Videoconferencing may be more suitable for some students with limited computer experience. In either case, the importance was highlighted of being part of a group of students with peer support opportunities.

Currently the universities offering courses to Elsipogtog First Nation students are primarily using web-based course delivery. None of the Elsipogtog First Nation community members interviewed had a choice about which technologies to use to match their learning preferences. The universities make the choices about the technologies used to deliver courses to First Nations community members, and the students felt they have no say about the choices the universities make.

Our study of the educational experiences of Elsipogtog First Nation community members provides a better understanding of their preferences and needs for post-secondary distance education. We would expect a similar range of experiences in other First Nations communities in the Atlantic region, although this exploratory study cannot be generalized more widely to other communities.

It should be noted that the technologies discussed in this article are not static in the sense that changes and upgrades in broadband networks can significantly affect the user experience of the distance education course delivery. Challenges to video communications in rural and remote Aboriginal communities have been previously researched (O'Donnell, Perley, Simms, & Hancock, 2009). Some of the challenges using videoconferencing raised by several participants in the study – poor connectivity and lag time (latency) with the video feed – can be improved with higher bandwidth networks. Indeed, at the time the study was being conducted, the community was preparing to install its own fibre optic network. Significant improvements in connectivity afforded by fibre networks will no doubt improve the quality of the videoconferencing in Elsipogtog First Nation and may influence distance learning preferences in future.

As suggested earlier from previous research by Fahy, Steele, and Martin (2009), a conclusion of the current study is that the delivery of distance education needs to respect the preferences of adult learners rather than asking them to make the most adjustment to the delivery methods.

Similarly, Deer and Hakansson (2005) suggest that knowledge, information and communication are at the core of the emerging global information society. Knowledge, information and communication, however, are culturally defined concepts and expressions and information and communication technologies are cultural products of the society that developed them. First Nations have their own concepts of knowledge,

information and communication and have developed their own forms of information and communication. Therefore First Nations need to take part in the information society on their own terms to be able to shape their future according to their unique needs. The current study strongly suggests that this would include making decisions about the ways distance education is delivered to meet the needs of diverse community members.

Our study findings suggest the possibility of an unreached pool of potential students in the community who may be more interested to participate in post-secondary distance education if more technology choices were offered. In particular, it would be worth exploring if a blended model of online web-based courses and videoconferencing could be tailored to meet their needs. It is important to recognize the unique circumstances of every student using these resources and understand that what works for one may not work for another. Developing course delivery models using a blend of different technologies to create a more positive learning experience for Elsipogtog First Nation community members will require additional funding and planning.

In future, Elsipogtog First Nation could work with the universities to explore possibilities for courses that blend not only web-based and videoconferencing technologies but also distance education with in-community options. It is entirely possible, for example, for a university instructor to travel to different First Nations in the Atlantic region and provide the instruction using both distance and in-person classroom education at different times during the academic year. This has even been tried in a limited way in the past.

Clearly there is significant room for the Elsipogtog First Nation community to take a more active role in determining how the university courses are offered by distance to their community members, including strategies to ensure that the different learning preferences and styles of the students are accommodated. Taking control of their own post-secondary learning opportunities, establishing partnerships with interested post-secondary institutions, and providing the required learning environments and student support systems are examples of successful distance learning models adopted in other First Nations. Each of these steps requires access to financial resources, people, and facilities that support local economic development. These local efforts help to move both the community and its partner institutions beyond the traditional colonial relationship and support local and regional development in a province that requires new innovative strategies to address its rural challenges.

Our study suggests that more support for and attention to the students' preferences for learning styles will lead to more successful distance education programs in these communities. This suggestion aligns with the concept of "First Nations Control of First Nations Education" advocated by the Assembly of First Nations. It also suggests that more appropriate post-secondary distance education options will allow more families to remain in remote and rural First Nations while they study instead of moving to the cities, contributing to the long-term sustainability of their communities.

Post-Secondary Distance Education in a Contemporary Colonial Context : Experiences of Students in a Rural First Nation in Canada

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Acknowledgements

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Roles and Student Identities in Online Large Course Forums: Implications for Practice

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Abstract

The use of large online discussion forums within online and distance learning continues to grow. Recent innovations in online learning such as the MOOC (massive open online course) and concomitant growth in the use of online media for the delivery of courses in traditional campus based universities provide both opportunity and challenge for online tutors and learners alike. The recognition of the role that online tutors and student identity plays in the field of retention and progression of distance learners is also well documented in the field of distance learning. Focusing on a course forum linked to a single Level 2 undergraduate module and open to over 1,000 students, this ideographic case study, set in a large distance learning university, uses qualitative methodology to examine the extent to which participation in a large forum can be considered within community of practice (COP) frameworks and contributes to feelings of efficacy, student identity, and motivation. The paper draws on current theory pertaining to online communities and examines this in relation to the extent to which the forum adds to feelings of academic and social integration. The study concludes that although the large forum environment facilitates a certain degree of academic integration and identity there is evidence that it also presents a number of barriers producing negative effects on student motivation and online identity.

Keywords : Online forums; online identities; online learning; higher education; e-learning

Background

With 65% of its offering delivered online and 7,000 tutors supporting learning, the university offers 473 undergraduate modules, 60 continuous professional development modules, and 146 post-grad modules with 89% of students studying in order to further career aims. Since its inception in 1969 the university has taught over 1.8 million students using a blend of both online and face-to-face pedagogy. But a number of recent reports suggest that not only distance learning universities and their students stand to profit by new developments in online learning, but that traditional campus based universities can transform learning journeys by applying research into online pedagogies to turn to their advantage (OLTF, 2011): This is particularly important in light of the development of mass online open courses (MOOCs). This paper uses as its case a large online forum open to undergraduate students in order to study the ways in which engagement or non-engagement with the forum both aids and presents barriers to student motivation and feelings of agency. Agency has been found to be a key element in the formation of working and professional identities (see for example Baxter, 2012; Lave & Wenger, 1991), and relates to feelings of being in control, on the part of the individual. This level of control has been found to be particularly important in the way in which it engenders feelings of positive motivation and links strongly to student retention and feelings of success (see Baxter, 2010, 2012). In drawing upon theory relating to online communities of practice (Hammond, 2000; Lave & Wenger, 1991; Wenger, 1998) and online identity (Baxter, 2012, 2012a) it explores the ways in which a large online forum contributes to learners' sense of agency and identity.

Context

For some time now the use of online forums in distance learning has formed a substantial element of research into distance and online learning. Research has focused upon both practical approaches to online moderation as well as studies into the degree to which they can motivate and engage students in order to enhance their learning journey (see for example Cleveland-Innes & Campbell, 2012; DeSanctis, Fayard, Roach, & Jiang, 2003). Some researchers suggest that the degree to which distance learners engage in online forums can be indicative of their capacity to progress within their studies, linking to both progression and retention (Baxter, 2012a; Baxter & Martyn, 2010).

A number of researchers have investigated online forums as communities of practice, focusing on the ways in which they move their online learner participants from novice to expert status (Shea & Bidjerano, 2009). Research into this function of online forums has become a leitmotif of studies in this area and the term has taken on nuanced meanings depending upon how and in what context it is used. Johnson's survey of current research on online communities of practice (2001) distinguishes between virtual communities as 'designed communities using current networked technology', making the distinction between these communities and communities of practice, which 'emerge within the designed communities via the ways their participants use the designed

community' (p. 45). Work into the learning value of such communities has been investigated by a number of researchers: Jean Lave and Etienne Wenger (1991) termed it *situated learning* and focused on the constructivist nature of learning in this environment, identifying key elements of the environment as 'ill structured questions, learning in the social and physical context of real world problems, including group activities, collaboration and team work, shared and often negotiated goals' (p. 42). But Wenger's later work on the way in which participation within a community of practice forms and shapes identities sees identity in practice as neither self-reflective nor discursive (Lave & Wenger, 1991, p. 151). A body of research within online communities disputes this, arguing that online identity in text based online communities is in many ways a discursive construction, formed from the way in which participants engage textually within the environment and reflect on the ways in which their posts reflect their online identities (see for example Garrison & Cleveland-Innes, 2005; Hewitt & Forte, 2006).

This area of research also reflects on the role of the online moderator (or tutor) in the creation of this online identity and the ways in which both cognitive and metacognitive strategies may be employed in order to foster engagement and participation whilst concomitantly strengthening the online identity through a deeper and more productive engagement with the environment (Garrison, 2007). Since then, both the role of the facilitator and the confidence and ability of the learner to participate in these forums have exercised many researchers; latterly in the context of massive open online courses (MOOCs), which rely upon large forums as a central part of their pedagogy (Anderson & McGreal, 2012).

Investigation in online participation has more recently come to focus on the affective dimensions of integration, examining the role of emotions on motivation to participate (Angelaki & Mavroidis, 2013). Angelaki and Mavroidis, in common with other researchers in this field, link emotions to the ability to create online social presence and remark that it is 'more significant to women rather than men, in particular, elements of 'the expression of emotions and non-verbal communication' (p. 90). Studies in this area have also identified the pivotal role played by metacognition in online learning: 'the ability of learners to take responsibility and control of the construction of meaning and confirmation of knowledge' (Akyol & Garrison, 2011, p. 183). Raised levels of metacognition and, to a certain extent, motivation were also found in studies involving peer facilitation amongst students, such as the study carried out by Hew and Cheung (2008). Their research investigated the depth of threads in particular student to student interactions, and identified particular forms of Socratic questioning techniques and ways in which differing types of questions promoted deeper student to student interaction, as evidenced by more extensive threads (see for example Mazzolini & Maddison, 2003), this then leading to heightened levels of confidence and enhanced participation. Henri's taxonomy of interaction identifies stages of participation in online forums (1992) (see Figure 1). This study takes a constructivist view of identity formation with learning and community integration as central to online student identity formation

(Baxter, 2011; Lave & Wenger, 1998). Figure 1 illustrates the ways in which the student moves from a relatively peripheral role in the community through to full integration. The increasing levels of learner confidence gained through this form of forum integration links positively to motivation, retention, and learner resilience (Burke & Reitzes, 1981; Duemer et al., 2002). Although at first glance there seems to be little difference between the quasi-interactive and interactive elaborative stages, in terms of participation and learner integration into the forum, the step is significant. The quasi-interactive stage involves merely making reference to the contributions of others, without really using the information in order to build on the point. In contrast, during the interactive elaborative stage of participation, the student uses the points made by other students in order to either challenge or support. This has the effect of not only strengthening their argument, but also provides a cohesive element to the debate, rather than the list of disparate arguments and statements that often feature in the independent and quasi-interactive stages.
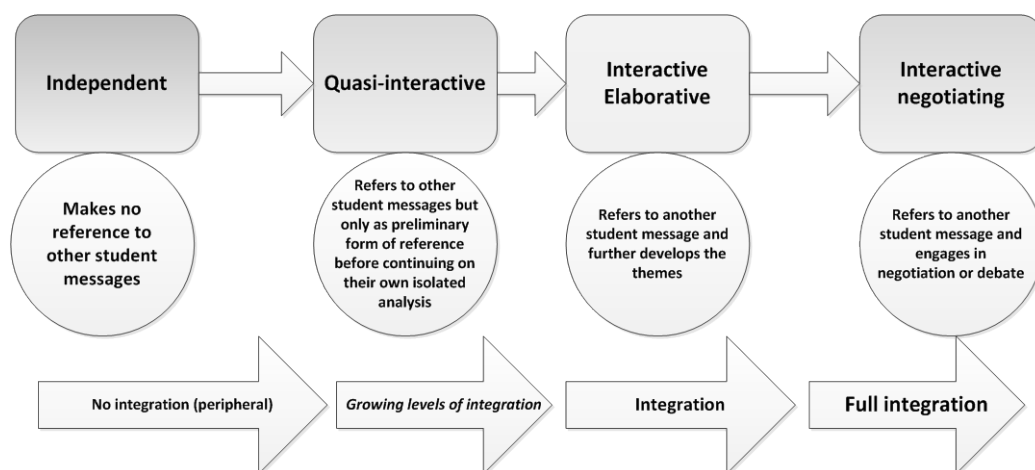
Figure 1. Henri's taxonomy of interaction (1992).

These extended discussions have been linked in other studies to the extent to which students feel agentive online, increasing their social presence and linking to motivation and efficacy (see for example Thomas, 2002).

Identity and Community

A number of studies have linked a strong and salient online identity to learner agency, resilience, and learner motivation to progress (see for example Baxter 2012a; Xie, DeBacker, & Ferguson, 2006) and identified role and engagement with communities of practice as being a central element within this online identity, influencing both online behaviours and emotions.. The constructivist premise upon which online pedagogies are based, in common with humanist theories of learning, considers that working identities

are constructed and used in order for individuals to make sense of their working environments (see for example Jonassen, Davidson, Collins, Campbell, & Haag, 1995). But to what extent do large online forums, now commonly used within both conventional distance offerings and MOOCs, contribute to a salient learner identity and what factors inhibit the development of this in the online context? The results from an early pilot focusing upon a large online forum open to over 2,000 students (Haycock, 2008) revealed that although over 50% of respondents stated a preference for large national forums compared to smaller forums based around individual tutor group, a substantial amount expressed concerns about the ways in which they portrayed themselves online (social presence). This concern extended to how this reflected upon both their identities as students and their ability to feel part of the forum. Research carried out in 2012 (Baxter, 2012a) reflected that these concerns often presented barriers to motivation and student progression. Both projects reflected a need for students to feel part of a community in order for them to feel authentic and agentive. This is also supported by work done elsewhere (see for example Johnson, 2001).

Feelings of belonging to a community have been identified as being a core element in the construction of salient and robust working and student identities (see for example Caravallo Johnson & Watson, 2004). Figure 2 summarises elements identified within current literature on forums as online communities of practice which contribute and act as barriers to feelings of inclusion and motivation leading to strong learner identities.
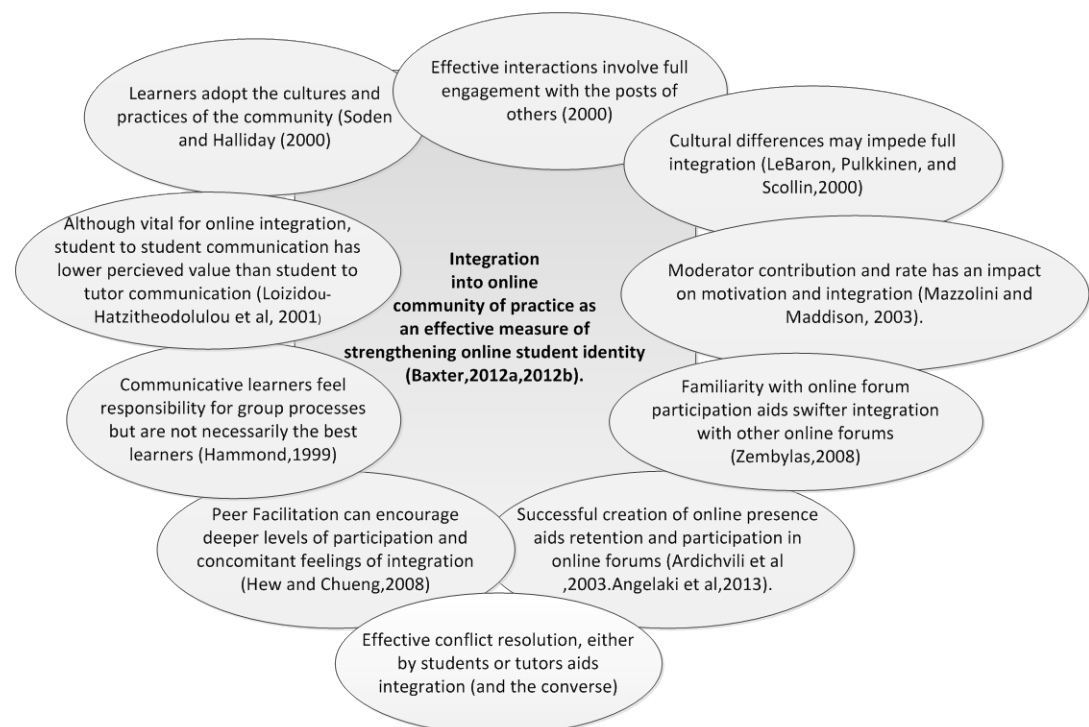

Figure 2. Key findings from current literature on forums.

The diagram illustrates a number of elements relating to enhancement of learner identity and motivation in the specific context of online forum engagement. It reveals a complex mix of elements which have been found to influence the extent to which students engage and participate on forums. The illustration also highlights areas which may present difficulties and barriers to community integration and learner motivation; for example, if familiarity with the online forum aids swifter integration in other online forums, does this cause problems of combining those with little or no experience of this type of interaction in the case of those adept in the use of other forms of social networking?

This discussion has revealed that successful online learning communities engage learners and enhance learner identities but the existence of particular barriers may be detrimental to this process, and raised three key questions for this study:

- What elements of online participation in a large forum enhance learner identity, both integrating the learners into the community and concomitantly enhancing their learner identity and sense of agency?

- Do student to student interactions enhance learner identity or do they have lower perceived value in terms of creating feelings of inclusion in the community of practice?

- What value is there in taking community integration from an identity perspective in the study of large online forums?

Method

This case study, based at The Open University UK, focuses on a student forum based on a single Level 2 module upon which 2,800 students were registered. The module is a compulsory component within a BSc (Hons) degree and focuses on elements of basic developmental psychology. At the time of the study 50% of the students who registered on the module had already completed one or other of the compulsory Level 2 modules. However for a significant proportion of students (20%), this module constituted their first experience of Open University study.

The forum itself is one of a number available to students; whilst undertaking the module students have access to a number of forums: The closed course conference comprises a Main Module Forum and separate forums for each assignment and the exam. Additionally there is a student run and moderated forum which is more often used between presentations. The purpose of the forum is peer support during the module study. A single moderator is available to make sure that guidelines are followed and a code of conduct is adhered to.

Sample

In order to benefit from ease of access and the remote geographical dispersion of students, the survey was hosted online (Hewson, 2003). It has been argued that this form of data collection can provide more candid information than that provided in other forms of data collection, particularly when used within the context of tutor student research (Johnson, 2001). The online survey aimed to target all students registered on the module; this includes those who rarely or never post as well as those who regularly post or those who use the facility in a read only capacity. More commonly termed 'lurkers' the rate of these has been found to be variable, but current research estimates that as many as 45 and 99% of the population of an online forum may fall into this category, making it essential that their thoughts are sought and represented in the final analysis (Preece, Nonnecke, & Andrews, 2004).

The final sample consisted of 1,000 randomly selected students (177 male and 823 female) from across two cohorts of the chosen module and final responses were gained from 100 students. The sample was selected by the University Student Research Panel and university codes of ethics were applied. All participants signed an ethics statement outlining the use of data and research protocols.

The particular challenges of tutors carrying out research with students is well documented in the literature (Groundwater-Smith, 1998; Reason & Bradbury, 2001), raising issues not only in terms of partiality, but also in terms of the degree of candour within this type of investigation. The research within this project was carried out by the forum moderator, herself a tutor on this particular module. In light of this and in light of research evidence which demonstrates that tutor/student research involves this element (Sikes & Potts, 2008), we recognise that some of the responses may have been influenced by this relationship. However whilst the sample was named, the responses were given anonymously.

Mode of Analysis

The results were downloaded and quantitatively analysed according to the following questions:

Why do students use online forums?

What is the most common use for this type of forum?

What were self-reported student confidence levels when using online forums?

Qualitative responses to the survey were then analysed using the framework for community identity integration adapted from Baxter (2012a) and illustrated in Figure 3. This framework draws on four elements of online community integration as the students move from a peripheral role within the community (either as lurkers, or as occasional contributors) to a fuller role in which they make regular posts and engage

more fully with the postings of others. In order to consider student identity within this context the framework draws upon the elements of community engagement outlined in Figure 1, dividing them into four thematic areas: social engagement, academic integration, engagement with peers, and, finally, management and structure of the forum. These areas are further sub-divided into components of each area identified during textual analysis of the qualitative data.

The results are discussed in the section which follows.
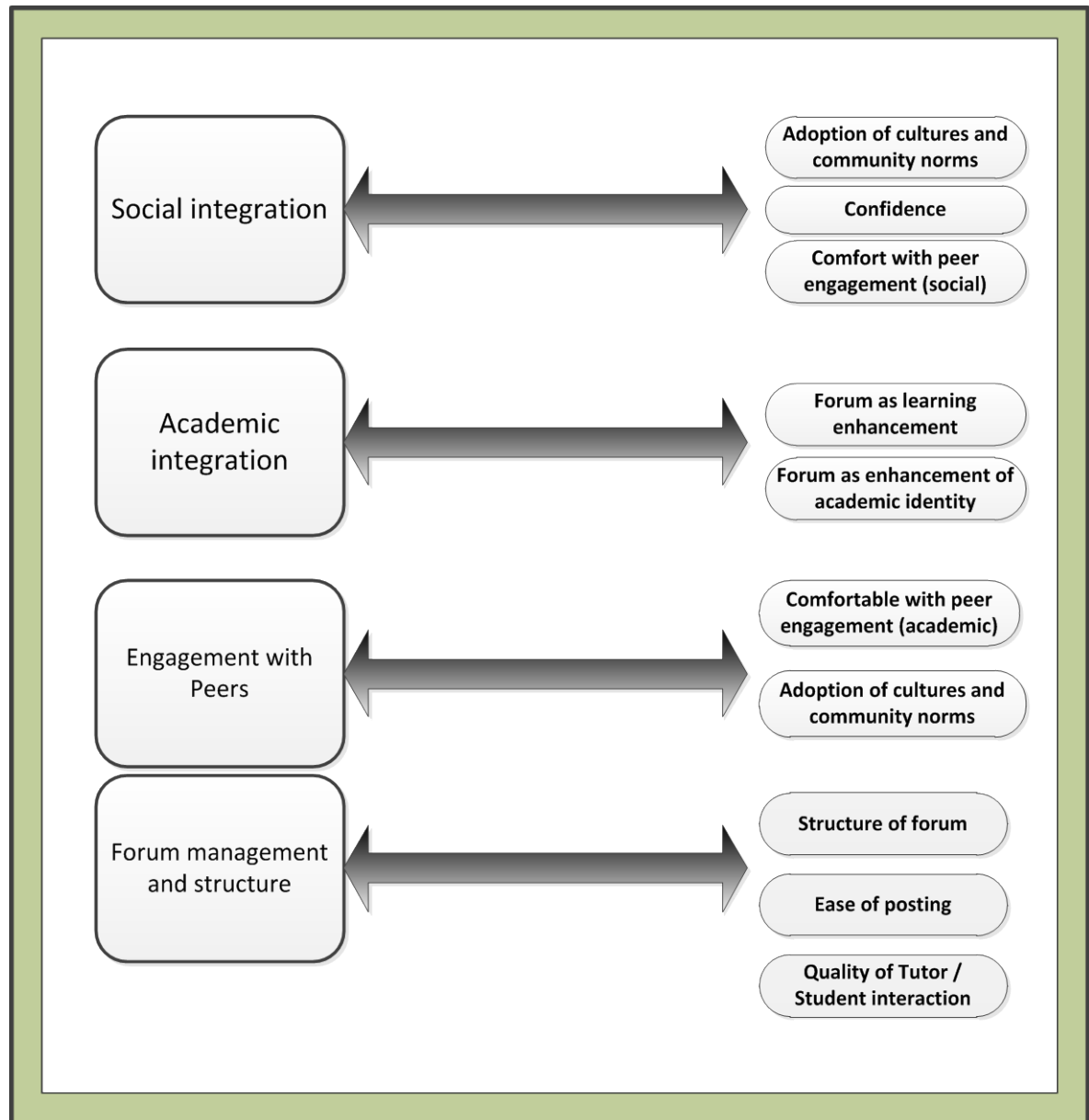
Figure 3. Elements of data analysis.

Findings

Quantitative Findings
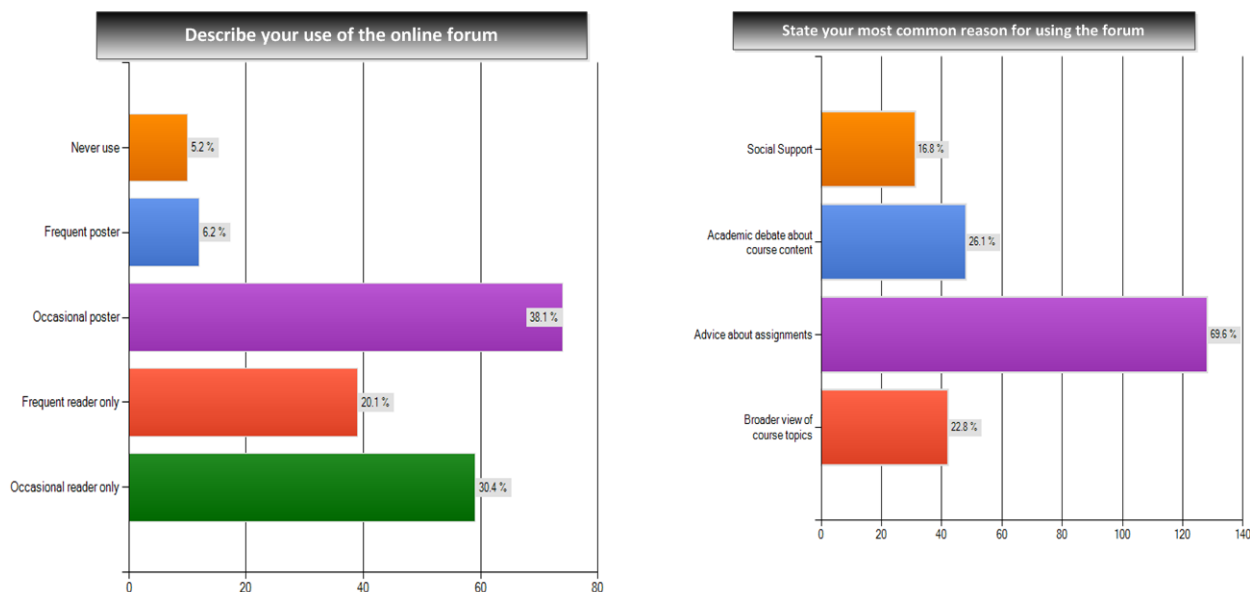
Figure 4. Use of online forums.

Responses to the two questions in Figure 4 (percentages reflect the fact that students were allowed multiple responses for each question) revealed that most students (38.1%) participated as occasional posters, whilst those who classed themselves as frequent posters only accounted for 6.2% of the sample; these students read the forum posts as well as posting. A substantial proportion of the students (20.1%) stated that they frequently read posts only, whilst 30.4% stated that they only occasionally read posts. Students in both reader categories did not post on the forum. A small proportion of the sample replied that they never use the forum (5.5%). In terms of forum use, most students reported that they most frequently used the form for advice about assignments (69.6%), whilst there were less students that used the forum for academic debate about course content; this, combined with those who used the forum for a broader view of course topics, added up to a significant 48.9% of students who used the forum as a way in which to integrate with the academic element of the community.
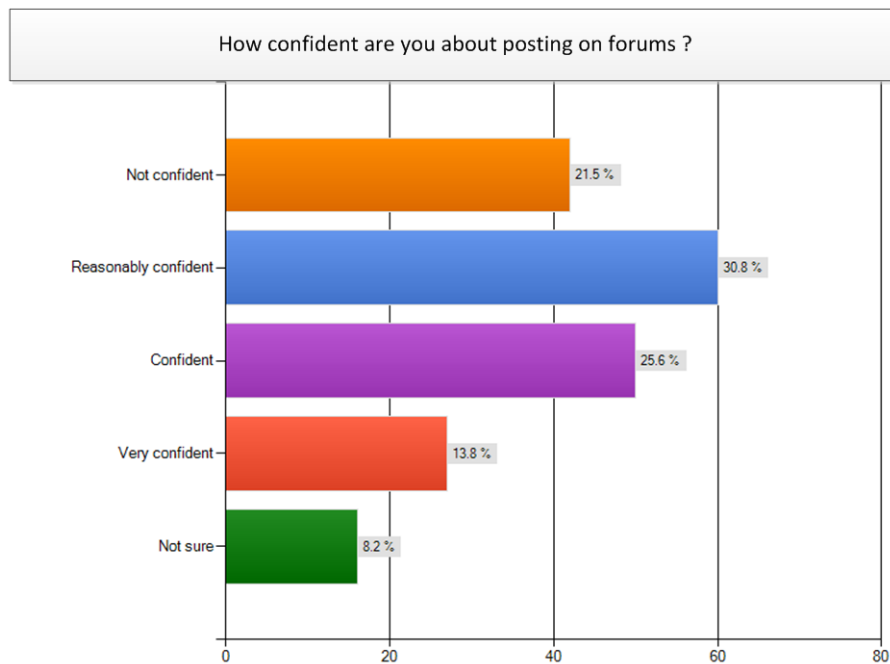
Figure 5. Confidence levels in forum posting.

In terms of their confidence in using the forum, just over 30% described themselves as reasonably confident and a total of 70% as either reasonably confident, confident, or very confident; surprisingly only 21% admit to lacking confidence while posting. Although these results are somewhat surprising given the low number of students that post regularly, they do not indicate whether students like or dislike posting on the forum, or whether in spite of feeling confident they have the time or inclination to regularly read and post on the site. In order to further explore the quantitative information we continue our analysis by examining the qualitative comments that emanated from the survey, analysing them in relation to the framework in Figure 3.

Qualitative Findings

Whilst the quantitative element of the study uncovered some interesting insights into confidence levels and use of forums, the qualitative findings revealed insights into the issues around using forums and the ways in which the students felt about engagement with both their peers and the forum moderator. These areas are discussed in terms of the three areas outlined in Figure 3.

Social integration.

In terms of individuals' social integration as discussed, the quantitative information seemed to indicate that students were feeling confident about posting on the forum. This would tend to indicate that levels of social integration were fairly high. But on

closer investigation the qualitative data revealed that in terms of the three analytical categories within this section, students were experiencing problems with both social peer engagement and adoption of forum cultures and community norms. For one student, the fact that the forum seemed to mix social and academic issues made him extremely uncomfortable: "the wider forums drive me to drink ! I would have more confidence in posting if the forums were more TMA or course info restricted" (P1).

Another was torn between a need for the forum as a support system and a dislike of the ways in which other students behaved online: "I think they are a good support system but I have seen them where people argue and it's upset other students which hasn't been very nice! But I like the fact you can discuss everything and anything on there" (F2).

Concerns with the personal nature of the forums was voiced in terms of both the public nature of their posts and also worries about the security of their data; as one student articulated, "I don't feel my data is protected" (F4).

Worries also centred on what others would feel about their postings and what this would mean for their online identity: "I am really worried about what others will think about my posting" (F5).

One student felt that there should be some firm guidelines on the differences between posting to this type of forum and other purely social forums such as Facebook:

> Stuff that you might put on something like Facebook where you are interacting with friends who want to know how well you are doing, they are not always encouraging to other students who may be struggling. I have seen many instances of this where virtual arguments have broken out. (F12)

But there were also some very strong indications that past experience, not only of university forums but of online chat rooms generally, contributed strongly to students' ability to both create online presence and confidence to post: "Having a go and using online chat-rooms, [gives me confidence to contribute] (F14).

The insights into the social element of integration into the community of practice are important in terms of the ability to learn in the social context of real world problems, identified by Etienne Wenger as being core to a community of practice (1998). However there appears to be an assumption by students that the social elements of interaction within this community can give rise to dissent amongst users and impact negatively on both online confidence and presence. Research into the use of online social networking sites, such as the study undertaken by Ellison and colleagues in 2007, revealed that use of Facebook was linked with feelings of psychological well-being, 'Suggesting that it might provide greater benefits for users experiencing low self-esteem and low life satisfaction' (Ellison, Steinfield, & Lampe, 2007, p. 1143). If this is the case then

students may well post on a forum in anticipation of receiving the same type of positive reinforcement for their efforts, which is often experienced when posting to other social networking sites. It could be argued that this is part of the creation of a community of practice; that the social elements are inseparable from academic content and that this mirrors a real life approach to dealing with issues within a community, forming an integral part of the move from peripheral to full participation. But the perceptions of a number of students reflect that because the forum is hosted by an academic community that the focus should be on academic debate.

The data support the idea of the need to create online social presence, and the strong links between this and positive and negative emotions (Angelaki & Mavroidis, 2013), and the concerns voiced by student F5, reflect the deep concerns around the ways in which postings reflect the online persona of individuals. This is reflected in a number of responses during the study, for example the statement made by F124, relating to anonymity below. But insights into what enables students to post with confidence revealed the use of other online media to be strongly influential in their ability to create online presence and concomitant online resilience and motivation to post, as this student reported: "I think I'm of the Facebook generation, whereby posting on forums is a widely used form of communication, so I've had a lot of practice in it" (F69). Although some students clearly felt that the forums were not an appropriate arena for social engagement, when this social engagement was specifically linked to academic engagement their accounts were substantially different.

Academic integration and engagement with peers.

As discussed earlier, some research reflects that student to student interaction has less perceived value than that between tutor and student (Loizidou-Hatzitheodoulou, Vasala, Kakouris, Mavroidis, & Tassios, 2001); although this element did appear within the data it predominantly manifested in frustrations around social use of the forum. The data did reflect that students felt a sense of responsibility in terms of their posts; and that this responsibility was articulated in the degree to which they felt confident in their knowledge of the subject. Where this was lacking, students tended to perceive their own role as being fairly peripheral to the academic community:

> I don't think my lack of confidence in forums is down to the university. I am much more of a reader than a contributor: a last minute student so someone has always asked my question. Also some students seem so academically advanced I feel my contribution may be stupid. (F6)

Another student felt that the forum was too public and that one would be publically shamed by asking a question founded on a fundamental misunderstanding: "If one could have the choice of writing anonymously it may be easier, as I personally would be

a bit embarrassed if I really did misread the question, as basically the whole forum would know about it" (F124).

Although it is not clear whether this individual was participating as a lurker, reading posts rather than posting, the post suggests that they had little sense of the forum as a community, seeing it rather as a FAQ element in terms of the course, and certainly not as a learning environment. This may suggest that there is value in addressing the metacognitive functions of the forum and of exploring to a greater extent the student understandings of how they learn online, reflecting Akyol and Garrison's argument that this element is fundamental to successful online engagement (2011). What is not clear is the extent to which this contributes to learner identity. It also raises questions about the identity and role of the lurker within the community. Often pejoratively labelled a non-participator, or in corporate forums 'the taker who doesn't give back' (Smith & Kollock, 1999, p. 44), the lurker identity is an interesting one in terms of his or her role identity within the online community. The work of Nonnecke and Preece has uncovered some interesting insights into the way in which lurkers both perceive their own role in relation to the online community and are in turn imagined by other community members (Nonnecke, Andrews, & Preece, 2006; Preece, Nonnecke, & Andrews, 2004). The statements made by F6 and F124, above, reflect some of the findings of Nonnecke and Preece in the way in which learners imagine their online role, exemplifying the ways in which online learners perceive a reading only role and the qualities that they ascribe to colleagues that do post.

 Many of the respondents in their research stated that by not posting they were contributing to the well-being of the community, citing the virtues of being a good listener, of not dominating and only posting if they feel that their post would offer a perceptibly valuable contribution to the community (Nonnecke, Andrews, & Preece, 2006, p. 212). One of the most interesting insights to emerge from their research in relation to this study was that individuals felt that by posting they were assuming a degree of expertise in the subject: In these instances even an opinion, due to its text based nature (rather than spoken), assumed an air of authority (p. 212). If this is the case then posting to some individuals may seem like too precipitate a move from novice to expert within the online community: an element worthy of further investigation.

This along with a number of comments on the way participants engaged with academic elements of the forum supported the findings of Ardichvili, Page, and Wentling (2003) and reflected that the affective domain is very influential in terms of enhancement of student engagement and identity, whilst also supporting its role in the construction of social presence, of an online identity that positively affected learner agency and motivation (Angelaki & Mavroidis, 2013) as this student articulates: "I am not afraid to speak up in the forums as I believe we can learn from our mistakes" (F61).

In the case of this student (and a number of others), there was a substantial amount of evidence that developing online presence in other social networking situations proved very helpful in encouraging swifter engagement with this forum, and that this not only

contributed to a deeper level of participation but also led to peer facilitation, students helping less confident students to participate: "Most posts seem friendly and non-judgemental. There is an atmosphere of helpfulness and of all being in the same boat" (F67).

But there was also evidence that failure to achieve adequate social online presence was problematic, not only for the individual but for those attempting to engage with that particular individual: "My main problem is understanding how the forums are used by others, you know: information about other users" (F50).

Feelings of posting into a vacuum with textual identities feeling indistinct and lacking substance caused some learners to feel isolated, either because this element made them feel reluctant to post, or because they felt that because they didn't feel any sense of familiarity with other participants, they found it difficult to feel part of the forum.

Feelings of academic integration and concomitant periphality appeared to be more influenced by student's ability to *appear* knowledgeable and confident online: the extent to which their online identity manifested as peripheral or central to the academic community. This was achieved in a number of ways : via integration on the part of other students who encouraged participation by peer support; by familiarity with the construction and maintenance of an online identity due to previous participation in social networking sites; and finally through the extent to which learners could adapt to the culture of the forum or perceived it to be an alien and sometimes hostile environment. The extent to which students were able to engage with peers in a supportive and helping manner appeared to colour their perceptions of the community, enhancing their sense of legitimacy and authenticity. This would tend to indicate that further studies such as that carried out by Hew and Cheung in 2008 into peer facilitation may be helpful in evaluating the extent to which peer facilitation schemes could enhance online presence and promote salient and agentive online student identities.

The final area for data analysis investigates forum management and structure and the impact of moderator interventions and activities.

Forum management and structure.

Although the previous discussions reflect the plentiful evidence in support of Zembylas' argument that familiarity with online forum participation aids swifter integration, and also that students were in some cases employing online communication styles learned elsewhere, there was also evidence to suggest that students viewed this large forum as being very different both in nature and structure to other online environments. The actual structure of the forum was often seen to be problematic with sheer quantity of posts proving overwhelming to some students: "Sometimes it seems confusing when trying to find a particular topic as some topics seem to be merged and some do not" (F96).

A substantial element of whether the forum was perceived to be useful was based around perceptions of the role of the moderator. In terms of integration into the community the students mentioned less about the expert role of the moderator, and spoke more of the moderator in terms of an ability to manage. This was particularly so in terms of the management of difficult situations, often termed 'flaming' in the online environment: "Sometimes I've seen some very negative responses to well-meaning posts and would like to see these removed" (F105).

Although the moderator in this case was not taking a tutoring role there was a feeling amongst a number of students that this should be the case, that the moderator should both initiate and shape discussions: "In other forums I found directed discussions and small buddy groups used there very useful, this could be extended here and make this much more than a social forum" (F19).

The feeling that the moderator should be acting in the role of academic expert offers some insight into the ways in which learners need the moderator in order to define their own positions within the community. Without the expert taking a strong steer and providing shape for discussions, there seemed to be a sense amongst students that the community had no shape, that it lacked an aspirational centre to which the students could gravitate in their progress from novice to expert. This appeared to impact on student perceptions of usefulness of the forums and core beliefs about the purpose of a forum in this academic context. There was the feeling among some students that this social forum was out of place in an academic context and that remarks not pertaining directly to academic matters should be reserved for Facebook pages or other sub-group formations outside of the control of the university.

Work done by Mazzonlini and Maddison (2003) reflects how difficult it is for moderators to achieve a balance between too much intervention and too little, whilst also highlighting how perceptually important for students it is to achieve this balance.

Conclusion

The study has revealed that the insights gained from taking this approach to the study of large forums has value in its capacity to reveal learner perceptions and the ways in which they impact on motivation and learner identity. In exploring the elements which enhance student motivation within this environment, the research has highlighted both the power and complexity of using this medium in order to create an online academic student community of practice. Many of the elements which the literature points to as enhancing student motivation and swift integration within the forum are paradoxically the very attributes that may prove detrimental to the participation and integration of other students. A particularly powerful example of this is the transfer of skills and expectations acquired within the context of other social networking environments to the academic environment.

The research also illuminates both challenge and opportunities within the context of student to student interaction. Although students found some student to student interactions problematic there was no evidence that those containing academic content were viewed as having a lower perceptible value than tutor to student interactions. However what was evident was that social interactions were viewed as having lower value than those which related to academic content. This suggests that perhaps the nature of this forum may need to be reviewed in light of student expectations. An important finding of this study is that academic peer to peer support was both valued and valuable in its capacity to place academic issues in the affective as well as the cognitive domain, supporting the work of Loizidou-Hatzitheodoulou et al. (2001). In terms of the function of this type of forum as an identity enhancer, its function to encourage students to feel part of an academic community, these insights are important.

The work highlighted a number of elements pertaining to the challenges inherent in using this forum for academic community integration and points to some elements that are worthy of consideration in pedagogic terms. Returning to the analytic framework illustrated in Figure 3 the investigation raises several considerations for future research. In terms of forum management and structure, the study has highlighted the power of student expectations in this realm. With little understanding of the constructivist premise upon which this tool is based, students appear to struggle with their understandings of what the forum is for, what purpose it serves in terms of their overall academic goals and aspirations. It was clear to most that this forum was designed as a form of support, but this term in itself needs to be unpacked. Evidence of this was most prevalent in the ways in which students were attempting not only to adapt presence creation techniques learned elsewhere, but also within their expectations of what support means in this context, powerfully illustrated by the student who articulated feelings that some students were expecting similar reactions from online peers in this context, to the positive reinforcement they receive on Facebook when making similar postings.

Expectations of the tutor were voiced in terms of the way in which the forum is managed and this area again raised the difficulties outlined by Mazzolini and colleagues in terms of levels of actual and anticipated tutor intervention (2003). Although there was evidence that students were aware of the tutor as an authority figure, reactions to this were mixed, some students feeling that this constrained expression, and others feeling that the tutor needed to take a more assertive stance, particularly in relation to posts that were perceived to be inappropriate in some form. In terms of student integration into the community, this was described on a number of occasions as 'policing', and perceived by a number of students as a vital element in order to feel able to safely contribute to the forum. This element of psychological safety, initially featuring in the work of Maslow (Maslow, Frager, & Fadiman, 1970; Maslow & Lowry, 1968), was later adapted by Gilly Salmon as a central tenet within her work in relating Maslow's hierarchy of needs to the online moderating context (see Salmon, 2002; Salmon, 1998).

Finally the study revealed that whilst there are potentialities within this type of interaction that these need to be evaluated in terms of the detrimental impact that large forums of this kind may have on learner engagement and identity. Early studies into MOOCs carried out at The University of California indicate that this form of learning, to which large online forums are central, does appear to have high levels of attrition (Rivard, 2013). Recent work carried out at The Open University UK reflects that the average completion rate (completing a course and receiving a certificate of completion) is 10% (Parr, 2013; Jordan, 2013). Although there are a number of confounding variables within these studies, they do raise several questions relating to their value in terms of creating learner identity and the sense that this learner identity is rooted in a community of academic practice which both creates and sustains it through periods of difficulty and doubt. If learner identity and feelings of community integration are central to learner motivation as a number of studies have indicated they are, then the consideration of both elements may be vital to the future of online learning.

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A Cultural-Historical Activity Theory Investigation of Contradictions in Open and Distance Higher Education among Alienated Adult Learners in Korea National Open University

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Abstract

Drawing upon cultural-historical activity theory, this research analyzed the structural contradictions existing in a variety of educational activities among a group of alienated adult students in Korea National Open University (KNOU). Despite KNOU's quantitative development in student enrollment, the contradictions shed light on how the institution's top-down, bureaucratic pedagogical system collided with individual expectations and needs. In particular, the participants' critical viewpoints demonstrate the incompatible social roles that the open and distance higher education institution plays in Korean society. For example, while KNOU contributes to extending higher education opportunities for those who have unmet educational needs, the value of the KNOU degree has not been socially acknowledged since there is little, if any, competition in the entrance process. This study also documents how these contradictions were culturally and historically embedded in the participants' distance higher education activities. Given the persistent contradictions, the research findings illuminate that KNOU's efficiency-oriented model has not effectively facilitated the students' learning as its distance higher education system is inevitably based on a compromise between a competitive, quality curriculum and the efficient extension of audiences.

Keywords: Cultural-historical activity theory; contradiction; open university; distance higher education

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Introduction

One of the three major goals of the Sixth International Conference on Adult Education (CONFINTEA VI) was "to review political momentum and commitment and to develop the tools for implementation in order to move from rhetoric to action" (UNESCO, 2010, p. 5). Some institutionalized forms of adult education, such as national training programs for adult educators and open universities, were part of the primary discussion agenda of the conference. Among a variety of national adult education institutions, open and distance higher education institutions are characterized as expanding open educational opportunities for citizens to attend accredited educational services provided by means of innovative pedagogical technologies (Beldarrain, 2006; Visser, 2012).

Globally, technological development has resulted in the increased number of mega-universities[1] built upon the principle of open and distance education (Bates, 1997; Dhanarajan, 2001; Jung, 2005). On a list of largest universities by enrollment (Wikipedia, n.d.), open and distance higher education institutions around the world comprise all top 30 ranks except the state systems of higher education in the United States of America. Those institutions of open and distance higher education have a long-standing commitment to extend participation in higher education because their "fundamental values and strategic priorities" have not changed much since the foundation of the prototypical British Open University in 1969 (Cooper, 2010, p. 70). The modern practice of open and distance higher education has not only transformed the traditional notion of higher education but also broadened the scope of formal educational services available to untypical learners. Investigating adult learners' experiences in an open university allows us to better understand how open and distance higher education has developed, expanded, and transformed in the institutionally centralized realm of the national education system.

Korea National Open University (KNOU), as a mega, open and distance education institution, has enabled many Korean citizens to participate in higher education both flexibly and conveniently (KNOU, 2011; Yoon, 2006). While only about 10,000 students attended KNOU in 1972, over 170,000 enrolled in 2010. Moreover, 508,835[2] people had graduated from the institution as of 2010 (http://ide.knou.ac.kr). Despite the positive impact of KNOU on the extension of higher education opportunity and participation (Lee, 2001), KNOU education has varying meanings and values for different individual adult students. As KNOU has developed in the specific socio-cultural circumstances of South Korea, the variety of meanings and values of KNOU as a national open and distance higher education institution has impacted not only individual learners' motivations but also the Korean culture of higher education.

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[1] The term "mega-university" was coined by John Daniel (1997) to refer to universities with more than 100,000 students (http://portal.unesco.org).

[2] Given the fact that the South Korean population is approximately 55,000,000 (www.kostat.go.kr), the number of KNOU graduates is significant.

As the rate of higher education has increased in South Korea (OECD, 2011), the social function of KNOU is no longer just an educational institution that gives a second chance to those not having any college degree (McIntosh & Woodley, 1974).
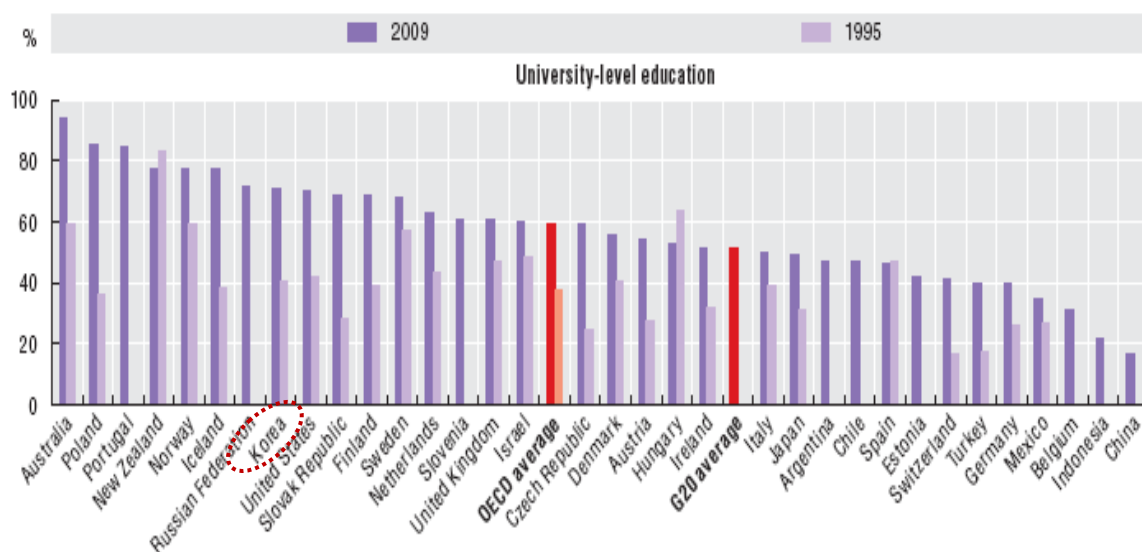
Figure 1. University-level education of OECD member nations (OECD, 2011, p. 19).

Many college or university graduates participate in KNOU to fulfill their lifelong learning needs (Lee, 2001; Yoon, 2006). According to the Lifelong Education Act of the Ministry of Education, KNOU has started to be regarded as an institution for not only higher education but also lifelong education. Even if this transformed position of KNOU does not have an exclusively negative influence on its social value, the role that KNOU plays in educating those who were alienated from higher education has faded.

In addition, Korea is notorious for being a credential-oriented society, which highly values the final educational degree of a person, as opposed to a meritocracy (Choi, 2009). Scholars have argued that one's place within the Korean social structure is heavily influenced by academic credentials, or, in other words, so-called credentialism[3] (Choi, 2007; Kim, 2003; Kim, 2004). Such social and cultural views by Koreans regarding higher education exacerbate the social discrimination and prejudice toward people with lower educational degrees (Kim, 2004; Lee, 1997). Given the general law of supply and demand, this also implies that adult learners in distance higher education, whether they have developed high skills and professional knowledge through education, can be socially discriminated against in a credential-oriented society like Korea. In this social context, participation in the inexpensive and open education of KNOU, as opposed to traditional higher education, is less valued in society.

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[3] Credentialism is the perceived over-emphasis on academic credentials when assigning social status (Collins, 1979).

The social bias and other negative aspects of KNOU education can be embodied in KNOU students' experience of contradictions in open and distance higher education. This study aims to illuminate the origins, patterns, and features of contradictions experienced by alienated KNOU students. The study focuses on identifying structural contradictions in KNOU education as experienced and identified by KNOU students. As opposed to distance education research focusing mostly on the efficiency and usefulness of open and distance higher education systems (Zawacki-Richter, Bäcker, & Vogt, 2009), the phenomenon of contradictions among socially alienated KNOU students highlights critical perspectives of KNOU's educational mechanism of open and distance higher education and students' learning experiences in the educational system.

Theoretical Frameworks

Theory of Alienation in Education

The target student group selected for this research was defined as alienated distance adult learners who could not continue their education due to socio-cultural barriers in school and the society. Marx was "the first theorist to link alienation explicitly to human productive activity" (Sidorkin, 2004, p. 252). Marx (1975) defines alienation as the phenomenon of becoming foreign to the world people live in, claiming that humans create both material and social products and conversely are made by them. Marx argues that productive activity is what links humans to their existence, as they exist only by creating themselves through the social process of production (Brenkert, 1979; Sidorkin, 2004). Alienation as an ecumenical human phenomenon thus manifests itself in the concept of reification in which social relations are conceived as relations between things (Israel, 1976). Schweitzer (1992) says that "alienation is a ubiquitous relational process and social phenomenon which pervades all spheres of human activity" (p. 29).

The concept of alienation drew considerable attention among Western sociologists and socio-psychologists from the middle of the twentieth century (Israel, 1976; Williamson & Cullingford, 1997). The expanded usage of the term is grounded in interdisciplinary facets of the philosophical meaning of alienation. For example, in his famous work *On the Meaning of Alienation*, Seeman (1959) attempted to articulate five principles of alienation by reconsidering each category within a social learning model, which he characterized as powerlessness, meaninglessness, normlessness, isolation, and self-estrangement (p. 783). Furthermore, Williamson and Cullingford (1997) categorized two of the most influential schools of thought, psychoanalysis and existentialism, which regard alienation as one of the fundamental ideas in mid-twentieth century.

Even though Marx did not explicitly address education, his philosophical underpinnings in regards to alienation have great implications for education (Sidorkin, 2004; Pacheco,

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1978). Sidorkin (2004) claims that one of the most conspicuous implications of Marx's productive activity for education is that students should develop their own essential humanity, which is only feasible by focusing on students' activity rather than the traditional pedagogical process. Case (2008) also notes that "student alienation arose as a particular focus in response to the student movement of the late 1960s" (p. 324). Along with a renewed interest in the work of Marx and the social problems experienced in the complexity of the contemporary world and post-modernism, the concept of alienation likewise emerged as central in the educational discourse from the mid twentieth century (Geyer, 2001). The problem of social alienation in education is relevant to the welfare of society from a broader sociological point of view.

Contradiction in Cultural-Historical Activity Theory

Cultural-historical activity theory (CHAT) is employed as a means to examine the contradictions of KNOU education and attendant participants' experiences while engaging in their KNOU educations. CHAT manifests itself in unraveling the heterogeneity of human activity by means of viewing an activity system as a unit of analysis, which allows a critical investigation of class standpoints by "an analysis of the processes of social differentiation within the learning process" (Sawchuk, 2003, p. 43).

Engeström (1987, 2001), one of the most influential contemporary CHAT scholars, has significantly contributed to the contemporary development of activity theory, articulating the methodological usefulness of the theory. Engeström (1987) developed the notion of activity system by combining the system's theoretical principles with CHAT. Starting from the Vygotskyan concept of subject-object relation mediated by tools or instruments, the activity system model includes communities, rules, and the continuously negotiated distribution of tasks, powers, and responsibilities among the components of the system (Cole & Engeström, 1993). Therefore, the idea of the activity system incorporates these societal and contextual factors influencing and encompassing human activity into the basic model of Vygotsky (Engeström, 2001). Figure 2 describes the structure of a human activity system designed by Engeström (1987).
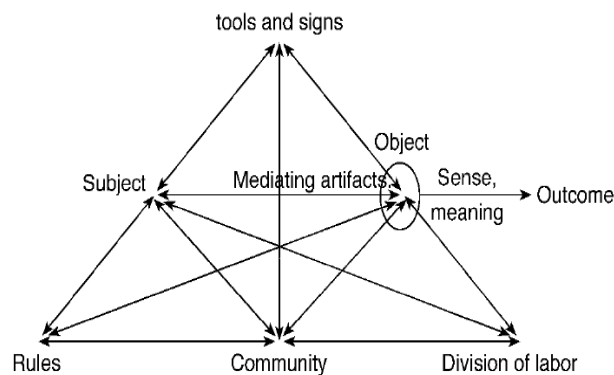

Figure 2. The structure of a human activity system (Engeström, 1987, p. 78).

Through the model of this activity system, CHAT has the ability to perform systemic and systematic investigations of complicated mechanisms of human activities and social and cultural phenomena (Daniels, 2004).

More importantly, activity systems are built upon the basis of constant internal and external contradictions (Daniels, 2004; Engeström, 2001). CHAT considers contradictions existing in/between human activities as the key to understanding human learning and development (Engeström, 2001). It is important to note that contradictions be differentiated from mere problems or disorienting dilemmas from the subject-only perspective (Engeström, 2001). Rather, they exist in human activities because each of their constituents has structural conditions that result from tensions (Lord, 2009).

Engeström (1987, 2001) theorizes four distinct levels of contradictions. The primary contradictions can be grasped in each element of the activity system (i.e., subject, object, mediation, community, rules, and division of labor). Secondary contradictions take place between the constituents of an activity system. And the tertiary contradictions arise when a culturally more advanced activity introduces a more advanced motive-driven object. Finally, the quaternary contradictions arise between the central activity system and the juxtaposed ones that can be related to activity systems of each element of the central activity system. By emphasizing the contradictions in activity systems, CHAT can approach the complexity of reality through a balanced, systemic, and sophisticated analysis (Daniels, 2004; Sawchuk, 2003).

Research Methods

In order to investigate the KNOU students' previous and current experiences, this study considers several distinct qualitative research approaches and techniques in an integrative manner. It specifically considers ethnography and phenomenology two fundamental methodological approaches. First, given the fact that Korean society and KNOU as social and cultural institutions impose distinct forms of learning, curricula, and pedagogy, an ethnographic approach can provide insights into how the group of KNOU students experienced the preset educational structure of KNOU and realized contradictions. The emphasis of this ethnographic investigation was on finding not just individual, subjective responses to the preset problem, but on the dominant culture that defines the KNOU students' identity and their abilities to critically recognize the social, structural, and political systems.

Secondly, phenomenology was used to conduct a micro-sociological and cultural-historical analysis of the life-world of participants, which ultimately offers a deeper understanding of the phenomenon of contradictions (Creswell, 1998; van Manen, 1990). Based upon two approaches, structured and semi-structured data collection guides were prepared for interviews and observations. The structured probe comprises preset

questions, whereas the unscheduled one was considered in order "to elicit more information about whatever the respondent has already said in response to a question" (Berg, 2001, p. 76).

The research was conducted at KNOU. Its main campus is located in Seoul, the capital city of South Korea, and KNOU also has 13 branch campuses across the country. The research was implemented from early May in 2011 for approximately three months in the meetings with selected groups and individuals. It includes 26 individual interviews, two focus group interviews, and three observations. In both individual and focus group interviews, the participants were asked to describe their experiences of contradiction in KNOU education as well as their pre-institutional experiences of alienation in education and at work. Three observations were intended to capture implicit aspects of contradictions in KNOU in the participants' interactions and conversations. The research also involved a review of documents indicating the evidence of alienation, discrimination, and inequality in Korean education and society. Furthermore, textual materials that inform problems of KNOU's distance higher education were the target of document analysis.

A purposeful sampling was designed to find KNOU students representing social and cultural alienation in terms of higher education. Specific groups and individuals were selected from identified KNOU students who had failed to become traditional college students when they were young. Research participants were among those who had no higher education experience other than their current KNOU participation. Thus, transfer students and new students who had experienced any other higher education institutions were excluded. In addition, the research limited participants to students who had at least two years of working experience after high (or lower level) school graduation, as it considered that their social experiences with lower credentials have shaped their identities and ways of thinking of life (Collins, 1979).

Once all the data was put in NVivo 9, the entire interview transcripts, field notes, and other textual materials were quickly scanned for the purpose of grasping overall themes and organizations of the descriptions. Meanwhile, I wrote memos and notes that illustrated my earlier thoughts on specific data units. This procedure enabled me to have a general sense of data characteristics and to contemplate a priori classification originally conceptualized through the preliminary research processes. Once the data set was realigned with the two overarching phenomena (i.e., alienation and contradiction), an intensive analysis of the entire data set followed.

The final analytical phase was to elicit and refine the final themes in the dialectical process of exhaustively reviewing the descriptions pointed to by the emergent codes and categories. In particular, when revisiting the participants' institutional experiences of KNOU education, the key elements (subject, object, mediation, community, division of labor, and rule) of the activity system in CHAT were considered. Furthermore, other

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central principles of CHAT such as contradictions, historicity, and multi-voicedness were used for revising the categories and themes.

General Activity System of KNOU Students

The general activity system of KNOU students is represented by Figure 3.
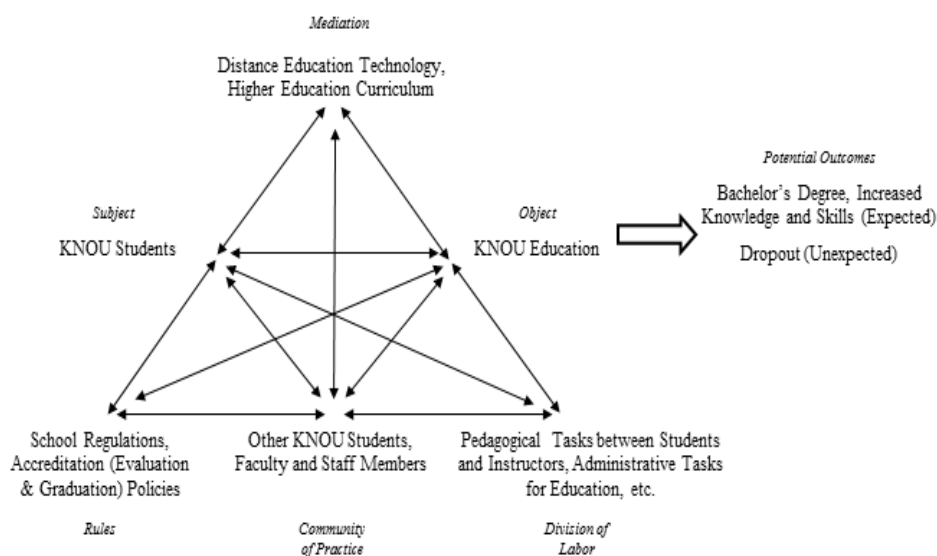
Figure 3. The general activity system of KNOU education.

The community in this activity system is comprised of KNOU students and staff/faculty members. They share distance higher education at KNOU as their common objective. This community is conceptually distinguished from communities of other higher educational institutions and/or other social groups in Korea, as well as different open and distance higher education institutions worldwide. To achieve the motive//object, each member in the community holds different responsibilities. For example, teaching tasks are given to instructors, and most administrative work is assigned to the staff members. Students study, learn, and participate in various formal and informal educational activities.

This triangular activity system represents the interplay of complex elements that constitutes the activity of KNOU education. Although diverse individuals and groups must perform different actions and operations within this central activity system, the KNOU students are the subject group for this central activity system. It is important to note that this model is conceptualized to describe the students' activity during their KNOU education in general. As the participants had been alienated from the mainstream educational system, their agency as distance learners previously alienated

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was considered the main perspective from which I revisited this general activity system. Their experiences of social discrimination and inequality due to their low academic credentials led to convergent motivations to attend KNOU and shaped their perspectives on the value of higher education. The participants' perspectives provide a directional force whereby their specific activity systems and attendant actions are understood.

The motive//object is the KNOU education pursued by the subject group. The object entails a variety of goal-oriented actions such as registering for courses, taking exams, attending face-to-face classes, and organizing study groups. Various motives, which are both material and ideal in nature, lead students to take part in the activity system (Engeström, 1999). The completion of their KNOU education can result not only in gaining the actual college diploma but also in increased knowledge and enhanced educational status. The general object 'KNOU education' also involves diverse motives among different groups of KNOU students. In particular, the meanings of KNOU education to the research participants themselves, who attend KNOU mainly to accomplish their previously unmet educational needs, should be differentiated from those of students attending KNOU merely to enjoy learning or to socialize with others. The participants specifically emphasized the motive to increase their employability and self-esteem through KNOU education. For example,

> To me, getting a higher educational credential means a lot. I have faced so many moments when I couldn't develop my career due to my final educational level. I think that, with the KNOU certificate, I will be able to have many more possibilities to try what I wanted to do before. So KNOU may be foundational, like a stepping-stone for my career. (K's individual interview)

Like her, many participants reflected upon their experiences of discrimination and inequality due to a lack of higher educational credentials. They envisioned the possible extension of their employability with a bachelor's degree given through graduation from KNOU.

The motive//object of KNOU education involves a variety of cultural and historical particularities that explain the motivations of the alienated KNOU students and the social contexts of the institution. For instance, since KNOU functions as compensation for those who did not accomplish their goals of higher education, the distance higher education provided by KNOU serves as a stepping stone upon which the participants could improve their career prospects in Korea. At the same time, the social position and status of the institution are also embedded in the object – KNOU education. The participants' critical reflection of the social position of the institution indicates how KNOU education entails negative meanings and values among the participants. In their

pessimistic understandings of KNOU education, it remains just an easy and inexpensive alternative to traditional higher education.

> I think that KNOU education doesn't mean that much because I used to work with elite people. I don't think that I will be taking much advantage of the KNOU degree for my career. KNOU education is not rewarding, as everyone can attend it. It simply means that I may be a little more qualified to apply for jobs requiring the bachelor's degree. (J's individual interview)

In a focused-group interview, the participants' critical perspective on the value of KNOU education appeared more straightforward.

> R1: Many KNOU students don't expose their participation in KNOU to others. They feel shame for attending this school. For example, my friend said I have to go to a master's program of another higher educational institution... Whenever I heard those kinds of comments, I asked myself, 'what am I doing here?'

> R2: Right, the disregard of KNOU is not an individual problem. It is deeply embedded in our society. To be honest, I don't want to let my children go to KNOU because our society doesn't accept the value [of KNOU education]. Even beyond that, our society is oriented toward academic credentials. Particularly, gender, academic credentials, and regionalism should not be underestimated. This is beyond an individual matter.

The participants' negative perceptions of KNOU's social position, as shown above, indicate that they themselves were not free from the social prejudice and biases against distance higher education.

The contrasting viewpoints of KNOU education illuminate the incompatibility between the advantages and the disadvantages of open and distance higher education in the capitalist, academic-credential-oriented society of Korea. The participants who were attending KNOU internalized those incompatible social values of KNOU education. In that sense, the participation in KNOU for the KNOU students was both rewarding and stigmatizing. The students' alienated experiences played a mediating role between the particular socio-cultural circumstances of Korea and their perceptions of KNOU education.

The participants' experiences of the KNOU education system are categorized into three overarching concepts: assessment, curriculum, and technology. These educational

elements are regarded as the key components of the general activity system of a KNOU education. Even if there are a number of mediated instruments which enable the subject (i.e., the alienated KNOU students) to accomplish the object (i.e., KNOU education), I specifically consider the curriculum of KNOU and the technology of distance education as two pivotal mediations for distance higher education of KNOU, because the participants pointed out those two concepts as essential to achieving their educational goals in KNOU.

Like the object, those mediations also involve both material artifacts and symbolic signs and have been socially, culturally, and historically developed in the particular context of KNOU. The KNOU curriculum has been adjusted to cater to national human resource development, which was oriented toward extending educational opportunities via mass education, as well as individual adult students' needs to consolidate high-level knowledge and skills. These two contrasting objectives were also evident in the participants' educational experiences of KNOU. Moreover, the highly developed technological infrastructure of Korea has enabled KNOU to establish and implement distance higher education more efficiently and has allowed the students to attend the institution more conveniently.

Meanwhile, assessment and evaluation processes are posited as major rules to accredit students' learning in KNOU education. As the rule in an activity system regulates how the subject and other community members interact with each other to accomplish the object, KNOU students follow institutional policies – more specifically, the university regulations set for accrediting distance higher education such as evaluation and graduation policies – as the rule of the general activity system in order to accomplish their higher education through KNOU.

To this end, the essence of this activity system analysis is to consider the systemic formation rather than separate connections. By identifying the general model and contextualizing each constituent in the system, we can project the holistic mechanism where the general processes and outcomes of KNOU education were designed and implemented in the complex social, cultural, and institutional settings.

Multiple Levels of Contradiction

The list of problems of KNOU education recognized by the participants are outlined in Table 1.

Table 1

Problems of KNOU Education Perceived by the Participants

Activity system	Recognized problems	
Technology-learning activity system	Ineffective online lectures	• The amount of knowledge delivered efficiently through technology • Monotonous online lectures: missing informal, face-to-face teaching-learning processes
	Limited communication	• One-way communication of technology-based instructions • Asynchronous mode of KNOU instruction: missing immediate communication
	Lack of interaction	• Unrealized identity as college students: Missing sense of belonging • Difficult to develop intimate relationships among students and between instructors and students
Curriculum-understanding activity system	Overly theoretical curriculum	• Useless textbook knowledge • The overly used academic language • Knowledge unmatched with students worldview and experience
	Too practical curriculum	• Decreased number of liberal art, humanity-related, and cultural study subjects • Pragmatic-outcome-orientation
Evaluation activity system	Individual factors	• Low self-confidence • Conflict in learning schedule
	Organizational factors	• Efficiency-oriented, bureaucratic settings of evaluation • Misleading questions in examinations and assignment • Inappropriate difficulty-level of examinations • Misguiding examination structure: mid-term and final distribution, grading policy, etc. • Tight examination schedule • Indoctrination

Even though these problems were straightforward in the data analysis, structural contradictions of KNOU education that resulted in those problems were not fully comprehensible in each individual's statements. Thus, in order to identify the structural contradictions as well as the origins of the KNOU students' negative perceptions, it is

necessary to further discuss the multi-level contradictions existing in/between the identified activity systems within the CHAT framework.
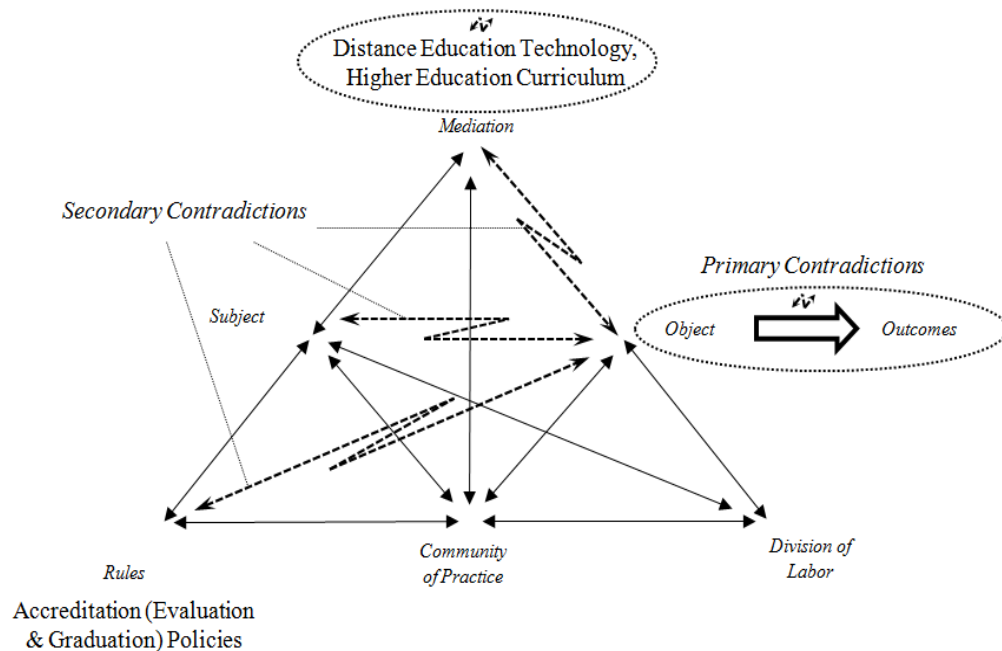
Figure 4. Inner-contradictions in the KNOU students' general activity system.

Primary contradictions are rooted in each node of the activity system. Those primary contradictions originate from the tension between the exchange value and the use value in the capitalist socio-economic formations (Engeström, 2001) and arise from the dual construction of the nodes as they have inherent worth (Foot & Groleau, 2011). The research findings specifically indicate that the object and the mediations of the central activity system involve an explicit form of contradictions as experienced by the participants.

Most of all, a primary contradiction embedded in the object arises between the dual principles of KNOU education. KNOU education as open and distance higher education involves the incompatible or conflicting aspects between open/mass and higher education. More specifically, KNOU opens its door to the public by offering inexpensive tuition and positing minimal requirements for entrance. This efficiency-oriented open and mass educational model of KNOU is designed to accommodate as many students as possible. On the other hand, KNOU as a national higher educational institution pursues in-depth and quality higher education in order to produce capable graduates. Those two conflictual principles (i.e., efficiency-oriented open and mass education vs. quality higher education) were embodied in the participants' critical reflections of the distance higher education system of KNOU.

There are also primary contradictions within the mediations. Distance educational technology is a pure commodity where the relationship between the use and exchange values is evident. For example, KNOU students use technological methods which are intended to facilitate their learning in KNOU. However, they realized that the technology-driven KNOU system failed to accommodate their need to have immediate communication channels and intimate relationships between KNOU community members. H said:

> Given the mass education of KNOU, I know it is not easy to respond quickly to every student's questions... I don't think we should just study what is given to us, take exams, get grades, and graduate. This is not a certification program. Higher education should be better than this.

In a similar vein, while the curriculum containing subject knowledge in regards to the topics of the course can be viewed as the course contents to enhance students' learning, the overly theoretical/practical curriculum did not meet the students' need for learning knowledge and skills relevant to their lives and careers. Y stated:

> Now I know the curriculum does not match to my previous motivation to study in KNOU. I thought I would learn and practice the Chinese language, but the majority of the curriculum consists of literature. There are also many areas of cultural studies to be completed, especially during the first and second years. I ask myself, 'Should I learn this kind of subjects in my old age?' and 'How am I going to use this kind of knowledge?'

Unlike other levels of contradiction, the primary contradiction generally remains unresolved (Engeström, 2001; Foot & Groleau, 2011; Sawchuk, 2006) because it is fundamentally embedded within each element of the activity itself (Engeström, 1987). However, the tension along with this primary contradiction makes the activity system constantly transform (Engeström, 2001; Foot & Groleau, 2011) and subsequently becomes the rudimentary ground upon which the other levels of contradiction are conceptualized.

Secondary contradictions occur in the conflicting relationship between two of the nodes in an activity system. By conceptualizing the secondary contradictions, we can grasp the implicit primary contradictions and address a specific problem (Foot & Groleau, 2011). In this research, I identify three types of contradictions existing at the secondary level.

First, the research findings illuminate a contradiction rooted in the relationship between the subject and the object of the general activity system. The participants' ambivalent perspectives on the KNOU education were intensified from the

contradictory relationship between these two elements. While alienation in the educational system and in society motivated students to attend KNOU, their alienation was not sufficiently addressed by the open and mass education of KNOU. The contradictions confronted by the participants who need to complete a higher educational degree as well as to gain useful knowledge and skills for their careers was exacerbated in this particular Korean socio-cultural context where high academic credentials are admired. This conceptualization promotes better understanding of the phenomenon of contradictions not just by observing explicit behaviors of the subject, but by relating the subject's socio-cultural statuses to the object's contradictions grounded in the institutionalization of national open and distance higher education.

Second, given the commodity form of distance higher education, another secondary inner-contradiction arises when the rule of KNOU education collided with the object. In the school's evaluation system, more sophisticated ways of evaluation to assure quality higher education are hampered by the efficient and top-down educational model of open and mass distance higher education. By this structural contradiction, students' learning was limited to practicing just superficial and memorization-centered knowledge. For example,

> I think our KNOU education should lead to our in-depth understanding of subject knowledge. But our examination system is not sufficient to fulfill that commitment. We don't have to, or cannot, deeply go into the knowledge to get ready for multiple-choice final exams... The KNOU evaluation system asks for simple, pre-set answers. Some may think that the midterm exams are open-ended so that we can express subjective ideas, but a lot of students actually think that even midterm exams ask fixed answers. This kept us from pursuing in-depth knowledge. (B's individual interview)

Given the essential role of evaluation in guiding students' learning in education, this secondary contradiction may be resolved by increasing funding for a more diversified evaluation system. The conceptualization of this secondary contradiction makes visible the latent feature of contradiction that was brought about by the bureaucratic system of KNOU education, which was represented in the rule of the central activity system.

Third, another secondary contradiction can be conceptualized in the dialectical relation between the mediations and the object of the central activity system. As the participants were given the institutionally preset pedagogical technology and curriculum, the primary contradictions existing in those two mediations of the central activity system became problematic because they collided with the primary contradiction rooted in the object. If the participants learned merely practical knowledge and skills, then that may undermine the original mission of KNOU as a national institution of higher education.

On the other hand, if they had learned overly theoretical knowledge, that mitigates adult learners' satisfaction and misguides their preparation for advanced careers. This ambivalent aspect of the students' experiences and perspectives of the KNOU curriculum were also articulated in the individual interviews as below.

> It doesn't seem like college education. When I was taking final exams [multiple-choice exams], I thought that this is almost like high school education. I usually prepared the exams hastily. Sometimes I asked myself 'Isn't this too easy to be higher education?' (M's individual interview)

> It was funny. I didn't expect at all that we would face this kind of learning contents of KNOU. When I first saw the Korean literature, I was asking myself, 'Do other freshmen in colleges study this as well?' (laughing). I muttered myself, 'Do you [the school] seriously need us to study this old Korean poem?' So I decided not to study what I thought unnecessary. (C's individual interview)

Similarly, because the technology-driven KNOU educational system emphasizes mass education, the secondary contradiction between the mediation of distance education technology and the object occurs when the alienated students with high motivation, who expect to receive a quality higher education, faced this mass education approach.

Identifying the secondary contradictions enabled me to elucidate the socio-cultural and structural characteristics of contradictions. Analyzing socio-cultural factors made the contradictions surface, which allowed me to re-conceptualize this phenomenon among the alienated KNOU students in more comprehensive and sophisticated ways.

A tertiary contradiction among the participants arose when the participants looked to resolve the secondary contradictions. For instance, when they realized that the impersonal KNOU approach did not fulfill their expectations, they searched for extra-curricular activities such as organizing study groups in order to supplement their unmet educational needs. Through this activity, they pursued the sense of belonging as a member of higher education and the bond formed through actual, not virtual, interactions with one another. This new way of learning through extra-curricular activities among the alienated students is an outcome of the internal contradictions rooted in the general activity. The participants supplemented the learning materials provided by the school such as online lectures, textbooks, and so on; they also created and participated in their own face-to-face study groups to share information and study together. The ways in which the participants prepared for the exams and assignments were also transformed from individual, self-directed studying to collaborative, interactional activities.

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Conclusion

KNOU's quantitative development in student number is attributed to the administratively optimized and efficiently operating education system of KNOU (KNOU, 2011; Lee, 2001; Yoon, 2006). However, the alienated students' experiences of contradictions shed light on how KNOU's top-down, bureaucratic pedagogical system collided with individual expectations and needs. While KNOU contributes to extending higher education opportunities for those who have unmet educational needs, the contradictions identified in this CHAT analysis imply that the open and distance higher education system also entails a variety of problems to those students. This is not just KNOU's problem; it is rather a common issue that most open, mass, and distance higher educational institutions confront (Garrison, 1989). The efficiency-oriented model of distance higher education inevitably entails a compromise between a competitive, quality curriculum and the efficient extension of audiences (Adams & DeFleur, 2006; Parker, 2008).

To better accommodate those students' learning needs, KNOU has to reconsider the original mission of Open University – that is, to provide quality higher education to broader audiences. This task requires balancing between extending educational opportunities by opening the institution's door and assuring the quality of higher education through an effective distance education system (Cooper, 2010; Garrison, 1989). For example, while KNOU screens students by their high school or equivalent records, the British Open University (OU) provides extensive educational opportunities regardless of pre-institutional qualifications. Additionally, the British OU programs involve more individually customized activities within a sophisticatedly designed distance education system as opposed to the efficiency-oriented KNOU education (Open University, 2011).

Given the contradictions in terms of the lack of variety in KNOU's pedagogical systems, which often collided with students' needs and lives, it is necessary to diversify the learning contents as well as the ways in which courses are delivered. KNOU also needs to develop more spaces for active communication and interaction as the participants expected a sense of belonging and close interactions with the instructors or between themselves. Lastly, the institution should reconsider any misleading, efficiency-driven evaluation system in order to enhance students' learning processes and outcomes by customizing it to suit each subject area and course objective.

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Athabasca University

Benchmarking the Habits and Behaviours of Successful Students: A Case Study of Academic-Business Collaboration
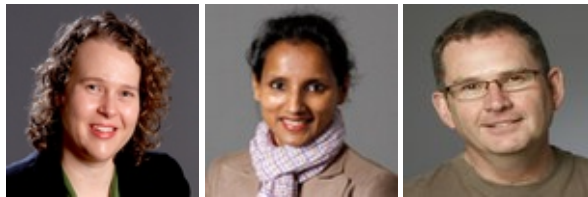
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Abstract

Student success and retention is a primary goal of higher education institutions across the world. The cost of student failure and dropout in higher education is multifaceted including, amongst other things, the loss of revenue, prestige, and stakeholder trust for both institutions and students. Interventions to address this are complex and varied. While the dominant thrust has been to investigate academic and non-academic risk factors thus applying a "risk" lens, equal attention should be given to exploring the characteristics of successful students which expands the focus to include "requirements for success".

Based on a socio-critical model for understanding of student success and retention, the University of South Africa (Unisa) initiated a pilot project to benchmark successful students' habits and behaviours using a tool employed in business settings, namely Shadowmatch®.

The original focus was on finding a theoretically valid measured for habits and behaviours to examine the critical aspect of student agency in the social critical model. Although this was not the focus of the pilot, concerns regarding using a commercial tool in an academic setting overshadowed the process. This paper provides insights into how academic-business collaboration could allow an institution to be more dynamic and flexible in supporting its student population.

Keywords: Distance education; student success; academic-business collaboration; habits and behaviours; benchmarking

Introduction

Student success is of major concern to a number of stakeholders in higher education including governments, policy makers, faculty, and students. An integral element in many models on student success and retention is the impact of students' habitus as a framework of "lasting, transposable dispositions which, integrating past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions" (Bourdieu in Berger, 2000, p. 99). Incorporating data on habits and behaviours into student success models provides an additional lens which speaks to personal attributes, and this in turn strengthens a student-centred approach.

The University of South Africa (Unisa) developed a comprehensive framework for enhancing student success, based on a socio-critical understanding of student success and retention (Subotzky & Prinsloo, 2011). Central to this understanding is the role of students' agency involving their habits and behaviours flowing from their habitus. The student success framework relies on a suite of instruments, as well as systems data to inform policy and practice. Very little information was, however, available on habits and behaviours which form part of non-academic risk and success factors. The Shadowmatch® pilot project was launched to provide this data by benchmarking successful students' habits and behaviours. This paper firstly examines the epistemological 'fit' between the socio-critical model for understanding and predicting student success and Shadowmatch®. We then continue mapping the pilot of Shadowmatch® in a higher education environment and highlighting the complexities as well as benefits of such a higher education-corporate collaboration.

The focus of this article are these complexities and benefits of a higher education-corporate collaboration. The details of the Shadowmatch® report and evaluation are addressed in an internal procurement report. This paper is a process article reflecting on how the institution engaged with the pilot with regard to negotiating access and permission for the pilot. The Shadowmatch® pilot implementation forms part of the background and contextualisation for this discussion. The research therefore has the potential to be transferred to any corporate-academic collaboration beyond the bounds of benchmarking the habits and behaviours of successful students.

Problem Statement

If student success is considered to be complex and the result of mostly non-linear, mutually constitutive factors and relations, it follows that it is time-consuming and possibly costly to develop in-house tools to map aspects or specific relations within the context of student success as a complex phenomenon. The aim of this paper is to examine the complexities and benefits of piloting a commercial product in the higher education environment as an alternative to an institution developing its own instrument.

Specifically, this paper examines the piloting of Shadowmatch®, a tool used in the corporate and commercial sector to determine the profiles of effective employees as a basis for planning professional development to increase organisational effectiveness and impact. The instrument was implemented and reporting adapted to profile successful students in various higher education qualifications. This represented a shift to focusing on requirements for success as opposed to merely identifying students at risk. The aim was to use these profiles of success to increase students' self-awareness and self-efficacy in order to encourage behaviours that will significantly increase their chances of success.

Literature Review

The literature review provides a brief overview of some of the theoretical models and research on student success and retention, before discussing the conceptual framework by Subotzky and Prinsloo (2011) employed at Unisa for the profiling of students. As this research specifically examines the use of a commercial product to profile students in a higher education institution, we will also briefly refer to the perceived tensions regarding higher education and its response to demands from and its relations to the corporate world (Apple, 2009; Blackmore, 2001; Giroux, 2003; Haigh, 2008; Lynch, 2006).

Theoretical Models and Research on Student Success and Retention

Attempts to profile students according to potential and risk-of-failure should be seen against the backdrop of concerns regarding the 'revolving door' and low throughput rates in higher education and specifically in distance education. Student success and failure have been explained, theorised, and researched by various authors (Bean, 1980; Kember, 1989; Spady, 1970; Tinto, 1975, 1988; Subotzky & Prinsloo, 2011). Since the early models explaining student success in face-to-face higher education (Spady, 1970; Tinto, 1975, 1988), there have been numerous models and theoretical frameworks addressing student failure and dropout (Baird, 2000; Bean, 1980, 1982; Cabrera, Nora, & Castaneda, 1992; Johnson, 1996; Kember, 1998). Though there is appreciation for those early works on student success, more recent research (e.g., Braxton, 2000) questions many of the assumptions and theoretical constructs of these early models and theories on student success, retention, and failure (Kuh & Love, 2000; Tierney, 2000; Prinsloo, 2009; and Subotzky & Prinsloo, 2011).

Subotzky and Prinsloo (2011) classify the different approaches to understanding student success and retention according to the context in which these approaches and models are developed, such as geopolitical (developing or developed), theoretical/philosophical/ideological/disciplinary, the type of institution and delivery (e.g., face-to-face, blended, or distance education), and the methodology used in the

approach (e.g., structural models, bivariate probability model, or logic regression analysis).

Compared to research in face-to-face contexts, there is less published research regarding student success and retention in distance education contexts. A range of authors (Kember, 1989; Kember, Lee, & Li, 2001; Prinsloo, 2009; Subotzky & Prinsloo, 2011; Woodley, 2004) therefore point to some unique considerations with regard to conceptualising student success in distance education contexts and question the direct transferability of traditional models and theories to distance education contexts.

A further complicating factor impacting on the transferability of different models on student success and retention, irrespective of context, is the increasing "unbundling" or the "unmooring" of traditional higher education (Watters, 2012) and a blurring of the boundaries between traditional notions and definitions of face-to-face education versus distance education and e-learning (Hanna, 1998; Woo, Gospera, McNeilla, Preston, Green, & Phillips, 2008). The fact that traditional face-to-face institutions and distance education institutions are including various elements and ranges of e-learning further complicates the formal, traditional distinctions between face-to-face and distance education delivery models. New forms of educational delivery therefore disrupt traditional models and theories of understanding student success and retention (Clow, 2013; Daniel, 2012).

A Socio-Critical Model for Understanding and Predicting Student Success

Though Tinto's interactionalist theory/model enjoys "near paradigmatic" stature (Braxton, 2000, p. 2), it "is partially supported and lacks empirical internal consistency" (Braxton, 2000, p. 3). Braxton and Lien (2000) therefore state that Tinto's model needs revision. Prinsloo (2009) also point to a number of other concerns regarding the transferability of current models for understanding and predicting student success and retention such as the fact that "tangible and intangible impacts of economic influences" on student persistence in developing world contexts "remain under-researched" (p. 85). "The impact of economic considerations as a psychological stressor may in a developing world context play an even more important role than in other contexts" (Prinsloo, 2009, p. 85). There is also evidence that suggests that "student throughput and retention operate differently for students of different ages, and that different factors influence early leavers and later leavers" (Prinsloo, 2009, p. 86).

Based on various criticisms against current models for understanding and predicting student success and retention (e.g., Braxton, 2000), Subotzky and Prinsloo (2011) follow Tinto (2006) in proposing a socio-critical model to make sense of student retention as a complex and layered, dynamic web of events.This model developed by Subotzky and Prinsloo (2011) provides the conceptual basis of efforts at Unisa to predict student success and identify students at risk.

Subotzky and Prinsloo (2011, p. 184-188) propose some key constructs informing their socio-critical model:

1. *Situated agents:* student and institution: Although student and institutional attributes and behaviours are strongly shaped by the structural conditions of their historical, geographical, socio-economic, and cultural backgrounds, they enjoy relative freedom within these constraints to develop their attributes in pursuit of success. Students' identity and attributes include, inter alia, not only various forms of capital, but also dispositions such as intellectual maturity, the ability to think critically, and various other competencies and abilities (Prinsloo, 2009). The institution's identity entails not only the impact and shape of its location, but also different forms of capital and habitus.

2. The *student walk* encompasses the numerous ongoing interactions between student and institution throughout the student's journey. These interactions are "mutually constitutive" and influenced by the situatedness of both agents. In this context, institutional and administrative efficiencies play a crucial role. Engagement during the student walk is mutually transformative, where reciprocal knowledge and understanding is key to the "fit" between the individual student's aspirations and dispositions and the culture and academic offerings by the institution.

3. *Capital:* Both students and the institution acquire "various forms of capital partly through the reproductive mechanisms embedded in their socio-economic and cultural contexts and partly through their own individual or institutional/organizational initiatives".

4. *Habitus:* The mutual and dynamic engagement between students and the institution is shaped by habitus as "the complex combination of perceptions, experiences, values, practices, discourses, and assumptions that underlies the construction of our worldviews".

5. *Domains and modalities of transformation* which include inter and intra-personal domains on the side of students, and academic, social, and operational domains on the side of the institution. Both the student and institutional domains are shaped by locus of control, attribution, and self-efficacy.

6. A broad definition of *success* which includes not only course success and graduation, but also student and institutional satisfaction, "successful fit between students' graduate attributes and the requirements of the workplace, civil society, and democratic, participative citizenship" and course success without graduation.

Subotzky and Prinsloo (2011, p. 179) state that factors impacting on student success and retention should be understood as comprising three distinct, but overlapping levels: "individual (academic and attitudinal attributes, and other personal characteristics and circumstances), institutional (quality and relevance of academic, non-academic, and administrative services), and supra-institutional (macro-political and socio-economic

factors)". Figure 1 illustrates these different levels. The "student walk" signifies different interactions in the nexus between the individual student (at the top) and the institution (at the bottom). The "student walk" is, however, not only shaped by the two main protagonists, but also by supra-institutional (macro-political and socio-economic) factors.
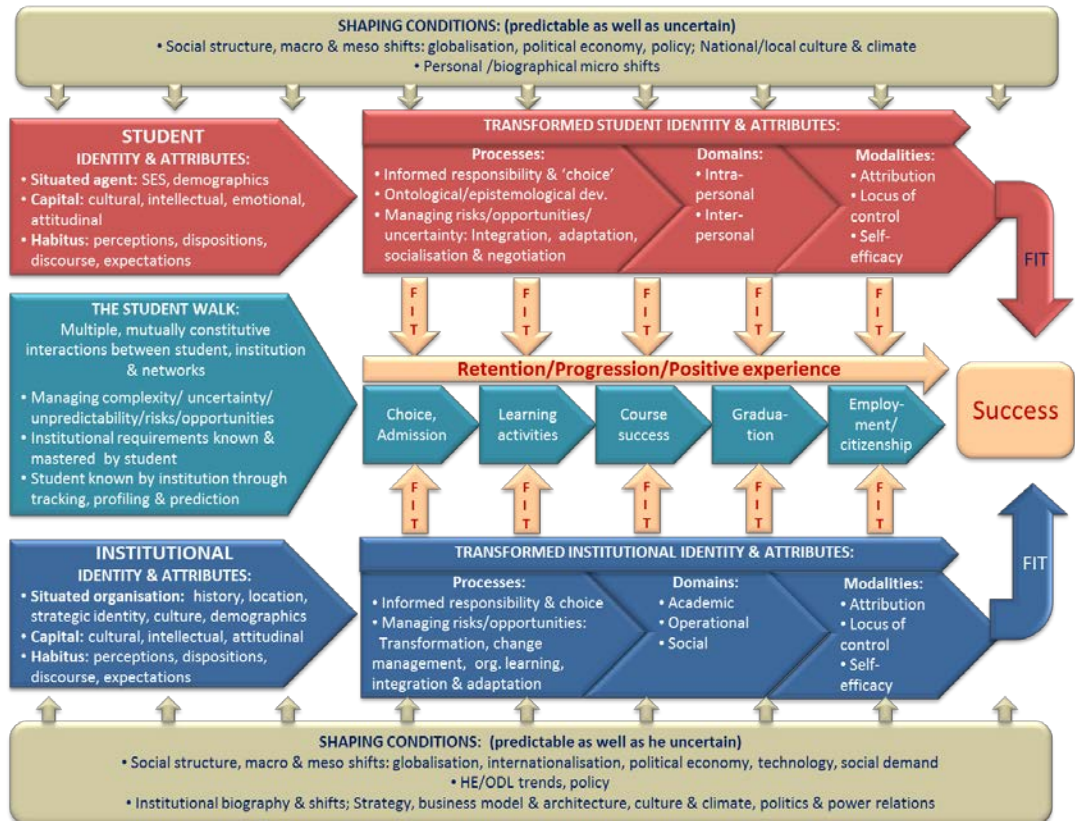
Figure 1. A socio-critical model for understanding and predicting student success (Subotzky and Prinsloo, 2011, p. 184).

Subotzky and Prinsloo (2011) state that "Many, if not most, international models interpret success narrowly as the outcome of students assimilating into prevailing institutional cultures and epistemologies" (p. 190). The increasing diversity of students and the socio-economic challenges inherent in developing countries implies that student success is much more complex than simply about students fitting in, as mutual responsibility is a precondition.

The Role, Potential, and Perils of Student Profiling in Higher Education

Profiling students in higher education is not a recent phenomenon. Admission criteria to higher education and to specific programmes were employed as one of the earliest ways through which some students were deemed to be showing the most potential for success, whilst other students, not meeting the criteria, were excluded. One of the unique characteristics of distance education has always been the less stringent admission requirements. One particular gestalt of distance education actually claims to provide 'open' education, such as open distance learning (ODL), depending on geopolitical contexts, legislation, and funding frameworks. Recent developments in higher education such as the massive open online course (MOOC) phenomenon have highlighted the role of open admission requirements on student success and retention (Clow, 2013), as well as the potential to harvest and analyse students' digital data in order to offer customised curricula, assessment, and support. Students are therefore not only profiled according to demographical and historical educational data, but increasingly these profiles are enhanced by real-time data such as time-on-task, number of logins, and so on (Booth, 2012; Long & Siemens, 2011; May, 2011; Oblinger, 2012; Siemens, 2011; Wagner & Ice, 2012).

There are many examples of the role and impact of effective student profiling in increasing not only the effectiveness of student success and retention, but also the more optimal allocation of resources (Chansarkar & Michaeloudis, 2001; Diaz & Brown, 2012; Kabakchieva, 2012; Wardley, Bélanger, & Leonard, 2013). Discourses regarding the scope, methods, and impact of profiling in other fields such as surveillance studies has shown that profiling opens up a number of ethical dilemmas (Knox, 2010; Mayer-Schönberger, 2009; Mayer-Schönberger & Cukier, 2013; Marx, 1998). There is very little research done in the context of higher education on the possible negative impact of profiling through institutional research or learning analytics. As Slade and Prinsloo (2013) and Prinsloo and Slade (2013) indicate, the harvesting and use of students' digital data raises a number of ethical questions and dilemmas for which most higher education institutions are ill-prepared (also see Diaz & Brown, 2012; Knox, 2010; and Pounder, 2008).

The provocations offered by Boyd and Crawford (2013) provide a sobering perspective regarding the potential of learning analytics and our profiling to provide authentic, dynamic, and holistic pictures of students. One of the dangers of profiling is that we assume these profiles to be objective and accurate, whilst our algorithms are based on social constructs embedded in current thinking, understanding, and values (Johnson, 2013). While our understanding of the complexities in student success and retention increases as more and more data become available, Boyd and Crawford (2013, p. 6) warn that "...bigger data are not always better data".

At present many of the profiling of students is focused on identifying students who are at risk and/or students who are in need of specific student support and interventions (Diaz & Brown, 2012). While there are some examples focused on both students at risk and identifying students with potential, most institutional profiling strategies are currently aimed at students-at-risk (Braxton, 2000; Diaz & Brown, 2012).

The Relationship between Public Higher Education and Commercial Enterprises

Modern higher education has always been embedded in existing power-relations, whether these entailed relationships are with organised religion, national governments, industry, the market, and a range of other stakeholders. Authors such as Barnett (2000), Blackmore (2001), Diefenbach (2007), Giroux (2003), Kezar (2004), Washburn (2005), Willmot (2003) and others differ regarding how higher education should respond to the increasing impact of neo-liberal capitalism, managerialism, and the corporatisation of higher education. Amidst concerns regarding "academic capitalism" (Diefenbach, 2007) and claims that higher education has become the "handmaiden" of the corporate world (Giroux, 2003), there are also concerns regarding the increasing outsourcing of essential services and functions (Gupta, Herath, & Mikouiza, 2005; Watters, 2012; Wood, 2000) and the (over)-reliance of higher education institutions on commercially licenced products and the way these, directly or indirectly, shape curricula, pedagogies, and identity (Beckton, 2012; Cribb & Gewirtz, 2013). Metaphors describing the ways in which higher education is changing refer to the "unbundling and unmooring" of higher education (Watters, 2012) and the "hollowed-out university" (Cribb & Gewirtz, 2013).

Though outsourcing is not a new trend in higher education, the scope and impact of outsourcing are increasing (Gupta et al., 2005; Wood, 2000). Many higher education institutions increasingly use a number of commercial products and licences (e.g., commercial learning management systems and software) or establish partnerships with commercial interests in fulfilling their mandate. Gupta et al. (2005) describe a range of reasons for this increased outsourcing and commercialisation of services including the "slowing economy, declining students' enrollments, state budget cuts, decreased funding for research, and rapidly increasing costs of higher education" (p. 396).

Despite the established practice of using various products and services developed for and by corporate entities, this case study reports on the use of a commercial tool developed for the corporate environment to profile students. A number of concerns and issues (such as student privacy, alignment, data ownership, etc.) were raised, to which we will later return. Many of the issues and concerns can be traced back to complexities and perceptions regarding not only the established relationship between higher education and commercial entities, but also to the increasing dependence originating in licencing regimes.

Research Methods

This research falls into the broader category of instrumental case studies (Rule & John, 2011; Thomas, 2011; Yin, 2009) where an issue or concern is studied through one bounded case to illustrate a particular issue. In this case the researchers aimed at gaining insight into the institutional processes, challenges, and opportunities for adapting a commercial model of assessing students' potential for success against empirically established benchmarks. The data were analysed using pragmatic eclecticism (Saldana, 2009), which means that the researchers kept themselves open during the initial data collection and coding to determine the most appropriate methods of coding. A number of first cycle coding methods (preliminary coding methods) were combined with second cycle coding (categorical, conceptual, and/or theoretical organisation). During the first cycle, coding and recoding, data were analysed according to meaningful units of text, with codes generated through an inductive process and allocated to each unit individually. Once the first cycle coding was completed, codes were clustered in meaningful groups to generate themes. The paper employed data from

- an extensive literature review pertaining to student success and retention;
- documentation received from Shadowmatch®;
- institutional documentation covering the rationale for using Shadowmatch®, negotiations with different stakeholders, project plans, and the implementation framework;
- field notes based on interactions with various stakeholders.

The methodological norms of this study were established through trustworthiness as first suggested by Guba and Lincoln (1985, pp. 289-331). Trustworthiness was established by ensuring transferability, credibility, dependability, and confirmability. This approach relies on 'thick'[1] descriptions to allow other researchers to transfer results to their own context. Prolonged engagement, referential adequacy, and peer debriefing were employed to establish the credibility of the research.

Shadowmatch® Pilot

The Shadowmatch® pilot is discussed in this section. The pilot process provided an appropriate platform to examine the academic-corporate collaboration. The data from this implementation is not the focus of this article. Instead, the article draws attention to the process of selecting and acquiring Shadowmatch® for the pilot. This pre-implementation phase produced most of the data relating to the tensions of academic-business collaboration. The second section deals with the pilot implementation.

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[1] The term thick description originates from the work of anthropologist Clifford Geertz (1975) and means that the description of behaviour should include the context, to make the behaviour meaningful to an outsider.

Pre-Implementation Phase

Unisa assesses student risk and success through the student success framework, which was conceptualised and developed by Subotzky and Prinsloo (2011) and is underpinned by a socio-critical model for understanding and predicting student success. The detailed model was discussed earlier. The student success framework relies on a suite of instruments, as well as systems data to inform policy and practice. Figure 2 illustrates the various elements which need to be measured as part of the framework.
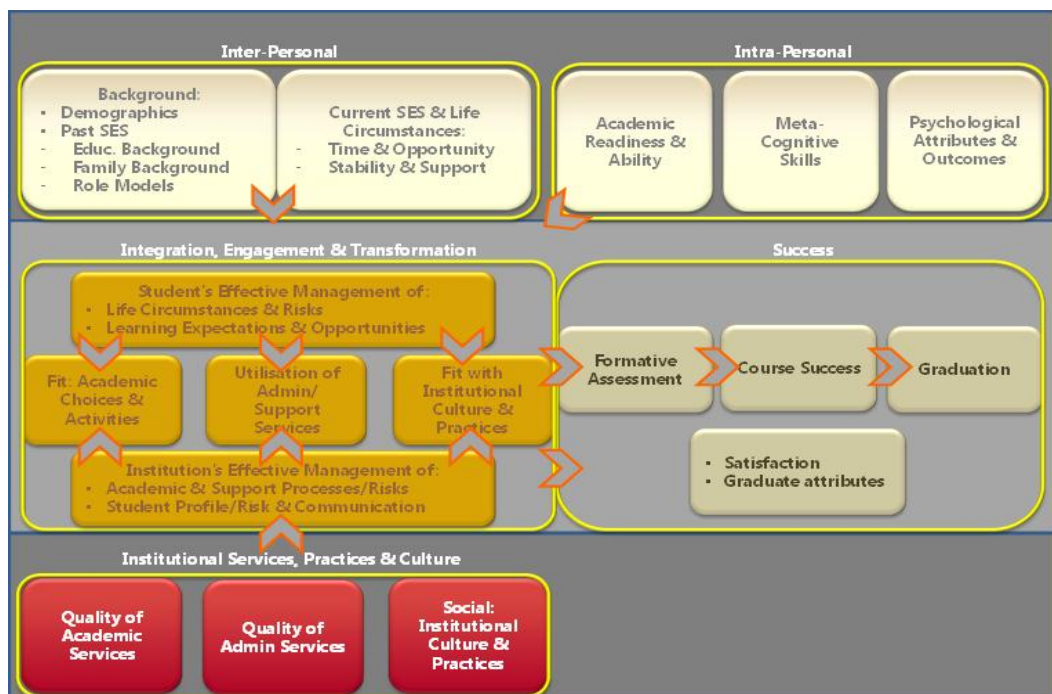
Figure 2. Elements to be measured as part of the student success framework.

Figure 3 illustrates the various tools and instruments which were being used to assess specific elements of the framework, prior to the pilot of Shadowmatch®. It became evident that very little information was, however, available on habits and behaviours which form part of non-academic risk and success factors. In 2011, Unisa expressed a need to find a well-developed and tested instrument for assessing students' habits and behaviours.
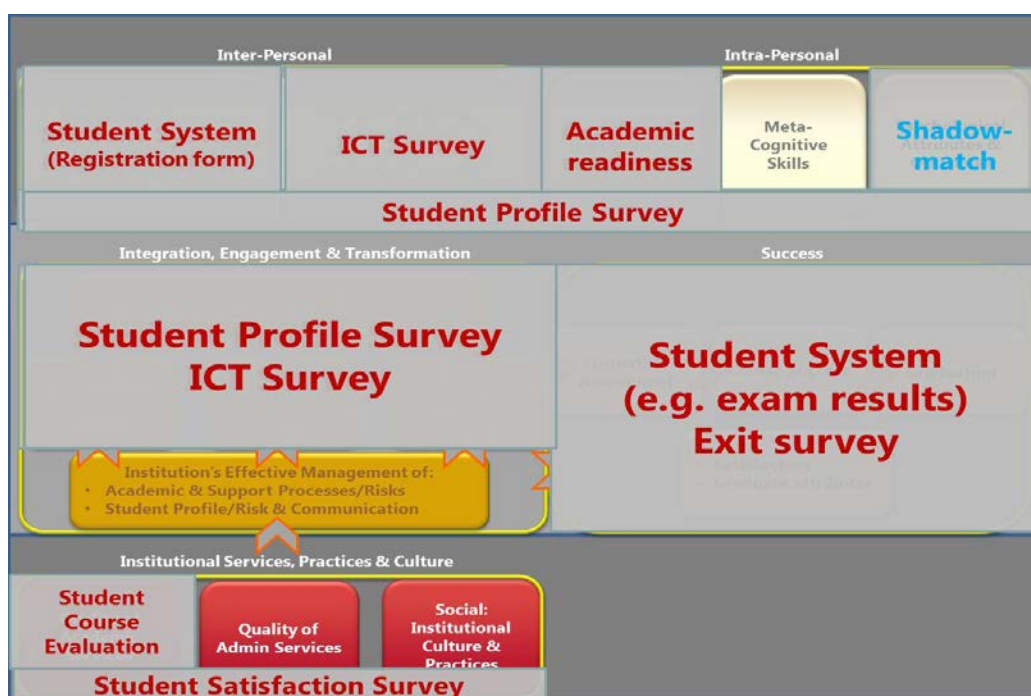
Figure 3. Instruments and data sources currently employed to measure the elements of the student success framework.

For this reason, in March 2011 it was proposed at the Senate Teaching and Learning Committee (STLC) that expressions of interest be invited from providers. The proposal for the expressions was approved by STLC on 28 March 2011. The Department of Institutional Statistics and Analysis (DISA) was tasked with the project and, through rigorous scanning of the local and international higher education environment, identified Shadowmatch® as a possible solution. The provider needed to be able to provide an online solution for the ODL environment, preferably with an automated individualised reporting and feedback system to support students in improving their habits and behaviours for success. The scanning indicated that only a single local provider, namely De Villiers, Bester and Associates (DBA), offered this through the Shadowmatch® tool. On 26 September 2011, the Shadowmatch proposal was presented to STLC. The proposal was approved in principle and referred to the Student Success Forum (SSF) for further recommendations regarding implementation and rollout of the tool. The SSF met thereafter on 24 October 2011 to consider the STLC resolutions and agreed to a pilot phase to include some qualifications in order to test the appropriateness for the Unisa environment.

Facilitated by DISA, a formal presentation of the tool was made by DBA to SSF, resulting in a productive session during which constructive insights and suggestions were shared in advance of the implementation of the project. The purpose of the pilot was to investigate the suitability of Shadowmatch® in measuring non-academic risk in

the Unisa context. The pilot phase of the project commenced firstly with the subscription to the Shadowmatch® tool followed by the formal contractual agreement between the DBA as the provider and Unisa. The latter was facilitated by DISA in collaboration with Procurement and Legal Services. Furthermore, given that the procurement of software solutions was in the ICT domain, the executive director of ICT was consulted during this phase and provided oversight during the finalisation of the contract for the subscription to the tool. Throughout the pilot subscription and implementation process there were regular reports made to SSF as well as additional engagement about the process.

Implementation

The Shadowmatch® instrument assesses a range of habits and behaviours. These include a propensity to own, a propensity to hand off, the ability to simplify, resilience, a propensity to change, frustration handling, team inclination, individual inclination, self-motivation, routine, problem solving, responsiveness, innovation, people positive, discipline, conflict handling, altruistic, self-confidence, and leadership. Over and above this, the instrument also assesses attitudes and locates them within four quadrants. Quadrant 1 represents those who are "Involved-Unaggressive"; Quadrant 2 represents those who are "Involved-Assertive/Aggressive"; Quadrant 3 represents those who are "Uninvolved-Assertive/Aggressive"; and Quadrant 4 represents those who are "Uninvolved-Unaggressive". The benchmark of the habits and behaviours of top performing students are shown in grey with the individual score of the student indicated in blue (see Figure 4).
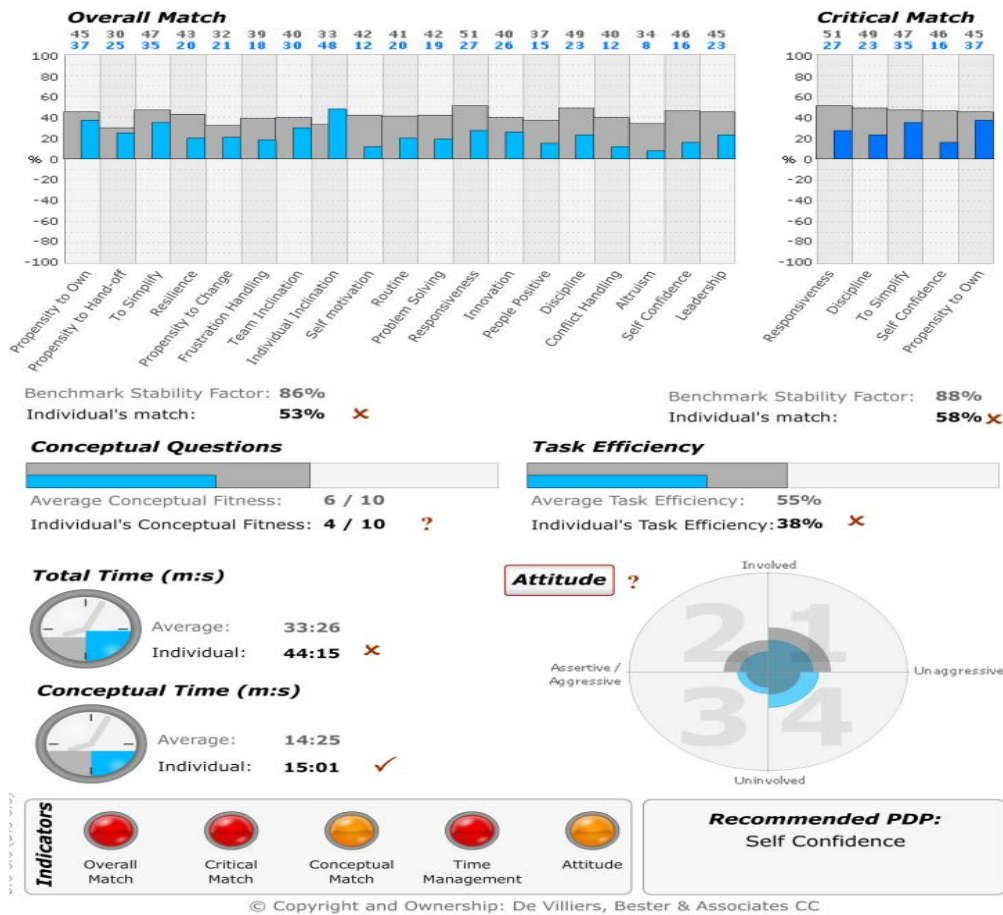
Figure 4. Demonstration: Individual match report.

Three phases characterised the Shadowmatch® pilot at Unisa. Phase 1 involved the assessment of successful students' habits and behaviours in order to establish benchmarks for comparison with the broader student population. Colleges at the institution were requested to provide the qualifications for inclusion in the benchmarking process, and 170 benchmarks were established across the colleges. The intention was to obtain a representative sample of both students and qualifications. The sampling frame of the study constituted students who had graduated in these qualifications – with graduation being regarded as the indicator of a successful student. The top 25 graduates from the previous year (2011) in the selected qualifications were identified for participation in the assessment of habits and behaviours by means of a questionnaire. To ensure fairness and consistency, the top performers were identified using the following three criteria: a) graduated from the qualification in 2011, b) highest average across all modules within the course, and c) completed the qualification within twice the minimum time for completion of the qualification. In order to boost the sample for the benchmarks, registered students who had performed well in recent examinations were also targeted for inclusion in the assessment. Benchmarks for habits

and behaviours per qualification were formed based on the assessments of the top performers in those qualifications. Benchmarks were established for 170 qualifications. The response rates to the assessment of students within these qualifications made this possible. Those qualifications which yielded poor or absent response rates from students were excluded.

Following the fieldwork to establish habit and behaviour benchmarks for top performing Unisa students, the same exercise was circulated to current Unisa students in the selected qualifications for completion. This characterised Phase 2 of the pilot. The aim here was to determine the fit or match between the students' current habits and behaviours (noting the qualification for which they were registered) and those of high performing students in these qualifications – as determined through the benchmarking process. The combined response rate to Phase 1 and 2 of the pilot was 9,500.

Results proved insightful in that the analysis profiled individual students in a range of qualifications in terms of their "match" to the benchmark for those qualifications. Based on the student's match to the benchmark for their qualification, students were provided with an automatically generated personal development plan for the habit or behavior which required development or intervention.

The third and final phase of the pilot involved ascertaining how student participants experienced the Shadowmatch® pilot, which included the Shadowmatch® instrument as well as the individual reports and the personal development plans which were the key outputs. This was determined through an evaluation instrument developed by the researchers and administered as an online survey. A total of 723 students participated in the evaluation. Results indicated that students' own reports of their experiences were generally positive, with relatively few students reporting that the experience was not beneficial. These survey results cannot be generalised to the broader group of students who participated in the pilot given the response rate. However, the results did provide insights which the university was able to use to determine if the pilot phase could be extended for an additional year.

Results and Discussion

The case study highlights the complexity of adapting and integrating an existing commercial product into a higher education environment. After a thorough theoretical exploration and validation of Shadowmatch® established its potential, a central concern of both academics and students was the issue of using a tool developed in a corporate environment in a higher education setting. Academics expressed the view that the higher education context is so unique that a tool developed to function in the corporate environment would be of little use. This manifested in concerns about how success is defined in the academic context. Some academics' perceptions were that the profile of habits and behaviours would be similar across all qualifications, thus invalidating the

necessity of an instrument that allows for individual benchmarks of success for various qualifications. Others perceived the definition of success to be so intrinsic to the qualification that they felt no instrument would be able to capture appropriate benchmarks. Academics also expressed the view that the business language intrinsic to the tool was not suitable for an academic environment and would require customisation. For students, the *academic versus corporate* pull manifested in a distrust of the origin of the assessments. Notwithstanding multiple communications employing various modes of communication (learning management system, sms, e-mail) some students still questioned the authenticity and expressed fears that the assessment was a means of phishing (fraudulently obtaining personal information).

The tensions of employing an instrument developed for the corporate environment were also expressed in relation to *ownership of the data and the instrument*, as well as *validity and reliability* issues. As the instrument was designed by an external company, the academic community was concerned about the potential for publication by the external company based on the data. The institution wished to have the opportunity to publish from the data, and this required a contractual agreement with Shadowmatch®. Furthermore, given that the instrument was the property of Shadowmatch,® validity and reliability had therefore been established by an external auditing company. Many academics expressed distrust in the validity and reliability as well as cultural appropriateness of the instrument for Unisa students, despite the instrument being designed for the South African context with a 10 year track record of success and existing reports on the validity, reliability, and cross-cultural appropriateness.

The negotiation also included discussions around data security and data access. *Data security* is a high priority for Unisa. Using an external provider to assess students' non-academic risk was perceived as a threat to data security. All aspects of data transfer, student contact information as well as storage of data had to be thoroughly scrutinised and formalised in the contract to allow for the pilot project to proceed. In this regard, the departments of Information and Communication Technology and Legal Services at the institution played an instrumental advisory role. The Shadowmatch® system can be implemented as a web-application with external hosting or integrated into the systems of an institution with local server hosting. The choice between local hosting and off-site hosting brought to the fore the tension between the advantages of reduced cost, reduced complexity, and the flexibility of off-site hosting on the one hand and the desire to protect data and keep functions in-house on the other hand.

Reflection on Findings

Despite the central role of student agency in determining student success and retention (Subotzky & Prinsloo, 2011), much of the resistance towards implementing an instrument designed for the corporate sector in the higher education environment was

based on fear by academics that the two environments were distinctly different. The view was that the requirements for the two environments were so unique that a tool designed for the one environment could not yield positive results in the other. There are perhaps two assumptions which underpin this view. Firstly, it illustrates how, even though the tool focusses on investigating students' similarities to established benchmark requirements for success, academics still examined the tool in terms of the assumption that the environment needs to be assessed and mapped to understand student success. Secondly, this expression of disjuncture between the requirements for success in the labour market as opposed to the academic environment suggests an assumption that the requirements of success in the academic environment are distinct from the requirements of success in the labour market. This raises the question of how a higher education institution is to establish employability in graduates if this disjuncture persists.

Despite the experienced tensions around the fit of the Shadowmatch® instrument in a higher education setting, the institution did eventually support a pilot project to test the value and appropriateness of this instrument. This was by and large influenced by the placement of this initiative within the overarching student success framework of the institution, referred to earlier. Students' habits and behaviours resonated with the non-academic risk factors catered for in the framework, and were regarded as one of many variables which could potentially assist over time in not only identifying students at risk but moving beyond this to identify the requirements for success in particular qualifications. If researched, in this case by employing the Shadowmatch® instrument, this could enable appropriate support interventions to be implemented to enhance students' chances of success.

As discussed earlier, students' own reports of their experiences were generally positive. This was examined through an evaluation instrument developed by the researchers to determine how students experienced the Shadowmatch® instrument as well as the individual reports and the personal development plans which were the key outputs. These results, in combination with a comprehensive evaluation of the benefits and challenges of the pilot project and various analyses, will determine future support for the use of the Shadowmatch® instrument at the institution. Within the context of researching student habits and behaviours as a key element in the student success framework, it will highlight whether a continued partnership between a corporate outfit and an open distance and e-learning higher education institution is indeed possible and beneficial.

Conclusions

The piloting of the Shadowmatch® instrument at Unisa provided the opportunity to implement a ready-made solution to assess student habits and behaviours as part of the

student success framework. It provided a fresh approach in that it firstly examined profiles of successful students along with identifying students at risk. Secondly, it stepped away from trying to establish the requirements of success in a qualification, and instead examined successful candidates to establish clusters of habits and behaviours that contributed to success. An unexpected outcome of the process was that it highlighted some of the underlying tensions and embedded assumptions at the institution, ranging from perceptions surrounding *academic demands versus employability demands* to the tension between maintaining *control over data versus the flexibility, reduced costs and little or no demand* on the ICT system of employing external providers.

The pilot project, undertaken by a support department within the institution, provided a lens to examine how corporate-academic partnership could allow an institution to be more dynamic and flexible in supporting its student population. It provides a glimpse into the complexities higher education institutions may face in a dynamic higher education landscape where technology is changing so rapidly that increased reliance on external providers by support functions will be required in order for them to appropriately deliver on their mandates of effectively supporting the core functions of teaching and learning, research, and community engagement.

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Multi-Country Experience in Delivering a Joint Course on Software Engineering – Numerical Results

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Abstract

A joint course, created as a result of a project under the auspices of the 'Stability Pact of South-Eastern Europe' and DAAD, has been conducted in several Balkan countries: in Novi Sad, Serbia, for the last six years in several different forms, in Skopje, FYR of Macedonia, for two years, for several types of students, and in Tirana, Albania, in the form of a crash, seven-day course, for the last two years. In this paper, we will put an emphasis on the assessment methods used within these courses, and compare them with the 'original' course that has been conducted at the Humboldt University in Berlin for almost a decade. Having a good environment for comparisons we draw some conclusions about teaching software engineering in different environments.

Keywords: Common course; joint project; multiple universities; software engineering

Introduction

Coinciding with the trends in European high education, under the auspices of the 'Stability Pact of South-Eastern Europe' and 'DAAD, Deutscher Akademischer Austausch Dienst' ('German Academic Exchange Service'), a project was established in 2001. The main idea of the project was to create and develop common courses in several fields of computer science. Also, the intention of the project was to enable the usage of shared materials for courses at a wide range of universities in countries participating in the project.

The project joined participants from 15 universities and nine countries: Germany, Serbia, FYR of Macedonia, and Bulgaria being the core members, and Croatia, Bosnia and Herzegovina, Romania, Albania, and Montenegro, as associate members. More about the project, its goals, and members can be found in the Joint SE course homepage (2013), as well as publications by Zdravkova, Bothe, and Budimac (2003) and Bothe et al. (2003, 2005, 2009), while the experiences gained were described by Budimac et al. (2008, 2009, 2011).

The general goal of the project is improvement and adjustment of educational processes in South-Eastern Europe, with respect to the current and modern trends of countries within the European Union, and from the start it managed to fulfil several more specific goals:

- inclusion of 'Software Engineering' as a stand-alone course and a core course in universities' curricula of participating countries;

- consensus in creation of a joint course, including determination and selection of appropriate topics to be included as the basis for the common pool of topics;

- creation and development of joint teaching, examination, and assessment material for the selected topics: slides, case studies, assignments, exam questions, literature...;

- establishment of e-Learning facilities, used both as a simple repository of teaching materials and more subtle materials in a form of e-Lessons;

- establishment of a research and education framework as the basis for future educational and scientific cooperation.

These goals are implemented through cooperation in creation, improvement, and enhancement of teaching materials, and production of a distributed, Internet-based, multilingual university course. The joint course in software engineering originated from the course that has been conducted at the Humboldt University in Berlin for several years. Its main objective was to present introductory notions and principles of the discipline, including a wide spectrum of sub-areas suggested by the ACM and IEEE societies (Computing Curricula, 2001) and others (Bran et al., 2001). Thus, the course

covers more than 85% of the basic lessons suggested in 'Curricular guidelines for undergraduate programs in computing.'

Since this paper will deal mostly with exercises and assessment, it is interesting to notice that the course is accompanied by a pool of case studies discussed during lectures and processed through assignments. From this pool lecturers/instructors are free to select the most suitable one(s). In addition, there is a pool of assignments referring both to the course contents and case studies, thus forming the base for specific exercises. Together with the assignments, sample solutions, correction hints, and typical errors are collected and presented to students when appropriate. Through these additions, flexibility is added to the course.

After practical experiences in running (almost) the same course in four countries with five educational directions, we collected numerical data that could enable understanding of possible differences between conducted courses with respect to students and their environment. Thus, the goal of this paper is not only to describe our project but to present our conclusions based on collected numerical data. In our efforts to understand possible differences we used a field research technique (collecting existing records) and partly also the survey research method. Both approaches belong to qualitative research methodologies whose main aim is to understand and possibly predict the behaviour of the phenomenon under investigation.

Related Work

Our international educational joint project is not alone in its endeavour to improve teaching, and there are other similar projects that can be found in books and research papers. There are for example three other projects dealing with the same field of software engineering, such as those explained by Modesitt (2002), Doberkat et al. (2004), and Hilburn et al. (2003). Others we can mention are Ariadne (2013) and Merlot (2013) which are involved in some other fields of computer science, but still gather participants from different countries.

What we see as a major difference between our project and those mentioned is the methodology of course creation. While the mentioned courses created a relatively independent set of courses, from which participants can choose and adjust those they prefer and can include into their curricula, our aim was to create the course as a whole, including complete teaching materials, lectures, assignments, case studies, exam questions, and even lists of typical errors made by students. By this approach, our aim was to ease material reusability and enable use of these resources even to those lecturers who do not have software engineering as a primary field of interest.

Since as a consequence and the follow-up of our project, within a Tempus project (TEMPUS course homepage, 2013), a whole curriculum for master studies in the field of software engineering was created, two other projects that had the same approach as this

are worth mentioning. As presented by Caplinskas and Vasilecas (2003), the idea of the *MOCURIS* project was to develop the whole project, regarded as "... a system composed of courses, modules, labs, projects, and other components." Pretty much the same problem we encountered is mentioned in this paper, and that is the problem of "existing staff abilities." As the authors say "... no one separate university is able to implement such curriculum separately, because of the shortage of human and other resources." The same solution was implemented by both projects, and that is accumulation of resources of the partners, exchange of not only ideas and opinions, but also of teaching staff as necessary.

The second project that started with the need to exchange experiences and views, but concluded with the development of the whole master curriculum, is mentioned by Tibaut et al. (2013). They created an e-Learning environment for an international master level program in information technologies for the field of architecture. This environment "... integrates resources (units of study, learning management system, virtual classroom, teachers and students) from five European universities." What differentiates this project from ours is the fact that while we aimed to combine expertise and experiences of lecturers, project members, and create *joint* courses, the ITC-Euromaster project decided to join individually and separately created courses, accepted by the project consortium, and offer their use to the other project members via an e-Learning system that is the integral part of a project. This meant also inclusion of lecturers through a video conferencing system, opposite to our approach where lecturers are present in person, until individual project participants develop their own teaching staff.

Structure of the Joint Course

During the last several years, the same version of the course has been conducted by some participants of the project.

The Humboldt University in Berlin has the longest tradition in conducting the course, where it has been conducted for more than a decade.

At the University of Novi Sad, Faculty of Sciences, the course has been conducted in several different ways:

- for undergraduate students of computer science, eight years,

- for undergraduate students of the direction 'Professor of Geography and Informatics', also eight years,

- two years for postgraduate students of computer science. After that, as a part of Tempus project CD-JEP-18035-2003 (TEMPUS course

homepage, 2013), master study curriculum in software engineering was created and conducted (Bothe at al., 2009a).

At the 'Ss Cyril and Methodius' University in Skopje, Faculty of Natural Sciences and Mathematics, the course has been conducted for undergraduate students of computer science, the first time during the school year 2007-08, and since then.

At the Polytechnics University of Tirana, a seven-day crash-course was conducted by a professor from Berlin and assistant from Novi Sad in the spring semester of 2006-07 and afterwards each year.

Even though all of the lecturers had the freedom to choose the methods of course conduction, the basic structure of a course is rather similar at all universities, as agreed within the project.

The course consists of 28 topics that cover most of the introductory notions from the software engineering field. The complete list of 28 topics is given below.

Part I: Introduction to Software Engineering

Topic 1: *What is software engineering?* gives insight into motivation, areas of interest, definitions, and history of the field.

Topic 2: *Quality criteria for software products* covers classification and definitions of software quality criteria, mentioning standards dealing with questions of quality.

Topic 3: *Software process models – introduction* explains the activities of software development, gives overview of models, and introduces details on selected process models.

Topic 4: *Basic concepts and software development documents* gives overview of concepts and documents created during the software development process.

Part II – Requirements Engineering (Analysis and Definition)

Topic 5: *Results of the 'Analysis and definition' phase* – Feasibility study, product model, and requirement document are discussed here.

Topic 6: *Cost estimation* – Costs, factors, and presentation of the 'function point' method are covered in the topic.

Topic 7: *Basic concepts of the function-oriented view* is devoted to function-tree and data-flow diagrams.

Topic 8: *Basic concepts of data-oriented view* – Data dictionary and entity relationship concepts are presented in the topic.

Topic 9: *Basic concepts of rule-oriented view* is concerned with concepts of rules, decision tables, and trees.

Topic 10: *Structured analysis* introduces notions of context diagram, DFD hierarchy, mini-specification, and shows the process of structured analysis.

Topic 11: *Basic concepts of state-oriented view* – Petri-nets, state automata, and activity diagrams are covered within this topic.

Topic 12: *Basic concepts of scenario-based view* is dedicated to concepts of collaboration diagrams and sequence diagrams.

Topic 13: *Object-oriented analysis* covers the transition process from object-oriented analysis to design, explaining activities, class diagrams, use cases, UML, and shows the process of object-oriented analysis, using case studies.

Topic 14: *Formal software specifications and program verification* – Z, algebraic, and Hoare logic are presented.

Part III - Design

Topic 15: *Overview of design activities* presents notions of software architecture, specification of components, quality assurance, giving an overview of some software architectures.

Topic 16: *Structured design* is mostly dedicated to structure charts, illustrating the process of structured design.

Topic 17: *Object-oriented design* covers the transition process from object-oriented analysis to design, explaining characteristic activities in more detail.

Part IV – Implementation and Testing

Topic 18: *Implementation* – Principles, methods, guidelines for the implementation phase of software development are presented.

Topic 19: *Systematic testing* gives a classification of testing methods, and discusses review/audit, control-flow and data-flow oriented methods.

Topic 20: *Functional testing* is dedicated to the most important testing methods, including a presentation of testing tools.

Part V – Advanced Topics

Topic 21: *Software metrics* introduces several metric methods: cyclomatic complexity, Halstead, LOC, object-oriented metrics, and presents several CAME tools.

Topic 22: *Maintenance* – Types, requests, costs and planning of maintenance are covered.

Topic 23: *Reverse engineering* discusses notions of software repair, reengineering, and restructuring, including presentation of CARE tools.

Topic 24: *Quality of software development process and its standardization* covers standards such as ISO 9000, and capability assessment models.

Topic 25: *Introduction to software ergonomics* – The most important notions of graphical user interfaces, standards, and guidelines are presented.

Topic 26: *User manuals* – Dedicated to principles and guidelines for writing user manuals.

Topic 27: *Project management* – Planning, organization, people management, and control are the most important notions covered.

Topic 28: *Configuration management* – The topic is dedicated to motivation, explains activities, and discusses CVS.

The second essential component of the course is usage of complex case studies. Currently, there are two case studies in use, 'Seminar organization' and 'XCTL software', while the development of several additional ones is in progress. Case studies are used after the presentation of theoretical topics, and the main idea is to show students the ways of application of theory and skills gained earlier, on a real software product.

- 'Seminar organization' represents a software system (Balzert, 1998) created for management of a company dealing with creation, organization, and presentation of external courses: contacts with clients and companies, communication with lecturers and participants, hotels and travel agencies, and so on. At the moment, this case study is used in 10 topics as an illustrative example.

- The second case study represents the software system 'XCTL', a real, existing system, used at the Department of Physics, Humboldt University, Berlin. This legacy system has been reengineered, refactored, and partially rewritten, in order for some additional features to be added. The case study is used in four topics as an illustration.

The third essential component of the course is team assignments, and in this paper we will mostly concentrate on these. There is a pool of assignments created, which can be used both for illustration of theory and for testing the acquired knowledge. An agreement within the project has been reached that the assignments will be given to *teams* of students.

Depending on the number of students, from 5 to 20 teams were created, numbering from 3 to 5 students. Members of the team are self-chosen which enables easier organization of teamwork, which is also a useful practice elsewhere (e.g., Bielikova and Navrat, 2004). After presentation of an appropriate topic, an assignment is given with a deadline of 2–3 weeks for solving. Teams have to organize meetings, discuss the assignment, distribute obligations, perform work, and submit a written report. Points are then assigned to these solutions and all of the team members receive the same number of points.

A minimum number of points required for a student to qualify for the final exam is settled at 50% of the possible maximum number of points. How those points influence the final grade is not the same: In Germany and Albania students were required to achieve 50% of the points, which qualifies them for the final exam, but does not influence the final grade. In Serbia and in FYR of Macedonia, besides the limit of 50%, the number of points influences the grades.

The Assignments

For the first time, during the school year 2004-05 a complete, absolutely identical course, with the same case studies and the same assignments, was held in Germany (Berlin) and in Serbia (Novi Sad).

In the following years, the Faculty of Natural Sciences and Mathematics of the 'Ss Cyril and Methodious' University of FYR of Macedonia in Skopje adopted the same lecturing style for the software engineering course. Later on, the course was conducted in a slightly different style at the Polytechnic University of Tirana, but with the same general structure. It was conducted as a seven-day crash course, where most of the topics were presented to students, including case studies, while only four assignments were given to students.

A pool of nine assignments has been created. They are:

- Assignment 1: *Review of 'preliminary requirements specification' and 'requirements specification.'* Case study 'Seminar organization' is used, and both requirements specifications are part of it. Students have to find misunderstandings, discrepancies, and errors and write a report with suggestions on how to solve the problems.

- Assignment 2: *Application of a function-point method.* Again, requirements specification for 'Seminar organization' is used and students have to estimate costs, expressed in human-power, for development of this software.

- Assignment 3: *Review of a product model resulting after structured analysis.* Data-flow diagrams for 'Seminar organization' software are presented, including

some errors in them. Students are required to recognize those errors and suggest correct diagrams.

- Assignment 4: *Development of a part of a static model through creation of a use-case diagram and class diagram.* As students are already familiar with use-case and class diagrams from other courses, we test their creativity on a part of a static model.

- Assignment 5: *Definition of a formal specification for several given operations.* After being introduced to formal specification of several classic operations, students have to develop their solutions for some additional operations.

- Assignment 6: *Review of a solution for the fourth assignment of a different team.* Teams were faced with another teams' solution of assignment 4. Analysis of other teams' solutions exposes the students to a different view on the same problem.

- Assignment 7: *Measuring the quality of given software.* The implementation of 'Seminar organization' system is used as a case study to be measured.

- Assignment 8: *Specification of a regression test.* Students are required to develop a regression test package for a given example program, using the given testing tool.

- Assignment 9: *Creation of a classification tree.* Practicing usage of classification tree method for function-oriented tests. Students are expected to specify a systematic test for a given business process, from the requirements specification for the 'Seminar organization' case study.

In practice, the following procedure is applied: Teams are given specific tasks and are expected to produce results before a given deadline. Each member of a team has to read, think about, and reflect on a task *before* the team meeting. During several team meetings, the team discusses and solves the task. Occasionally, one class is organized where the most interesting and provocative solution is presented by the members of the team submitting it.

For assignments, students are divided into teams, according to their choice. This approach has several advantages. The first is simplicity from the managerial point of view. Second is that the opportunity for a student to sign up for a team of their choice creates a tendency to base the choice on personal relationships. Thus, time needed for adjustments and adaptation of team members is shortened. Thirdly, efficiency of teams created this way tends to be rather high.

The mentioned advantages are inclined to minimize most of the real-life problems that arise. Teams *do* get started without additional effort, extra meetings are organized more easily, and usually there is a natural pressure on team members 'not to disappoint their friends.' Still, there are two disadvantages of this approach. The first one is obvious – there is a risk that team quality can (and usually does) vary significantly. The second

drawback is that every now and then, some of the groups have complaints concerning individual team members. To 'fire' them and cancel their participation in a team is more difficult when team members are friends. Thus, there is a common mistake of some of the members covering for other, non-working members. Hopefully, bad experience within their studies might steer students away from this habit.

We will also mention here that *not all* of the assignments are performed each year, at each university. Besides personal choice of the lecturer, technical elements influence such a decision, for example, assignments 8 and 9 require specific tools, available only in Berlin, while some of the other assignments require additional time so they are not appropriate for usage in the crash course in Tirana.

Another important point is the fact that the 'correct solution' for each of the assignments, presented to students by lecturers, is created *in cooperation*, and based on the *combined practice and knowledge* of lecturers from Berlin and Novi Sad. Those experiences are based on solutions previously submitted by students.

The Assignment Results

In this section, we will present results of the assignments gained at different universities. We will start with the two groups of students from Novi Sad, continue with the results achieved in Tirana, then in Skopje, and finish with the results of Berlin students.

Novi Sad Students

Average results and number of points students gained per assignment give us some interesting insights. Let us first present results for two groups of Novi Sad students, students of the 'Computer Science' study programme, and students of the 'Professor of Geography and Informatics' programme.

Table 1

Assignment Points for Novi Sad Students of Computer Science

Novi Sad	Nr of Students	Average Points Assgn 1	Average Points Assgn 2	Average Points Assgn 3	Average Points Assgn 4	Average Points Assgn 5	Average Points Assgn 6	Average Points Assgn 7	Total Points Assgn
2007	45	81.11%	66.67%	63.78%	73.11%	75.78%	88.61%	68.52%	74.05%
2008	54	73.89%	74.53%	80.38%	79.90%	80.68%	94.32%	95.45%	81.75%
2009	60	81.67%	75.42%	88.00%	75.56%	80.67%		95.00%	81.85%
2010	66	77.73%	75.99%	85.76%	77.42%	78.30%	94.38%	91.67%	82.18%
2011	47	80.20%	69.63%	80.20%	69.33%	50.40%	87.25%	85.50%	73.56%
Average		78.92%	72.45%	79.62%	75.06%	73.17%	91.14%	87.23%	78.68%

Even though the number of students constantly grows, the percentage of gained points for assignments shows a more or less regular behaviour.

Results of assignments for the first year are significantly different than those for the following years. We think that the reasons are twofold: inexperienced lecturers during the first year and inexperienced assistants who checked the solutions for the first time. Results of assignments for the last year (gray-coloured area in the table) are also sometimes radically different. Since the same thing also happened in Skopje, we believe that the reason for this is the fact that during this year, the first generation of students studying according to Bologna principles approached this course. While this alone can influence results, the more important thing in our opinion is the fact that a lot of not-so-good students from previous generations finally made the effort of passing to the final year of their studies, in order to avoid switching to a new curriculum. Namely, the curriculum created in accordance with Bologna principles introduced several new courses, discarding of some of the old courses, changing the way courses are assessed, which was highly undesirable for older students.

The worst results and the lowest number of points are usually gained for assignment number 2 (application of the function-point method). Even though it is quite straightforward – a conclusion that has also been made by students – it seems that the assignment has enough hidden difficulties such that it is a regular practice that not many teams reach the maximum number of points. Assignment number 6 (review of a solution of another team's assignment) has the highest average, but it represents simply the ability of team members to defend their own opinion, so it is not of a high expertise level.

The really best results and the highest number of points are usually gained for assignment number 7 (measuring of the quality of software), denoted in Table 1 by a rectangle. Again, there are two reasons, in our opinion. It is again a straightforward and relatively simple task, where most of the required answers are given by the installed software. The second important reason is that this is the last assignment, given at the end of the semester, when students are aware and experienced in how and what they need to do to solve their task.

The assignment that requires the highest level of 'creative' work, assignment number 4 (creation of use-case and class diagrams), denoted in the table by an eclipse, also has a rather low average. The main reason for this we consider to be the lack of experience with real-life work, no practical abilities and skills, and possession of scholarly knowledge only.

The average total points achieved by students are sufficient for them to approach the second part of the exam, and even more it is close to 80% of possible points, which we consider very good.

Worth noting is also assignment number 5 (definition of formal specification), but only in comparison with the solutions of other groups, so we will discuss this topic in more detail later. Here, we would just note that again, results from last-year students (gray area) are far lower than the results of any of the previous generations.

At the end, we note that the average of the total points for the last generation is again far below most of the others, and far below average. As a reminder, that is the generation consisting of the first enrolment of students studying by the Bologna principles, plus remains of previous generations, finally making it to their last year of study. What lies behind this, in our opinion, are several things. For 'Bologna' students

- there is a much larger group of 'elective courses' for this generation of students, which naturally invited students to skip some of the more difficult ones that are needed for assignment solving;

- there exists a much higher percentage of exam passing within this generation, because of changed methods of knowledge assessment. This in turn allowed a greater number of students to pass to the next study years, but with somewhat less knowledge, and considerably lower grades, on average.

For 'old' students

- they have been struggling with their studies for years, having lower knowledge and grades, passing exams only after several attempts and/or years of trying;

- by the time they reached the final year, a high percentage of them had to find a job to support themselves, and their studies suffered greatly because of that.

Novi Sad Students – Professors Programme

Let us now look into the results of students of the Novi Sad programme 'Professor of Geography and Informatics'.

Table 2

Assignment Points for Students of the Programme Professor of Geography and Informatics

Novi Sad Professors	Nr of Students	Average Points Assgn 1	Average Points Assgn 2	Average Points Assgn 3	Average Points Assgn 4	Average Points Assgn 5	Average Points Assgn 6	Average Points Assgn 7	Total Points Assgn
2007	4	57.50%	50.00%	62.50%	75.00%	65.00%	87.50%	83.33%	67.74%
2008	11	62.00%	54.55%	61.82%	69.05%	72.73%	89.77%	75.00%	68.73%
2009	7	71.43%	44.64%	81.43%	57.14%	52.86%		83.33%	64.29%
2010	15	53.33%	50.83%	72.00%	41.67%	72.70%	59.00%	72.73%	59.30%
2011	12	70.00%	70.88%	73.30%	44.42%	40.00%	75.00%	83.33%	63.02%
Average		62.85%	54.18%	70.21%	57.46%	60.66%	77.82%	79.54%	64.62%

The number of students in this programme is relatively small for making definitive conclusions, so we will just compare these results with those from the previous table.

Results of assignments for the first year are not much different from the results from other years, as they are for the students of the computer science programme. A possible reason for this is that they are both low enough, so there cannot be too much difference.

Again, the worst results are gained for assignment number 2 (function-point method) and assignment number 4 (creation of use-case and class diagrams), the 'difficult one' and the 'creative one.' Similarly, the best results are again gained for assignment number 7 (measuring of the quality of software), 'the final one.'

Contrary to the computer science students, within this group it happened on several occasions that on average, students failed to achieve the necessary 50% of points – for assignment number 2 in school year 2009, for assignment number 4 during school years 2010 and 2011, and for assignment number 5 during school year 2011 (see circled areas in Table 2).

Again, average total points achieved by students were sufficient for them to approach the second part of the exam.

With this group of students, the difference for the last generation of students is *not* that obvious. The reason for this, in our opinion, is the fact that they *do not* all belong to the same generation, since (each year) more than half of these students remain from some of the previous years. This, in turn, may also partly explain why results for all of the assignments for this group are weaker than for the computer science programme.

Tirana Students

The second country where the course has been conducted is Albania. At the Polytechnic University of Tirana, during the school year 2006-2007, a seven-day crash course for the selected students of the 2nd year of master studies was conducted by a professor from Germany and assistant from Serbia, for the first time. In the following years, the same crash course was conducted.

Because of the shortage of time and physical constraints, it has been decided that this group of students will have to solve only four assignments, namely assignments 1 (review of requirements specifications), 2 (function-point method), 5 (definition of algebraic specification), and 7 (measuring of the quality of software). Particulars of tasks were also slightly different – the first assignment they had to solve was before the course started in order to get introduced to the requirements specification. Three other assignments had to be solved after the course was finished, and they were given two weeks per assignment. The results are presented in Table 3.

Table 3

Assignment Points for Tirana Master Students

Tirana	Nr of Students	Average Points Assgn 1	Average Points Assgn 2	Average Points Assgn 5	Average Points Assgn 7	Total Points Assgn
2009	17	78.24%	80.59%	80.00%	98.24%	84.26%
2010	15	69.30%	74.00%	76.70%	95.30%	78.83%
2011	15	66.00%	78.70%	80.70%	92.70%	79.53%
Average		71.18%	77.86%	79.13%	95.41%	80.87%
Novi Sad		77.76%	75.31%	79.88%	94.04%	79.74%

It can be noticed that these results are quite comparable to the results of Novi Sad students of computer science. In the last, gray row of the table, percentages disregarding the first, introductory year and the last, mixed year are given. As expected – *master* students from Tirana gained slightly higher numbers of points per assignment, while, again as expected, students studying in non-mother tongue achieved less than maximal results. As a consequence, master students were not much better than graduate students in total numbers.

Skopje Students

The third country that has been engaged in conducting a common course was FYR of Macedonia. The Faculty of Natural Sciences and Mathematics in Skopje started with the conduction of this course in 2007-08 and has been conducting it since. The data we present here concern two groups of students: students of 3-year studies and students of 4-year studies (according to Bologna principles). The following year besides these two groups another group appeared: students of 4-year studies, studying *not* according to Bologna principles. Here are the results.

Table 4

Assignment Points for Students from Skopje

Skopje		Nr of Students	Average Points Assgn 1	Average Points Assgn 2	Average Points Assgn 3	Average Points Assgn 4	Average Points Assgn 5	Average Points Assgn 6	Total Points Assgn
2010	3-year	46	46.34%	88.46%	97.14%	51.27%			66.90%
	4-year	75	61.44%	96.72%	89.74%	67.94%			76.76%
2011	3-year	51	55.49%	53.33%	73.92%	35.53%	56.74%	34.88%	51.65%
	4-year	118	58.36%	72.89%	74.57%	30.35%	43.01%	12.96%	48.86%
	"old"	80	61.54%	71.63%	83.26%	57.40%	92.21%	82.22%	74.71%

During the first year in Skopje only the first four assignments were used. The decision of the lecturers was that 'formal specifications' have been tested enough within other courses, while they did not manage to lecture on the topic of 'software metrics,' so this assignment could not be used. Instead, they added one more assignment from the field of 'product models,' which we will not consider here. During the second year, having more experience with the course, lecturers decided that the course would have six assignments. The first, obvious thing that could be noticed is the fact that students of the 4-year studies achieved much better results than students of the 3-year studies (except for the 3rd assignment – Review of a product model). This is due to the general observation in Skopje that the students of 4-year studies are more skillful and possess a better background in informatics than students of 3-year studies.

Here again we can notice a big difference between results for the first and the second year of conducting the course. For example, for the first year (Table 4, gray area), an observation can be made about the distribution of points between assignments. Namely, assignments 1 (Review of requirements specifications) and 4 (Development of a part of a static model) in both groups were solved much worse than the other two assignments (Function-point method and Review of a product model). At the end, on average, students of the 4-year studies had around 15% better results than the students of the 3-year studies. For the second school year (Table 4, white area), differences are not that high, which again might have to do with the experience of the assistant. For this school year, of much greater importance is the difference between groups of students. Students of the 3-year and 4-year studies (studying according to Bologna principles) have lower results for each assignment than the 'old' students. In some cases, that difference is extreme – for assignment number 7, they received only 35% and 13% of points, while the 'old' students received 82% of points on average! The difference is significant also for assignments number 5 and 6, and considerable for assignment number 4. This, being rather similar to the situation in Novi Sad, keeps the question about peculiarities and lower results of Bologna students still open.

Berlin Students

How do all of the mentioned results compare to Berlin students? For the course conducted in Berlin, statistics for three years are available (Table 5).

Table 5

Assignment Points for Berlin Students

Berlin	Nr of Students	Average Points Assgn 1	Average Points Assgn 2	Average Points Assgn 3	Average Points Assgn 4	Average Points Assgn 5	Average Points Assgn 7	Total Points Assgn
2007	52	88.57%	78.41%	75.00%	72.27%	65.00%	86.73%	77.14%
2009	85	86.88%	80.63%	86.25%	74.67%	75.63%	78.00%	80.34%
2011	64	87.14%	87.62%	87.62%	87.62%	81.00%	91.90%	87.15%
Average		87.53%	82.22%	82.96%	78.19%	73.88%	85.54%	81.54%
Berlin differences			9.21%	12.62%	15.35%	16.00%	13.90%	13.42%
Novi Sad differences			1.46%	7.62%	4.35%	2.38%	3.79%	3.92%

Except for the first assignment, percentages for Berlin students are quite different between years. As can be seen in the gray area of Table 5, differences for each year are much higher in Berlin than in Novi Sad. The fact that between 2007 and 2009 an assistant has been changed in Berlin probably caused such differences. As it has been already concluded for Novi Sad results, 'inexperience' of an assistant can have influence on grades and number of points awarded to students. This can also be confirmed if we look at the average percentage of points awarded for *all* of the assignments per year. While in Novi Sad, Tirana, and Berlin (during the first two years) the average percentage of points gained in total is around 80–82%, *inexperienced assistants* had quite different results: 74% in Novi Sad during the first year and 87% during the first year for the new assistant in Berlin.

The worst results by far the German students achieved with the 5th assignment (Formal specifications). While both Novi Sad and Tirana students gained around 80% of points for it on average, Berlin students had only 74% for no apparent reason.

Assignment number 7 (Measuring the quality of software) had a similar trend as assignment number 5 when compared with other groups. This assignment, which was the easiest one for Novi Sad and Tirana students, for Berlin students was not that successful, and they gained 'only' 85% on average. Still, this difference might have one quite simple explanation – the assistant for Novi Sad and Tirana students was the same, with the same criteria, while Berlin students had a different assistant. With the change of assistant in Berlin results became closer – Berlin students on the last year gained 92% of points on average.

Results of Tests

In Serbia, Albania, and FYR of Macedonia, the second part of the exam was organized through tests consisting of theoretical questions. The actual structure of the tests varies for each particular country, but the general form is the same. There is a repository of around 400 questions covering the whole curriculum. There were two tests covering the curriculum (in Tirana), or three (in Skopje), or four (in Novi Sad). Still, total numbers of questions and points that can be gained is the same in each case: two tests with 30 questions, three tests with 20 questions, or four tests with 15 questions. In total, 60 points can be gained within tests added to 40 points that could be gained through assignments give the total of 100 points. In Berlin, the second part of the exam is performed orally, so here we will compare only statistics for the rest of the countries.

In Novi Sad, there were four tests organized during the semester, with the exception of the first year. Calculated averages account only for the last three years, since there was a different distribution of questions and topics in tests during the first year. The following are student results (Table 6).

Table 6

Test Points for Novi Sad Students of Computer Science

Novi Sad	Average Points Test 1	Average Points Test 2	Average Points Test 3	Average Points Test 4	Total Points Tests
2007	67.77%	67.70%	77.50%		70.99%
2008	68.07%	66.09%	66.92%	63.95%	66.25%
2009	70.41%	71.35%	67.54%	70.89%	70.05%
2010	68.63%	70.00%	54.01%	53.33%	61.49%
2011	66.07%	58.67%	53.40%	44.47%	55.65%
Average	68.29%	66.53%	60.47%	58.16%	63.36%

Since the 3rd test during school year 2010-11 (Table 6, gray area), we can notice significantly lower results than before.

The explanation is twofold. Throughout the year, current standings for all of the students are known and published, together with the final grade gained up to that moment. More importantly, students are aware that *after* the semester, there is one additional possibility to do the test(s) again. Those who passed some tests, but are not satisfied with their success, must either accept these points, or re-take *all* of the tests. So as the last test approaches, students start calculating their possibilities: If they estimate they will not get as many points as they want, they submit an 'empty' test, fail it, and re-take it later.

The second point is again related to the school year 2010-11, and students representing a mixture of those studying by Bologna principles and those repeating their studies for several years. For 'Bologna' students, there is a high percentage of students arriving to the final year of studies, compared to the number of enrolled students at the beginning, and there are more students with less knowledge, lower grades, and missing (elective) courses needed as pre-knowledge for this course. For the other part of the group, it is obvious that we are dealing with students struggling with their studies, students with much lower knowledge. So, as a result, averages for *each* of the tests are the lowest compared to the previous years. The low-point is the last test of the last year, when – on average – students achieved only 44-47% of points. Even the average number of points, for *all* of the tests, is the lowest for all years – just 55-65%, compared to 62-71% for the previous years.

The results of tests obtained by another group of students from Novi Sad, professors of Geography and Informatics, are as follows (Table 7).

Table 7

Test Points for Novi Sad Students of Geography and Informatics

Novi Sad Professors	Average Points Test 1	Average Points Test 2	Average Points Test 3	Average Points Test 4	Total Points Tests
2007	51.25%	62.50%	66.88%		60.21%
2008	42.00%	57.50%	43.00%	41.33%	45.96%
2009	52.86%	58.89%	53.33%	49.44%	53.63%
2010	59.70%	50.51%	45.15%	44.17%	49.88%
2011	62.93%	44.73%	47.93%	39.20%	48.70%
Average	54.37%	52.91%	47.35%	43.54%	49.54%

Results for this group are significantly worse than for the other group of students from Novi Sad. Much less pre-knowledge in informatics is exhibited here, so the average number of points gained is hardly over 50%, which is the minimum for passing the test. And again, the difference of the results from last year is not too high, and we are of the opinion that it is for the same reason: the fact that a large number of those students in each year is from previous generations, studying by pre-Bologna principles.

Let us now present the results that students from Tirana obtained. They had only two tests and, what is probably more important and influencing the results, tests were performed 'on the distance.' The professor and assistant sent tests to the local organizer, who organized an exam in Tirana. Both tests were performed at the same time, which is yet another difference compared to other institutions, where tests are scheduled throughout the semester. Questions were chosen from the same repository, and two tests of 30 questions were formed. Test results are presented in Table 8.

Table 8

Test Points for Tirana Master Students

Tirana	Nr of Students	Average Points Test 1	Average Points Test 2	Total Points Tests
2009	17	58.33%	50.33%	54.33%
2010	15	64.23%	56.43%	60.33%
2011	15	67.33%	52.00%	59.67%
Average		63.30%	52.92%	58.11%

The number of points gained is much lower than the number of points gained by Novi Sad students of computer science and only slightly higher than points gained by Novi Sad students of the 'Professor of Geography and Informatics' programme. The only reasonable explanation, which was also confirmed through consultations with master students, was the problem of the English language. Usage of non-mother tongue in tests and answers presented the greatest problem to the students, greater than the expert knowledge required. During tests English had to be used on-site, both for understanding the questions and for answering, which created a lot of problems. The additional problem was the fact that the test was performed on the distance. So, ambiguousness within questions, even lingual ones, could not be solved.

In Skopje, the final part of the exam was organized through three tests. As in Novi Sad, students that failed a certain part of the exam, or were unable to take it, had one additional chance to take it. The results of tests obtained by students from Skopje are given in Table 9.

Table 9

Test Points for Students from Skopje

Skopje		Nr of Students	Average Points Test 1	Average Points Test 2	Average Points Test 3	Total Points Tests
2010	3-year	46	45.59%	56.70%	54.85%	52.38%
	4-year	75	59.98%	67.63%	66.60%	64.74%
2011	3-year	51	50.38%	52.20%	56.90%	52.90%
	4-year	118	62.66%	64.07%	61.10%	62.61%
	"old"	80	57.46%	58.19%	57.59%	57.75%
Average			56.83%	58.15%	58.53%	57.75%

Similar to the assignments, students of the 4th year gained significantly more points than students of the 3rd year. The distribution of points between tests is quite regular, the first one being 'the most difficult one' which is the common practice, before students get acquainted with the material.

As far as the percentages are concerned, actual comparison is not easy, because of the different number of tests in each country. Yet, knowing the topics presented, we can try to give a rough comparison: Students of the 4-year studies from Skopje are somewhat below the percentages of students both from Novi Sad and from Tirana. It is not surprising that results of the students of 3-year studies from Skopje are comparable to Novi Sad students of 'Geography & Informatics' programme (Table 10). We already discussed reasons for that in the previous section.

Table 10

Final Test Percentages for all Countries

	Test 1	Test 2	Test 3	Test 4	All tests
Novi Sad CS	68.29%	66.53%	60.47%	58.16%	63.36%
Novi Sad Prof	54.37%	52.91%	47.35%	43.54%	49.54%
Tirana	63.30%		52.92%		58.11%
Skopje III year	47.99%	54.45%	55.88%		52.77%
Skopje IV year	60.03%	63.30%	61.76%		61.70%
Average	58.80%	59.30%	55.68%	50.85%	57.10%

If we just extract the data for comparable groups, the results are more similar, as we think they should be (Table 11).

Table 11

Final Test Percentages for the Final Year students of CS Programme from Different Countries

	Test 1	Test 2	Test 3	Test 4	All tests
Novi Sad CS	68.29%	66.53%	60.47%	58.16%	63.36%
Tirana	63.30%		52.92%		58.11%
Skopje IVy	60.03%	63.30%	61.76%		61.70%
Average	63.87%	64.91%	58.38%	58.16%	61.06%

Discussion

We can note that all of the institutions used different methods for determining the final grade.

In Serbia, the final grade is based on three inputs:

> points gained for solving assignments,

> points gained at tests, and

> bonus points for activity during the course.

In Albania, the final grade was based on two inputs:

> points achieved for assignments, and

> points achieved at tests.

In FYR of Macedonia, the final grade is based again on three inputs:

> points obtained for assignments,

> points obtained at tests,

> extra points obtained for attendance, activity, or on-time homework delivery.

In Germany, the final grade is based only on the results of the final, oral exam, while points for the assignments present only the necessary prerequisite to approach the oral exam.

In the end, let us present students' average final grades for all courses conducted (Table 12; the scale of the grades is from 6 to 10).

Table 12

Final Grades

Course	Final mark
NS CS 2007	8.24
NS CS 2008	7.94
NS CS 2009	8.24
NS CS 2010	8.29
NS CS 2011	7.63
NS Prof 2007	6.50
NS Prof 2008	6.00
NS Prof 2009	7.25
NS Prof 2010	6.50
NS Prof 2011	7.00
Tirana 2010	8.24
Tirana 2011 I	8.40
Tirana 2011 II	8.20
Skopje 2010 3-year	8.11
Skopje 2010 4-year	8.31
Skopje 2011 3-year	6.56
Skopje 2011 4-year	6.82
Skopje 2011 4-year - old	7.64

In our opinion, final grades represent steady and expected trends. It is not just the expected average, it is also within the normal (Gaussian) distribution for each group. Grades are significantly higher for students of computer science than for the programme 'Professor of Geography and Informatics' and for the 3-year studies.

Conclusions

The general opinion of all project members is that the project was very successful and useful, first of all for students. During project realization we also went a step ahead and developed and intensively used several educational tools within several programming courses. Also, we conducted several questionnaires in order to obtain students' opinion about different educational issues and influences like gender influences on studying, usefulness of wikis for students' practical team work, privacy and usability aspects of using LMS, and so on. The main achievements and results of these activities are:

- Time for course preparation is drastically shortened.

- Students are enabled to learn in accordance with contemporary contents, principles (Klašnja Milićević et al., 2011; Vesin et al., 2013), and European standards.

- Course compatibility, both general and concrete, is achieved.

- An excellent base for usage of distance learning principles is created (Putnik et al., 2013; Ivanović et al., 2013a).

- Experiences, methods, and learning activities and styles of lecturers from several different countries are adopted (Ivanović et al., 2013).

- Possibilities for different kinds of future cooperation among the project participants are promoted and recognized. What is more, based on excellent experiences, and using the same technique, we developed several other courses and introduced them into curricula of a number of universities (Ivanović et al., 2013b).

The central attention in this paper has been devoted to the software engineering course. The same course was conducted in four different countries over multiple years and the same pool of assignments was used. Furthermore, the lecturer in Berlin and Tirana was the same, as well as the assistant in Novi Sad and Tirana. In all countries we had students of computer science and with significant background in informatics, while in two countries we had students with lower background in informatics ('professors' in Novi Sad and 3-year students in Skopje). All this created a good environment to draw some conclusions based on numerical results.

- To be successful (student) in software engineering, one must have a certain background in informatics. This justifies the position of this course at the end of studies, rather than near the beginning.

- Assistants' experience in conducting the course is an important factor – every time the assistant changed, the results showed inconsistency with general patterns and trends in results.

- Although students of 'Professor' and '3-year' studies are getting significantly fewer points than students of computer science, their results are still proportional and follow the general pattern. Furthermore, comparable groups of students from different countries have quite similar results. This leads us to the conclusion that problems and issues of software engineering are universal, and that cultural, historical, and other differences do not influence students' achievements nor should influence teaching methods.

We also have to note that students studying according to Bologna principles exhibited significantly lower achievements. While we tried to explain it in the paper, we are still not ready to draw formal conclusions. Further investigation of this phenomenon is needed.

Acknowledgment

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An Exploratory Study of Effective Online Learning: Assessing Satisfaction Levels of Graduate Students of Mathematics Education Associated with Human and Design Factors of an Online Course

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Abstract

This exploratory research project investigated graduate students' satisfaction levels with online learning associated with human (professor/instructor and instructional associate) and design factors (course structure and technical aspects) using a survey study. A total of 81 graduate students (master's students who majored in math and science education) enrolled in an online math methods course (Conceptual Geometry) participated in this study. According to the results of this study, student satisfaction level is closely associated with clear guidelines on assignment, rubrics, and constructive feedback. In addition, student satisfaction level is related to professor's (or course instructor's) knowledge of materials.

Keywords: Education; math education; distance education; satisfaction factors

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There has been clear evidence of rapid growth in online learning in U.S. higher education (Christensen, Horn, & Caldera, 2011; Nagel, 2010). According to Ambient Insight Research (2009), it is projected that more than 80% of all higher education students will take at least one online course by 2014. About 65% of higher education institutions in the U.S. have reported that they offer online education options (Allen & Seaman, 2005). Considering the current needs of online programs at the higher education level, the critical concern is how to maximize student learning by providing quality online learning experiences. Studies have shown that affective domains of students such as motivation and/or satisfaction are significantly related with their learning outcomes (Bryant et al., 2005; Eom, Wen, & Ahill, 2006). More importantly, when they are satisfied with online learning, students tend to be more motivated in learning and motivation leads to context (Graham & Scarborough, 2001). It is essential to closely investigate what elements and factors impact the level of student satisfaction. When students have a high level of satisfaction in learning, they obtain a high level of learning (e.g., Alavi, Wheeler, & Valacich, 1995). To provide students with an effective learning environment, Zhu (2012) recommends that student satisfaction levels should be taken into consideration in designing online courses and building online environments. Thus, it is important to investigate what factors are associated with student satisfaction level for online learning in order to maximize student learning. In this study, factors specific to an online mathematics methods course were investigated.

In this study, the researcher used a conceptual model based on the framework suggested by Piccoli, Ahmad, and Ives (2001) that both human and design factors influence student affective and cognitive domains and ultimately lead to effective learning. Figure 1 presents the conceptual model of this proposed study based on Piccoli et al.'s work.
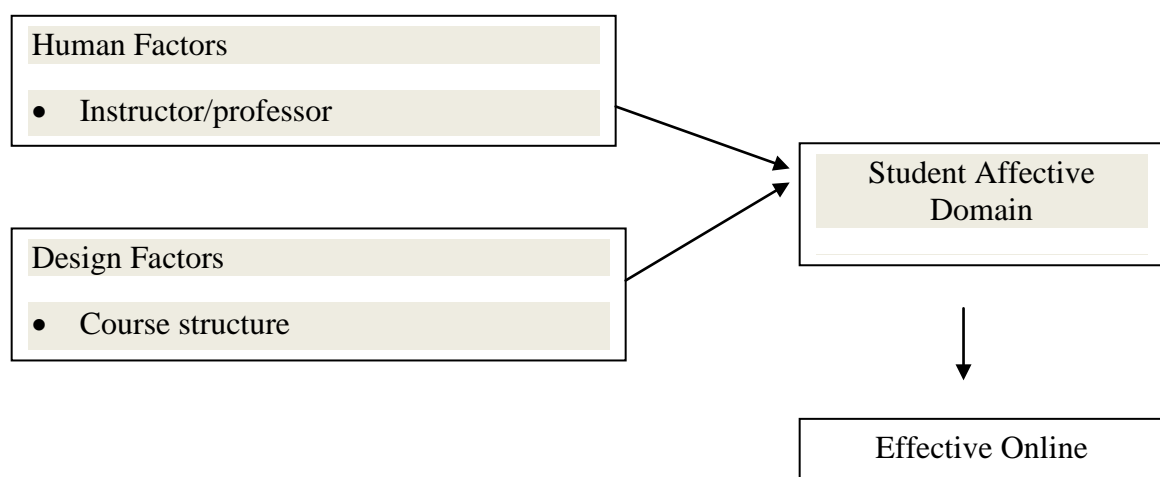
Figure 1. Conceptual model.

In high-quality online courses, students learn as much as in face-to-face courses (Meyer, 2002). As Figure 1 presents, high-quality online courses are composed of high-quality

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human (Osmanoglue, Koc, & Isikal, 2013; Russell et al., 2009) and design factors (Nuangchalerm, Prachagool, & Sriputta, 2011). Empirical studies have shown how these factors impact student outcomes or adult learner outcomes. For example, Russell et al. (2009) investigated the effects of online courses for middle school algebra teachers and found significant impacts on teachers' mathematical understanding, pedagogical beliefs, and instructional practices associated with human factors, in this case math education instructors. When instructors provided teachers with a highly supportive environment, they tended to show positive outcomes in teaching and learning. O'Dwyer et al. (2007) emphasized quality communication as a way to build supportive virtual learning environments for students. They found the lack of communication between students and instructors affected student satisfaction levels in a negative manner. Osmanoglu et al. (2013) examined 19 pre-service and 7 in-service mathematics teachers on the use of online video case discussions and found that effective communications among peers and with instructors promoted pre- and in-service teachers' mathematical process skills (problem solving, connection, mathematical communication, reasoning and proof, and representation). In particular, the outcomes were shown to be more significant when the instructor participated in discussions.

In addition, design factors impact student learning (Nuangchalerm, Prachagool, & Sriputta, 2011). Nuangchalerm and his colleagues found that students' online learning experience was less effective due to the difficulty of access to technical assistance. Ku et al. (2011) reported similar findings with 21 graduate students (in-service teachers), who felt less satisfied with online learning because they lacked the skills to use the technology.

This study focused on affective domains (levels of student satisfaction) associated with these two factors, specifically student satisfaction level. For the purpose of this study, human factors (course instructor/professor and instructional associate [IA]/ graduate assistant [GA]) and design factors were course structures and technical aspects.

The following specific research questions were addressed in this study:

1. What factors associated with the course instructor/professor are associated with student satisfaction level?

2. What factors associated with the IA/GA are associated with student satisfaction level?

3. What factors associated with course structures are associated with student satisfaction level? and

4. What factors associated with technical aspects are associated with student satisfaction level?

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Methodology

Research Design

A cross-sectional study was conducted in which a survey was administered to participants one time. Cross-sectional study has been known as an effective method to provide a snapshot of the current behaviors, attitudes, and perspectives of participants (Gay, Mills, & Airasian, 2009). This method was used to measure what factors are associated with student satisfaction level in online learning.

Instrumentation and Pilot Study

For the purpose of this study, the researcher designed a questionnaire and conducted a pilot study in order to measure reliability of the survey instrument. The survey items comprise a total of 24 questions including four open-ended questions. The items were developed by reviewing online learning design-based research (DBR). DBR is an emerging paradigm which includes pedagogy and tools to help develop and sustain learning environments (Norton & Hathaway, 2008). The major principle of DBR is to produce the most effective learning environment by applying continuous cycles of design enactment, analysis, and redesign (Cobb, 2001). Following the principle of DBR, the survey measures human and design factors associated with student satisfaction levels. In this study, human factors involve professor and instructional associate (IA) or graduate assistant (GA). Design factors include course structure and technical aspects. The survey consists of the following: five items to measure participants' thoughts on the professor, six items to measure participants' thoughts on the IA/GA, six items to measure participants' thoughts on course structure, and seven items to measure participants' thoughts on technical aspects. Twenty questions are answered on a six-point Likert scale ranging from 1 = *strongly agree* to 6 = *strongly disagree*, and four are open-ended questions (see Appendix for instrument).

Reliability.

According to Cox (1996), the term "reliability" is explained by the word "consistency." When an observed score is strongly consistent, the instrument has high reliability. To measure reliability of the instrument, a pilot study was conducted with 10 graduate students. The results were analyzed using Cronbach's alpha which is calculated, which is commonly used to test the reliability of questionnaire items (Cronk, 1999). In the pilot, only the 20 quantitative questions were used to calculate the reliability of the survey. Cronbach's alpha on all 20 items was .92, which indicates very high reliability.

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Participants

A total of 81 graduate students (master's students who majored in math and science education) enrolled in an online math methods course participated in this study. Eighty of the participants were geographically spread out across the United States; one was from Korea. The participants were composed of 68 female and 13 male students. All participants reported that they identified themselves as a teacher or educator who directly worked in the field of math and/or science education. Seventy-two participants were school teachers from pre-K through grade 12. Others worked as math and/or curriculum coordinators and science, technology, engineering, and math (STEM) curriculum consultants.

Program Overview

The program in which the participants were enrolled aims to provide a master's degree in Math and Science Education to in-service teachers or educators from pre-K through grade 12. Students who are admitted to the program take a total of 36 credit hours to complete the degree.

Online Course Structure and Instructional Design

The course (Conceptual Geometry) was offered once a year. Its curriculum focused on how to promote pedagogical content knowledge of geometric reasoning and conceptual understanding of geometry for teachers/educators from pre-k to grade 12. This course is required for all graduate students who are admitted to the program. It is five weeks long, with five modules (one module for each week). The instructor of the course utilized Blackboard (a web-based course management system). Table 1 presents the structure and instructional design of the course.

Table 1

Course Structure and Content

Module	Contents	Instructional tools	Grading & monitoring
1	National Council of Teachers of Mathematics' Geometry Standards	- Video - Reading - Quiz - Assignment (math journal) - Peer discussion	IA/GA & Instructor
2	Understanding student geometric reasoning & proof	- Video - Reading - Quiz - Assignment (geometry book) - Peer discussion	IA/GA & Instructor
3	Planning and teaching	- Video - Reading - Quiz	IA/GA & Instructor

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		• Assignment (lesson plan: PreK-Grade 5) • Peer discussion	
4	Integrated approach Geometry for ELLs	• Video • Reading • Assignment (lesson plan: Grades 6-12) • Peer discussion	IA/GA & Instructor
5	Assessment and cultural connection	• Video • Reading • Assignment (Tangram book, geometry song) • Peer discussion	IA/GA & Instructor

In order for students to meet course expectations, they viewed video-taped lectures and PowerPoint presentations, completed required readings, took quizzes, completed assignment(s), and participated in theme-threaded forum discussions on a weekly basis. Students were required to submit their assignments on Blackboard by midnight of every Sunday. IA/GAs were required to complete grading by every Wednesday and to monitor student discussions on a daily basis. The course instructor continuously monitored IA/GA work and graded student work if necessary.

Results

Human Factors

Efficient online learning associated with professor.

Table 2 shows how participants' satisfaction levels were associated with a professor/instructor. More than 95% of participants strongly agreed or agreed that their online learning was more satisfactory if their professors had the following characteristics and behaviors: knowledge of the course, prompt reply, constructive and timely feedback on student works. The highest percentage of participants (about 77%) strongly agreed that the professor's knowledge of course materials is important to make their online learning satisfactory.

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Table 2

Participants' Satisfaction Levels Associated with Professor

Professors	SA	A	N	D	SD	NA	Missing
In order to make online learning more satisfactory …							
professor's knowledge of course materials is important	76.54%	23.46%	0%	0%	0%	0%	0%
professor's prompt reply to student e-mail or call is important.	70.37%	23.46%	2.47%	1.24%	0%	2.47%	0%
professor's constructive feedback on student work is important.	71.61%	25.93%	1.24%	0%	0%	0%	0%
professor's timely feedback on student work is important.	72.84%	23.46%	1.24%	0%	0%	0%	2.47%

SA-strongly agree, A-agree, N-neutral, D-disagree, SD-strongly disagree, NA-not applicable,

Missing-missing data (didn't answer)

One open-ended question asked participants about the qualities they expected for a course professor that would make online learning more satisfactory. Participants' feedback is categorized into the following four major themes: grading, knowledge, clear guideline/expectations, and availability/prompt reply. Illustrative examples of participant feedback reflecting these themes are presented below.

Grading

- I look for a professor to provide valuable feedback on assignments.

- I look for constructive feedback due to the need to learn what I can improve and what I am doing well on.

- I look for a professor that is consistent with grading and knows the course material.

- Someone gives assignments that help me grow as a teacher

- When I receive an assignment back, I first look for the comments. I learn best by my mistakes.

- I also appreciate comments on my work I turn in so I know I am meeting the expectations of the professor and the course. Suggestions are great so I can better improve my work in the future as well.

- On time with grading and sticking to deadlines

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Knowledge

- The professor has knowledge of the new math CCSS.

- Knowledge of current issues in math education

- I also like to have a professor that is highly knowledgeable in the area of study presented in the course.

- Strong knowledge of the subject being taught

- The professor should demonstrate knowledge about the course content and have the ability to present the content in a streamlined, intentional manner.

Clear Guidelines/Expectations

- Clarity of assignment details, due dates, grading scheme (rubrics)

- I like instructors who understand the uniqueness of attending classes online. I prefer instructors who clearly state the assignment objectives and are readily available to answer questions.

- I look for professors that are very clear and concise in laying out their expectations for the course. I also look for clear and thorough descriptions of assignments. Most of all, I look for professors who have an equally high expectation of themselves as they have of their students.

- Clear when communicating (E-mails don't result in further questions from the student)

- I look for clear guidelines of the teacher's expectations, i.e. rubrics, and try to follow those as closely as possible to achieve the highest mark that is indicative of my personal best.

- Clear, concise explanations of expectations

Availability/Prompt Reply

- Timely e-mail responses to questions

- I expect the professor to be available for questions, organized, and prompt with replies.

- Particular qualities I look for in a professor of an online class include the professor being available in a timely manner if I have a question about something.

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- Open communication with quick response to students

- To me, the most important quality is that if I need information, or have a question, the professor gets back to me quickly. I don't get to see my professors face to face, so email is important and with the fast pace of a 5 week class, there is little time to waste. All of my professors so far have gotten back to me within a few hours of any emails I have sent.

Efficient online learning associated with instructional associate (IA) or graduate assistant (GA).

Table 3 presents participants' perceptions of qualities that make online learning efficient associated with an instructional associate (IA) or graduate assistant (GA). The highest percentage of students strongly agreed that IA's constructive feedback on student work is important to make their learning satisfactory. More than 95% of students either strongly agreed or agreed that their online learning was more satisfactory when the IA/GA had the following qualities and behaviors: knowledge of the course materials, prompt reply, constructive and timely feedback on student work.

Table 3

Participants' Satisfaction Levels Associated with Instructional Associate (IA) or Graduate Assistant (GA)

Instructional associate (graduate assistant)	SA	A	N	D	SD	NA	Missing
In order to make online learning more satisfactory ...							
IA's knowledge of course materials is important.	62.92%	28.40%	6.17%	0%	0%	0%	0%
IA's prompt reply to student e-mail or call is important	69.14%	25.93%	0%	1.24%	0%	2.47%	1.24%
IA's constructive feedback on student work is important.	79.01%	19.75%	0%	1.24%	0%	0%	0%
IA's timely feedback on student work is important.	74.07%	23.46%	0%	1.24%	0%	0%	1.24%
IA's fair grading is important.	76.54%	19.75%	1.24%	0%	0%	0%	2.47%

SA-strongly agree, A-agree, N-neutral, D-disagree, SD-strongly disagree, NA-not applicable,

Missing-missing data (didn't answer)

One open-ended question asked participants about the qualities they expected in an IA/GA to make online learning more satisfactory. Participants' feedback is categorized into the following three themes: grading along with feedback, accessibility/prompt response, and knowledge of course. Examples illustrating these themes are presented below.

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Grading along with Feedback

- Grading in a timely manner with pertinent feedback

- I look for constructive comments that can be used to improve the quality of my assignments when the IA is responsible for grading.

- Clear feedback on assignments, especially when the score is less than 100%. Always provide reasons for deducting points (even if it's just 1).

- Clarification of assignment details, due dates, grading scheme (rubrics)

- Timely grading (within 7 days)

Accessibility/Prompt Response

- I think that a quality that the IA should possess is accessibility. This person needs to be able to be reached at all times and expect that he/she will be contacted at any moment.

- Willing to answer questions, readily available

- Someone who responds to you in a timely fashion and is helpful

- I want my IA's to email me back quickly as well. I've noticed more often than not that it is my IA I communicate with the most, so a timely response to my questions is vital to my success in this program.

- Quick, appropriate feedback and answers to questions

- Quick responses & meaningful feedback on assignments

Knowledge

- The same knowledge and quick communication that is expected from the professor

- The IA is knowledgeable of the course content and materials and has a clear understanding of the direction the professor is taking with the course.

Efficient online learning associated with course structure.

Table 4 presents participants' perspectives on efficient online learning associated with course structure. The highest percentage of students (82.72%) strongly agreed that clear guidelines for course assignments and assignment rubrics are important to making their learning satisfactory. Students also strongly agreed that course contents should be well

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aligned with course objectives and should provide useful learning materials for math education.

Table 4

Participants' Satisfaction Levels Associated with Course Structure

Course structure	SA	A	N	D	SD	NA	Missing
In order to make online learning more satisfactory …							
it's important to have course contents appropriately structured based on the objectives of the course.	75.31%	23.46%	0%	0%	0%	0%	1.24%
providing useful learning materials associated with math education is important.	75.31%	23.46%	0%	0%	0%	0%	1.24%
clear guidelines on course assignment and assignment rubrics are important.	82.72%	17.28%	0%	0%	0%	0%	0%
assignment examples are important.	58.03%	28.40%	11.11%	0%	0%	0%	2.47%
having the quiz available online is important.	54.32%	30.86%	9.88%	2.47%	1.24%	0%	1.24%
using a discussion board is important.	41.98%	32.80%	13.58%	6.13%	0%	0%	2.47%

SA-strongly agree, A-agree, N-neutral, D-disagree, SD-strongly disagree, NA-not applicable, Missing-missing data (didn't answer)

One open-ended question asked participants what aspects of course structure would make their online learning more efficient and satisfactory. Participants' feedback is categorized into the following three themes: clear assignment rubrics, useful teaching resources, and module organization. Examples of participant responses that illustrate these themes are presented below.

Clear Assignment Rubrics

- The rubric and assignment expectations have to be clear.

- I like having the rubrics to guide my efforts. Also examples of assignments have been very useful in clarifying what the final product will look like.

- It is important to have clear requirements for assignments and grading.

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- The online course is more effective to me if I can see examples of the assignments.

- Clearly outlining assignments and due dates

- Clear expectations, rubrics and examples of work provided by the professor are important so I am able to meet those expectations in my assignments.

Useful Teaching Resources

- ...useful material available to benefit the students. I use the information to go back and refer to as a resource.

- A variety of meaningful learning tools and e-math materials allows me to learn more about the course content and be more successful in completing course work.

- I want the e-activities to be beneficial to me in this degree. I want to be able to learn something more than I already knew.

Module (Course) Organization

- Checklist with due dates is very beneficial. Weekly or either for the whole course where we can check each box when it is done.

- Courses should also have a clearly outlined pacing guide and due dates for each week presented at the beginning of the course.

- The syllabus and organization is essential. Each detail makes the course more effective and satisfactory. Helping us look ahead to future assignments is crucial for our success and maintaining our teaching jobs.

- I like to work at my own pace online. I like being able to also see what resources are online to help me through the course.

- Aligning the assignments with the objectives is a great way to make the course more effective.

Efficient online learning associated with technical aspects.

Table 5 presents participants' perspectives on efficient online learning associated with technical aspects. The highest percentage of students (77.78%) strongly agreed that a user-friendly course delivery system is important. In order to make online learning more effective, students also strongly agreed (72.84%) that course materials should be beneficial.

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Table 5

Participants' Satisfaction Levels Associated with Technical Aspects

Technical aspects	SA	A	N	D	SD	NA	Missing
In order to make online learning more satisfactory, …							
online distribution of learning materials should be beneficial.	72.84%	24.69%	0%	0%	0%	0%	2.47%
multimedia itself (e.g., audio, video) should be useful.	58.03%	37.04%	3.70%	1.24%	0%	0%	0%
using a discussion board should be beneficial.	43.12%	33.33%	13.58%	6.17%	0%	0%	1.24%
timely technical assistance/support is important.	67.90%	23.46%	1.24%	0%	0%	6.17%	1.24%
a user-friendly course delivery system is important.	77.78%	16.05%	3.70%	0%	0%	0%	2.47%

SA-strongly agree, A-agree, N-neutral, D-disagree, SD-strongly disagree, NA-not applicable,

Missing-missing data (didn't answer)

One open-ended question asked participants what technical aspects they expected to make their online learning more efficient and satisfactory. Participants' feedback is categorized into the following three themes: user-friendly, material availability/accessibility, and technical support. Participants' responses that illustrate these themes are presented below.

User-Friendly

- Online math materials are easy to navigate.

- Easy to follow prompts

- Easy to use technology that is working effectively

- Easy to use, easy to get help

- I think that the course should be easy to navigate.

- User-friendly and very simple to navigate

- Clear direction on how to use and access the material in the course is very important. Also, it is important that links to resources work.

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All Materials Available Online/Accessibility

- The online course is great because everything that I needed was online (books, articles, videos, discussion). It really makes the learning less stressful.

- The course is more effective if all materials can be accessed online. Readings should be able to be accessed through the course site.

- Being able to access material without difficulty is most important.

- Working links to materials distributed electronically

- I love that it is accessible anytime. It is great also to be able to see all of the modules to look ahead if needed. It is quite easy to access documents.

- Access 24/7

- Readily accessible materials and a delivery system with few glitches make the course more satisfactory.

- Being able to access the materials easily

Technical Support

- Tech support is imperative!

- The availability of technical support is very important, especially between 6pm-12am and weekends.

Conclusions

It is critically important for universities to understand the emerging online learning environment, particularly the level of student satisfaction which is closely associated with learning outcomes. The paradigm of adult learning has changed from content-centered to learner-centered, which places more emphasis on learners than on course materials/contents (Magnussen, 2008). In this regard, this study focuses on learners and provides exploratory empirical data to contribute to the field of online math education in order to make online learning more meaningful to students.

Human Factors

Participants in this study thought that it was most important that a professor and IA/GA be knowledgeable about course materials and provide up-to-date effective strategies/pedagogical knowledge for teaching math. There was a slightly different

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expectation for instructional personnel: The highest percentage of students expected a course professor to be knowledgeable of course materials while they expected an IA/GA to be able to grade fairly with constructive feedback. Several participants stated that they needed constructive and clear feedback on their work as they attempted to improve their work as well as become a better teacher of mathematics. Prompt replies from the professor and IA/GA were also related to student satisfaction levels. This is a similar finding to that of Russell and her colleagues (2009) in their research conducted with teachers of middle school algebra. They found that instructors' and content experts' availability was a key component of student effective learning in online math methods courses. Availability of a professor (instructor, content expert, and/or facilitator) is especially important in online math education courses since the course work or assignments often require a clear understanding of the tasks in order to successfully perform and complete them. If a student does not correctly understand the task, it is problematic. The first step of math problem solving is "understanding a question/problem" (NCTM, 2011). Therefore, finding ways to maximize the availability of a course professor or facilitator is essential. For example, setting up online conferences (live chat, webinar) on a regular basis (e.g., weekly) and having virtual office hours during which students can communicate with the course instructor can facilitate easy access to instructors.

Design Factors

In terms of course structure, students considered clear assignment rubrics and guidelines to be important to make online learning satisfactory. Participants expressed strong feelings about receiving explicit course expectations and assignment guidelines/rubrics. Students tend to focus more on learning when online courses are planned with clear expectations and guidelines (Dykman & Davis, 2008; Ku et al., 2011; Moallem, 2003; Salmon, 2002). Clear explanation is a key for successful online learning because it helps to prevent misunderstanding of course materials and assignments. NCTM (2001) strongly recommends that teachers of mathematics precisely present expectations of students as well as mathematical ideas in order to avoid student confusion in performing their tasks.

Participants also thought that a user-friendly system is an important factor of their satisfaction level. Not all students are proficient in using technology (Darrington, 2008), so it is important to provide a user-friendly system to students for efficient online learning. However, it is also necessary to provide adequate training (e.g., how to navigate course materials, how to upload and download materials, how to get technical assistance, etc.) in order to reduce the level of student frustration. This also prevents difficulties with online technology from interfering with learning (Cornelius & Glasgow, 2007).

This study found that students' perceptions of discussion boards were associated with the level of their satisfaction. This is an interesting finding that students thought that a

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discussion board was less significant to make online learning satisfactory. There have been many studies which showed the positive impact on learning of the use of online discussions as students share their own experiences, reflections, and insights from their life as well as their readings (Rettig, 2013). This study did not indicate whether the participants' experience with discussion boards in the current online course was negative or they were simply not fond of online discussions in general. Future researchers should further investigate the use of discussion boards for virtual discussions in terms of formats, structure, contents, and so forth. Finding effective, interactive, and collaborative ways to participate in discussions is an essential part of making online learning meaningful to students (Bell, Hudson, & Heinan, 2004; Russell et al., 2009).

Communication is "an essential part of mathematics and mathematics education" (NCTM, 2001, p. 60). Communication in math education is critically important since it promotes students' reasoning and proof abilities along with their collaborative skills as they share their own mathematical ideas and listen to their peers' perspectives. Further study is necessary to determine how to promote student participation in online discussions and communications with their peers (e.g., what helps students feel more motivated to participate in discussions/communications, what format helps students feel more comfortable sharing their mathematical thinking and insights about teaching, etc.).

Gallie (2005) and Jung et al. (2002) suggest that instructor/professor involvement with online discussions is more effective than discussions held among students only. Depending on who initiates the discussion, the outcomes of learning differ. According to Russell and her colleagues (2009), the accessibility of instructors and/or facilitators is even more key to engaging more students in virtual discussion in online math education than self-paced online discussions.

Assessing students online using tests (quiz, mid-exam, final exam, etc.) has been a challenge in higher education due to the lack of validity (Clarke, et. al., 2004; Hewson, 2012). Participants in this study indicated that an online quiz was one of the least effective factors among other design factors associated with student satisfaction levels. This is a conflicting result based on previous studies (e.g., Dermo, 2009; Marriott, 2009) in which participants showed relatively positive and favorable attitudes toward online summative assessments. Thus, it is recommended for researchers to investigate both formative and summative assessment in online courses in order to adequately evaluate student learning and at the same time to successfully motivate student interest and increase their level of satisfaction. Online assessment needs to be re-conceptualized in order to promote higher order thinking levels. Work that is authentic and applicable to the real world is more meaningful (Dunlap, Sobel, & Sand, 2007; Fish & Wickersham, 2009). In addition, Hewson (2012) urges further studies to examine student affective domains regarding online assessments to determine the best methods to assess students in the way they favor and that lead to a low anxiety level.

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Study Limitations

This study is limited in several aspects. First, more studies are necessary to investigate in more depth the human and design factors associated with student satisfaction levels and effective online learning. Especially, it is important to investigate how to make effective and meaningful online learning. For example, one might ask how to make course structure more meaningful and effective to meet the needs of students (i.e., does live instruction work better than videotape-based instructions?; does presentation work better than discussions or readings? etc.). Second, this study does not consider students' demographic information. Demographic variables should be taken into consideration to sensitively meet the needs of students. Third, rigorous study designs are necessary to investigate cause and effect relationships on individual factors (design and human factors) by applying a true experimental design. Individual factors can also be broken into several aspects to investigate how to make them effective for meaningful learning. For example, design factors involve assessments, discussions, lecture types, live chatting, virtual conferences, and so forth. It is necessary to further investigate how each aspect impacts and/or is associated with student learning.

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Appendix

Online Learning Survey: What does make your online learning satisfactory?

Professors	SA	A	N	D	SD	NA
Professor's knowledge of course materials is important						
Professor's prompt reply to student e-mail or call is important.						
Professor's constructive feedback on student work is important.						
Professor's timely feedback on student work is important.						
What qualities of the professor do you look for to make your online learning more efficient and satisfactory?						

Instructional Associate (Graduate Assistant)	SA	A	N	D	SD	NA
IA's knowledge of course materials is important.						
IA's prompt reply to student e-mail or call is important						
IA's constructive feedback on student work is important.						
IA's timely feedback on student work is important.						
IA's fair grading is important.						
What qualities of the IA do you look for to make your online learning more efficient and satisfactory?						

Course Structure	SA	A	N	D	SD	NA
It's important to have Course contents appropriately structured based on the objectives of the course.						
Providing useful learning materials is important.						
Clear guidelines on course assignment and assignment rubrics are important.						
Assignment examples are important.						
Having the quiz available online is important.						
Using a discussion board is important.						
What makes your online learning more effective and more satisfactory in terms of course structure?						

Technical Aspects	SA	A	N	D	SD	NA
Online distribution of learning materials is beneficial.						
Multimedia itself (e.g., audio, video) is useful.						
Using a discussion board is beneficial.						
Timely technical assistance/support is important.						
A user-friendly course delivery system is important.						
What makes your online course more effective and more satisfactory in terms of technical aspects?						

SA-strongly agree, A-agree, N-neutral, D-disagree; SD-strongly disagree, NA-not applicable

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Initial Trends in Enrolment and Completion of Massive Open Online Courses

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Abstract

The past two years have seen rapid development of massive open online courses (MOOCs) with the rise of a number of MOOC platforms. The scale of enrolment and participation in the earliest mainstream MOOC courses has garnered a good deal of media attention. However, data about how the enrolment and completion figures have changed since the early courses is not consistently released. This paper seeks to draw together the data that has found its way into the public domain in order to explore factors affecting enrolment and completion. The average MOOC course is found to enroll around 43,000 students, 6.5% of whom complete the course. Enrolment numbers are decreasing over time and are positively correlated with course length. Completion rates are consistent across time, university rank, and total enrolment, but negatively correlated with course length. This study provides a more detailed view of trends in enrolment and completion than was available previously, and a more accurate view of how the MOOC field is developing.

Keywords: MOOCs; higher education; massive open online courses; online education; distance learning

Introduction

In the past two years, massive open online courses (MOOCs) have entered the mainstream via the establishment of several high-profile MOOC platforms (primarily Coursera, EdX, and Udacity), offering free courses from a range of elite universities and receiving a great deal of media attention (Daniel, 2012). 2012 has been referred to as 'the year of the MOOC' (Pappano, 2012; Siemens, 2012), and some herald this as a significant event in shaping the future of higher education, envisioning a future where MOOCs offer full degrees and 'bricks and mortar' institutions decline (Thrun, cited in Leckart, 2012).

There are clearly great potential individual and societal benefits to providing university-level education free of some of the traditional barriers to participation in elite education, such as cost and academic background. However, it is not clear the extent to which MOOCs provide these benefits in practice. MOOCs may favour those who are already educationally privileged; Daphne Koller of Coursera has stated that the majority of their students are already educated to at least undergraduate degree level, with 42.8% holding a bachelor's degree, and a further 36.7% and 5.4% holding master's and doctoral degrees (Koller & Ng, 2013). A further study of Coursera students enrolled in courses provided by the University of Pennsylvania indicates a greater dominance of highly educated students, 83.0% of respondents being graduates and 44.2% being educated at the postgraduate level (Emanuel, 2012). The author concludes that MOOCs are failing in their goal to reach disadvantaged students who would not ordinarily have access to educational opportunities (Emanuel, 2013). In order to succeed in a MOOC environment, higher digital literacy may be required of students (Yuan & Powell, 2013), potentially exacerbating pre-existing digital divides. In theory MOOCs remove geographical location as a boundary to access, although a lack of internet access may prevent this from being realized in practice (Guzdial, 2013).

Although smallerscale, connectivist MOOCs have existed for several years, the development of largerscale MOOCs offered by elite institutions has propelled MOOCs into the mainstream. The earliest and perhaps most highly cited example is the Stanford AI class, which attracted 160,000 students (20,000 of whom completed the course) when it ran in autumn 2011 (Rodriguez, 2012). However, while this example is often used, it is unlikely to be representative of how the field is developing. A survey undertaken by *The Chronicle of Higher Education* in February 2013 suggested that the average MOOC enrolment is 33,000 students, with an average of 7.5% completing the course (Kolowich, 2013). Detailed studies of particular courses have emphasized that those who enroll upon courses have a wide variety of motivations for doing so (Breslow et al., 2013; Koller, Ng, Do, & Chen, 2013); however motivation does not predict whether a student will complete a course (Breslow et al., 2013). In examining completion and engagement with courses, studies have focused upon characterizing types of learners (Kizilcec, Piech, & Schneider, 2013; Koller et al., 2013). Limitations of these studies are that they focus upon a small number of early MOOCs, and ascribe

course completion primarily to student choice and motivation. There is a gap in the research literature here about what could be learnt about characteristics of courses themselves and their effect upon enrolment and completion, which this study sought to explore.

Six-figure enrolment statistics have generated a good deal of interest in MOOCs in the higher education sector, and are frequently conflated with active participation or completion. However, the earliest courses are the most frequently cited examples and may not be representative of how the phenomenon is developing, and the extent to which enrolment numbers are indicative of completion has not been explored comprehensively. These issues are obscured to an extent by a lack of consistent data being made open to those outside of the MOOC platforms. For example, the Coursera data export policy gives individual institutions control over the data that is released about courses (Coursera, 2012), and in practice the extent of data sharing is highly variable and ad hoc.

Now, over 18 months on from the advent of the large MOOC platforms, this paper seeks to synthesise the data that has found its way into the public domain in order to address some of the very basic questions associated with MOOCs. How massive is 'massive' in this context? Completion rates are reputedly low, but how low? From the available data, can we learn anything about factors which might affect enrolment numbers and completion rates?

Methods

The approach taken here drew together a variety of different publicly available sources of data online to aggregate information about enrolment and completion for as many MOOCs as possible. Information about enrolment numbers and completion rates were gathered from publicly available sources on the Internet. Given the media attention which MOOCs have garnered, and their 'massive' nature, there is a good deal of publicly available information to be found online, including news stories, university reports, conference presentations, and MOOC student bloggers. Issues of reliability associated with using this data are addressed below.

The list of completed MOOCs maintained at Class Central[1] was used as a starting point for the inquiry. Completed courses from Coursera, EdX, and Udacity were identified for inclusion in the study, while other individual MOOCs and platforms were excluded. This criteria was used because (i) Coursera, EdX, and Udacity are the platforms which have received the greatest media focus and have fuelled the global interest in MOOCs, (ii) the platforms account for the vast majority of MOOCs to date, and (iii) the platforms reflect the higher education sector more broadly, offering courses presented from 'bricks and

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[1] http://www.class-central.com/#pastlist

mortar' institutions through the platforms. At the time of writing (22nd July 2013), this list comprised 279 courses (including courses which have run multiple times).

Enrolment and completion figures were selected as the data to be collected for the courses, as these are the metrics which are most commonly available. Completion in this sense was defined as the percentages of students who had satisfied the courses' criteria in order to gain a certificate. The exact activities required to achieve this vary according to course. Where possible, data was also recorded about the number of 'active users' in courses. Information about the number of active users was available for 33 courses, although some did not provide any definition of the term. Those courses who did define active users characterized them as students who actively engaged with the course material to some extent (as opposed to those who enrolled but did not use the course at all). For example, this includes having logged in to a course, attempted a quiz, or viewed at least one video. Data was also collected about the date a course began, the course length in weeks, and university ranking (using the Times Higher Education World Rankings; THE, 2013) in order to explore whether these factors affect enrolment and completion.

The enrolment and completion data was collected in two ways: via internet searches and crowdsourcing information from students who participated in courses, by appealing via social media. Students contributed data which had been shared with them by the course instructor to the author's blog (Jordan, 2013). This yielded information about enrolment numbers for a total of 91 courses (32.6% of total potential sample), and completion for 42 courses (15.1% of total). For transparency, the sources used for all data items are included here. Details of courses for which only enrolment data was available are shown in Table 1; details of courses for which completion data was found are shown in Table 2.

Table 1: Data Drawn from Online Sources for Courses for which Enrolment Numbers Only were Available

Course	Institution	Enrolled	Start date	Length (weeks)	Platform	Source
Introduction to Databases	Stanford University	60000	2011-10-01	9	Coursera	Widom, 2012
Human-Computer Interaction	Stanford University	29105	2012-05-28	5	Coursera	Lugton, 2012
Introduction to Sociology	Princeton University	40000	2012-06-11	7	Coursera	Lewin, 2012a
Introduction to Finance	University of Michigan	125000	2012-07-23	15	Coursera	Masolova, 2013
Algorithms, Part I	Princeton University	65000	2012-08-12	6	Coursera	Princeton University, 2012
Introduction to Sustainability	University of Illinois at Urbana-Champaign	32000	2012-08-27	8	Coursera	Rushakoff, 2012
Securing Digital Democracy	University of Michigan	14000	2012-09-03	5	Coursera	University of Michigan, 2012
Statistics One	Princeton University	96000	2012-09-03	12	Coursera	Bialik, 2013
Modern & Contemporary American Poetry	University of Pennsylvania	36000	2012-09-10	10	Coursera	Unger, 2013
Introduction to Mathematical Thinking	Stanford University	57592	2012-09-17	10	Coursera	Devlin, 2012
A History of the World since 1300	Princeton University	83000	2012-09-17	12	Coursera	Cervini, 2012
Organizational Analysis	Stanford University	81000	2012-09-24	10	Coursera	Hawkins, 2013
An Introduction to Interactive Programming in Python	Rice University	54000	2012-10-15		Coursera	Weinzimmer, 2012
The Modern World: Global History since 1760	University of Virginia	40000	2013-01-14	15	Coursera	Kapsidelis, 2013
Microeconomics for Managers	University of California, Irvine	37000	2013-01-21	10	Coursera	Heussner, 2013
Fundamentals of Human Nutrition	University of Florida	45000	2013-01-22		Coursera	Nelson, 2013
Data Analysis	Johns Hopkins University	102000	2013-01-22	8	Coursera	Jordan, 2013

Course	Institution	Enrolled	Start date	Length (weeks)	Platform	Source
Principles of Public Health	University of California, Irvine	15000	2013-01-28	5	Coursera	Florida Public Health Training Center, 2013
Introduction to Digital Sound Design	Emory University	45000	2013-01-28	4	Coursera	Williams, 2013
Nutrition for Health Promotion and Disease Prevention	University of California, San Francisco	50000	2013-01-28	6	Coursera	Ferraro, 2013
Grow to Greatness: Smart Growth for Private Businesses, PartI	University of Virginia	71000	2013-01-28	5	Coursera	University of Virginia, 2013
Developing Innovative Ideas for New Companies	University of Maryland, College Park	85000	2013-01-28	6	Coursera	Welsh & Dragusin, 2013
The Modern and the Postmodern	Wesleyan University	30000	2013-02-04	14	Coursera	Roth, 2013
Clinical Problem Solving	University of California, San Francisco	28000	2013-02-11	6	Coursera	Harder, 2013
Aboriginal Worldviews and Education	University of Toronto	23000	2013-02-25	4	Coursera	Stauffer, 2013
Introduction to Music Production	Berklee College of Music	50000	2013-03-01	6	Coursera	Clark, 2013
Songwriting	Berklee College of Music	65590	2013-03-01	6	Coursera	Pattison, 2013
Sustainable Agricultural Land Management	University of Florida	13000	2013-03-04	9	Coursera	Nelson, 2013
How Things Work 1	University of Virginia	20000	2013-03-04		Coursera	Burnette, 2012
Leading Strategic Innovation in Organizations	Vanderbilt University	33000	2013-03-05	8	Coursera	Furman University, 2013
Economic issues, Food & You	University of Florida	16000	2013-03-18	10	Coursera	Nelson, 2013
Global sustainable energy: past, present and future	University of Florida	18000	2013-03-24	15	Coursera	Nelson, 2013

Course	Institution	Enrolled	Start date	Length (weeks)	Platform	Source
Science, Technology, and Society in China I: Basic Concepts	The Hong Kong University of Science and Technology	17000	2013-04-04	3	Coursera	Sharma, 2013
Introduction to Improvisation	Berklee College of Music	39000	2013-04-29	5	Coursera	Burton, 2013
Grow to Greatness: Smart Growth for Private Businesses, Part II	University of Virginia	71000	2013-04-29	4	Coursera	University of Virginia, 2013
TechniCity	Ohio State University	16000	2013-05-04	4	Coursera	Campbell, 2013
Nutrition, Health, and Lifestyle: Issues and Insights	Vanderbilt University	66000	2013-05-06	6	Coursera	Moran, 2013
History of Rock, Part One	University of Rochester	30000	2013-05-13	7	Coursera	Rivard, 2013
First-Year Composition 2.0	Georgia Institute of Technology	17000	2013-05-27	8	Coursera	Head, 2013
Creative Programming for Digital Media & Mobile Apps	University of London International Programmes	70000	2013-06-03	6	Coursera	Gillies, 2013
Growing Old Around the Globe	University of Pennsylvania	4500	2013-06-10	6	Coursera	Posey, 2013

Table 2: Data Drawn from Online Sources in Relation to MOOC Enrolment, Number of Active Users, and Completion Rates

Course	Institution	Enrolled	Active	Completed	Start date	Length	Platform	Source
Introduction to Machine Learning	Stanford University	104000	41600	13000	2011-10-01	10	Coursera	McKenna, 2012
Introduction to Artificial Intelligence	Stanford University	160000	80000	20000	2011-10-01	10	Udacity	Schmoller, 2012
6.002x - Circuits and Electronics	Massachusetts Institute of Technology	154763		7157	2012-03-05	14	MITx	Lewin, 2012b
Software Engineering for SaaS	University of California, Berkeley	50000		3500	2012-05-18	5	Coursera	Meyer, 2012
Listening to World Music	University of Pennsylvania	36295	22018	2191	2012-07-23	7	Coursera	Jordan, 2013
Internet History, Technology, and Security	University of Michigan	46000	11640	4595	2012-07-23	13	Coursera	Severance, 2012
Gamification	University of Pennsylvania	81600	49776	8280	2012-08-27	6	Coursera	Werbach, 2012
6.002x: Circuits and Electronics	Massachusetts Institute of Technology	46000	6000	3008	2012-09-05	14	EdX	Chu, 2013
Functional Programming Principles in Scala	École Polytechnique Fédérale de Lausanne	50000		9593	2012-09-18	7	Coursera	Miller & Odersky, 2012
Social Network Analysis	University of Michigan	61285	25151	1410	2012-09-24	8	Coursera	Jordan, 2012
Bioelectricity: A Quantitative Approach	Duke University	12000	7761	313	2012-09-24	9	Coursera	Belanger & Thornton, 2013
Greek and Roman Mythology	University of Pennsylvania	55000		2500	2012-09-24	10	Coursera	Jordan, 2013
An Introduction to Operations Management	University of Pennsylvania	87000	58000	4000	2012-09-24	8	Coursera	Barber, 2013
Mathematical Biostatistics Bootcamp	Johns Hopkins University	15930	8380	740	2012-09-24	7	Coursera	Anderson, 2012
Computing for Data Analysis	Johns Hopkins University	50899	27900		2012-09-24	4	Coursera	Simply Statistics, 2012

Course	Institution	Enrolled	Active	Completed	Start date	Length	Platform	Source
Learn to Program: The Fundamentals	University of Toronto		38502	8243	2012-09-24	7	Coursera	St. Petersburg College, 2013
Introduction to Genetics and Evolution	Duke University	33000	14000	1705	2012-10-10	12	Coursera	Duke Today, 2012
CS50x: Introduction to Computer Science I	Harvard University	150349	100953	1388	2012-10-15	24	EdX	Malan, 2013
3.091x: Introduction to Solid State Chemistry	Massachusetts Institute of Technology	28512	6000	2082	2012-10-15	12	EdX	Chu, 2013
Computational Investing, Part I	Georgia Institute of Technology	53205	28199	2554	2012-10-22	9	Coursera	Balch, 2013a
Think Again: How to Reason and Argue	Duke University	226652	132000	5322	2012-11-26	12	Coursera	Riddle, 2013a
Introduction to Astronomy	Duke University	60000	40000	2141	2012-11-27	8	Coursera	Belanger, 2013
Drugs and the Brain	California Institute of Technology	66800	10426	4400	2012-12-01	5	Coursera	Lesiewicz, 2013
Calculus: Single Variable	University of Pennsylvania	47000	7000		2013-01-07	13	Coursera	Unger, 2013
Calculus One	Ohio State University	35579	24385		2013-01-07	15	Coursera	Evans, 2013
Image and video processing: From Mars to Hollywood with a stop at the hospital	Duke University	40000	23000	4069	2013-01-14	9	Coursera	Riddle, 2013b
Artificial Intelligence Planning	University of Edinburgh	29894	15546	654	2013-01-28	5	Coursera	University of Edinburgh, 2013
E-learning and Digital Cultures	University of Edinburgh	42844	21862	1719	2013-01-28	5	Coursera	University of Edinburgh, 2013
Critical Thinking in Global Challenges	University of Edinburgh	75844	35084	6909	2013-01-28	5	Coursera	University of Edinburgh, 2013

Course	Institution	Enrolled	Active	Completed	Start date	Length	Platform	Source
Introduction to Philosophy	University of Edinburgh	98128	53255	9445	2013-01-28	7	Coursera	University of Edinburgh, 2013
Astrobiology and the Search for Extraterrestrial Life	University of Edinburgh	39556	20413	7707	2013-01-28	5	Coursera	University of Edinburgh, 2013
Equine Nutrition	University of Edinburgh	23322	18998	8416	2013-01-28	5	Coursera	University of Edinburgh, 2013
Introductory Organic Chemistry - Part 1	University of Illinois at Urbana-Champaign	17400	9000		2013-01-28	8	Coursera	Arnaud, 2013
Stat2.1x: Introduction to Statistics: Descriptive Statistics	University of California, Berkeley	52661		8181	2013-02-20	5	EdX	Adhikari, 2013
Computational Investing, Part I	Georgia Institute of Technology	25589	15688	1165	2013-02-23	8	Coursera	Balch, 2013b
AIDS	Emory University	18600	10601		2013-02-25	9	Coursera	Williams, 2013
Introductory Human Physiology	Duke University		33675	1036	2013-02-25	12	Coursera	Zhou, 2013
Pattern-Oriented Software Architectures for Concurrent and Networked Software	Vanderbilt University	30979	20180	1643	2013-03-04	8	Coursera	Jordan, 2013
Introduction to Mathematical Thinking	Stanford University	27930		1950	2013-03-04	10	Coursera	Schmoller, 2013
A Beginner's Guide to Irrational Behavior	Duke University	142839	82008	3892	2013-03-25	8	Coursera	Jordan, 2013
Gamification	University of Pennsylvania	66438	34548	5592	2013-04-01	6	Coursera	Werbach, 2013
Medical Neuroscience	Duke University	44980	18433	756	2013-04-08	12	Coursera	Novicki, 2013

Course	Institution	Enrolled	Active	Completed	Start date	Length	Platform	Source
Healthcare Innovation and Entrepreneurship	Duke University		15596	1520	2013-04-15	6	Coursera	Kenyon, 2013
Mathematical Biostatistics Bootcamp	Johns Hopkins University	21916		2087	2013-04-16	7	Coursera	Jordan, 2013
Generating the Wealth of Nations	University of Melbourne	28922	12197	500	2013-04-29	10	Coursera	Signsofchaos blog, 2013
Sports and Society	Duke University	19281	6918	1626	2013-04-30	7	Coursera	Anderson, 2013
Introduction to International Criminal Law	Case Western Reserve University	21000		1432	2013-05-01	8	Coursera	Farkas, 2013
Inspiring Leadership through Emotional Intelligence	Case Western Reserve University	90000	58000		2013-05-01	8	Coursera	Farkas, 2013
Statistical Molecular Thermodynamics	University of Minnesota	10000	5000		2013-05-20	8	Coursera	Friedrich, 2013
Introduction to Systems Biology	Icahn School of Medicine at Mount Sinai	26,915	15392		2013-06-03	6	Coursera	Course site at Coursera

Data analysis was conducted using linear regression carried out with Minitab statistical software. Linear regression was chosen as the approach to analysis because at this stage the aim of the research was exploratory, to identify potential trends rather than being explanatory and seeking to fit a model. This would be a valuable goal for follow-up research particularly if more consistent data became available for MOOCs more broadly.

Linear regression analyses were carried out individually according to different factors of interest rather than as a single multiple regression due to issues of data consistency and availability; that is, data is not available for every field in Tables 1 and 2 for every course, so n varies according to different tests (see Results and Analysis section). Rather than discarding courses for which the full spectrum of data was not available and in order to gain the greatest insight possible into the different factors, a series of individual regression analyses were carried out.

Limitations

There are a number of limitations which must be borne in mind with the approach taken by this study, including issues of validity of data and reliability of the research instruments used.

In terms of validity, it should be noted that the accuracy of figures varies according to sources, with some institutions releasing highly accurate figures and others (particularly when releasing enrolment data through the press) are rounded figures. This reflects the fact that MOOC courses do not consistently release this information into the public domain, and most of the courses that would have been eligible for inclusion (67.4%) have not released any data. Of the institutions or instructors choosing to make data available, bias may be introduced according to their motivations for publicizing this information, which are unknown. There is also a degree of trust involved in the information provided by student informants via the blog.

It should be emphasized that the study sought to be exploratory in nature, identifying trends of interest in the data as a starting point for further research but not seeking to explain or model the phenomenon. Reliability of the approach is less contentious as the data have been collected via several rounds of internet searches during the data collection period (February 13th to July 22nd 2013) and shown in full in Tables 1 and 2 should others wish to reproduce the tests or carry out alternative analyses. By collating data 'in the open' at the author's blog (Jordan, 2013), this offered a platform for others (including course leaders) to scrutinize the data and provide more accurate figures in some cases.

Results and Analysis

Trends in Total Enrolment Figures

Total enrolment numbers draws upon the data in both Tables 1 and 2, which comprises a total of 91 courses (excluding three courses which are missing total enrolment figures). Total enrolment figures range from 4,500 to 226,652 students, with a median value of 42,844. The data does not exhibit a normal distribution (Figure 1); six-figure enrolments are not representative of the 'typical' MOOC. Total enrolments are shown plotted against the date each course began in Figure 2. This demonstrates a negative correlation, with enrolment numbers decreasing over time.
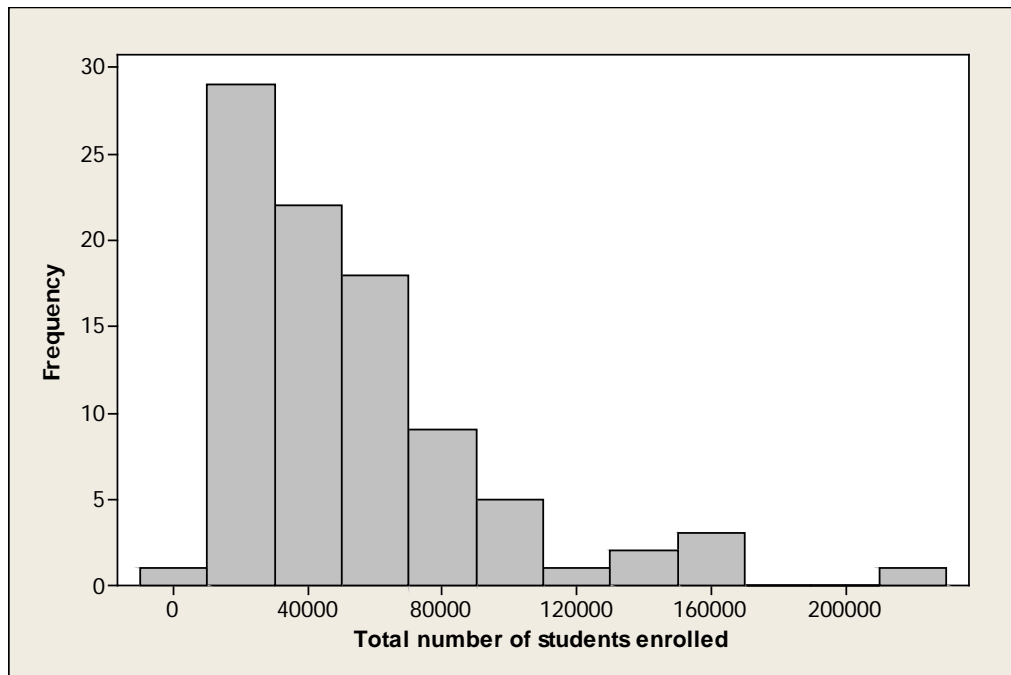
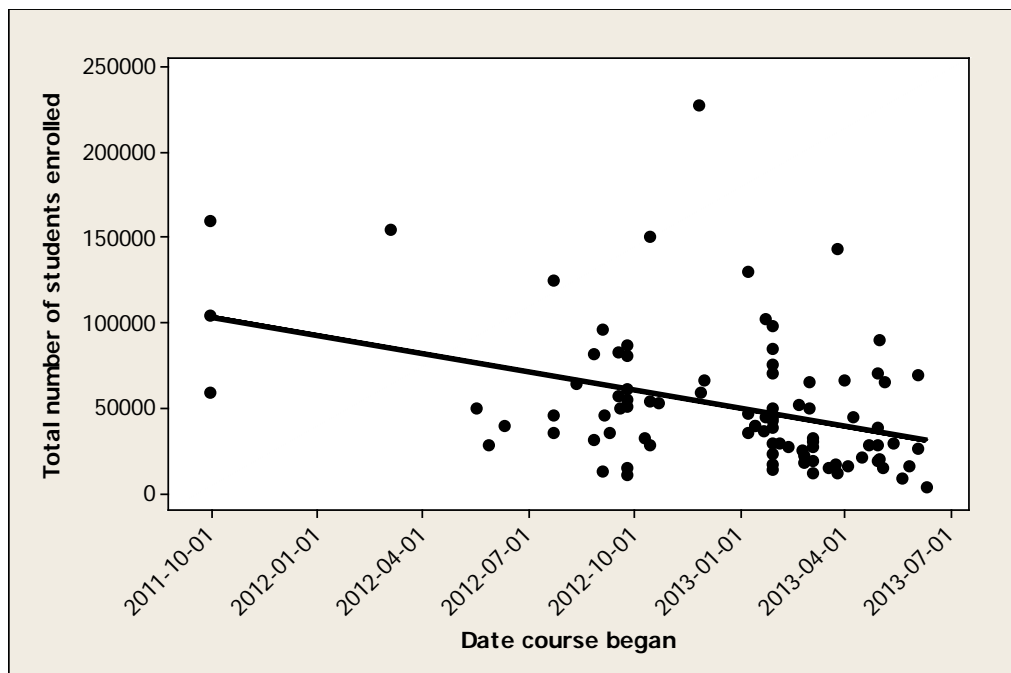*Figure 1.* Histogram of total enrolment numbers for the sampled courses (*n* = 91).

Figure 2. Scatterplot of total enrolment numbers plotted against course start date for the sampled courses (*n* = 91).

A regression analysis was carried out, prior to which the data was subject to a Box-Cox transformation as the residuals do not follow a normal distribution. Regression analysis showed that date significantly predicted total enrolment figures at the 95% significance level by the following formula: ln(Enrolled) = 104.249 - 0.00226915*StartDate (R^2 = 0.1719, $p < 0.001$). The relationship is a negative correlation, indicating that as time has progressed, enrolment figures have decreased. The relationship is relatively weak (time as a factor accounts for 17.2% of the variance observed, as R^2 is a measure of the fraction of variance explained by the model; Grafen & Hails, 2002), although the sample is sufficiently large that this is statistically significant (critical R^2 values decrease according to sample size, with an *n* of 91 being relatively large; Siegel, 2011). This highlights that a focus upon figures from early courses is misleading and not representative of how the field is developing.

The relationship between course length and total enrolments was also considered, and found to demonstrate a positive correlation between course length and total enrolment (Figure 3).
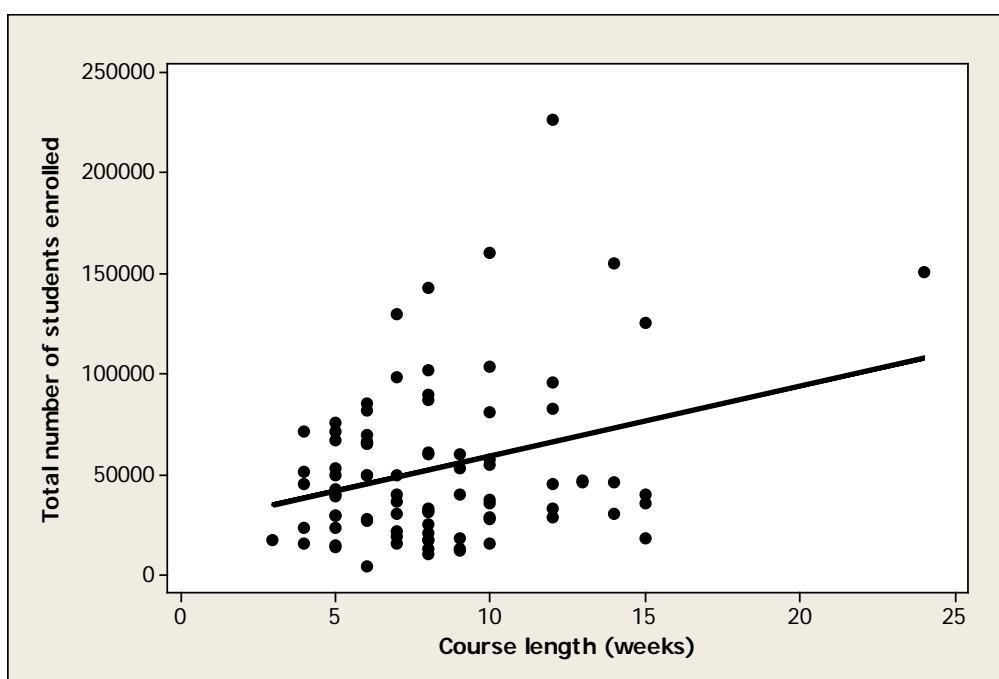

Figure 3. Scatterplot of total enrolment numbers plotted against course length for the sampled courses (*n* = 87).

Following a Box-Cox transformation, regression analysis showed that course length significantly predicted (at the 95% significance level) total enrolment figures by the following formula: ln(Enrolled) = 10.2248 + 0.0491206*Length (R^2 = 0.0545, p = 0.029). The correlation between the variables is positive, indicating courses that are

longer attract a greater number of enrolments. The relationship is relatively weak, accounting for 5.5% of the variance observed, although the sample size is sufficiently large for this to be a statistically significant relationship. This positive correlation may suggest that prospective MOOC students prefer more substantial courses (however, see also the relationship between course length and completion rates).

In addition, the relationship between university ranking and enrolment figures was considered, although it was not found to be significant at the 95% level.

Trends in Completion Rates

Completion rates were calculated as the percentage of students (out of the total enrolment for each course) who satisfied the criteria to gain a certificate for the course. This information was available for 39 courses in the sample. Completion rates range from 0.9% to 36.1%, with a median value of 6.5% (Figure 4). The data is skewed, so the higher completion rates are not representative, with completion rates of 5% being typical.
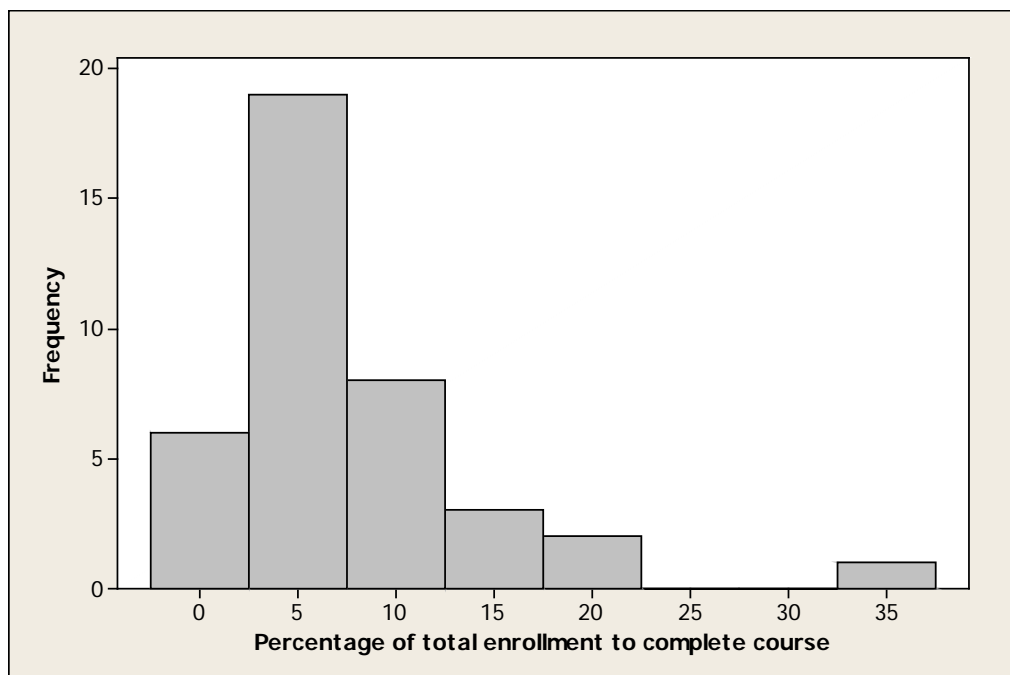

Figure 4. Histogram of completion rates for the sampled courses (n = 39).

As the residuals were not normally distributed, a Box-Cox transformation was again carried out before conducting regression analysis. No significant relationships were found between completion rate and date, university ranking, or the total number of students enrolled. Completion rates remained consistent across these factors. A significant negative correlation was found however between completion rate and course

length, shown in Figure 5. Regression analysis showed that course length significantly predicted completion rate by the following formula: $\ln(PercentTotalCompleted) = 2.64802 - 0.100461*CourseLength$ ($R^2 = 0.2373$, $p = 0.002$). The correlation in this case is negative, indicating that a lower proportion of students complete longer courses. Course length accounts for 23.4% of the variance observed, and the correlation is significant at the 95% significance level.
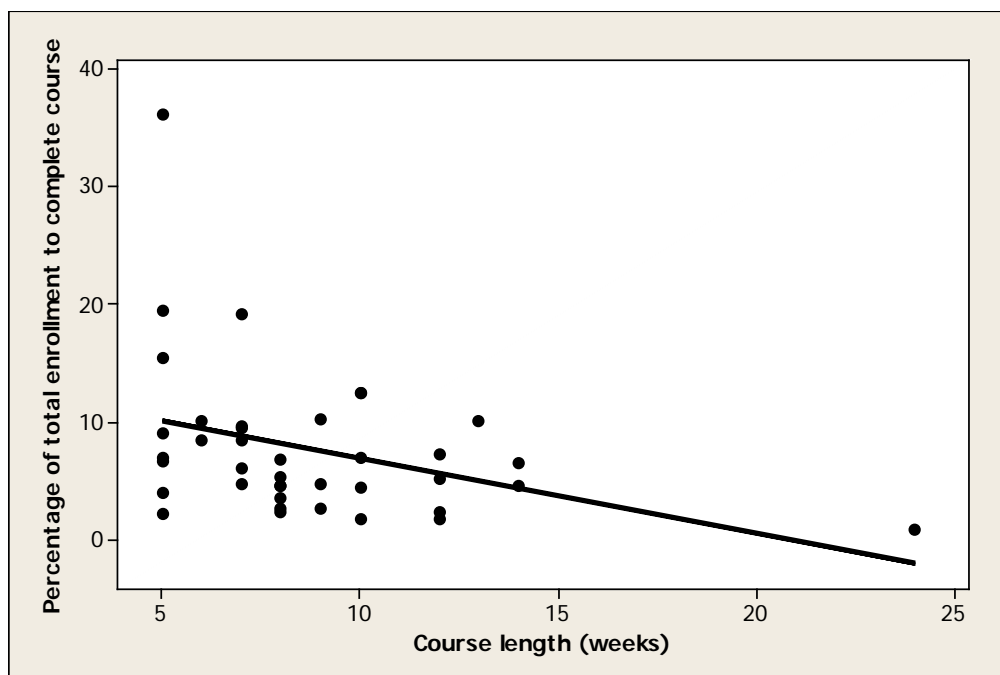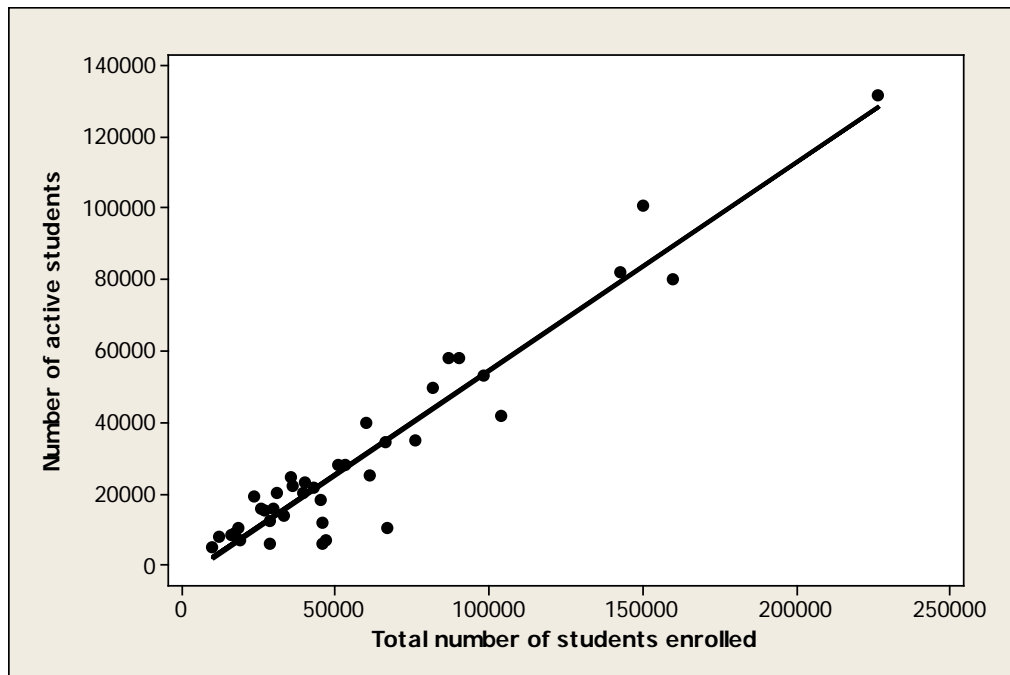

Figure 5. Scatterplot of completion rate plotted against course length for the sampled courses ($n = 39$).

While considering completion rate as the percentage of the total enrolment that complete the course is the type of data that is most readily available, a criticism of this characterization is that many students may enroll without even starting the course, and that completion rates would be better characterized as the proportion of active students who complete. This level of information is available for a subset of the sampled courses (39 courses with a number of active students and total enrolment; 33 courses with data about the proportion of active students who complete).

The number of active students is remarkably consistent as a proportion of the total enrolment of the course (with approximately 50% of the total enrolment becoming active students). This is shown graphically in Figure 6. Regression analysis showed that total enrolment significantly predicted the number of active students by the following formula: $Active = 0.543336*Enrolled$ ($R^2 = 0.9556$, $p < 0.001$). The correlation is strong (accounting for 95.6% of the variance) and positive, showing a consistent relationship

between total enrolment and the percentage who become active students (being approximately 54% of those who enroll).

Figure 6. Scatterplot of number of active students plotted against total enrolment for the sampled courses (*n* = 39).

When calculating completion rate as the percentage of active students who complete the course, completion rates range from 1.4% to 50.1%, with a median value of 9.8% (Figure 7). While completion rates as a percentage of active students span a wider range than completion rates as a percentage of total enrolments, there remains a strong skew towards lower values. The differences here would be worthwhile to explore in further detail to explore features of course design that may account for the wider variation observed.
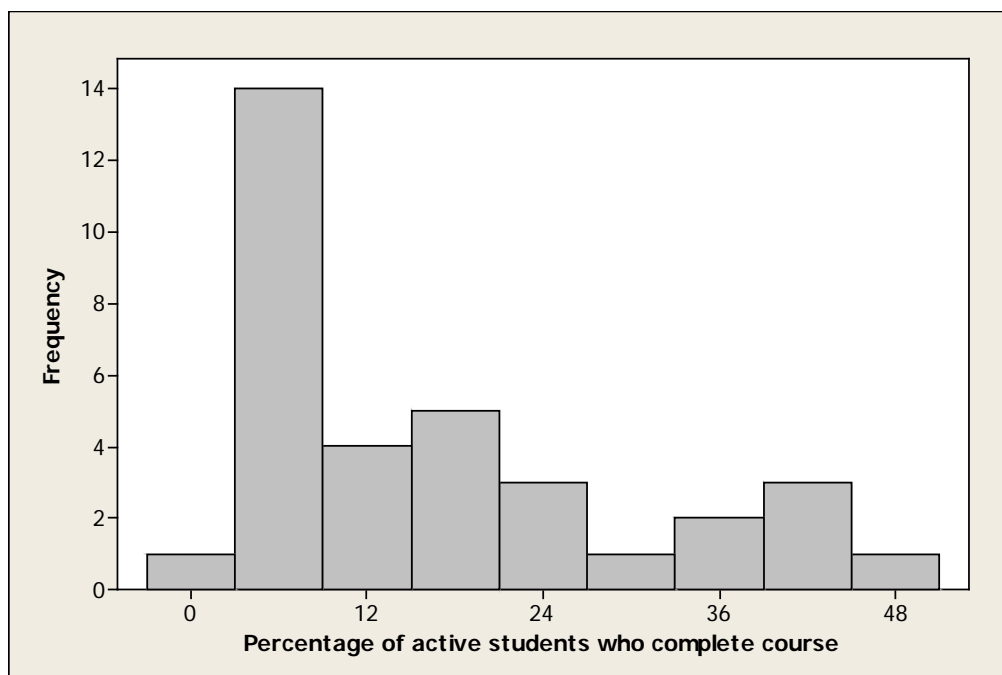
Figure 7. Histogram of completion rates as a proportion of active students for the sampled courses (*n* = 39).

No significant relationships were found between completion rate as a proportion of active users and date, university ranking, total enrolment, or (in contrast to completion rate as a percentage of total enrolment) course length. This may suggest that enrolled students may be put off starting longer courses, but this is less of an issue for those who do become actively engaged in the course.

Conclusions

The findings here demonstrate changes in the field since the concept of MOOCs entered the mainstream and the inception of the major MOOC platforms. It is misleading to invoke early enrolment and completion figures as representative of the phenomenon; six-figure enrolments are atypical, with the median average enrolment being 42,844 students, and decreasing over time as the number of courses available continues to increase. Although this is lower than the earliest examples, it emphasizes that it is inappropriate to compare completion rates of MOOCs to those in traditional bricks-and-mortar institution-based courses.

The majority of courses have been found to have completion rates of less than 10% of those who enroll, with a median average of 6.5%. The definition of completion rate used here is the percentage of enrolled students who satisfied the courses' criteria in order to

earn a certificate, and this definition was used because it is the type of information that is most frequently available. There are potentially many ways in which MOOC students may participate in and benefit from courses without completing the assessments. The wider range of completion rates (while still remaining quite low overall, with a median of 10%) observed when defining completion as a percentage of active learners in courses is interesting and warrants further work to better understand the reasons why those who become engaged initially do or do not complete courses.

This is not to say, however, that completion rates should be ignored entirely. Looking at completion rates is a starting point for better understanding the reasons behind them, and how courses could be improved for both students and course leaders. For example, the relationship between enrolments, completion, and course length is an interesting issue for MOOC course design, balancing the higher enrolments with the lower completion rates of longer courses. Figures about how many students achieved certificates obscure how many students attempted to gain a certificate but did not meet the criteria. Given that MOOCs are offered free of educational prerequisites, striving to improve teaching on courses so that students who wish to complete are assisted in doing so is an important pedagogical issue. The extent of understanding that can be gained outside of running a MOOC will continue to be constrained however as long as the release of detailed data about courses is limited.

This study has only considered relationships between enrolment and completion and a small number of general factors for which data is available publicly; various other factors would be worthwhile to explore. For example, it would be useful to look at in terms of the underlying pedagogy, whether differences emerged based on how transmissive (so-called 'xMOOCs') or connectivist ('cMOOCs') courses are. The impact of different assessment types, being necessarily linked to the criteria for achieving a certificate of completion, would also be a worthwhile area to consider in further detail. Along with the studies discussed in the introduction which focus upon links between student demographics or behaviours and completion (Breslow et al., 2013; Kizilcec et al., 2013; Koller et al., 2013), a limitation of the approach used here is that the data neglects the student voice. While these approaches can identify trends and patterns, they are unable to explore in detail the reasons behind the trends observed.

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A Case Study of Integrating Interwise: Interaction, Internet Self-Efficacy, and Satisfaction in Synchronous Online Learning Environments

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Abstract

This paper reports research on the implementation of a web-based videoconferencing tool (Interwise) for synchronous learning sessions on an industrial technology course offered through a university in northern Taiwan. The participants included undergraduate students from the same course offered in two different semesters. We investigated students' perceptions of interactions with the instructor and fellow students, their confidence in utilizing the Internet (Internet self-efficacy), and the satisfaction level that students perceived throughout the learning process with Interwise. We also examined the effect of interactions and Internet self-efficacy on student satisfaction. Data collected through paper-based and online surveys were analyzed using correlation and multiple regression. The results revealed that overall, learners perceived Interwise as a tool that was moderately easy to use for synchronous learning. Learners seemed to prefer using the Interwise features, such as emotion icons, talk, or raise hand, to interact with their instructor. Learners had high confidence in gathering data or getting support through the Internet, but low confidence in resolving Internet related problems. Both learner-learner and learner-instructor interactions were significant predictors of student satisfaction, while Internet self-efficacy did not significantly contribute to satisfaction. Learner-instructor interaction was found to be the strongest predictor of student satisfaction.

Keywords: Learner-learner interaction; learner-instructor interaction; Internet self-efficacy; synchronous learning; satisfaction; Interwise

Introduction

Distance education has become a popular alternative to traditional, face-to-face instruction in many countries throughout the world. In distance education, information and communication technologies (ICTs) can help bridge the separation of distance and time between teachers and students by enabling interaction (Moore & Kearsley, 1996). ICTs are digital tools or sources used to manipulate, distribute, and create information (Apena, 2012; Olusola & Alaba, 2011). ICTs include traditional (e.g., radio, television) and new technologies such as the Internet, the World Wide Web (WWW), teleconferencing, interactive CDs, virtual realities, hardware, and software (Apena, 2012; Olusola & Alaba, 2011; Wang & Woo, 2007). These tools manipulate and process information but also facilitate communication (Apena, 2012; Koustourakis, Panagiotakopoulos, & Vergidis, 2008). ICT integration is a multi-faceted process and includes micro- (e.g., instructional, class) and macro- (e.g., state, institutional, organisational) levels (Altun, Kalaycı, & Avci, 2011; Wang, 2008). This study exemplifies micro-levels of ICT integration.

Recent improvement in ICTs has made the use of synchronous instruction more popular than previously. Synchronous and asynchronous learning differ in terms of interaction and the type of support that may be required (Ng, 2007). The advantages of using synchronous technology tools include real-time communication between the instructor and learners or among learners, immediate response from the instructor for clarification on learners' questions, decrease of travelling time, and simulated experience of a real classroom learning setting (Salmon, 2000). Studies have shown that integration of ICTs enhances students' interaction with their classmates and instructor, which in turn helps create a satisfying learning experience (Altun, Kalaycı, & Avci, 2011; Snowball & Mostert, 2010; Wang, 2008).

Learners' confidence in using ICTs may affect their learning experiences in distance learning. According to a report by Taiwan's Executive Yuan (2011) on Taiwanese ICT use and digital opportunities, more than 72% of the 12-and-older population have access to a computer and the Internet. The Internet-access rate is associated with education level. Although many use the Internet in Taiwan, the level of self-efficacy towards the Internet may vary from one person to another. Internet self-efficacy reflects one's confidence in performing Internet-related tasks, which may be especially important for online learners, who need to possess a certain level of Internet skills to proceed with their learning successfully. Although interaction has been identified as a critical component of student satisfaction in distance learning (Kuo, Walker, Belland, & Schroder, 2013), the impact of Internet self-efficacy on student satisfaction is not clear (Puzziferro, 2008; Rodriguez Robles, 2006). In addition, depending on the types of technology tools utilized in distance learning, students' learning experiences would differ. Each type of technology tool is developed with its own purpose for teaching and learning. For example, WebCT is designed for course delivery and management (Rogerson-Revell,

2007). Wikis are used to increase communication and collaboration among students (Bradley, Lindstrom, & Rystedt, 2010; Carter, 2009).

The web-based conferencing tool used in this study, Interwise, allows an instructor to provide a live lecture or presentation to their students. Real time communication between instructor and students is enhanced through features such as audio, video, whiteboard, and hands-on functions (AT&T, 2013). Studies on the use of Interwise in teaching and learning are limited (Ng, 2007; Skylar, 2009). This study investigated the influence of interaction and Internet self-efficacy on Taiwanese students' satisfaction in synchronous learning environments through Interwise.

Literature Review

First, we provide an overview of three major constructs in online education – interaction, Internet self-efficacy, and student satisfaction. In particular, we summarize previous research on the relationships between the independent variables (i.e., interaction, Internet self-efficacy) and dependent variables (i.e., student satisfaction) in online education settings.

Interaction.

Interaction is important in all forms of education, regardless of whether technology is involved. Interaction in traditional classroom learning focuses on the dialogues between instructors and students. Due to the rapid development of ICTs, the concept of interaction has been expanded to distance learning environments within which a wide range of mediation takes place. The nature of interaction occurring in a traditional classroom may not be possible, and consequently the effectiveness of teaching and learning might be lowered to a certain extent.

The most prominent framework of interaction includes three major constituents: learner-instructor interaction, learner-learner interaction, and learner-content interaction (Moore, 1989). Although other types of interaction are often addressed by researchers from different perspectives, Moore's interaction model continues to dominate research on interaction in distance learning environments (Moore, 1989; Northrup, Lee, & Burgess, 2002). For example, Northrup, Lee, and Burgess (2002) categorized interaction within online learning into four elements: content interaction, conversation and collaboration, meta-cognitive skills, and need for support. Focusing on the social, pedagogical, and economic impact, Anderson (2003) extended the definition by proposing six types of interaction: teacher-teacher, teacher-content, and content-content, in addition to the three types of interactions described by Moore. Muirhead and Juwah (2004) considered the previous definitions and proposed that interaction is a dialogue or discourse or event that occurs between participants or objects through the synchronous or asynchronous mediation of responses, feedback, or technology.

Among the three types of interaction, learner-instructor interaction and learner-learner

interaction are easy to explain and understand. The former involves a two-way communication between the instructor and learners, and the latter refers to a two-way communication between learners (Moore, 1989). Both are regarded as essential factors in traditional learning and distance learning settings. For most learners, desired learner-instructor interaction includes immediate feedback and professional guidance from the instructor, especially at the points of application and evaluation. Learner-content interaction refers to an internal process in which learners elaborate and reflect on the course content (Moore, 1989).

This study focused on learner-learner interaction and learner-instructor interaction since these two types of interaction were identified as most important to online learners in previous research (Battalio, 2007; Bolliger & Martindale, 2004; Jung, Choi, Lim, & Leem, 2002). Instead of measuring the amount of interaction that students actually had with their instructor or classmates, this study investigated the interactions that students perceived from their communications with the instructor and their fellow students, but not how much interaction there really was. Therefore, a self-report that reflected student perceptions towards interaction was utilized to measure learner-learner interaction and learner-instructor interaction.

Internet self-efficacy.

People's confidence in their ability to perform certain tasks, or self-efficacy, has long been examined to predict the extent to which they will engage in the task (Bandura, 1977). Internet self-efficacy refers to one's belief in his or her capability to organize and execute Internet-related actions to accomplish online tasks or assignments (Eastin & LaRose, 2000). Eastin and LaRose (2000) claimed that previous studies did not develop a measure of self-efficacy for overall Internet usage, but a measure specific to a certain type of Internet-related task (e.g., using a browser, writing HTML, moving bookmarks). Thus, the Internet self-efficacy scale proposed by Eastin and LaRose (2000) is a self-report that assesses one's judgment of their ability to apply Internet skills more widely, including understanding of Internet software and hardware, finding information, troubleshooting search problems, and confidence in learning advanced Internet skills.

Internet self-efficacy is positively related to previous Internet experience and Internet use, but negatively related to Internet stress (Eastin & LaRose, 2000). People with positive attitudes toward technologies are likely to have higher Internet self-efficacy, compared to those with negative attitudes toward technologies. Internet training is helpful to improve learners' Internet self-efficacy, especially for those with positive attitudes toward technologies, and those with low computer anxiety (Torkzadeh, Chang, & Demirhan, 2006; Torkzadeh & Van Dyke, 2002).

Student satisfaction.

Referring to student perceptions of the extent to which their learning experiences were helpful and enjoyable, student satisfaction is a critical indicator of instructional quality.

Student satisfaction is strongly related to cognitive learning outcomes (e.g., performance, achievement) (Biner, Bink, Huffman, & Dean, 1997; Wang & Ku, 2010). It is worthwhile to investigate student satisfaction due to its relation to retention, loyalty to a program, and student performance (Ali & Ahmad, 2011; Allen & Seaman, 2003; Yukselturk & Yildirim, 2008). It provides valuable information to instructors or administrators on what could be improved to a program or an online course (Biner, Bink, Huffman, & Dean, 1997; Bolliger & Martindale, 2004). Student satisfaction in this study was measured through student self reports in order to obtain student perceptions of the level of satisfaction towards the synchronous sessions.

Interaction, Internet self-efficacy, and student satisfaction.

Interaction is a pivotal variable that has an impact on student satisfaction in distance learning environments (Bray, Aoki, & Dlugosh, 2008; Kuo, Walker, Schroder, & Belland, 2014; Rodriguez Robles, 2006). For example, Offir, Lev, and Bezalel (2008) found the interaction level in a synchronous class to significantly predict the effectiveness of the class. Although the literature indicates that both learner-instructor interaction and learner-learner interaction are significant predictors of student satisfaction, it is unclear which type of interaction is most important in evaluating students' experiences in which type of distance learning environments. Some research indicated learner-instructor interaction as the best predictor of student satisfaction while others identified learner-learner interaction as the best predictor of student satisfaction (Bolliger & Martindale, 2004; Rodriguez Robles, 2006). It seems that learner-instructor interaction would be most influential to student satisfaction in a course that involves a high percentage of instructor-led instructions. When a course is designed applying learner-centered approaches to engage students through a series of collaborative activities, learner-learner interaction appears to be most critical to one's learning experiences (Battalio, 2007).

The findings of the relationship between Internet self-efficacy and learning results such as performance and satisfaction are inconclusive. Some studies indicated that Internet self-efficacy positively correlates with or predicts students' performance in web-based learning environments (DeTure, 2004; Joo, Bong, & Choi, 2000; Thompson, Meriac, & Cope, 2009). For example, students with higher Internet self-efficacy were found to have better information searching skills and learn better than those with lower Internet self-efficacy (Tsai & Tsai, 2003). However, little is known about the effect of Internet self-efficacy on student satisfaction in distance education. Only a few studies investigated the relationship between Internet self-efficacy and satisfaction, and showed that Internet self-efficacy is not significantly correlated with or predictive of satisfaction in web-based learning environments (Puzziferro, 2006; Puzziferro, 2008; Rodriguez Robles, 2006). Lim (2001) found that Internet experiences in a class correlate positively with student satisfaction. More research is needed to examine the role of Internet self-efficacy for student satisfaction in online synchronous learning.

No previous study has investigated the effect of learner-learner interaction, learner-instructor interaction, and Internet self-efficacy on student satisfaction with the implementation of Interwise in web-based learning. It appears to be worthwhile to identify the relationships of satisfaction in terms of interaction and Internet self-efficacy. The contribution of two types of interaction and Internet self-efficacy in predicting student satisfaction in online synchronous settings was of particular interest in this research. In addition, learners' perceptions of using Interwise were explored.

Methodology

This study examined the influence of two types of interaction and Internet self-efficacy on the satisfaction of students enrolled in a course involving two synchronous learning sessions. The study investigated the relationships between predictors (learner-learner interaction, learner-instructor interaction, and Internet self-efficacy) and student satisfaction. A model for significant prediction of student satisfaction in terms of interactions and Internet self-efficacy was expected. Further, the contribution of individual predictors in student satisfaction was of interest.

Research Questions

1. To what extent does each independent variable (learner-instructor interaction, learner-learner interaction, and Internet self-efficacy) correlate with student satisfaction?
2. Are learner-learner interaction, learner-instructor interaction, and Internet self-efficacy significant predictors of student satisfaction?
3. What is the unique contribution of each significant independent variable to student satisfaction?

Setting and Participants

Participants in this study were students in three sections of a course entitled "Introduction to Transportation Technology" offered by the Department of Industrial Technology Education (ITE) at a university in northern Taiwan in fall 2009 and spring 2010. There were two class sections in spring 2010, and one class section in fall 2009. Out of 65 students who attended the class, 57 students responded to the survey. The return rate was 88%.

Table 1 shows the students' demographic information. There were more male respondents than female respondents. All respondents were single with their ages ranging from 18 to 24 years old. Most respondents had been using computers for more than 6 years. Ninety-five percent of the respondents had their own computer.

Table 1

Student Demographic Information

	Frequency	Percentage
Gender		
Male	38	66.7
Female	19	33.3
Marital status		
Single	57	100
Age		
18	6	10.5
19	19	33.3
20	5	8.8
21	14	24.6
22	8	14.0
23	4	7.0
24	1	1.8
Grade level		
Freshman	24	42.1
Sophomore	3	5.3
Junior	28	49.1
Senior	2	3.5
Years of using computers		
1-3	4	7.0
4-6	11	19.3
7-9	22	38.6
10-12	11	19.3
Above 12 years	9	15.8
Own a personal computer		
Yes	54	94.7
No	3	5.3

Materials

This course included 14 weeks of traditional face-to-face sessions and 2 weeks of online synchronous sessions. The online synchronous sessions were facilitated through use of the Interwise software.

Interwise is a Web conferencing tool that provides individuals the opportunities of real-time communications by voice and graphics over the Internet. The Interwise platform includes features that allow a two-way video connection between the moderator and participants. The instructor acts as a moderator who monitors the conversations between him or her and the participants, by submitting questions, tests, or surveys to participants. The instructor can display PowerPoint slides, videos, or images on the whiteboard.

When leading a synchronous meeting, the instructor can enable students to point at or

mark up the content on the screen displayed in real-time. By pressing the "raise a hand" tab, students are able to ask a question verbally. Emotion icons are provided for students to express themselves. The whole live learning session is available to students through recording (AT&T Connect, 2010). Figure 1 shows the Interwise interface when students underwent the online synchronous sessions.
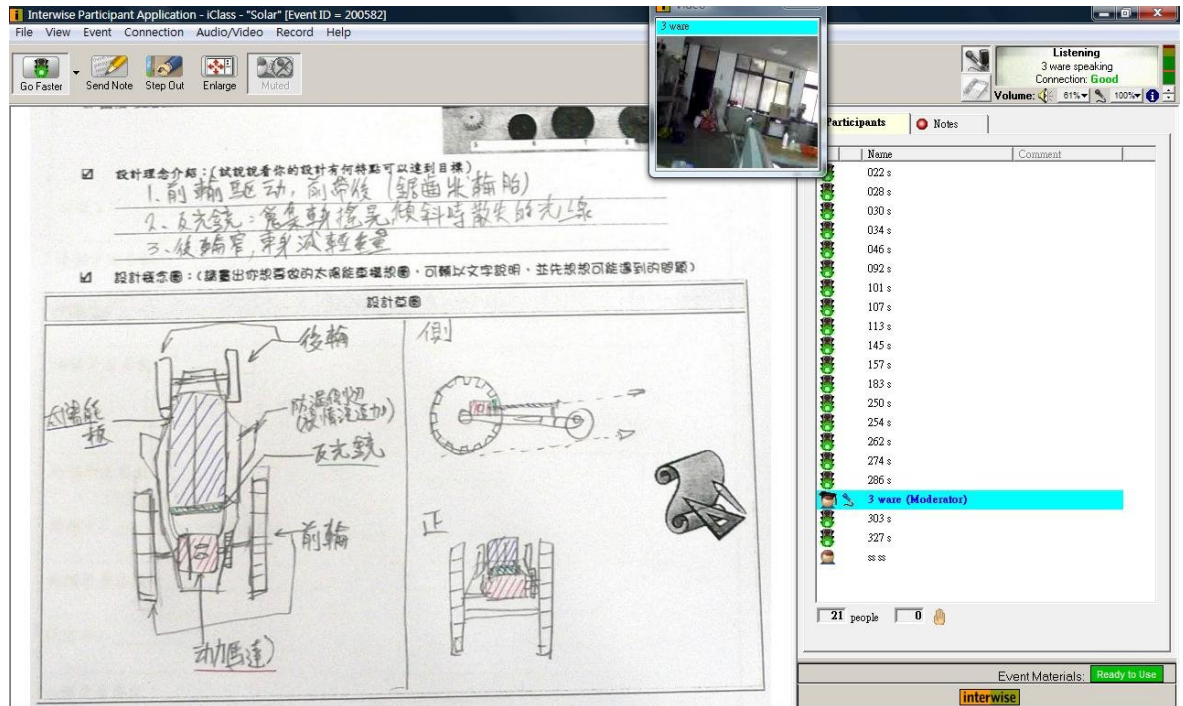
Figure 1. Interwise interface in the online synchronous sessions.

Instrument

A questionnaire was designed that includes four major sections: demographic information, Interwise usage, student perceptions of two types of interactions, Internet self-efficacy, and student satisfaction. The demographic information covers six items, which consisted of gender, marital status, age, grade level, years of using computers, and possession of a personal computer (Please see Table 1). Interwise usage contains questions in relation to learners' perceptions of ease of using Interwise and preference for some featured functions. To measure student perceptions of interaction and student satisfaction, the researchers modified the items of the questionnaire from a previous study (Kuo, Eastmond, Schroder, & Bennett, 2009), which was developed to measure student perceptions of interactions and satisfaction, with good reliability and validity information. The Cronbach's alpha coefficient values for interactions and satisfaction scales from the previous study ranged from .795 to .901.

Both interaction and satisfaction scales are a 5–point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The interaction scale includes two sections,

which are "Learner-learner interaction," and "Learner-instructor interaction" subscales, with seven and eight items respectively. The learner-learner interaction subscale measures the extent to which students perceived that they communicated with fellow students through idea sharing, comments, or working on the same activities or projects. The learner-instructor interaction subscale measures the extent to which students perceived interacting with the instructor by answering questions, getting feedback, or being encouraged to express their thoughts. The student satisfaction scale includes five items regarding students' perceptions of the value of their learning experiences to their own professional development, and their willingness to take similar courses in the future. Slight wording changes were made to fit the context of this study where the Interwise platform was utilized. The Cronbach's coefficient alpha values for each type of the interactions and satisfaction ranged from .852 to .898 (please see Table 3).

The Internet self-efficacy scale in this research was developed by Eastin and LaRose (2000). This measurement with eight items is a seven-point scale that ranges from 1 (*very unlikely*) to 7 (*very likely*). This scale was found to be reliable and internally consistent with a Cronbach's coefficient alpha value at .93. The construct validity of this scale was examined and proved valid.

Procedures

The instructor presented the Interwise tool to students and showed how it worked one week before online synchronous sessions started, to ensure that students were able to operate the software in their own computers. The processes of installing Interwise and using other necessary supplements such as a webcam, a headset, and so on were addressed by the instructor and teaching assistant. Three days before the implementation of Interwise sessions, the instructor and the teaching assistant provided several meeting opportunities to help each student with the installation of Interwise as well as the tests of voice and visual functions, to make sure that Interwise could be used by each student.

The questionnaire was translated to Chinese by the researchers since the students' native language is Chinese. The translated questionnaire was administered to students at the end of spring semester. Before distributing the questionnaire, the researchers contacted the instructor to obtain permission to distribute the survey. Two forms of the survey with the same content were distributed: a paper-based version and an electronic version. The paper-based survey was distributed to the students during the class one week before the end of June 2010, since the students still attended the face-to-face sessions. In terms of convenience of reaching students who had finished the course earlier in the previous semester, the electronic version of the survey was emailed to the students who had finished their class in the fall semester of 2009.

Data Analysis

All data analyses were conducted using SPSS 16.0 for Windows software package.

Descriptive analyses were performed to represent basic student information as well as the average scores for learner-learner interaction, learner-instructor interaction, Internet self-efficacy, and satisfaction. Correlation analysis was used to understand the relationship between the two types of interaction, Internet self-efficacy, and student satisfaction. In addition, correlation analysis served as a preliminary analysis of examining possible multicollinearity problems before any multiple regression analyses were performed. Multiple regression analyses were performed to investigate the combined contribution of predictors towards student satisfaction.

Findings

Table 2 shows students' perceptions of using Interwise. Overall, students agreed that it was moderately easy to use Interwise ($M = 3.28$). When asked whether they liked features such as talk, Interwise whiteboard, emotion icons, send note, and raise hand, the average scores fall within 3 and 4. Emotion icons seemed to be the most preferable features for students, followed by the raise hand feature. Students favored using talk features least.

Table 2

Interwise Usage

Interwise usage	M	SD
Ease of using Interwise	3.28	1.06
Talk feature	3.23	1.07
Interwise whiteboard	3.35	0.99
Emotion icons (laugh, etc.)	3.87	1.07
Send note feature	3.42	1.03
Raise hand feature	3.61	1.14

Note. This is a 5-point likert scale with a minimum score of 1 and a maximum score of 5.

Table 3 reveals the average scores on the two types of interaction, Internet self-efficacy, and student satisfaction. The average scores of learner-learner interaction and learner-instructor interaction are both higher than the mid-point score 3. The average score of Internet self-efficacy is 4.66, which is larger than the mid-point score 4. This means that most respondents agreed that they had a certain amount of interaction with their instructor and fellow students. It appears that most respondents were confident in performing Internet-related tasks. The average score of 3.27 indicates that overall the respondents were moderately satisfied with the class implemented through the use of Interwise.

Table 3

Descriptive Information of the Scales

Interactions & satisfaction	*M*	*SD*	α
Learner-learner interaction (7 items)	3.04	0.74	0.852
Learner-instructor interaction (8 items)	3.35	0.67	0.859
Internet self-efficacy (8 items)	4.66	0.82	0.860
Satisfaction (5 items)	3.27	0.80	0.898

Note. The minimum score for all scales is 1.The maximum score for the interaction and satisfaction scales is 5 but 7 for the Internet self-efficacy scale.

Research Question 1: To what extent does each independent variable (learner-instructor interaction, learner-learner interaction, and Internet self-efficacy) correlate with student satisfaction?

Table 4 depicts the relationships among the two types of interactions, Internet self-efficacy, and satisfaction. The two types of interactions and Internet self-efficacy are all positively related to satisfaction. There was a significant correlation between the learner-learner interaction and satisfaction ($r = .559$, $p < .01$). The level of interaction between learners and the instructor is significantly correlated with satisfaction ($r = .747$, $p < .01$). The correlation between Internet self-efficacy and satisfaction was weaker ($r = .398$, $p < .01$). As the interactions of learners with their fellow students and the instructor increase, the level of satisfaction increases. The more confident learners were in performing Internet related tasks, the higher level of satisfaction they perceived.

Table 4

Correlations Among Independent Variables and Student Satisfaction

	Learner-learner	Learner-instructor	Internet self-efficacy	Satisfaction
Learner-learner	—	.462**	.160	.559**
Learner-instructor		—	.523**	.747**
Internet self-efficacy			—	.398**
Satisfaction				—

*$p < .05$. **$p < .01$. ***$p < .001$

Research Question 2: Are learner-learner interaction, learner-instructor interaction, and Internet self-efficacy significant predictors of student satisfaction?

Based on the correlation values among independent variables, no potential multicollinearity problems were shown, since all correlations among predictors were lower than .80, which indicated that the three predictors were devoid of multicollinearity. Before multiple regression analysis was performed, the assumptions of linearity, homoscedasticity, and normality of residuals were tested to make sure no violations were made against the requirements of regression analysis.

Table 5

The Variance in Satisfaction Explained by Three Predictor Variables

Model	R	R²	Adj. R²	SE of the estimate
1	.786ᵃ	.618	.596	.510

The model summary (see Table 5) revealed that 61.8 % of the variance in satisfaction was explained by the predictors learner-learner interaction, learner-instructor interaction, and Internet self-efficacy. This multiple regression model was significant ($F(3, 53) = 28.57$, $p < .001$), which indicates that, overall, the combination of interactions and Internet self-efficacy significantly predicted satisfaction.

There was no multicollinearity for the predictors with tolerances larger than .10 and VIFs smaller than 10 (see Table 6). Three β-values were all positive, indicating there were positive relationships between each type of the interactions and satisfaction. The predictors learner-learner interaction ($t(53) = 2.869$, $p < .01$) and learner-instructor interaction ($t(53) = 5.361$, $p < .001$) significantly contributed to the model while Internet self-efficacy ($t(53) = 0.414$, $p > .05$) was not a significant predictor in the model. Learner-instructor interaction was the strongest predictor. Internet self-efficacy was a weak predictor that contributed little to satisfaction.

Table 6

Multiple Regression Analysis

Variables	*B*	*SE B*	β	t	*p*	Tolerance	VIF
(Constant)	-.220	.455		-.483	.631		
Learner-learner	.298	.104	.276	2.869	.006**	.777	1.287
Learner-instructor	.715	.133	.598	5.361	.000***	.580	1.725
Internet self-efficacy	.040	.098	.041	.414	.681	.718	1.392

*$p < .05$. **$p < .01$. ***$p < .001$

Research Question 3: What is the unique contribution of significant independent variables to student satisfaction?

To obtain the unique contribution of significant predictors to student satisfaction, hierarchical linear regression was performed by having each predictor entered in the last step of the regression. Table 7 reveals the unique variance each predictor contributes to student satisfaction after controlling for the influence of the other two predictors. Learner-instructor interaction, which is the strongest predictor, explained 20.7% of the variance in student satisfaction, while learner-learner interaction explained only about 5.9% of the variance of student satisfaction. Internet self-efficacy, which is not a significant predictor, contributes almost nothing to student satisfaction, with only 0.1% of the variance in satisfaction explained.

Table 7

Unique Contribution of Each Predictor

Variables	R square change	F change	Sig. F change
Learner-learner interaction	.059	8.23	.006**
Learner-instructor interaction	.207	28.74	.000***
Internet self-efficacy	.001	.171	.681

*p < .05. **p < .01. ***p < .001

Discussion

Although both learner-learner and learner-instructor interactions were significant predictors for student satisfaction, learner-instructor interaction was the most influential factor. Internet self-efficacy was not found to be a significant predictor for student satisfaction. Explanations and discussions about these major findings were provided.

Learner-Instructor Interaction is the Most Important Contributor to Student Satisfaction

Learner-learner interaction and learner-instructor interaction were two significant components in the prediction of student satisfaction in this study. This result is aligned with the findings of studies conducted by Battalio (2007) and Bolliger and Martindale (2004). Both studies found that learner-instructor interaction and learner-learner interaction were important indicators of student satisfaction. Although both types of interaction were significant predictors, learner-instructor interaction was the stronger predictor when compared to learner-learner interaction. This finding seems to make sense for the following reasons. First, according to Skylar (2009), the advantages of

using synchronous (e.g., Interwise) learning tools include real time knowledge sharing and immediate access to the instructor for questions or comments. In this study, lecturing was the main activity. Instructors served as the major content delivery person; they offered live lectures and/or initiated questions and other class activities. As the synchronous sessions did not involve student collaboration projects, students may have had lower communication with classmates than the instructor. It corresponds to some previous studies indicating that the integration of collaborative projects or assignments would enable conversation, discussion, or negotiations among learners in terms of social constructivism (Jung, Choi, Lim, & Leem, 2002; Woo & Reeves, 2007)

Second, in this study the instructor was the main moderator who controlled the teaching processes in Interwise synchronous environments. Interwise, mainly designed to support learner-instructor interaction, provides very limited interaction opportunities for participants (Ng, 2007). Interwise is more like an instructor-led platform. Consistent with Ng's (2007) study where students perceived that their interaction with classmates was extremely limited, learner-learner interaction did not contribute very much to student satisfaction in this study, even though learner-learner interaction was a significant predictor. In addition, the three features that students favored using most in Interwise (i.e., emotion icons, raise hand, and send note) would help explain the significance of learner-instructor interaction in this context (please see Table 2). These features allow students to respond to the instructor by asking questions or receiving files from the instructor. One interesting finding was that emotion icons seemed to be one of the most popular features that students preferred to use when communicating with their instructor. Findings of previous studies indicated that use of emoticons increased motivation and interactive learning experiences in e-learning environments as emoticons were often used as visual or social cues that provide additional information behind the text (Tung & Deng, 2007; Wolf, 2000).

Third, it was the first time students utilized Interwise. Students only used Interwise for two sessions out of one semester class. They might still have explored how to interact with the instructor or their classmates through the Interwise features. Given this, students might have been more inclined to follow the directions from the instructor, instead of being very active in interacting with their classmates. As Reushle and Loch (2008) suggested, training and technical support are critical for the successful use of web-conferencing tools.

Last, culture and approaches to learning may play a role in the finding of our study that learner-instructor interaction was the strongest predictor. Chinese students tend to learn by rote and repetition. They prefer a teacher-centered style of teaching by which knowledge is transmitted directly from the instructor (Wong, 2004). Western pedagogy that favors a constructivist approach and participative style of learning is less acceptable to Chinese students than Western students. Chinese students would be more active in one-to-one interaction with the instructor especially when the instructor initiates the

questions to students (Levinsohn, 2007). The preference of teacher-centered learning approaches may result in more student interaction with the instructor than with peers.

Internet Self-Efficacy is Correlated with but Not Predictive of Student Satisfaction

Even though most students in the class seemed to possess a certain level of confidence in utilizing Internet-based technologies, Internet self-efficacy was not a significant predictor of student satisfaction. This result corresponds to Rodriguez Robles's (2006) research where Internet self-efficacy did not significantly contribute to student satisfaction. Interwise may not require a high level of skill in performing Internet-related tasks, so the variance of Internet self-efficacy among students might have been reduced and therefore failed to impact satisfaction in the presence of the other predictors. Most students had neutral Internet self-efficacy and were able to use Interwise smoothly, which in turn may have led to the non-significant impact on student satisfaction. Moreover, when looking into the years of computer usage (please see Table 1) among these students, about 70 % of them have been using computers for more than 7 years, which may have led to the fact that most students' confidence in performing Internet required activities was on an average level.

Among the eight Internet self-efficacy items, learners seemed to have a higher level of confidence when relating to their confidence in gathering data ($M = 5.59$) through the Internet and getting support through online discussion when necessary ($M = 5.10$). Learners' confidence level dealing with Internet hardware trouble-shooting ($M = 4.12$) and identification of failed Internet-related tasks ($M = 4.04$) was typically lower than the responses for the rest of the Internet self-efficacy survey items. However, the average scores of these two items were still above the median score (4.0). Scheduling a training session before the synchronous sessions start would likely be helpful to those students who have lower confidence in using the Internet and the web-based conferencing tool, as suggested by Torkzadeh and Van Dyke (2002) that training is an approach to improving one's Internet self-efficacy.

Conclusion and Implications

Overall, learners seemed to be moderately satisfied with the online synchronous sessions through the use of the Interwise platform. It was not difficult for them to use Interwise for course related activities during the class. Learners perceived more interaction with their instructor than with classmates during the two-week long online sessions. The combination of learner-instructor interaction, learner-learner interaction, and Internet self-efficacy significantly contributed to student satisfaction. Learner-learner and learner-instructor interactions were significant predictors of student satisfaction, while Internet self-efficacy barely had an influence on student satisfaction.

Learner-instructor interaction was the strongest predictor of satisfaction, which corresponds to the design of instructor-led features embedded in Interwise.

According to the findings of this study, we suggest that (a) instructors should consider the features of technology tools they intend to utilize for the class, and employ appropriate pedagogies to enhance interaction among learners in synchronous learning environments; (b) learners' background with different cultures or learning approaches to learning should be taken into account while delivering course content synchronously; and (c) pre-class training should be offered to ensure learners' understanding about the features of the adopted technology so that their interaction with the instructor or peers would be enhanced.

Limitations and Suggestions for Future Research

This study is based on two sessions of online synchronous learning. If more such sessions could be implemented, there could have been more interactions among learners, which in turn might have increased the influence of learner-learner interaction on student satisfaction. In addition, other components, which are not included in this study, may influence student satisfaction, such as learner-content interaction, student autonomy, and class size. Researchers might consider including other components that have potential effect on student satisfaction in future studies.

Self-report was used in this study, which is a convenient way of measuring student perceptions of interaction, Internet self-efficacy, and satisfaction. However, self-report may not tell the whole story of how students interact with their instructor and classmates. Interviews and examinations of log files may be employed in future studies. Examinations of log files would further allow researchers to study student interactions with digital objects.

The participants of this study involved two cohorts who took this class in two different semesters. The instructor might have been more skilled in using Interwise during the second semester, which in turn may have influenced study results. For instance, any problems encountered in the first semester may not have occurred in the second semester, if the instructor knew how to solve students' problems quickly based on his previous experiences in the first semester.

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Student Satisfaction with a Web-Based Dissertation Course: Findings from an International Distance Learning Master's Programme in Public Health

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Abstract

Introduction

Online distance learning (e-learning) is now an established method for providing higher education, in the UK and across the world. The focus has largely been on developing the technology, and less attention has been given to developing evidence-informed course provision. Thus the effectiveness of this teaching approach, and its acceptability to students, is, at times, uncertain. Many higher education courses require students to submit a dissertation. Traditional face-to-face courses will include meetings between the student and an allocated supervisor, to support the dissertation component of the course. Research into the supervisory relationship and student satisfaction has focused on doctoral students. Little is known about the experiences of students studying for a master's degree.

The aim of the current study was to measure student satisfaction with the dissertation course as part of a fully online distance learning master's programme in public health.

Methods

All students submitting a dissertation as part of their master's programme in Public Health were sent an electronic survey to complete, in September 2012. The 34 item questionnaire used a four point Likert scale for students to rate levels of satisfaction across key components of the course, including preparatory materials, study skills, and support, and with the amount and content of supervision. Open ended/free text questions were used to determine factors associated with levels of satisfaction and to

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gain student feedback on the course overall. The constant comparative method was used to identify key themes from the free-text responses.

Results

Of the 45 students submitting a dissertation, 82% (37) responded to the survey. The majority of students, 85% (28) were satisfied or very satisfied with the dissertation course overall. Levels of satisfaction remained high for many of the components examined. Differences were observed for part time and full time students, and for the type of dissertation, but these were not significant. Similarly, non significant findings were observed for associations between satisfaction and the estimated number of contacts initiated with their supervisor, and for the time spent working on their dissertation. The constant comparative analysis identified key themes and feedback included 'self development', 'peer support', and 'writing skills'.

Conclusions

Generally high levels of satisfaction were received from students studying a dissertation course as part of a fully online distance learning programme in public health. Areas for further improvement were identified and the results act as a benchmark for future quality enhancement. These findings suggest that appropriate information, study skills, and supervisory support can be provided in an online distance learning programme, for students taking a master's level dissertation course.

Keywords: Supervision; dissertations; thesis; master's degree; postgraduate; satisfaction

Introduction

E-learning refers to 'learning facilitated and supported through the use of information and communications technology' (JISC, 2007). This includes complete distance learning through to its inclusion in face-to-face/classroom teaching (blended or hybrid learning). The internet is now a central teaching platform, with over a quarter of students in higher education registered on an e-learning course in America (Allen & Seaman, 2013). In England, senior politicians described e-learning as an 'historic opportunity' for students and educators (Coughlan, 2013), as societies become more 'digitised' (Weller, 2011).

This paper is focused on distance learning programmes provided over the internet. These 'e'-learning courses offer a number of possible advantages to students, including flexibility regarding their location of study, choice when they engage with the course materials, and more control over their individual pace of learning (Childs, Blenkinsopp, Hall, & Walton, 2005). Students with an internet connection, regardless of their location in the world, can register for e-distance learning courses. Evidence reviews find

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that e-learning can be as effective and at times more effective than face-to-face teaching in higher education (Cook, Levinson, & Garside, 2008; Means, Toyama, Murphy, Bakia, & Jones, 2009). It is a preferred choice for many groups of students (Halsne & Gatta, 2002) and can result in similar levels of student satisfaction when compared with face-to-face approaches (Allen, Bourhis, & Burrell, 2010; Driscoll, Jicha, Hunt, Tichavsky, & Thompson, 2012). Consequently, e-distance learning courses have the potential to provide access to effective higher education for hundreds of thousands of students who had previously been disadvantaged by their geographical location (Naidoo, 2005) and the challenge of studying whilst working (Collis & Wende van der, 2002).

Our previous research has shown that diversity in the student population can enrich the experience of individual students on an e-distance learning programme (Gemmell, Harrison, Clegg, & Reed, 2014). The current study examines student satisfaction with the dissertation course as part of an e-distance learning master's programme in public health. Student satisfaction is an important quality indicator of any course and regarded as one of 'five pillars' of quality in e-learning, alongside learning effectiveness, access, faculty satisfaction, and institutional cost effectiveness (The Sloan Consortium, 2013). In the UK, the National Student Survey includes measures of student satisfaction, amongst other things "to contribute to public accountability and help inform the choices of prospective students" (HEFCE, 2012). As part of their marketing strategy, course providers will wish to show high levels of student satisfaction in these publically available league tables. With a rise in student fees and expectations, this type of information will no-doubt be a key component of a student's decision to register for a particular course.

Student satisfaction with an e-learning course is influential in their learning journey. It has been shown to have a positive effect on motivation and engagement with the course materials, and is linked with overall course performance (Sahin & Shelley, 2008; Wickersham & McGee, 2008). Students found to be dissatisfied with a course are more likely to end their studies early (Levy, 2007) . Given the centrality of student satisfaction to students and course providers, it is ironic that "in general [there is] a scarcity of studies of the learner experience" to inform the development and delivery of future e-learning courses (Sharpe & Benfield, 2005). Key factors known to influence student satisfaction on e-learning courses include the relevance of the course materials, the learner's autonomy, and their competence with technology (Ke & Kwak, 2013) (Bolliger & Halupa, 2012; Carroll, Booth, & Papaioannou, 2011).

Postgraduate courses often include a research or project based dissertation, and students are allocated an academic supervisor to support this process (Meeus *, Van Looy, & Libotton, 2004). The supervisor-student relationship is another important factor in the students' performance and their levels of satisfaction (de Kleijn, Mainhard, Meijer, Pilot, & Brekelmans, 2012). Attention on this topic has usually focused on the dissertation for postgraduate research students (PhD). This overlooks the needs of masters students, despite their greater number (Anderson, Day, & McLaughlin, 2008). Furthermore, few have attempted to evaluate the quality of the entire dissertation

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process (Aspland, Edwards, O'Leary, & Ryan, 1999), and move beyond the influence of the supervisor to examine the provision and access to resources and other institutional factors (Buttery & Ruchter, 2005). Finally, we found no studies examining student satisfaction with their dissertation unit as part of an e-distance learning programme. This gap needs to be reduced if we are to use evidence informed approaches to increase the quality of future courses whilst enhancing the student experience.

The aim of the study was to assess student satisfaction with key elements of a dissertation course, including but not limited to supervision, as part of a master's in public health (MPH). The MPH was established in 2001 by the University of Manchester, England (www.manchester.ac.uk/mph) and it is a fully online e-distance learning programme. Each year, the course accepts up to 100 new students onto the full or part time programme, of whom usually two thirds reside in the UK and Europe, and a third in the rest of the world. The course is delivered completely over the internet using the virtual learning environment Blackboard 9 (www.blackboard.com).

For the MPH, the dissertation course is the final part of the master's programme. Students register for the dissertation course after passing three core units (Evidence Based Practice, Fundamentals of Epidemiology, and Biostatistics) and five optional units, selected from 16 available units covering a range of public health themes. Each unit is worth 15 credits and based on 150 hours study time per unit. The dissertation is worth 60 credits and needs to be within a word length of 8,000 to 10,000 words. Students have up to 12 months to complete and submit the final dissertation. Unlike more traditional postgraduate courses, on the MPH students do not carry out primary research. Instead, they select from one of five different models, designed to reflect the diversity of public health learning needs requirements. These are (1) a research grant proposal, (2) an adapted quantitative or qualitative systematic review, (3) an analysis of existing data sets, (4) a public health/outbreak report, or (5) a qualitative theoretical study. After registering for the dissertation unit, students have up to 12 months in which to submit their thesis.

The wide range of resources available to all students are designed to help prepare them for the dissertation unit and to provide further support and direction over the 12-month writing period. Giving access to the resources as soon as students register for the MPH gives an opportunity for students to familiarise themselves with the material and to help them think about ideas for their dissertation earlier in the course.

The dissertation handbook is a central point for information on the dissertation process and administrative procedures. It includes a section on "What is the role of a supervisor?" and "What students can realistically expect". There is a self-directed learning unit which covers the following key topics: "What is a dissertation?"; "How to select and write a suitable proposal"; "How to write a critical literature review"; and "How to present your work". This includes structured learning materials and a range of resources including short video presentations from dissertation tutors and PowerPoint

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presentations. Other resources include online access to copies of previous dissertations that were awarded a distinction and links to writing and study guides.

Students are encouraged to develop their own ideas for their dissertation. Many use work-based experiences and/or career aspirations to form the basis for their dissertation. Students submit a dissertation proposal using a structured application form to frame their ideas and methodology. They then receive written feedback from three dissertation tutors. This process is intended to ensure that the student's ideas have the potential to meet the requirements for the dissertation, within the time permitted and the resources available to the student. Once students have a satisfactory proposal for their dissertation, they are put in touch with a supervisor to support the remainder of their work. Most supervisors are based within the University of Manchester. Senior academics are self-selected for this role, to match them with the student's dissertation topic and the selected dissertation model. All supervisors are invited to training sessions and/or are sent written guidance. They also have access to the same learning and support materials as the student. Supervisors can seek additional support at an individual level from the course dissertation lead (RAH). As a guide, supervisors are expected to provide around 16-20 hours of supervisory support in total, over the academic year. This includes responding to student queries, giving feedback on their written work, and providing general guidance, information, and support. In the initial stage, supervisors are encouraged to provide an introductory email to their student, and to agree mutually acceptable methods for communication (e.g., email, telephone, Skype, Google+). Similarly, in the initial stages, students are encouraged to introduce themselves to their supervisor and to identify any immediate or potential future learning needs. The whole process is monitored by the course dissertation lead (RAH), who can also respond to individual queries and further support needs from students and their supervisor.

Methods

In September 2012, all students submitting their dissertation were invited to complete an online satisfaction survey which was sent to their university email address. The survey was produced and distributed using SelectSurvey.net version 4.07. The invitation email provided an overview of the survey with a clear statement that it was anonymous. A reminder was sent two weeks later, and two weeks after that the survey was closed. The survey was distributed after students had submitted their dissertation but before they received their marks.

The 34 item questionnaire sought levels of satisfaction with the themes: (1) preparatory information, (2) study skills resources, and (3) supervision. Information was also collected on registration status (full or part time) and the type of dissertation model selected by the student. It was not possible to collect more detailed information on baseline characteristics as this could have broken the student's anonymity.

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The majority of questions used a four-point Likert scale. The analysis calculated frequencies and percentages for questions using the Likert scale. Fishers exact test was used to test for associations between levels of satisfaction and registration status, type of dissertation model, and level of contact with supervisor. Open ended/free text questions were used to obtain information on a number of themes. These were analysed using the constant comparative method (Maykut & Morehouse, 1994). Students were asked to estimate the amount of time they spent working on their dissertation overall, in numbers of hours which were then rounded up or down to the nearest whole number. This variable was not normally distributed and the Kruskal Wallis test was used to test for an association between overall satisfaction and the median time spent working on the dissertation. The study was conducted as part of a service evaluation. Ethical approval and participant signed consent was not required. Students could opt out by not completing the survey without giving any reason.

Results

In September 2012, 45 students were expected to submit a completed dissertation and they were all sent a copy of the online survey. The number of students responding to the survey was 37 (82%). The majority of respondents, 33 (89%) were part time students, compared with 4 (11%) doing the course full time. This compares with 38 (84%) part time and 7 (16%) full time students taking the dissertation that year. For reasons unknown, three students only answered the first four questions, leaving 34 students who completed the full survey.

Most dissertation students had selected the option of a systematic review (41%) and only one student responding to the survey had submitted a dissertation based on a qualitative/theoretical study (Table 1).

Table 1

Baseline Characteristics of Survey Respondents Compared with all Students Eligible for the Survey

	Everyone sent the survey	Survey respondents
	N (%)	*n* (%)
Dissertation option:		
Systematic review	19 (42)	15 (41)
Public health /outbreak report	11 (24)	12 (31)
Analysis of existing data set	9 (20)	5 (14)
Research grant proposal	3 (7)	4 (11)
Qualitative/theoretical study	3 (7)	1 (3)
Total	45 (100)	37 (100)

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Overall Satisfaction

Students were asked "overall, how would you rate your experience of the dissertation unit?" Of those responding, 85% (28) replied that they had had a very positive or positive experience overall. Only 15% (5) of students said that their experience was not so good. Students experience was observed to vary between part time and full time students, with only part time students expressing a less than positive experience (Table 2). These differences were not statistically significant (Fishers exact test = 0.830, p = 1.000).

Table 2

Level of Satisfaction Overall Based on Type of Registration

	Part-time n (%)	Full-time n (%)	All n (%)
Very positive	6 (20)	1 (33)	7 (21)
Positive	19 (63)	2 (67)	21 (64)
Not so good	5 (17)	0 (0)	5 (15)
Not good at all	0	0	0
Total	30 (100)	3 (100)	33 (100)

There was some variation in the levels of satisfaction with the course overall by the type of dissertation model students had chosen to do (Table 3). Most students expressed at least a positive experience. However, these findings are difficult to interpret because of the small number of students within each category and percentages have not been presented.

Table 3

Level of Satisfaction Overall by Type of Dissertation Model

	Research grant proposal	Systematic review	Analysis of existing data	Public health report	Qualitative/ theoretical study
Very positive		4		1	
Positive	3	7	4	6	1
Not so positive	1	4	1	0	
Not positive at all	0	0	0	0	0
Total	4	15	6	7	1

(1 non-responder) (Fishers exact test = 4.264, p = 0.380).

Note. In the statistical analysis the categories where combined to public health report, systematic review, or other because of small numbers in some cells.

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The 'free-text' question asked students "What key issues/experiences influenced your answer to this question?". The constant comparative analysis identified two main themes from their responses to this question, 'preparedness' and 'self development'.

Preparedness.

Students felt that they had been adequately prepared to start work on their dissertation. They valued an opportunity to select a topic/question related to their current employment and/or particular interests. Students appreciated the amount of information available about the different aspects of the dissertation process. Generally, this was easy to access, and any questions sent to members of staff, including the administrative team, were quickly answered. Some were disappointed that the supervisor was not allocated until their dissertation proposal had been accepted and had wanted "discussion with experienced supervisors for how to go about choosing a dissertation topic right at the beginning of the dissertation" [respondent 27].

Self-development.

Some students used the question as an opportunity to reflect on their own learning and self-development gained whilst taking the dissertation unit. One noted their achievement in producing a dissertation, and another had gained confidence in understanding what they had learnt. One student described the dissertation unit as "a voyage of self-discovery" [respondent 25]. Whilst writing a dissertation was challenging, they had adequate support. One student commented, "had to do my own readings and research to do the [systematic] review" [respondent 16], suggesting that this had been unexpected. One felt that "for someone who is not research minded like me, it will always remain a necessary evil" [respondent 5], whilst another reflected on relief with "the fact that it is over now" [respondent 6].

Satisfaction with Preparatory Information

Five questions sought information about student satisfaction with the preparatory information about the dissertation unit. At least 71% (24) of students were satisfied or very satisfied with each of these five areas (Table 4). A small number of students expressed some level of dissatisfaction with one or more items relating to the preparatory information.

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Table 4

Levels of Satisfaction with Preparatory Information

	Very satisfied	Satisfied	Not very satisfied	Not satisfied at all
	n (%)	*n* (%)	*n* (%)	n (%)
Provision of information about starting the dissertation	10 (29)	24 (71)	0	0
Content of the dissertation handbook	9 (26)	24 (71)	1 (3)	0
Presentation of the dissertation handbook	6 (18)	27 (79)	0	1 (3)
Guidance on the marking and grading scheme for the completed dissertation	6 (18)	25 (74)	3 (9)	0
Guidance on completing the dissertation proposal form.	3 (9)	28 (82%)	3 (9)	0

Students where then asked to comment on "how could we improve information for students about the dissertation unit?". The constant comparative analysis identified four main themes, 'developing the dissertation proposal', 'time planning', 'peer support', and 'location of information'.

Developing the dissertation proposal.

A number of students wanted to have been given more information and support to develop the initial dissertation proposal. This included a "live chat forum" [respondent 27] to discuss their ideas with a tutor during office hours and more examples of previous dissertations which included the marker's critique. Another suggested "more video content on how to go about doing the dissertation, to choose the topic and type of work, emphasise the number of hours needed to complete..." [respondent 28].

Time planning.

A range of ideas were put forward by students to help increase future satisfaction with support for keeping on track towards the submission date. This included sending a timeline of key dates and stages for the dissertation unit to all students at an early stage. Others suggested an email to "prompt what stage students should be at with their dissertation" [respondent 24].

Peer support.

One student thought that it would have helped to have seen "hints and tips" [respondent 7] from previous students who had completed the dissertation unit. Another thought it would be a good idea to regularly summarize individual questions

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from students and produce a 'live' updated Frequently Asked Questions [respondent 14] section as an addendum to the handbook.

Location of information.

Several students had found difficulties in accessing information, and that whilst the "information was adequate....I did find that it was not always to be found in the place I expected" [respondent 13]. One solution offered was to put everything into the dissertation handbook rather than having it in different places within the dissertation unit in Blackboard.

Satisfaction with Study Skills and Resources

Eight questions sought information on levels of satisfaction with the general study skills and resources section of the dissertation unit. The majority of students were satisfied or very satisfied with guidance on completing the dissertation proposal form (91%), the content in the self-directed teaching unit (91%), and the amount of general information on writing a dissertation (86%). But at least 26% (9) were less than satisfied with four of the other seven items examining this area (Table 5).

Table 5

Satisfaction with Guidance on Selecting and Writing the Dissertation

	Very satisfied	Satisfied	Not very satisfied	Not satisfied at all
	n (%)	*n* (%)	*n* (%)	*n* (%)
Guidance on complete the dissertation proposal form	3 (9)	28 (82)	3 (9)	0
Amount of guidance given to choosing a dissertation topic	3 (9)	22 (65)	8 (24)	1 (3)
Amount of general information on writing a dissertation	4 (12)	25 (74)	4 (12)	1 (3)
Relevance of the material to your chosen dissertation topic	4 (12)	21 (62)	8 (24)	1 (3)
Amount of guidance on developing and planning your dissertation	4 (12)	21 (62)	8 (24)	1 (3)
Suggestions for background reading	2 (6)	23 (68)	8 (24)	1 (3)
Suggestions for sources for further support	3 (9)	22 (65)	9 (26)	0
Content covered in the self-directed teaching unit	4 (12)	27 (79%)	3 (9%)	0

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Students were asked "overall, how could we improve information covered in the blackboard dissertation skills unit?". Two main themes were identified in the analysis, 'writing and structure' and 'assessment'.

Writing and structure.

Students said that they would have liked more guidance and information on how to write and structure a dissertation: "the dissertation course had several good ideas and provided guidance but for students who had never written a dissertation, more help on the actual writing process would have been helpful" [respondent 33]. Some students came up with helpful suggestions including a video from the tutor and from past students, to talk about some of the more practical aspects of writing a dissertation: "even a video of a past student(s) indicating what they did and what they would do differently" [respondent 9] and "it would have been helpful to learn different practical approaches that work well for others such as outlining the chapters and then starting a file for each chapter" [respondent 34].

Assessment.

An interesting comment made by one student reflected that the students' use of the dissertation materials was not formally assessed. They suggested that it would complement the material in the core taught unit Evidence Based Practice: "the idea is not only use EBP learning in the dissertation but think in the dissertation while learning EBP" [respondent 17]. Thus dissertation skills could form part of the assessment in the core unit Evidence Based Practice.

Supervision

The median number of hours estimated by students to have spent working on their dissertation was 250 (range 40-2,000). (Figure 1)

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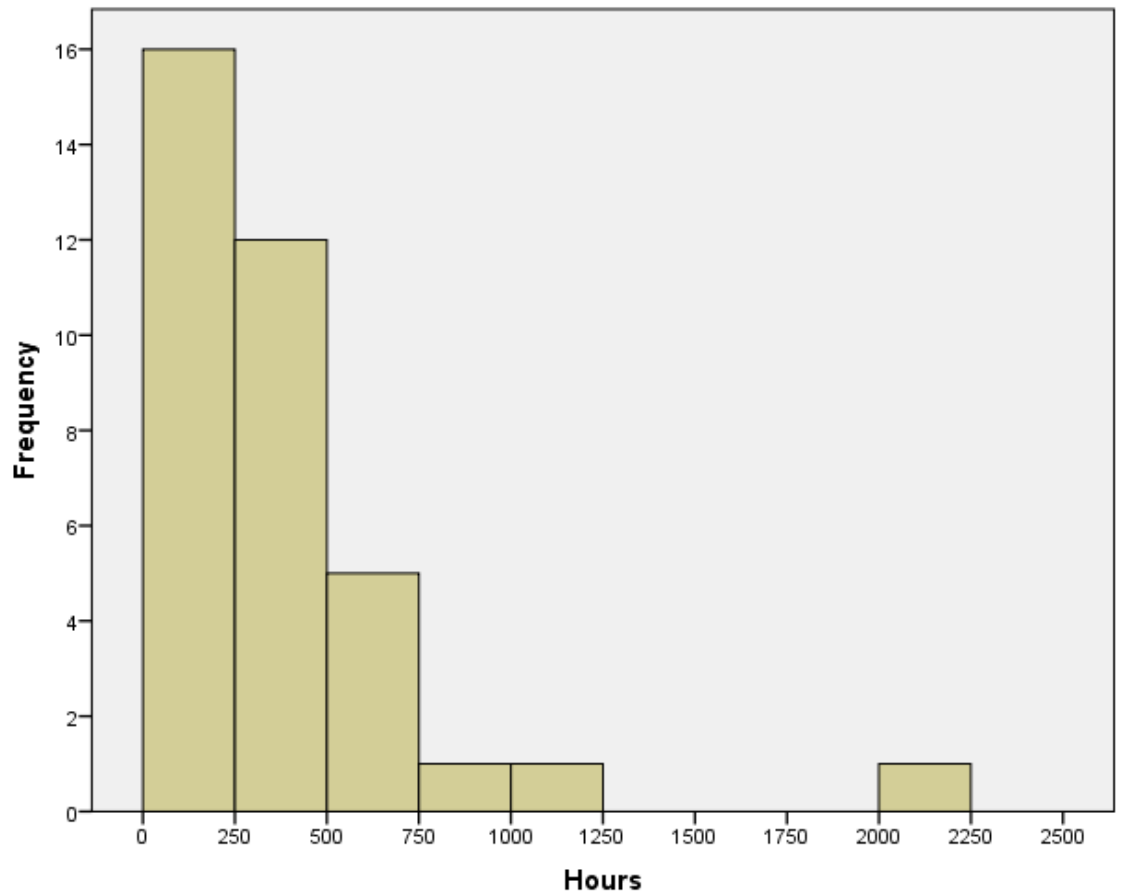
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Figure 1. Student estimated time (hours) spent working on their dissertation.

Students were asked to estimate how often they initiated contact with their supervisor, with the options of once a week, once a month, every three months, or less than once every three months. Just over half the students, 19 (56%), stated that they initiated contact with their supervisor at least once a month, 9 (26%) about once every three months, and 5 (15%) less than three times over the dissertation year. One student initiated contact with the supervisor on a weekly basis. There was some variation in the level of satisfaction with the course overall and the amount of time students contacted their supervisor (Table 6). The results suggest that students who initiated contact at least once a month were more likely to have had a positive experience of the course. However these findings were not statistically significant (Fishers exact test = 2.423, p = 0.694).

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Table 6

Overall Satisfaction with the Course and Estimated Frequency of Contact with their Supervisor

Satisfaction level	Estimated frequency that the students initiated contact with their supervisor			
	Once a week *n* (%)	At least once a month *n* (%)	About once every 3 months *n* (%)	Less than once every 3 months *n* (%)
Very positive	1 (100)	5 (26)	2 (22)	0 (0)
Positive	0	12 (63)	5 (56)	4 (80)
Not so positive	0	2 (11)	2 (22)	1 (20)
Not positive at all	0	0	0	0
Total	1 (100)	19 (100)	9 (100)	5 (100)

Five questions were used to assess student satisfaction with the potential for and the actual supervision they received. The dissertation handbook outlined that students could expect around 16 hours of support from their supervisor over the academic year, and that they should allow up to 10 working days to receive feedback on written work. At least 85% of students were 'satisfied' or 'very satisfied' across these areas (Table 7). As many as 15% (5) of students expressed some level of dissatisfaction with the amount of supervision they received, the amount of feedback given, and the extent they felt their supervisor supported them.

Table 7

Satisfaction with Potential and Actual Supervision Received

	Very satisfied	Satisfied	Not very satisfied	Not satisfied at all
	n (%)	*n* (%)	*n* (%)	*n* (%)
Potential provision for supervision	14 (42)	17 (52)	2 (6)	0
Amount of supervision actually received	14 (42)	14 (42)	3 (9)	2 (6)
Time it took your supervisor to respond to queries/questions	17 (52)	12 (36)	4 (12)	0
Amount of feedback on your work	17 (52)	11 (33)	4 (12)	1 (3)
The extent that your supervisor supported you over the academic year	16 (48)	12 (36)	3 (9)	2 (6)

(One student did not answer these questions; *n* = 33)

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Three main themes were identified when students were asked "how supervision could be improved". These were 'methods of communication', how to use a supervisor', and 'availability'.

Methods of communication.

Supervision online provides a number of different ways in which students can contact their supervisor. Students commented that this was usually done by email, but making a compulsory initial Skype or telephone call with the supervisor would be helpful, as "that way, the relationship will kick off immediately without delay" [respondent 8]. One student suggested that this needed to continue as supervisors "did not have any dedicated time over the phone to talk through issues, just quick emails or ad hoc phone calls" [respondent 26].

How to use a supervisor.

Students made a few comments relating to the process of working with a supervisor. Several students identified a need for them to be encouraged to make contact with their supervisor initially, and then during the supervisory period and that "I imagine this is a common issue for some students" [respondent 11]. The idea of using a survey part way through the course was seen by one student as another way of encouraging student to supervisor contact. One commented that "the dissertation process is difficult, and supervisors can be over-critical sometimes even contradicting earlier directives given, which can be frustrating" [respondent 5].

Availability.

Some students were clearly frustrated at the apparent lack of availability of their supervisor, and sometimes there were "long gaps in communication such as my supervisor being away for extended periods of time that I was not aware of" [respondent 15]. Another commented that "I was provided with a supervisor who was not available during the final months of writing my dissertation, which was when most of my work was to be done" [respondent 32] and "I was somewhat surprised that my supervisor was on holiday in the time leading up to the deadline for the dissertation" [respondent 13].

Despite the variation in levels of satisfaction, and the comments raised above, many students commented positively on the quality of the dissertation unit. Many comments reflected the following sentiments: "Overall you are doing well" [respondent 26] and "I actually think that it is at a very high level already" [respondent 3]. Several students praised their own supervisor, with "the supervision I got from XXXXXX was excellent in every sense.....she epitomised a good supervisor in every sense" [respondent 2] or "XXXX was excellent, supportive and flexible......I could not have asked for better supervision" [respondent 4], and "it was like no other I have gotten in previous studies" [respondent 2].

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Discussion

We gained considerable insight into the experience of students taking a dissertation unit on an e-distance learning master's course in public health. It was encouraging to find that the majority of students were satisfied or very satisfied with the course unit overall, and with particular dimensions that we assessed. Our findings show that students were well-informed about the dissertation process, had access to usable, relevant information, and received good levels of supervisory support. We did expect to see some variation in levels of satisfaction for the different items assessed because of different academic and professional experiences at the start of the course. Moreover, their reasons for registering on the e-distance learning master's degree (Chen, Lambert, & Guidry, 2010) and their use of e-learning technology varied widely and this may have influenced their general satisfaction. The student feedback confirms how we largely accommodated these varied needs to the satisfaction of the student. Previous authors have described the master's dissertation as "an elusive chameleon" and a source of confusion and student dissatisfaction (Pilcher, 2011). However, our evidence suggests that providing student-orientated resources and support, informed with relevant pedagogical evidence, can provide clarity and transparency to the requirements of the final product.

A dissertation is a requirement of many post graduate courses. Yet there is surprisingly little published evidence about the student experience of this important aspect of the course. Even fewer studies have reported levels of student satisfaction with their dissertation unit on an e-learning course. As such, the current study helps to plug an important research gap. Our findings are at least comparable to levels of overall satisfaction reported in the UK National Student Survey, with an average of 85% of students satisfied with the quality of a course (HEFCE, 2012). Whilst this national survey of higher education includes face-to-face and online learning courses, it acts as a benchmark for students' experiences with the MPH.

A strength of our study is the combination of fixed question responses and open-ended questions. The latter provided further insight into student satisfaction and factors influencing this. The good response rate increased the generalizability to students enrolled on this course. Students did not always report equal levels of satisfaction for each of the items considered. This heterogeneity suggests that students were reflecting on their experience specific to each question item, rather than applying a generic response to hasten completion of the survey, thus indicating good validity of the survey methods. We acknowledge that our findings are based on a single academic year and the sample size might have been underpowered to identify statistically significant relationships in the analyses carried out.

We were unable to identify an existing validated satisfaction survey that was applicable to an e-distance learning course in an international context. Where possible, we used previously published studies to inform the dimensions assessed and the construction of the questions (Arambewela & Hall, 2009). Moreover, we couldn't explore predictors of

satisfaction including gender, age, and previous educational attainment, as this would have reduced the likelihood of maintaining student anonymity. Similarly we had no information on previous use of e-learning and confidence with technology .

The survey highlights the need to provide better personal communication with our students before and after their dissertation proposal has been approved. In the current system, students are not allocated a supervisor until their proposal has been approved. Thus, whilst having access to the learning resources, they are expected to develop their own ideas into a workable proposal before they receive support from a supervisor. Public health covers a very wide breadth of topics making it difficult to identify a suitable supervisor until the student's dissertation topic is known. Moreover, public health professionals need to be able to develop independent skills in evidence based practice, which includes identifying, framing, and answering a particular question and then making sense of the information. Thus the current process acts as a gateway to the more independent component of the dissertation course. In addition to the dissertation skills unit and other resources, students can use the discussion board in Blackboard to raise ideas and queries about their dissertation, and to receive feedback from other students, respond to other students, and with further postings from the dissertation tutor (RAH). Discussion boards have been found to be a valuable tool to support students in healthcare environments (Thomas, 2013). Despite the reasons for our current process, we do need to consider how we can be more proactive during the preliminary stages, given the feedback presented in this survey.

Having been allocated a supervisor, a number of students went on to report dissatisfaction with the amount, timing, and purpose of the supervisor-student contact. As one might expect, this interaction is a key factor effecting student satisfaction (Kuo, Walker, Belland, & Schroder, 2013). Our study suggests that some supervisors need to be more proactive in communicating with their supervisees, and to provide better timely and constructive support. This includes providing students with relevant educational 'scaffolding' that encourages them to reflect on their ideas and to use this as part of the learning process (Quan-Baffour & Vambe, 2008). Supervisors also need to be encouraged to use their own and other real life examples, to support the students' understanding and self-reflection (Sahin & Shelley, 2008).

The feedback from students in the current survey lends support to continued training for new and existing supervisors. This needs to remain responsive to the needs of our dissertation students and to reflect any changes in the course delivery and available use of technology (McCallin & Nayar, 2012). We are well aware of the rapidly developing technology to deliver and support e-learning programmes. At times, this challenges existing teaching methods and raises new pedagogical approaches compared with on-campus supervision (Abrami, et al, 2012). A particularly attractive development following Web 2.0 technology is the ease at which social learning communities can be created. These can provide a virtual space for supervisors and their students, and/or be restricted to their peers to interact in various ways (Batalla-Busquets & Pacheco-Bernal, 2013; Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012). A systematic review

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found that communication was a key theme in the literature exploring e-learning for adult learners who work (Carroll et al., 2011). The authors of the review suggested that this social learning interaction is perhaps more influential amongst working adults in higher education, as students are likely to have shared professional beliefs and experiences, enhancing their potential to learn from each other (Carroll et al., 2011). However, as with all new technologies, we need to ensure that an approach like this would increase student satisfaction, amongst other things, which is currently uncertain (Kuo et al., 2013) . Similarly, we would need to consider the role (or not) of supervisors in social learning communities (Zhang, Perris, & Yeung, 2005).

Sceptics of e-distance learning courses may use any accounts of student dissatisfaction to add to their concerns about this learning method. Even advocates of e-learning recognise that "students miss those serendipitous moments of learning that so often occur in a F2F [face-to-face] environment—the overheard remark, the discussion in the hallway, the before-class updates" (Sanders, 2006). Few would doubt the potential value of these interactions. Yet higher levels of interaction can occur between student and tutor in an e-learning environment compared with face-to-face courses (Swan, 2006). Of particular value to working adults enrolled on an e-distance learning programme is that these communications do not need to be in 'real time', enabling students to effectively communicate with peers and supervisors at their convenience (Abrami et al., 2012). Furthermore, communicating with students using email means that they can refer back to communications with their supervisor, which is a potential advantage over face-to-face interactions with a supervisor.

Conclusion

Our findings support the view that a master's level dissertation unit on an e-distance learning programme can achieve high levels of student satisfaction. These findings are important given the lack of existing evidence on this particular topic, despite the established requirement for a dissertation on master's programmes, and the now established use of e-distance learning programmes. Our findings highlight the need to provide the right environment for effective student-supervisor communication and to further develop appropriate social learning communities to support dissertation students.

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Design and Implementation of a Simulation-Based Learning System for International Trade

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Abstract

In the traditional instructional method used in international trade, teachers provide knowledge to learners by lecturing using slides and setting assignments; however, these methods merely deliver international trade knowledge rather than facilitating student development of relevant skills. To solve these problems, we proposed a simulation-based learning system for international trade, combining international trade-process simulation and business letter writing. We investigated learner opinions toward the system and the quality of business letters by using quantitative and qualitative analyses. Regarding the results, learners perceived that the proposed system improved their knowledge of international trade and business English.

Keywords: Simulation-based learning; international trade; instructional technology; usability studies

Introduction

The popularity of the Internet has increased the importance of Internet-based teaching and learning. Teachers have attempted to use learning management systems (LMS) and learning content management systems to enhance their teaching methods. Robinson and Schaible (1995) suggested collaborative teaching, in which teachers teach a subject or design learning activities and discuss and share their teaching experiences with other teachers. Teachers frequently use the Internet to instruct students (Curran, 2002). Because online classes are increasingly common, numerous researchers have attempted to develop innovative approaches that meet the needs of online learners and are not limited to face-to-face conferencing (Hyland & Hyland, 2006; Miller, 2001; Peterson, 2001; Wible, Kuo, Chien, Liu, & Tsao, 2001). DiNucci (1999) coined the term Web 2.0 to describe the features of information sharing, interoperability, user-centered design, and collaboration. In Web 2.0, information flow changes from unidirectional to bidirectional; recently, Web 2.0 has also been combined with e-learning, which is referred to as e-learning 2.0 (Downes, 2005).

In international trade, teachers traditionally provide knowledge to learners by using slides, setting assignments, or using other classroom-based teaching methods. For example, learners can be divided into groups, each of which is regarded as a trading company. The group members collaboratively discuss and prepare reports. To overcome physical access limitations, certain institutions have leveraged the Internet to facilitate teaching international trade, building e-learning systems that include teaching videos and slides. Learners can watch the teaching videos anywhere and at any time through the Internet. They can also download and study slides and submit homework through the system. This teaching method is similar to the traditional teaching method, allowing learners to conveniently study international trade by using the Internet. However, such methods enable only a partial understanding of the international trade process; thus, certain institutions have developed international trade classrooms or games to facilitate learning international trade (Houston & Hoyt, 2001; Chiang, 2007). Although such methods are more attractive compared with traditional teaching methods, they present major disadvantages such as comprising an incomplete trade process and limited models.

To overcome the limitations of traditional teaching methods, international trade classrooms, and games, we proposed a simulation-based international trade learning system for both students and teachers, allowing students to practice writing English business letters and conducting international trade processes by using the Internet. Designing the virtual environment by using Web 2.0 technology ensures that the proposed system is suitable for face-to-face classes and after-school and distance learning. We designed several system functions that enable teachers to easily correct English business letters. We also surveyed user opinions toward the proposed system throughout two semesters, evaluating the quality of the generated letters. Few studies have presented the design and evaluation of e-learning systems that help students learn about international trade processes by using simulations. The proposed system assists

students in writing business letters and conducting international trade through hands-on experiences. The findings should serve as a reference for both developers and teachers to improve system designs and the instructional methods used in international trade education.

Literature Review

E-learning 2.0

E-learning 1.0 differs from traditional learning methods; learners can learn anywhere and at any time by using an e-learning system (Ngai, Poon, & Chan, 2007). Numerous studies have shown that e-learning yields greater positive effects compared with traditional face-to-face learning (Dutton, Dutton, & Perry, 2002; Koory, 2003), facilitating increased interaction between the learner and computer. E-learning 1.0 supplements traditional learning materials, incorporating animations, computer games, and other computer-supported collaborative activities, positively motivating students and yielding a positive learning effect (Holzinger, 1997; Weiss, Knowlton, & Morrison, 2002).

According to O'Reilly (2007), Web 2.0 is characterized by trusting users as codevelopers, harnessing collective intelligence, and leveraging the long tail through customer self-service. The slogan of the so-called read/write Web is "the user is the content." Alexander (2006) noted two features of Web 2.0: microcontent and social media. Cuene (2005) distinguished Web 1.0 and Web 2.0 from the user perspective: Web 1.0 comprises static web pages, whereas Web 2.0 refers to shared content among web users. Human–computer interaction changed between Web 1.0 and 2.0. In Web 1.0, users merely read web pages, but in Web 2.0, users actively contribute. Because of the increasing contributions of users, the level of collective intelligence and amount of reusable dynamic content has increased. Engaging with content establishes a sense of community, empowerment, and ownership among users. When appropriate systems and tools are available, amateurs can surpass professionals in knowledge; Wikipedia (http://wikipedia.org) is a widely recognized example of this phenomenon (Barsky, 2006; Barsky & Purdon, 2006).

Web 2.0 encourages users to interact with other users, a feature that numerous theorists consider fundamental to e-learning (Kamel Boulos & Wheeler, 2007). Interaction encourages deep and active learning engagement, builds learning communities, and enables learners to provide feedback to teachers (Fahy, 2003). Scholars have recently reported associations between teacher–learner interaction in online learning and increased levels of student motivation (Shea, Pickett, & Peltz, 2003; Levy, 2007).

Web 2.0 tools, such as wikis, blogs, and social networks, can be used in distance education or online courses to facilitate user interactions (Usluel & Mazman, 2009; Smith, 2012); these tools facilitate collaborative working, information sharing, and effective communication. Applying emerging technologies alters the pedagogies involved in distance education. Anderson and Dron (2011) summarized three generations of pedagogies involved in distance education: cognitive-behaviorist, social constructivist, and connectivist. Web 2.0 technology belongs to connectivism, allowing students to explore, connect, create, and evaluate knowledge. Den Exter et al. (2012) studied the potential of using Web 2.0 technology, conducting two case studies that indicated Web 2.0 tools can be integrated to facilitate collaborative distance learning.

Downes (2005) discussed the perception of e-learning 2.0 in his article: "For all this technology, what is important to recognize is that the emergence of the Web 2.0 is not a technological revolution; it is a social revolution." E-learning 2.0 uses social network power to facilitate student learning. The critical aspect of a social network is a community of practice that is articulated and promoted by people. To emphasize the social power of e-learning 2.0, Ebner (2007) proposed that e-learning 2.0 = f (e-learning 1.0, Web 2.0, and the human factor). The formula shows that successful e-learning 2.0 consists of users sharing content over the web (Web 2.0), the learning material is accessible through an LMS (e-learning 1.0), and Web 2.0 must be presented to the teacher and learners (the human factor).

Common Errors in English usage

We referred to numerous studies to design a colorful annotation module to classify common English usage errors, including the Online Annotator for English as a Foreign Language (EFL) Writing, developed by Yeh, Lo, and Huang (2006). This system replaces traditional paper-based error feedback and correction with interactive feedback and analysis. Using the system, learners write and teachers correct English compositions. The system is tailored to teach business English, and particularly writing English business letters. Certain differences exist between writing business letters and general English such as the architecture and rules. To classify business English and common usage errors, we referred to a computer-aided error analysis study (Dagneaux, Denness, & Granger, 1998) that involved using standard text-retrieval software tools to analyze an error-tagged corpus; this method quickly yields the types of English errors and error counts. In the current study, we divided English writing errors into seven major types, which were subdivided into specific types.

Kubota (2001) studied learning a foreign language, focusing on Australian students learning the Japanese language. Although the current study did not explore learning English, this was a useful reference because it classified Japanese language errors; this facilitated generating classification rules.

To Chinese people, English is a foreign language. Potter (1992) authored a book elucidating common business English errors made by Chinese students in Hong Kong.

The book included various examples that provided a solid foundation for establishing the error type categories used in the proposed system.

Annotation and Learning

Annotation refers to a comment added to the original text (Glover, Xu, & Hardaker, 2007). Online annotations allow students to learn based on conversations, whereas paper-based annotations are shared only through print technology (Wolfe, 2002). Regarding collaborative learning, Bargeron, Gupta, Sanocki, and Grudin suggested that annotations can provide contextual and personalized notes, enabling asynchronous collaboration among user groups (1999). Online annotations also enable users to add and share commentaries that are no longer limited to passively viewing content on the web. Ovsiannikov, Arbib, and Mcneill (1999) proposed that online annotations comprise four primary functions: remembering, thinking, clarifying, and sharing.

Several online annotation systems have been developed and applied to learning, including CoNote (Davis & Huttenlocher, 1995), which enables a group of people to communicate by sharing annotations among sets of electronic documents. Yang (2006) proposed a personalized annotation management system to track seven types of annotations, including questions, explanations, commentaries, bookmarks, sketches, drawings, and links; this inspired researchers to explore various types of error annotations that could allow learners to quickly understand their errors. These studies prove the usefulness of annotation systems in empirically evaluating real-life learning contexts.

Online annotations provide powerful functions, such as clarifying, sharing, and facilitating synchronous or asynchronous communications; thus, EFL teachers and learners experience an environment that engenders constructive error correction and feedback.

Digital Simulation and Learning

Various definitions have been proposed for digital simulation. After referencing several studies, Baek (2009) suggested, "A computer (digital) simulation can be defined as a program that models a system or a process." Simulations can be categorized into distinct types. In education, according to the teaching objective, Alessi and Trollip (2001) categorized simulations into those "about something" and those explaining "how to do something."

Simulations enable learners to experience specific situations, expanding beyond typical learning activities (Baek, 2009). Magee (2006) argued for employing simulations in education, indicating that they facilitated a risk-free environment, experimentation, problem-solving skills, assessments, and social interactions. Simulations are used to support learning in various approaches, such as constructivist learning, through

learning-by-doing, improving higher order thinking by applying various teaching models, and supporting lifelong learning as a tool (Baek, 2009).

Several simulation-based systems have been developed and applied to education. Regarding teaching "how to do something," Sawhney and Mund (1998) developed a simulation-based construction-management learning system, enabling students to learn how to manage construction projects. In this system, students use their knowledge and consider the given resources to plan the construction process before executing their simulation model. If the result is unsatisfactory, they can redesign their model and conduct iterative tests to determine an effective solution. This system provides a risk-free environment, reduces the costs deploying real construction plans, and provides hands-on experience. Regarding teaching "about something," Swaak and de Jong (2001) used a simulation-based discovery learning environment called CIRCUIT, simulating the behavior and voltage sources of electrical sources to explore the learning effect of this type of learning environment; the findings indicated that using the system increased the intuitive knowledge of students. Cho et al. (2012) developed a computer simulation-based smart learning system called EDISON for use in science and technology; the platform is used by 671 users at 14 colleges in South Korea for managing simulation tools, and provides a simulation environment, services, and computing resources. Students can use this system to easily perform various science experiments.

Few studies have investigated simulation-based learning systems for use in international trade education. Therefore, we designed, implemented, and conducted a preliminary evaluation of such a system. Leveraging simulation-based learning, online annotation, and e-learning 2.0 enables students to learn the international trade process and business letter writing.

System Design

System Overview

The proposed system enables students to learn international trade processes and business letter writing by acquiring hands-on experience in a simulated environment. Figure 1 illustrates the system components and component interactions of the proposed international trade practice learning system.
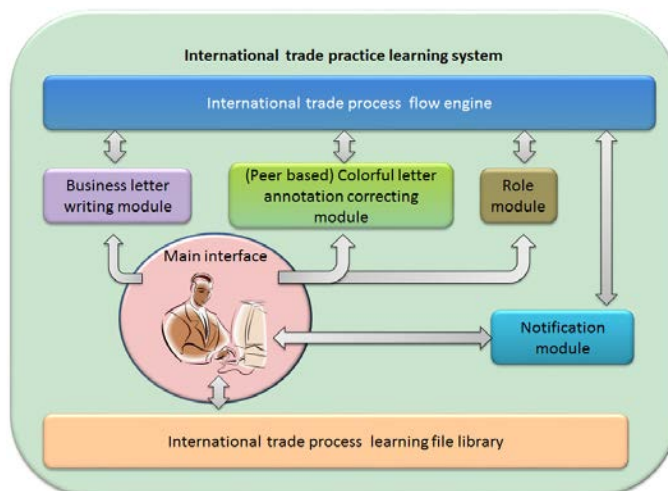
Figure 1. International trade practice learning system.

We designed the international trade process flow engine, notification module, and role module to provide a virtual environment for international trade. The primary interface provides users access to the business letter writing module, (peer based) colorful letter-annotation correcting module, and international trade process learning file library. The process flow engine simulates the international trade process in 38 steps; system users encounter these steps in a way similar to the real world. The business letter writing module was designed to allow students to practice business letter writing. The letter-annotation correcting module can be set to teacher or peer-based modes. The peer-based mode can be used to reduce teacher efforts regarding corrections, and the user conducting the correction can easily provide the error types and comments by using the module. The corrections are displayed as annotations in the letter, allowing students to recognize error types and providing directions for modification. A feedback mechanism helps students express their opinions or ask questions regarding corrections. After students receive corrections, they can ask the teacher (or peer corrector) questions or discuss and clarify the errors with their teammates. When students do not know what to do or how to begin writing, they can access the international trade process learning file library to obtain sample letters and knowledge regarding international trade.

Virtual International Trade Environment

Figure 2 shows the virtual international trade environment. The general administration department comprises teachers and system administrators. These parties can manage system settings, allowing peer-based correction or changing student roles. In the proposed system, we designed various departments similar to those in the real world such as trade companies, banks, and manufacturers.
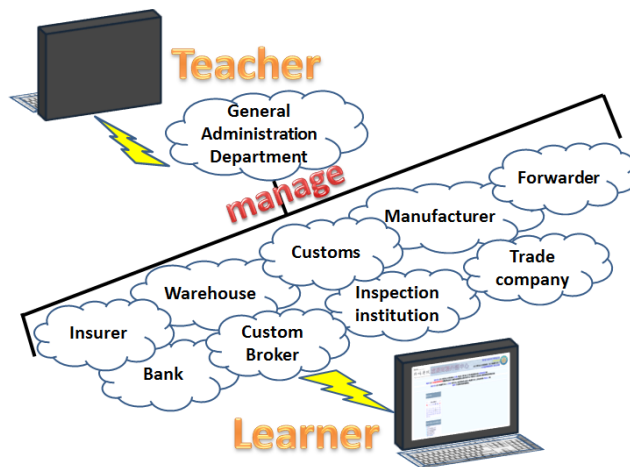
Figure 2. Virtual international trade environment.

Business Letter Writing

Writing business letters (or commercial mail) plays a critical role in the real-world international trade process. Learners must understand how to write business letters, using formal and correct English. The proposed system provides a platform for learners to write business letters and discuss their work with teachers or other learners.

Figure 3 shows the flow process for writing and correcting business letters. A learner first writes and submits a letter, and a teacher or student subsequently corrects the letter. All learners on a team can read these corrections, regardless of whether they are the author. After reading the correction comments, the team members discuss the letter and raise questions, which teachers or peer correctors answer. A team of learners can discuss the comments and content of the letter until they obtain the desired answer; thus, the author can rewrite the letter after learning how to improve it.
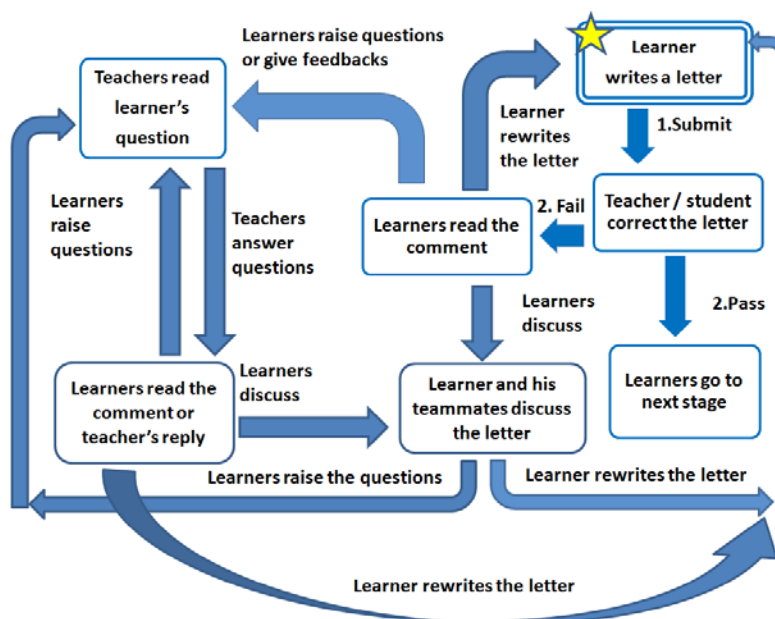
Figure 3. The flow of business letter writing.

System Evaluation

Overview

We investigated system usability and student opinions toward the proposed system throughout two semesters (summer 2011 and spring 2012). The course content was identical in each semester. Because students were allowed to take the course several times, certain students took both the first and second semester courses. No peer-based correction or role-changing mechanisms were involved in the first semester course; we added these mechanisms and several other system improvements after the first semester when we collected and analyzed student opinions toward the system. Following the second semester, we collected both learner and teacher opinions to determine the system improvement status.

Sample

The volunteer participants comprised 102 learners, of which 85 were undergraduate students and 17 were graduate students. The learners completed an online questionnaire; at the end of each semester, we received 49 and 24 valid questionnaires. We interviewed nine teachers in the language department, who also completed the questionnaire.

Procedure

During each semester, the College of Foreign Languages and Literature of Providence University ran an international trade seminar course. The course objective was to instruct students regarding international trade and business-letter writing. Prior to the class, we used two class periods to introduce the proposed system. After the system introduction, the students attended normal classes, using the system to practice the international trade process after class. Students were allowed to take this course more than once. Before the end of each semester, the students completed the questionnaire. At the end of the second semester, the researchers interviewed nine teachers in the language department, who provided their opinions of the proposed system. Each teacher was introduced to the system and operated it for several minutes. At the end of the interview, each teacher completed a questionnaire.

Materials

The questionnaire used to evaluate the proposed system comprised two sections. First, we adopted the widely applied system usability scale (SUS) to evaluate system usability (Brooke, 1986). The questionnaire comprised 10 questions, and each item was scored from 1 (*strongly disagree*) to 5 (*strongly agree*). The total score for the odd numbered questions was the original score minus one, and 5 minus the original score for the even numbered questions. The SUS score was the sum of the total scores multiplied by 2.5, and the scores ranged from 0 to 100. A high total item score indicated that the proposed system performed effectively regarding that item.

In the second section of the questionnaire, three open-ended questions were used to investigate opinions toward the system. The question content included "What do you think about the International Trade Practice Learning System?" "Could any function of the International Trade Practice Learning System be improved?" and "What type of function or tool should be added to the International Trade Practice Learning System?"

SUS Results Obtained from Students After the First Semester

Table 1 presents the SUS questionnaire results, indicating that the average SUS score was 58.10. According to Bangor et al. (2009), a value greater than 55 scores between OK and good, implying that the proposed system should be scrutinized and improved.

Table 1

SUS Results (First Investigation of Learner Side)

	System Usability Scale	Contribution mean	SD
1.	I think that I would like to use this system frequently.	2.75	0.46
2.	I found the system unnecessarily complex.	2.12	0.83
3.	I thought the system was easy to use	2.62	0.74
4.	I think that I would need the support of a technical person to be able to use this system	1.00	0.76
5.	I found the various functions in this system were well integrated.	2.88	0.64
6.	I thought there was too much inconsistency in this system	2.37	0.52
7.	I would imagine that most people would learn to use this system very quickly.	3.00	0.53
8.	I found the system very cumbersome to use.	2.75	0.46
9.	I felt very confident using the system.	2.75	0.46
10.	I needed to learn a lot of things before I could get going with this system.	1.00	0.53
SUS score		58.10	

All items yield standard deviations less than one, indicating that the student opinions were similar.

Item 7 yielded the highest mean score (3 points); the lowest scored items, Items 4 (1 point) and 10 (1 point), indicate that users believe the system can be easily learned and used, but the process may require technical support. The Item 10 score shows that using the proposed system requires considerable prior knowledge because the system is integrated with the international trade process. The demographic information indicated that numerous participants majored in the English language, law, and computer science. Few learners were international trade majors.

Although Item 5 (2.88) attained the second highest mean score, indicating that the functions of the proposed system were well integrated, the Item 2 score implied that the system is unnecessarily complex and should be simplified.

Open-Ended Question Results from the First Semester Students

We used grounded theory to analyze the collected data. Based on keyword practice, the students indicated that knowledge learned from textbooks can be applied in the simulated environment. Apparently, international trade knowledge was recalled and used during the simulation. Students also indicated that the proposed simulation environment facilitated practicing business letter writing; thus, it enables practicing international trade skills. Using keywords such as *complex*, *simplify*, *process*, and *easy-to-use* indicated that when learners become familiar with the system, it is easy to use; however, it remained unnecessarily complex. This is consistent with the results of the SUS. Numerous learners believed the proposed system process was complex and should be simplified. Based on the keyword instructions, learners believed the system instructions should be improved to help learners rapidly familiarize themselves with the system. Analyzing keywords, such as *appealing* and *user-friendly*, indicated that the user interface should be enhanced and replaced with attractive icons. Finally, regarding additional functions, the learners sought communication functions such as chatting and video conferencing.

SUS Results from the Second Semester Students

Before the second semester, we considered the suggestions collected from the first semester students. We simplified the system flow, added a peer-based correction mechanism, a role-changing mechanism, and new detailed instructions. We also adjusted the system interface and functions.

Table 2

SUS Results (Second Investigation of Learner Side)

System Usability Scale	Contribution mean	SD
1. I think that I would like to use this system frequently.	2.75	0.46
2. I found the system unnecessarily complex.	2.62	1.06
3. I thought the system was easy to use	2.88	0.99
4. I think that I would need the support of a technical person to be able to use this system	2.25	1.16
5. I found the various functions in this system were well integrated.	3.00	0.53
6. I thought there was too much inconsistency in this system	2.37	0.74
7. I would imagine that most people would learn to use this system very quickly.	3.13	0.35
8. I found the system very cumbersome to use.	2.62	0.52
9. I felt very confident using the system.	2.75	0.46
10. I needed to learn a lot of things before I could get going with this system.	2.00	1.41
SUS score	65.93	

Table 2 presents a summary of the SUS results. The total SUS score increased to 65.93 in the second semester. According to Bangor et al. (2009), values greater than 65 score between OK and good, indicating that the proposed system should be further scrutinized and enhanced. Although the current version was superior to the previous version of the system, several problems require attention.

Similar to the first semester results, Items 7, 5, and 3 yielded the highest scores. The mean contributions of most items increased, particularly those of Items 4 (1.25 points) and 10 (1 point); thus, the proposed system improved in most dimensions. Moreover, the standard deviations of most items increased, particularly those of Items 10 (0.88) and 4 (0.4), indicating slightly different student opinions toward the system.

In addition, both the contribution means and standard deviations of Items 4 and 10 increased; thus, compared with the first semester, more users in the second semester indicated that they did not require technical support to use the system. The item, "I need to learn several things before I can use this system" also improved. This result could be because of the detailed instructions, simplified process, and interface adjustments. However, detailed instructions may only help certain students solve problems because they are incomplete or certain users do not read these instructions when using the system. Although the system was improved, the level of required prior knowledge regarding international trade remained the same. Thus, the results may

differ because certain students took both semesters of the course and their experiences with the previous version of the proposed system made them more familiar with it compared with new users.

Item 2 attained a mean value of 2.38, which was 0.50 greater compared with the first investigation, indicating that an increased number of learners did not perceive the system as unnecessarily complex. This result elucidates the change in the standard deviation of Item 2, because learners were likely to rate *agree* or *strongly agree* in the first investigation and *disagree* or *strongly disagree* in the second investigation. However, this demonstrates that certain learners perceived the system as unnecessarily complex.

Comparing the results from both semesters yields similar item scores, and similar items yielded the highest and lowest scores in both investigations. The SUS scores for Items 4 and 10 were the lowest in both semesters, indicating that although adding detailed instructions and streamlining the process increased the scores, the need for technical support and prior knowledge to use the system remained problematic. The Item 10 score may be difficult to improve because despite improvements, the system requires knowledge of international trade processes. However, the Item 4 score can be improved such that users do not report a need for technical support when using the system.

Open-Ended Question Results from the Second Semester Students

First, learners perceived that they would become familiar with the international trade process if they frequently used the proposed system. This shows that students familiarized themselves with international trade and improved their relevant skills by frequently using the system.

Second, numerous students who participated in both semesters of the investigation mentioned that "the interface is more user-friendly compared with the former version" and "the function is more user-friendly compared with the former version." Thus, learners perceived the enhanced interface and functions in the revised version of the proposed system.

Third, learners spent less time learning this version compared with the previous version, and the detailed instructions facilitated using the system.

Fourth, in addition to providing positive feedback, learners hoped the system could provide instant notifications. Certain learners also suggested using e-mail as another form of notification. Notifying learners when to perform the next step in the international trade process could raise the level of execution efficiency among students.

Finally, certain learners perceived that the system included sufficient functions and that they merely needed time to become familiar with the system. This shows that certain

students were satisfied with the system functions. Increasing the functions may cause these students to consider the system as unnecessarily complex.

SUS Results Obtained from Teachers After the Second Semester

We designed a colorful annotation module, a learning-file library, and a notification module for teachers, who used the SUS to evaluate these modules. Table 3 shows that the SUS score was 74.45. According to Bangor et al. (2009), this value scores between good and excellent; thus, the proposed system yielded effective system usability to teachers. This section presents a detailed analysis of these results.

Items 1 (3.44 points), 3 (3.44 points), 8 (3.22 points), 7 (3 points), and 9 (3 points) yielded the highest mean scores, demonstrating that the proposed system is easy to use and learn. An optimal user experience allows users to gain enjoyment from using the system.

Items 4 (1.59 points) and 10 (1.33 points) yielded the highest standard deviations. Based on Item 4, certain teachers required help learning to use the system, whereas others did not. Similarly, based on Item 10, certain teachers required prior knowledge before using the system, whereas others did not. Although certain teachers indicated their need for technical support, enhanced instructions should be able to help teachers learn how to use the proposed system.

Table 3

SUS Results (Teacher)

System Usability Scale	Contribution mean	SD
1. I think that I would like to use this system frequently.	3.44	0.73
2. I found the system unnecessarily complex.	2.89	0.33
3. I thought the system was easy to use	3.44	0.50
4. I think that I would need the support of a technical person to be able to use this system	2.56	1.59
5. I found the various functions in this system were well integrated.	2.78	0.97
6. I thought there was too much inconsistency in this system	2.89	0.78
7. I would imagine that most people would learn to use this system very quickly.	3.00	0.00
8. I found the system very cumbersome to use.	3.22	0.44
9. I felt very confident using the system.	3.00	0.00
10. I needed to learn a lot of things before I could get going with this system.	2.56	1.33
SUS score	74.45	

The standard deviations of Items 7 and 9 were both 0.00, and their mean contribution scores were both 3.00. Thus, although teachers require initial help to use the system, they can effectively use the system after receiving help.

Open-Ended Question Results from Teachers After the Second Semester

In addition to gathering learner opinions, the teachers completed the open-ended questionnaire to provide their opinions. First, the teachers indicated that the system is easy to use and familiarized themselves with the system following brief instruction. This result is consistent with the SUS scores.

Second, certain teachers indicated that too many colors caused problems in the system, yielding numerous errors and making it difficult for learners to rapidly realize these errors; this decreased the instructional efficiency of the system. The primary difficulty in error correction lies in learner failure to detect errors rather than a lack of knowledge. Adding the error type and a special notation before presenting the error content or showing the error and annotated content may solve this problem. Using this method could also reduce the number of colors required for various errors. Thus, the color selection should be adjusted by considering the relationship between the color and the error.

Third, certain teachers suggested adjusting the types of errors used in the proposed system based on distinct errors such as the document structure or writing style. However, not all teachers agreed that a specialized error set was required. Offering personalized error types that teachers could customize may solve this problem; however, this could cause confusion regarding error types when students encounter varying error sets. Another possible method could be for teachers to discuss the error sets to be implemented before a semester and before deploying the system.

Fourth, the interface should be improved to enable users to easily notice relevant buttons. Hot keys should also be added for each button.

Fifth, several suggestions were received regarding notifications and the add function. The system should inform teachers when letters awaited error correction to enhance the system efficiency. The system should also provide a learner status, detailing the number of written letters, errors, and login frequency. An active notification mechanism or passive status summary report can also be added to the system, enabling teachers to assess the student status and aid in the learning process. Designing advanced functions could enable the system to automatically detect possible English errors. When correcting letters, teachers can refer to the errors detected by the system to increase the efficiency and quality of error correction. Adding voice-recording functions, allowing teachers to record responses to each error, could also allow learners to rapidly understand their errors.

System Use and Writing Performance Evaluation

In the summer of 2012, 33 students enrolled in the international trade seminar course. We recorded student login times to analyze the system use habits of students. Figure 4 illustrates the student login time distributions from August 31, 2012 to February 28, 2013. In total, 797 system login times were recorded. The data indicated that 1100, 1000, 2200, and 2300 hours were the most popular login times, exhibiting 153, 88, 82, and 73 logins, respectively. Most of the login times (635) occurred in the first three months (before November 27, 2012). The reason could be that most students needed to prepare for final exams, or the international trade process was practiced throughout the first three months and students decreased their system use as the course progressed.
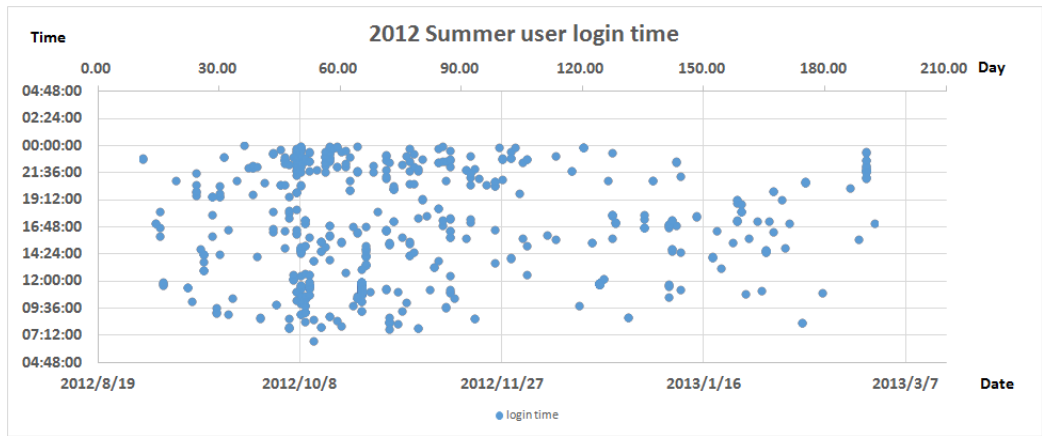
Figure 4. The login time distribution chart for summer 2012.

To assess writing performance levels, we recorded all error numbers in the student-written letters (209 letters) and submission dates. Figure 5 shows the error number distribution of each letter. The maximal, minimal, and average numbers of errors per letter were 10, 0, and 0.30. The linear regression slope was -2.78, showing that the number of errors in each letter decreased, possibly because of improved student writing skills. In addition to conducting the error number and time analyses, we interviewed the teacher at the end of the semester; he reported that the letter quality improved and the number of errors per letter decreased as the students used the system to practice business-letter writing.
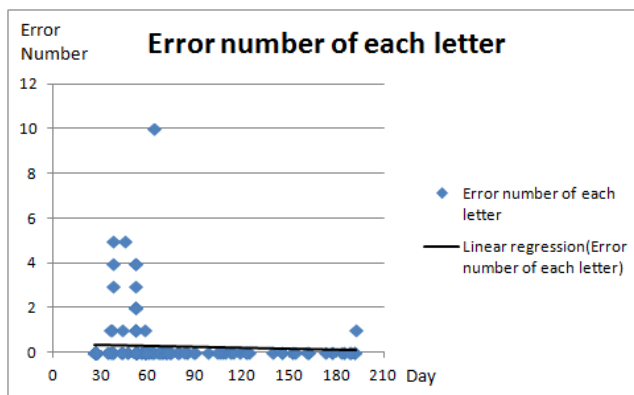

Figure 5. The error number chart for each letter.

Discussion

We proposed a simulation-based international trade learning system for both students and teachers, investigated user opinions toward the system, and examined how using the system enhanced the quality of student-generated business letters.

Based on the answers to the open-ended questions, students perceived that the system helped them practice writing English business letters and conducting international trade processes. They also perceived that frequently using the system familiarized them with international trade processes. Thus, the students applied the knowledge they learned from their classes or textbooks in the simulation environment to perform the international process. Simulations allow students to practice and develop skills such as business letter writing. The student SUS results indicated that the system usability increased between the semesters, possibly because we adopted suggestions from the first semester students to enhance the system. The overall teacher SUS grades were higher compared with the student grades, possibly because teachers primarily used the business letter writing functions, whereas students also used the international trade functions, which required simplification. The grades may decrease because of the complexity of the international trade functions. Users also suggested several functions such as e-mail or instant message notifications for both teachers and students. This shows that in addition to system notifications, users wish to receive notifications in various forms. Teachers also suggested several valuable functions such as voice recording, intelligent error detection, and learner status notifications. These functions could be added to the proposed system to relieve the burden on teachers and enhance their understanding of learner status.

The summer 2012 data indicate that student letter-writing quality improved. This could be because the colorful letter-correction and annotation function enhanced student understanding, improving student writing skills after they found and corrected errors.

These findings imply that students can recall and apply their knowledge from class or textbooks in a simulation-based learning environment; practicing in a simulated environment also facilitates developing skills. The proposed system can be used in face-to-face classes or after-school and distance learning. Regarding after-school and distance learning, after a teacher introduces the proposed system to users, it can be used to practice conducting international trade processes in class or after class. If students generate questions, they can query the system and their peers and teacher can also provide feedback to facilitate learning. Future studies could investigate whether and to what extent the proposed system improves international trade skills. International trade companies could also deploy the proposed system to train new employees to observe its training effects. Moreover, after modifying the business letter writing module, it could be used to practice international trade in various languages (e.g., Chinese, Japanese, Russian). Considering other application domains, after replacing the flow process, the proposed system could be applied to teach document flow processes among governmental or industrial institutions.

Acknowledgement

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Athabasca University

How Well do Canadian Distance Education Students Understand Plagiarism?

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Abstract

This project ascertains how well students taking online, distance education courses at a Canadian university recognize plagiarised material and how well they paraphrase. It also assesses the types of errors made. Slightly more than half of 420 psychology students correctly selected plagiarised phrases from four multiple choice questions. Only a minority was able to rewrite a phrase properly in their own words. A more diverse sample of university students also had difficulty recognizing plagiarised passages from multiple choice options. The poor ability of students to identify plagiarised passages may suggest poor understanding of the concept. Students may benefit from training to improve their understanding of plagiarism.

Keywords : Distance education; higher education; online learning

Alarming numbers published in academic journals and the media produce the perception that plagiarism is a widespread and urgent problem (e.g., Briggs, 2009; Chai, 2010). However, the actual prevalence of plagiarism is unknown, as most data come from self-reports (Dee & Jacob, 2012; Walker, 2010). If students do not fully understand what constitutes plagiarism, the accuracy of self-reports is questionable, even if students are being truthful. Although several recent studies have examined plagiarism (Dee & Jacob, 2012; Holt, 2012; Kirsch & Bradley, 2012), more needs to be known about actual student behaviour as well as understanding. This project assesses Canadian distance education students' knowledge of plagiarism by (1) asking them to select plagiarised (or non-plagiarised) passages from a number of choices; (2) having them produce a paraphrase using their own words; (3) implementing a simple exercise aiming to improve understanding; (4) analyzing the types of errors made.

The literature on plagiarism as cheating will be presented. This is followed by a review of the research on plagiarism in online courses and then a discussion of evidence suggesting that student knowledge about plagiarism is limited. Empirical data collected from a high-enrollment online psychology course is then presented, followed by data from a wider sample of the university. The data support the notion that many students do not fully comprehend plagiarism and therefore might benefit from more education about it.

The Extent of the Problem

Although there are several types of plagiarism (Briggs 2009; Turnitin, 2012), this paper focuses on instances in which words are copied verbatim, often known as "copy and paste" plagiarism (Jocoy & DiBiase, 2006; Jones, 2011). (Note that this is referring to the copying of a few passages, not reproducing an entire article.)

Purposeful plagiarism.

In confidence, many students admit that they have copied word-for-word from textbooks or websites. This has been found in post-secondary institutions in Australia (Zimitat, 2008), the United States (both undergraduate students; McCabe & Trevino, 1993; Scanlon & Neumann, 2002; and graduate students; McCabe, 2009), and in the United Kingdom (Szabo & Underwood, 2004).

Why is the rate of purposeful plagiarism so high? Students tend to downplay the importance of this (Breen & Maassen, 2005; Thomson Maddox, 2008). As Park (2003, p. 476) and McCabe (2005, p. 26) discovered, many students think copying a few words here and there is not a "big deal". Partly because students see university papers as reviews of other people's work rather than production of original thought, many do not view copy and paste plagiarism as severe cheating (Ashworth, Bannister, & Thorne, 1997; Baker, Berry, & Thornton, 2008).

Scanlon (2003) suggests this blasé attitude is encouraged when there are no harsh penalties for being caught. Evidence exists to support the idea that many students do get

away without strong penalties. Some faculty members simply give verbal warnings (Szabo & Underwood, 2004). They are often hesitant to follow up on suspected plagiarism (Ercegovac & Richardson, 2004; McCabe, 2009), some because they feel the administration does not support them, others because they believe it is not their role to police students (McCabe, 2005).

Another major reason for cheating (including plagiarising) is the pressure many students feel to get good grades (Ellery, 2008; Christensen-Hughes & McCabe, 2006). Often students care more about their grades than about their learning (Park, 2003).

Some authors suggest that plagiarism is what students are used to, because they used various plagiarist activities successfully during their secondary education (Davis & Ludvigson, 1995; Hansen, 2003). It may be that this begins even earlier (Sciammarella, 2009).

Students working in a second language have higher rates of plagiarism than native speakers (Ellery, 2008; Marshall & Garry, 2005). There are a number of reasons for this, including general difficulty with the language and different cultural attitudes toward sharing and expression of ideas (Christensen-Hughes & McCabe, 2006; Park, 2003). One study did find that native English speakers engaged in more plagiarism than non-native speakers. It is not clear why these results differ from those of other studies (Soto, Anand, & McGee, 2004).

To what extent does plagiarism occur with online courses?

Given the relatively recent use of online learning on a large scale, the extent of plagiarism in online courses has not been explored as much as plagiarism in traditional institutions. Many believe that widespread use of the Internet has increased plagiarism. Some researchers note that the Internet makes it easier to find, copy and paste material, hire writers or editors, or purchase complete essays, so students are more tempted than before (Kennedy, Nowak, Raghuraman, Thomas, & Davis, 2000; Stuber-McEwen, Wiseley, & Hoggatt , 2009). Others focus on the feelings of detachment (Kennedy et al., 2000; Stuber-McEwan et al., 2009) or perceived lack of contact between students and instructor (Kasprzak & Nixon, 2004) when studying at a distance that may also increase temptation.

Other research suggests there is no more cheating in online classes than in face-to-face classrooms (Scanlon & Neumann, 2002; Varvel, 2005). In fact, some researchers found the amount of cheating (including plagiarising) among undergraduate students studying online was lower than that for students attending campus courses at the same university (Stuber-McEwen et al., 2009; Walker, 2010).

The degree to which plagiarism is committed in online courses remains uncertain. Similarly, there is continuing debate about whether students plead ignorance to avoid paying the consequences for being caught in the act of plagiarism, or if some really do

not know what constitutes plagiarism. A review of the evidence suggesting plagiarism may be unintentional follows.

Accidental Plagiarism

Voss and Rosati (2002) recount an anecdote in which a professor announced in class that the three people who plaigiarised a particular assignment should come to her office. Fourteen students showed up! This suggests that there is a considerable portion of students (and/or faculty members!) who do not know exactly what plagiarism is. Another example comes from Hansen (2003, p. 780), who reported that McCabe (no date), who conducted several large self-report studies on academic misconduct, found evidence of ignorant plagiarism: "When I debrief a small percentage of them [after a survey], some of them say, 'Yeah, I did that but I don't consider it cheating so I didn't check it off.'" This suggests many students likely engage in misconduct inadvertently rather than as an attempt to cheat.

Along with anecdotes, studies providing different scenarios of possible ways to use text reveal many postsecondary students are not fully aware of what constitutes plagiarism. A large percentage did not know that using some sentences from an original source with a minor change to a couple of words is considered plagiarism (Ellery, 2008; Marshall & Garry, 2005). Many students believe it is perfectly okay to take a few word-for-word phrases from the original text and string them together with the students' words (Marshall & Garry, 2005; Zimitat, 2008). A common belief is that sources only need to be cited when direct quotes are used (Ellery, 2008; Zimitat, 2008) or that acknowledging the source means quotation marks are not needed (Ellery, 2008; Soto et al., 2004). Another common belief is that if authors provide a reference list they do not need to include citations in the body of the paper (Ellery, 2008). One of the few Canadian studies found many students use some sources that are not acknowledged in the reference list without thinking twice (Jurdi, Hage, & Chow, 2012). Surprisingly, students view copying from the Internet as not very serious, or at least not as serious as copying from books (Baker et al., 2008; Hansen, 2003; Marshall & Garry, 2005). Many also believe they do not need to cite Internet sources (Ellery, 2008). Clearly there is much misunderstanding.

Further evidence of ignorance about plagiarism comes from studies that let students know in advance that plagiarism would be targeted by using Turnitin plagiarism detection (word matching) software. Often students engaged in plagiarism despite this warning (Soto et al., 2004; Walker, 2010). Informal interviews with students who had plagiarised despite being told that plagiarism would specifically be looked for revealed, "most seemed perplexed about why they were considered to have plagiarised, and all were seeking better guidance than had been provided in this regard" (Ellery, 2008, p. 511).

Asking students to identify plagiarised passages indicates many students perform poorly. Roig (1997) reported almost half of his sample of 316 undergraduates claimed six of

eight plagiarised versions of a single paragraph were not plagiarised. Similarly, Jones (2011) found that only half of the 48 students in her online business course correctly identified all nine scenarios of plagiarism presented. None of the 128 university students tested by Hochstein, Brewer, Steinke**,** and Taylor (2008) correctly categorized all 16 items as plagiarised or not. Most passages were recognized correctly by only 63% of individuals. Of over 2800 students who took Jackson's (2006) online tutorial, more than a quarter (29%) failed to recognize that a sample passage was plagiarised in the pre-test. Hale (1987) found 73% of his 109 students identified passages correctly. However, 11% of students misjudged a plagiarised passage as being an adequate paraphrase. Hale argued his results demonstrated that students do actually recognize plagiarism well, but they also indicate that a substantial number of students do not. The fact that many students have trouble recognizing plagiarism suggests they may not fully understand what it is.

Taken together, research suggests that students do not fully understand the concept of plagiarism, and therefore may be committing it accidentally. However, more studies are needed on student behaviour in addition to their recognition ability. Discovering the areas in which students are having difficulty is an important step toward designing prevention programs.

Preventing Plagiarism

There have been several attempts to prevent plagiarism, some more effective than others. A few found that students who received instruction later plagiarised less than those without instruction, but still continued to commit plagiarised acts (Jocoy & Dibiase, 2006; Soto et al., 2004). Exposing students to "real-world" examples of plagiarism improved their recognition of plagiarism and their paraphrasing ability better than did a feedback session (Landau et al., 2002). Moniz, Fine, and Bliss (2008) found all groups made "significant gains" (p. 277) (details lacking) on a plagiarism knowledge and recognition task, regardless of whether they received one session of interactive instruction, a didactic Powerpoint session, or a session in which students role-played a scenario about plagiarism. Barry (2006) found that students' definitions of plagiarism significantly improved after practice in paraphrasing, and also were significantly better than students without such practice. However, she did not assess whether there were differences in actual plagiaristic behaviour.

Shirley (2004) claimed success in using six face-to-face paraphrasing exercises involving the whole class over four sessions. Other instructors may find this too time-consuming. A promising approach comes from studies helping students achieve "authorial identity" (Elandera, Pittam, Lusher, Fox, & Payne, 2010, p. 157; Vardi, 2012). This involves sessions helping students develop their own voices, however can be quite time-intensive. Another interesting approach comes from Kirsch and Bradley (2012), who created a workshop with interactive multimedia activities and information regarding plagiarism, paraphrasing, citations, and more. Theirs is a work in progress,

but they were able to conclude that students have most difficulty in paraphrasing and common knowledge, even after taking the workshop.

Walker (2008) was partially successful in uncovering the types of errors students made by creating a coding system to detect different types of plagiarised text:

> 1) word strings, that is lifting exact phrases consisting of five-to-nine words from the original 2) substitutions, modifying the original text by using one to two synonyms; 3) additions, including one-to-two new words to the original 4) deletions, eliminating one-to-four words from the original; and, 5) reversals, rearranging sentence order or interchanging phrases. (p. 390)

She found that training a randomly selected group of 19 students to paraphrase properly significantly reduced all five types of plagiarism in comparison to a control group of 17 students, although there was no difference in use of word strings for a second, lengthier passage. The fact that students benefitted from this training suggests that they may be uninformed about plagiarism, but can learn with intervention.

It seems that more research is needed to determine the circumstances in which training is useful and perhaps the types of training that suit particular audiences. Time-limited training is also an issue.

Unfortunately, many of the ideas for plagiarism prevention are not relevant for an online, distance education institution. At the present institution, many students are not enrolled in a program, but take only one or two courses and transfer these credits to their 'home' institution. Another difference from traditional universities is that students are admitted on a continuous basis, so only a small number start the course at the same time. This makes it more difficult to have students attend real-time workshops or information sessions on plagiarism, as Sciammarella (2009) and others suggest. Unlike what is recommended for traditional universities (e.g., McCabe, 2009), an honour code would also be difficult to implement. Waiting for students to go through the process of learning to write over their academic career, by first engaging in a process of "patchwriting" (Howard, 1995; Zimitat, 2008), is not an option when students are taking only one course in order to facilitate their degree at another institution. Many researchers suggest that students need time and practice to develop writing skills for academia, so they continue to develop these skills over the years of their degree (Ellery, 2008; Vardi, 2012). Yet students taking one online course may not have the necessary time required.

Because insufficient research exists on the topic of plagiarism, the present study assesses whether students recognize plagiarised work in which wording from the original had been changed in various ways. One group (the Psychology students) receives feedback on their recognition attempts and later is asked to paraphrase a

passage. The prediction is that with feedback and practice, this group should improve over time. It is also expected that this improvement will transfer to their attempt to paraphrase without plagiarising. A second group of more diverse students (the University group) is tested to see if the results generalize. The types of errors made, based on Walker's (2008) definitions, will be assessed for descriptive purposes, but no hypotheses are offered.

Method

Participants

Eighty-five percent of 497 students ($N = 420$) who registered in the Psychology of Adolescence course from August 8, 2007 to November 9, 2010 completed all five course quizzes and are included in this report. This study analyzed the data obtained from the questions about plagiarism. The university's Research Ethics Board provided permission to use student data for the purposes of the present study. The majority of students (87%) was female with a mean age of 29. Most (44%) lived in Alberta, and 2.2% were international students. The remainder lived in other Canadian provinces or territories.

As part of a larger study on academic integrity, a second group of participants from the same university (the University group) received a different set of scenarios. This group consisted of undergraduate ($N = 125$; 71% female) and graduate students ($N = 103$; 73% female) from Arts, Business, Communications, Journalism, Nursing, Allied Health Studies, Math, Science, Social Sciences, and Interdisciplinary Studies. The undergraduate students were spread roughly equivalently across the four years of university and all students were taking at least one course online at a distance.

Procedure

Psychology of Adolescence is a fully online distance education course. Built into the course is a series of five quizzes, each consisting of 15 multiple choice questions and five short answer questions. Students read a portion of their textbook and study guide, and then took an online quiz before proceeding to the next readings. Most quiz questions were related to course content, but for the first four quizzes, one multiple choice question from each involved recognizing plagiarism. For this question, a passage from the textbook was presented. Students were asked to select one of four options that did or did not represent plagiarism of that passage. Because students receive feedback from markers, it was expected that the markers' feedback would increase students' awareness of plagiarism so their ability to recognize it would improve throughout the course. It was also predicted that because of this learning, they would paraphrase well when asked to do so in the fifth quiz. Students came from a variety of educational

backgrounds, so the extent to which they had been taught or read about paraphrasing and plagiarism is unknown.

The plagiarism question in the fifth quiz was not a multiple choice question. Instead, a passage from the textbook was presented and students were asked to "Read the following passage from page 429 of your textbook."

> 'Although nearly all Trukese males in their teens and twenties engage in these activities, their externalizing escapades are limited to the weekends, and they rarely drink or fight during the week.' Write the above passage in your own words in a way that does NOT constitute plagiarism.

For the second group of students (the University group), students from throughout the university (rather than from a single course) were randomly selected to be invited to participate in a larger study on academic integrity. This article reports on the questions related to recognizing plagiarism. Aside from the fact that all scenarios included a proper citation, three scenarios were similar to those given to the Psychology students in that they involved multiple choice items asking students to identify whether a particular paraphrase was plagiarized or not. A fourth multiple choice question asked participants to identify what was wrong with a paraphrased passage. These students answered all questions at one point in time and did not receive any feedback on their answers.

Coding System for Paraphrased Passages

The fifth quiz for the Psychology students, which asked them to paraphrase a short passage in their own words, was coded according to a modified version of Walker's (2008) coding system. Instances of plagiarised text were tagged if there were three or more exact words from the original text (word strings), one to two synonyms used in place of the original words (substitutions), insertions of one to four new words into the original passage (additions), one to four words removed from the original text (deletions), and a different ordering of words from the original passage (reversals). The coding was conducted by a research assistant who was blind to the purpose of the study, but who had experience dealing with plagiarised material.

Results

Slightly more than half of the 420 Psychology students (n = 215; 50.8%) correctly classified all four items as plagiarised or not. The remaining students correctly answered between none and three questions. See Table 1 for numbers and percentages of students who correctly answered the four quiz questions on plagiarism.

Table 1

Numbers and Percentages of Psychology Students who Correctly Answered the Four Quiz Questions on Recognizing Plagiarism

Number of questions correct	*N*	Percent of students
All four questions correct	215	50.8%
Only three questions correct	119	28.0%
Only two questions correct	67	15.8%
Only one question correct	17	4.00%
No questions correct	5	1.20%

Most students got the first question correct (93.8%), followed by the fourth question (82.2%), the second question (75.5%), and finally the third question (71.5%). Table 2 shows the number and percentage of responses for each option.

Table 2

Number and Percentage of Psychology Students Choosing Each Option for the Four Quiz Questions

	QUIZ 1	
Option	Read the following passage from page 13 of your textbook: "For now, however, it should be emphasized that even though there is evidence to support a modified storm and stress view, this does not mean that storm and stress is typical of all adolescents in all places and times." Which of the following is NOT plagiarised from the above passage?	N chosen (%)
a	It should be emphasized that even though there is evidence to support a modified storm and stress view, this does not mean that storm and stress is typical of all adolescents in all places and times.	2 (.92%)
b	**Many, but not all, adolescents experience some aspects of storm and stress at some point in their development.**	**205 (94.5%)**
c	For now, however, it should be emphasized that even though there is evidence to support a modified storm and stress view, this does not mean that storm and stress is typical of all adolescents in all places and times.	4 (1.8%)
d	Although there is evidence to support a modified storm and stress view, this does not mean that storm and stress is typical of all adolescents in all places and times	6 (2.8%)

		QUIZ 2	
Option		Read the following passage from page 177 of your textbook. "Had Luther grown up in a different time and place, he would have developed a much different identity." Which of the following does NOT constitute plagiarism of the passage?	N chosen (%)
a		According to Arnett (2007), had Luther grown up in a different time and place, he would have developed a much different identity.	15 (3.16%)
b		**According to Arnett (2007, p.177), "Had Luther grown up in a different time and place, he would have developed a much different identity."**	**355 (75%)**
c		Had Luther grown up in a different time and place, he would have developed a much different identity.	10 (2.1%)
d		All of the above are plagiarised.	95 (20%)

		QUIZ 3	
Option		Read the following passage from page 197 of your textbook. "Fathers usually reported being in a good mood during the rare times they and their adolescents were doing something together". Which of the following does NOT constitute plagiarism of the passage?	N chosen (%)
a		During the rare times fathers and their adolescents were doing something together, fathers usually reported being in a good mood.	24 (5.2%)
b		**Although fathers and adolescent daughters did not spend much time together, fathers tended to enjoy the time they did share (Arnett, 2007).**	**320 (69.4%)**
c		Fathers usually reported being in a good mood during the rare times they and their adolescents were doing something together (Arnett, 2007).	75 (16.3%)
d		None of the above constitutes plagiarism.	42 (9.1%)

		QUIZ 4	
Option		Read the following passage that was taken from page 325 of your textbook: "Certainly it is true that with longer school days, a longer school year, cram schools, and private tutors, Japanese adolescents have far less time for after-school leisure and informal socializing with friends than American adolescents do (Rohlen, 1983; Stevenson & Zusho, 2002)." Which of the following does NOT plagiarise the above passage?	N chosen (%)
a		It is true that because of longer school days, a longer school year, cram schools and private tutors, Japanese adolescents have far less time for after-school leisure and informal socializing than American adolescents do (Rohlen, 1983; Stevenson & Zusho, 2002).	14 (3.1%)
b		Japanese adolescents have far less time for after-school leisure and informal socializing with friends than American adolescents	40 (8.8%)

	do because of longer school days, a longer school year, cram schools, and private tutors (Rohlen, 1983; Stevenson & Zusho, 2002; as cited in Arnett. 2007).	
c	**In Japan, adolescents do not have much time for extracurricular activities because they spend so much more time with schooling than American students do (Rohlen, 1983; Stevenson & Zusho, 2002; as cited in Arnett. 2007).**	**375 (82.6%)**
d	All of the above are plagiarised.	25 (5.5%)

Turning to the Psychology student paraphrases, the majority contained at least one instance of plagiarised text (word string, substitution, addition, deletion, or reversal). As can be seen in Table 3, using substitutions (453 instances) was the most common type of plagiaristic behaviour. This was followed by word strings (376 instances). Fewer occurrences of the other behaviours were observed: 58 additions, 34 deletions, and 18 reversals.

Table 3

Number of Instances of Plagiarised Segments (420 Psychology Students)

Original passage: "Although nearly all Trukese males in their
teens and twenties engage in these activities, their
externalizing escapades are limited to the weekends, and they
rarely drink or fight during the week."

Types of Plagiaristic Behaviour	Number of instances (range per paraphrase)
Word string: three or more words in a row taken from the original text without quotation marks.	376 (0-4 per paraphrase)
Substitution: modification of original wording by substitution of one to two synonymous words, or by substitution of a preposition.	453 (0-6 per paraphrase)
Addition: Addition of one to four words to the original text.	58 (0-2 per paraphrase)
Deletion: Elimination of one to four words from the original text.	34 (0-2 per paraphrase)
Reversal: rearranging sentence order or interchanging phrases.	18 (0-2 per paraphrase)

For the University group, most students got the first plagiarism scenario correct (58% of undergraduates and 52% of graduates). For Scenario 2, 62% of undergraduates and 66% of graduate students correctly recognized the reasons why a particular paraphrase was plagiarised. A slim majority of students got the correct answer for

Scenario 3 (50% of undergraduates and 55% of graduate students). Results for Scenario 4 revealed that a minority of students selected the correct answer (26% of undergraduate students and 36% of graduate students). Table 4 shows the number and percentages of options chosen for the four scenarios.

Table 4

Number and Percentages of Options Chosen for the Scenarios for the University Group

	SCENARIO 1		
Option	"In the area of intelligence testing, an interminable debate has raged between those (following Charles Spearman) who believe in a general factor of intellect and those (following L. L. Thurstone) who posit a family of primary mental abilities, with none preeminent among them." The above quotation was taken from Gardner (2011, p. 7). Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences* (3rd Edition). New York, NY, USA: Basic Books. Retrieved from http://site.ebrary.com/lib/athabasca/Doc?id=10449816&ppg=62 Which of the following is a good paraphrase of the quotation?	N chosen (%) under-grads	N chosen (%) grads
a	Those who posit a family of primary mental abilities are in a debate with those who believe in a general factor of intellect (Gardner, 2011).	7.5 (6%)	10.3 (10%)
b	**There is still controversy as to whether intelligence is a general trait or if it consists of a number of different abilities (Gardner, 2011).**	**72.5 (58%)**	**53.56 (52%)**
c	With regard to the area of intelligence testing, a debate has raged between those who believe in a general factor and those who posit a family of primary mental abilities, with none dominant among them (Gardner, 2011).	13.75 (11%)	11.33 (11%)
d	In the area of testing intelligence, "an interminable debate" (p. 7) has erupted between those who follow Charles Spearman who believe in a general factor of intelligence and those who follow L. L. Thurstone who postulate a family of mental abilities, with none of them preeminent (Gardner, 2011).	30 (24%)	27.81 (27%)

	SCENARIO 2	N chosen (%) under-grads	N chosen (%) grads
Option	"The increasing study of realistic and practically useful mathematical models in population biology, whether we are dealing with a human population with or without its age distribution, population of an endangered species, bacterial or viral growth and so on, is a reflection of their use in helping to understand the dynamic processes involved and in making practical predictions." The above quotation was taken from Murray (2002, p. 1). Murray, J. D. (2002). *Mathematical biology: An introduction.* Secaucus, NJ, USA: Springer. Retrieved from http://site.ebrary.com/lib/athabasca/Doc?id=10047716&ppg=25 What, if anything, is wrong with the following paraphrase? Mathematical models in biology are increasingly studied as realistic and practical. This is true regardless as to whether we are studying the human population, an endangered species population, or bacterial or viral growth. It is a reflection of their use in helping to understand the dynamic processes involved and in making practical predications (Murray, 2002, p. 1).		
a	Some of the word sequences are taken from the original source and should be in quotation marks.	18.75 (15%)	13.39 (13%)
b	The paraphrase follows the original passage too closely.	20 (16%)	15.45 (15%)
c	**Both of the above.**	**77.5 (62%)**	**67.98 (66%)**
d	Nothing is wrong with the paraphrase	8.75 (7%)	7.21 (7%)

	SCENARIO 3	N chosen (%) under-grads	N chosen (%) grads
Option	"One thing that all Canadians are supposed to have is universal access to health care and to quality primary and secondary education. Unfortunately, the last few government cutbacks to social programs have undermined the universality of access to these social programs, at least for the lower of these three strata of society." The above quotation was taken from Phillips (2003, p. 2). Phillips, P. (2003). Inside capitalism: An introduction to political economy. Winnipeg, MB, CAN: Fernwood Publishing. Retrieved from http://site.ebrary.com/lib/athabasca/Doc?id=10192216&ppg=9 Which of the following is a good paraphrase of the quotation?		
a	**Although an important aspect to Canadians is universal health care and good quality education, recent government cuts have meant that these are "universal" only to the rich (Phillips, 2003).**	**62.5 (50%)**	**56.65 (55%)**
b	For the lower strata of society, government cutbacks to social programs have undermined the universality of access. This is despite the fact that one thing all Canadians are supposed to have is universal access to health care and to quality education (Phillips, 2003).	41.25 (33%)	32.96 (32%)
c	One thing that all Canadians are supposed to have is universal access to health care and quality education.	17.5 (14%)	13.39 (13%)

	Unfortunately, government cuts to social programs have undermined this, at least for the lower of the three strata of society (Phillips, 2003, p.2).		
d	All Canadians are supposed to have universal access to health care. They are also supposed to have access to quality primary and secondary education. It's a shame, but the last few government cutbacks have been to social programs which have undermined the universality of access, at least for the lower of the three strata of society	3.75 (3%)	1.03 (1%)

	SCENARIO 4		
Option	"The relationship of social scientists to politics in English Canada can be analyzed in terms of two roles which, though not mutually exclusive, have not overlapped to any considerable extent in practice." The above quotation was taken from Brooks & Gagnon (1988, p. 119). Brooks, S. & Gagnon, A.-G. (1988). *Social scientists and politics in Canada: Between Clerisy and* Vanquard. Montreal, Quebec, Canada: McGill-Queen's University Press. Which of the following is a good paraphrase of the quotation?	N chosen (%) under-grads	N chosen (%) grads
a	There are two roles for social scientists who study politics in English Canada. They are not mutually exclusive, but have not overlapped to any extent in practice (Brooks & Gagnon, 1988).	11.25 (9%)	5.15 (5%)
b	When studying the relationship of social scientists to politics in English Canada, there are two roles with little overlap (Brooks & Gagnon, 1988).	57.5 (46%)	42.23 (41%)
c	**Social scientists who study English Canada's politics can take two distinct positions (Brooks & Gagnon, 1988).**	**32.5 (26%)**	**37.08 (36%)**
d	Two roles can be used to analyze the relationship of social scientists to politics in English Canada, which are not mutually exclusive, but have not overlapped in practice (Brooks & Gagnon, 1988).	23.75 (19%)	18.54 (18%)

Discussion

The objective of this project was to assess the ability of students taking online courses to recognize plagiarised material. A second objective was to explore whether this ability improved with feedback and practice by having students attempt a paraphrase. A further objective was to classify the types of errors made. This study found that almost half of the students in a third-year psychology course did not recognize plagiarised material consistently. The evidence does not support the prediction that the Psychology student scores would improve over time given feedback and practice, as more students got the first question correct (93.8%) than the fourth question (82.2%). Furthermore, the majority of these students did not correctly paraphrase a passage they were asked to write in their own words, even after they had received feedback on their recognition

quizzes. This suggests more extensive instruction is needed. The University group also failed to recognize many plagiarised passages that included word strings, reversals, substitutions, additions, and deletions. As suggested by Hochstein et al. (2008), the poor ability of students to identify plagiarised passages may imply poor understanding of the concept. Therefore, when these students write their course assignments and other written work, they may not be able to recognize their own tendency toward plagiarism and thus engage in it accidentally.

Types of Plagiaristic Errors

Characterizing the types of errors students made can provide guidance for future work in plagiarism prevention. In evaluating the types of errors committed, four pieces of evidence are considered: (1) four Quiz recognition items from the 420 Psychology students; (2) paraphrases created by these Psychology students; (3) four Scenario recognition items from 125 undergraduate students from the University group; (4) the same four Scenario items answered by 103 graduate students from the University group.

One important finding is that many students seemed to believe that plagiarism had not been committed if a source was included in the rewritten passage, even if the new passage was taken word for word from the original. This was evident in the option selected by 3.2% of Psychology students for Quiz 2, 16.3% for Quiz 3, and 8.8% for Quiz 4. Stronger evidence comes from the paraphrases of the 420 Psychology students; in 215 instances, students added the citation from the original text (although these citations were not always done correctly). This fits with Roig's conclusion, back in 1997, that students believed that as long as a source was cited, plagiarism was not being committed. Other evidence from the literature also finds that students place emphasis on the presence of a citation in their judgments of plagiarism (Holt, 2012).

While it is good that students are aware of the importance of citing sources, evidence suggests they often do not do this properly (Ellery, 2008; Zimitat, 2008). Educating students about the correct documentation for their discipline is important (Breen & Maassen, 2005), but students need to learn that using their own words when rewriting text is also important. Students would also benefit from learning to use quotation marks properly (Holt, 2012), as 25% of Psychology students did not select the option that included a proper quotation and citation in Quiz 2.

Recognising that reversing the order of words from the original source is considered plagiarism seems to be another weakness for students. Two multiple choice questions in the Psychology course contained an option in which the wording of the original was reversed. For Quiz 3, 5.2% of students incorrectly selected this option. For Quiz 4, 8.8% chose this option. For the University group, 33% of undergraduates and 32% of graduate students for Scenario 3 and 6% of undergraduate students (10% of graduate students) for Scenario 1 incorrectly selected the item with reversed wording as the passage that was not plagiarised. Since correct citations were provided for the four

Scenarios rated by students from the University group, perhaps the next clue that students use to classify a passage as non-plagiarised is that the words are not in identical order. Work from Dawson and Overfield (2006) supports this, as their students also had more difficulty recognizing plagiarism when a reversal was used than when words were taken directly from the original.

Interestingly, although the recognition items suggest students do not perceive reversals as plagiarism, the Psychology students used very few reversals in their own paraphrases. Only 18 instances of reversals were recorded among the 420 Psychology students. This discrepancy between performance in recognition and production tasks makes it difficult to judge whether or not reversals are a difficulty for students in their writing. One possibility is there is a disconnect between what students recognize and what they produce. Kirsch and Bradley (2012) reported a similar result, in that while only 53.5% of students correctly chose the paraphrased option on a multiple choice quiz, up to 76.25% of them were able to produce a good paraphrase. This is an area for further research.

After citations and reversals, the most common incorrect option was the one containing word strings (identical words to the original passage) along with substitutions and/or deletion(s) and/or addition(s) that hold the paraphrase together. These options were chosen by 3.8% of Psychology students in Quiz 1 and 3.1% of students in Quiz 4. For the University group, 24% of undergraduates (27% of graduates) chose this option for Scenario 1, for Scenario 3, 14% (13% of graduate students) chose this option, and for Scenario 4, 19% of undergraduates (18% of graduate students) selected this option. In comparison, Psychology students' paraphrases in Quiz 5 included a moderate amount of additions and deletions (58 and 34 instances, respectively). However, at 453 instances, substitutions were by far the most common type of plagiarism used in the paraphrasing task.

Although the present study found that students had some difficulty recognizing plagiarism in phrases that contained substitutions, additions, and deletions, students in the study by Dawson and Overfield (2006) had the greatest amount of difficulty with such phrases. Because students tend to use substitutions frequently in their own writing (as evidenced in the paraphrasing task in the present study) this may indicate they do not consider this as plagiarism. Dawson and Overfield did not report use of citations (the main cue used by students in the present study), so the reason for the discrepancy between their study and this one as to the degree to which students incorrectly perceive using substitutions as a way to paraphrase is not clear. However, both studies concur that sticking closely to the original text (rather than focusing on summarizing the meaning of the passage) may be a weakness among students. Howard (1995) claimed "patchwriting" (p. 799), in which a few changes are made to the original text, was a necessary step through which beginning students learn to engage in academic writing. However, she also stated that final papers should not be handled in this way. Clearly students need more instruction in understanding plagiarism.

An unexpected result in this study was that the majority of students from the University group did not select the correct option for Scenario 4 (see Table 4). The modal (incorrect) response was an option that had fewer words than most of the other options. It may be that when phrases are correctly paraphrased, they tend to be shorter than the original passage. Some support for this notion comes from Walker's (2008) finding that students who had been trained in proper paraphrasing used fewer words in their rewrites than did students in the control group. However, further research is needed to test this.

Conclusion

Becoming familiar with terminology, time management, learning how to read academic papers for meaning and how to summarize the main points of a text, in addition to learning proper citation rules and how to avoid plagiarism, are essential skills for students in higher education. Currently, instructors may be overestimating students' abilities in these areas. Rather than perceiving poor paraphrasing as a type of cheating, it may be more appropriate to identify it as a weakness in skills. Knowing where student weaknesses lie provides essential information as to where to direct intervention. Educating students about avoiding substitutions, word strings, reversals, additions, and deletions may be a first step in preventing accidental plagiarism.

If it is true that a large number of students do not fully understand plagiarism, proactive prevention rather than punishment may be the best means to deal with it. Several authors suggest training in skill development is key. Soto et al. (2004) and Zimitat (2008) observed that students who plagiarised did not have good note-taking skills. They recommended that students be taught such skills, but whether this is a causal or merely correlational relationship requires future investigation.

Information literacy has been touted as a crucial factor in preventing plagiarism (Moniz et al., 2008; Rolfe, 2011). Reading peer-reviewed journal articles, as is often asked of students in higher education, can be very difficult. Students may need guidance in their selection of journals, but even more so, students may need to be taught how to read such articles. Prevention may need to focus on helping students grasp the main ideas and summarize material rather than focusing on details (Walker, 2008). This may help ensure "students don't conclude that creating a technically perfect bibliography is enough" (Howard & Davies, 2009, p. 65).

Requiring that students pass a test that demonstrates they have the necessary skills could be a prerequisite to handing in their assignments. Several such online tutorials exist (see Reference note). Currently instructors may be asking students to perform "what they have not been taught" (Levin, 2006, p. 6). To label the outcome as cheating may be an act of misconduct on the part of academic staff.

Acknowledgements

Reference note

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- Quoting and paraphrasing sources
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- The cite is right: quiz show
  http://library.camden.rutgers.edu/EducationalModule/Plagiarism/citeisright.html

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Challenges and Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania

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Abstract

Higher education in Tanzania like in many other Sub-Saharan countries suffers from unavailability of quality teaching and learning resources due to lack of tradition, competence, and experience to develop such resources. Nevertheless, there are thousands of open educational resources (OER) freely available in the public domain that can potentially improve the quality of existing resources or help to develop new courses. The uptake and reuse of these resources in higher learning institutions (HLIs) in Tanzania has been very low. The study applied the unified theory of acceptance and use of technology (UTAUT) model to elicit instructors' intention to adopt and use OER in teaching. The paper also investigated challenges that hinder instructors to adopt and use OER. A sample of 104 instructors selected randomly from five HLIs was collected and tested against the research model using regression analysis. The study found effort expectancy had significant positive effect on instructors' intention to use OER while performance expectancy, facilitating conditions, and social influence did not have significant effect. Challenges that were found to hinder instructors to adopt and use OER are discussed. The findings of this study will help those who are involved in OER implementation to find strategies that will maximize OER adoption and usage in higher education in Tanzania.

Keywords: Open educational resources; eLearning; OER acceptance; UTAUT

Introduction

The past decade has seen the tremendous development of information and communication technologies (ICT) and the internet in Tanzania. The recent rollout of SEACOM marine cable has increased internet speed up to 155 Mbps as well as reducing telecommunication costs by 95% (Swarts & Wachira, 2010). Recently, the government has also exempted all ICT equipment imported in the country from value added tax (Sife, Lwoga, & Sanga, 2007). Consequently, the price of ICT equipment has decreased significantly and it has become affordable to the majority of Tanzanians. These developments have heightened the need for higher learning institutions (HLIs) to use ICT to embrace educational delivery.

Naturally, institutions have been spending a considerable amount of resources to procure, install, and maintain various ICT equipment as well as information systems to complement face-to-face delivery. For example, 80.2% of HLIs in Tanzania had installed eLearning systems by the end of 2011 (78% Moodle and 2.5% Blackboard) (Munguatosha, Muyinda, & Lubega, 2011) while others were using audiotapes, CDROMs, videotapes, video conferencing, and other eLearning technologies (Lwoga, 2012).

Despite massive investments made by institutions to procure and manage various educational technologies, far too little attention has been paid to develop course content for students. The majority of existing content is text based in the form of course hand-outs with minimum content, without multimedia to make them more interactive (Lwoga, 2012). As a result, many institutions have continued to rely on printed resources which are expensive and difficult to share with a wider group of learners (Lwoga, 2012; Nyandara, 2012).

As the cost of text books and other educational resources from commercial companies continue to rise, institutions normally tend to use out-dated books, old course content, or poorly designed learning resources (Keats, 2003; Ngugi, 2011). Clearly, the use of such resources has implication on the quality of graduates. In fact, a majority of instructors in developing countries do not have expertise and experience to develop quality educational resources (Unwin et al., 2010). Nonetheless, the recent emergence of open educational resources (OER) is described as one of the main solutions to help institutions to acquire quality learning resources at no cost.

OER are freely and openly available digitized learning resources that can be adapted, modified, and re-used for teaching, learning, and research (OECD, 2007). The idea behind OER was first introduced by United Nations Educational, Scientific and Cultural Organization (UNESCO) in a Forum on the Impact of Open Courseware for Higher Education in Developing Countries 2002 hosted by UNESCO in Paris, France (UNESCO, 2002). The forum cemented the need to release these resources in order to expand access to education specifically in developing countries. As a result, thousands

of OER spanning across all disciplines have been made available in the public domain through the support of Organization for Economic Co-operation and Development (OECD), the William and Flora Hewlett Foundation, the Commonwealth of Learning (COL), and UNESCO. They include full courses, course modules, video of lectures, homework assignments, simulations, and electronic textbooks.

By the end of 2007, over 3,000 courses from over 300 universities were available (OECD, 2007). These included 1,900 courses from Massachusetts Institute of Technology (MIT), 2,500 courses from over 200 universities under OCW Consortium, and more than 1,500 courses under Japanese OCW Consortium (Butcher, n.d.). Others include 750 resources from China Open Resources for Education (CORE) and more than 22,500 resources from Multimedia Educational Resource for Learning and Teaching Online (MERLOT) (Yuan, Mac, & Kraan, 2008). Moreover, there are already African-based initiatives that have shared thousands of locally developed OER. Some notable initiatives are OER Africa, Teacher Education in Sub-Saharan Africa (TESSA), and UCT Open Content.

Despite free availability of these resources, their uptake and reuse in many Sub-Saharan countries like Tanzania is very low (Freitas, 2012; Hoosen, 2012; Unwin et al., 2010). MIT OCW statistics show that only 2% of MIT OCW traffic since 2004 has come from users in Sub-Saharan Africa (MIT, 2013). In Tanzania, for example, despite efforts made by Open University of Tanzania (OUT) to adapt and use MIT OCW, only 21.8% of 150 respondents indicated awareness of their existence (Samzugi & Mwinyimbegu, 2013). Similarly, since University of Dar es Salaam signed an agreement with MIT a few years ago to use MIT OCW, none of the departments has reported using these resources.

So far, however, there has been little research around the use of OER in the African context (Percy & Belle, 2012). A majority of existing OER studies focus on development and publication of OER repositories as well as on the integration of policies in various institutions (Andrad et al., 2011). Therefore, this study focused on investigating reasons behind low uptake and reuse of OER in higher education in Tanzania. Specifically, the study aimed to

- elicit instructors' behavioral intention to adopt and use OER in teaching, and
- identify challenges that hinder instructors to adopt and use OER in teaching.

The study was conducted in five HLIs located in Tanzania. These institutions are:

- University of Dar Es Salaam (UDSM),
- Ardhi University (ARU),
- Dar Es Salaam University College of Education (DUCE),
- Dar Es Salaam Institute of Technology (DIT), and
- Mkwawa University College of Education (MUCE).

The Importance of OER for Higher Education in Tanzania

The availability of OER in the public domain can offer several benefits to higher education in Tanzania. These include helping instructors to improve the quality of existing courses or develop new courses through adapting, modifying, and reusing thousands of freely available courses in the public domain. OER can also improve the quality of locally developed content by sharing course content under open licenses through receiving plenty of peer reviews from other academics in OER communities. Additionally, through participating in OER communities staff can acquire skills and competences to develop quality course content (Wilson-Strydom, 2009). These skills include content/subject matter, instructional techniques, online approaches, review processes, production, presentation, and publishing of educational materials.

Moreover, OER can reduce social inequalities by complementing existing blended learning courses offered by several institutions in Tanzania. In this case, OER can widen access of education to disadvantaged learners such as those who are located in remote areas or unable to study due to work or family commitments (Butcher, 2011; Freitas, 2012). In practical terms, since 90% of institutions in Tanzania are government funded, sharing and reuse of content amongst institutions will make efficient utilization of taxpayers' money, thus everyone benefits (Hylén, 2006; Sclater, 2009).

Another advantage of OER in higher education is to attract more students, increase institutional reputation, and attract research funding and new partnerships (Butcher, 2011; Hylén, 2006; Sclater, 2009; UNESCO & COL, 2011). This was demonstrated by MIT, which found that students' awareness of their freely available courses influenced 35% of new students to apply to various courses (MIT, 2006). Similarly, at least 4,400 new students who registered on courses offered by Open University of UK had accessed the same courses on the OpenLearn site before as OER (McAndrew et al., 2008). Moreover, MIT and OpenLearn's public image and reputation have increased tremendously since they started OER projects and have attracted dozens of funding agreements and partnerships. The same benefits can be reaped by HLIs in Tanzania by participating in OER initiatives.

Theoretical Framework

The study adopted the unified theory of acceptance and use of technology (UTAUT) model to examine instructors' behavioral intention to adopt and use OER in teaching. The model was developed by Venkatesh et al. (2003) by combining eight similar technology acceptance models. The models that were combined to form UTAUT are: technology acceptance model (TAM), innovation diffusion theory (IDT), theory of reasoned action (TRA), and motivation model (MM). Other models include theory of planned behavior (TPB), combined TAM and TPB, model of PC utilization (MPCU), and social cognitive theory (SCT).

The model consists of four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (see Figure 1). These four constructs are direct determinants of usage intention and behavior. Moreover, the variables gender, age, experience, and voluntariness of use moderate the key relationships in the model. This model has demonstrated the robustness and validity in predicting the acceptance of various new IT innovations which influenced the choice of the model for this study. Moreover, it was able to explain 70%of the variance in behavioral intention in IT and about 50% in actual use, which was better than the other eight models (Venkatesh et al., 2003).
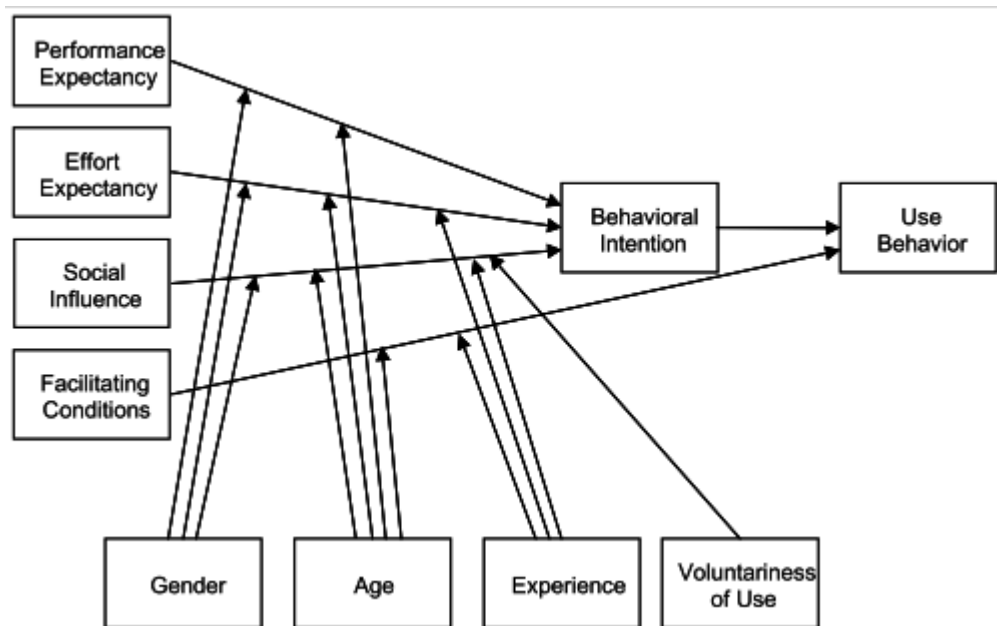
Figure 1. The UTAUT model (Source: Venkatesh et al., 2003, p. 447).

Research Model and Hypotheses

A majority of studies that adopted UTAUT have extended the model by including new variables or reducing existing variables to suit a particular context of the study. Likewise, this study extended the model to suit the context of OER adoption in Tanzania. OER is expected to increase accessibility of educational resources that will be integrated into existing courses or used to develop new courses. In this case *voluntariness of use* in UTAUT was removed. Also, this study does not investigate the effect of *gender*, *age,* or *experience* of instructors in behavioral intention to use OER. Therefore gender, experience*,* and age were also removed. The hypotheses and constructs are below.

Performance expectancy.

This is the degree to which instructors believe that using OER will help them to enhance their teaching performance (Venkatesh et al., 2003). Venkatesh et al. also demonstrated that performance expectancy is the strongest predictor of behavioural intention to use several technologies in both voluntary and involuntary settings. In a similar study conducted in Africa with 96 respondents, performance expectancy was found to have strong influence for instructors to adopt and use OER in teaching (Percy & Belle, 2012). Adapting performance expectancy to the OER context, instructors are expected to find OER useful and will enable them to accomplish teaching activities more quickly and flexibly or even help them to increase their teaching effectiveness. Therefore, the hypothesis can be explained as follows:

Hypothesis 1: Performance expectancy has a positive effect on behavioural intention to adopt and use OER.

Effort expectancy.

This represents a degree of easiness associated with locating, adapting, and using OER (Venkatesh et al., 2003). Therefore, the study hypothesizes that the acceptance to adopt and use OER will depend on whether instructors believe using OER will be easy and free of effort. Several studies have found effort expectancy to be an important predictor of information technology usage. Likewise, Percy and Belle (2012) found effort expectancy to have a positive influence on adopting and using OER in Africa. Therefore, the proposition is derived as follows:

Hypothesis 2: Effort expectancy has a positive effect on behavioural intention to adopt and use OER.

Social influence.

This represents a degree to which instructors perceive how important it is for others to believe they should adopt and use OER (Venkatesh et al., 2003). This construct was considered a very important aspect in predicting acceptance of IT in previous studies such as TRA and TAM 2. These studies called it subjective norms. Therefore, it is expected the OER adoption rate will increase if instructors perceive their colleagues in the department or institution management believe they should use it. The hypothesis can be explained as follows:

Hypothesis 3: Social influence has a positive effect on behavioural intention to adopt and use OER.

Facilitating conditions.

Venkatesh et al. (2003) define facilitating conditions as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (p. 453). Therefore, the OER adoption rate will increase if

instructors believe that institutions have systems and services to support the application and use of OER in teaching. In the context of OER, these support systems can be the availability of reliable internet and having the necessary skills to be able to use OER. Therefore, the proposition is derived as follows:

Hypothesis 4: Facilitating conditions has a positive effect on behavioural intention to adopt and use OER.

The research model is shown in Figure 2.
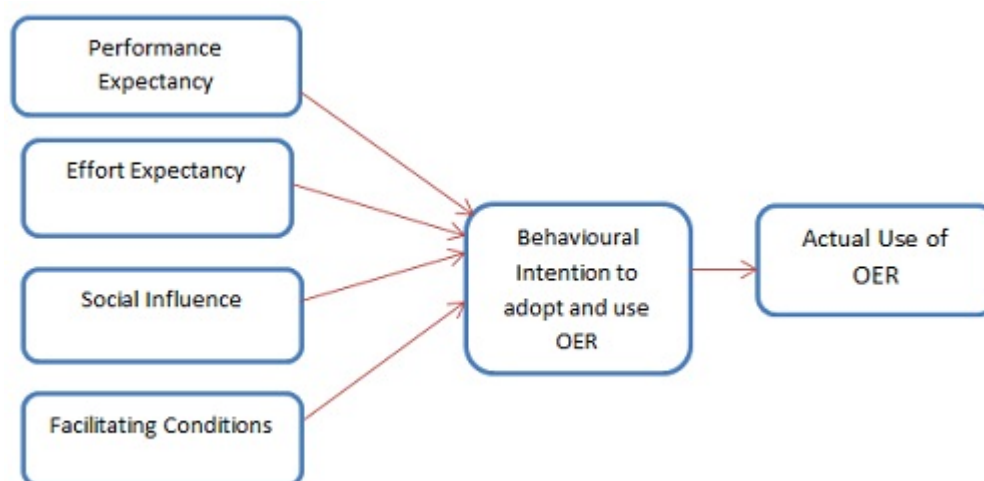
Figure 2. Research model.

Research Methodology

The study adopted a research instrument developed by Venkatesh et al. (2003) which uses a five–point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The questionnaire was modified by re-wording items to suit the context of the study (see Appendix). New items were added to assess how instructors use internet services to prepare and share learning resources. The questionnaire was created using Google Docs, and emailed to 608 instructors selected randomly from five institutions. Ninety-six emails were undelivered. Therefore, a total of 512 responses could have been received. However, a sample of 104 instructors out of 512 usable responses was obtained. This is 20.3% of all respondents.

All respondents were guaranteed confidentiality of their individual responses, and the name field was treated as optional. Data was collected through Google Docs, and, thereafter, recorded directly into an Excel file. The data collection was undertaken between April and June 2013. The study used Statistical Packages for Social Science (SPSS) version 20 to analyze data.

Research Results

Demographic information.

The study revealed that 75% of respondents were males, and 15% were females. In terms of institution distribution, 52.9% of respondents were from UDSM, 12.5% from DUCE, 8.7% from DIT, 18.7% from MUCE, and 7.7% from ARU. Moreover, 82% indicated they shared their course notes with other instructors, while 18% did not. When they were asked if they could share their lecture notes with other people via internet for free, 84.6% said yes, while 15.4 said no. However, 83% said they have heard about OER before, while 17% said they have never heard about it. Table 1 shows the demographic information of the respondents.

Table 1

Respondents' Demographic Profile

Respondents profile	Classification	Frequency	Percentage
Gender	Male	78	75
	Female	26	25
Institution	UDSM	55	52.9
	DUCE	13	12.5
	DIT	9	8.7
	MUCE	19	18.3
	ARU	8	7.7
Can you share your course notes via internet for people to access freely?	Yes	88	84.6
	No	16	15.4
Have you ever shared your course notes with other lecturers?	Yes	85	82
	No	19	18
Have you ever heard about OER before?	Yes	86	83
	No	18	17

Instructors' Acceptance to Adopt and Use OER

To explore instructors' intention to adopt and use OER, data were tested against the research model using linear regression analysis. First, the reliability of the research instrument as well as individual constructs was measured.

Research reliability and validity.

To measure reliability of the instrument and constructs, Cronbach's alpha (α) was used.

Based on SPSS results, the Cronbach's alpha coefficient for the 19-item instrument was 0.877 exceeding 0.70 required for basic research. Therefore, the data collection tool was reliable. As shown in Table 2, Cronbach's alpha values of the five constructs ranged from 0.670 to 0.927 which are all above 0.5.

Table 2

Cronbach's Alpha Coefficients for Construct Reliability Measurement

No.	Construct	Cronbach alpha (α)
1.	Performance expectancy	0.846
2.	Effort expectancy	0.906
3.	Social influence	0.750
4.	Facilitating conditions	0.670
5.	Behavioural intention	0.927

The overall questionnaire was considered valid as it used the same items from previous surveys without adding new or deleting existing items.

Assessment of research model.

To assess the research model, a confirmatory factors analysis was conducted. Five factors loaded successfully in pattern matrix table using direct oblimin rotation method. The five factors were then subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between independent variables (IVs) (performance expectancy, facilitating conditions, effort expectancy, and social influence), and the dependent variable (DV) (behavioral intention to use OER).

Using enter method, a significant model emerged: $F(4,99) = 4.563654$, $p < .005$. The model explains 12.2% of the variance (Adjusted R Square = 0.122) on instructors' behavioral intention to adopt and use OER in HLIs in Tanzania. Clearly, there are factors other than the four proposed in this model which can be used to predict instructors' behavioral intention to adopt and use OER. However, this is still a good model as Gaur and Gaur (2009, p. 109) pointed out that as much as lower value R square 0.10-0.20 is acceptable in social science research. Table 3 shows a summary of the research model.

Table 3

Model Summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.395[a]	.156	.122	.937246

Hypothesis testing.

To test the proposed research hypotheses, regression analysis was used to determine the causal relationship between the DV and four IVs. Table 4 shows the result of nonstandardized and standardized regression coefficients for the constructs entered in the model. Similarly, Table 5 shows a summary of predictive factors in terms of beta values for each hypothesis obtained from regression analysis. The results show that three hypotheses did not have significant effect on instructors' intention to adopt and use OER; values were not less than 0.05. However, effort expectancy (beta = 0.25) had significant positive effect on instructors' behavioral intention to adopt and use OER in teaching.

Table 4

Unstandardized and Standardized Regression Coefficients for the Constructs Entered in the Model

Constructs	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.603E-017	.092		.000	1.000
Performance Expectancy	-.187	.102	-.187	-1.839	.069
Facilitating conditions	-.170	.097	-.170	-1.752	.083
Effort expectancy	.250	.104	.250*	2.400	.018
Social influence	-.094	.103	-.094	-.908	.366

*$p < 0.05$

A summary of how the hypotheses have been tested is shown in Table 5.

Table 5

Summary of Results Hypothesis Testing

Hypothesis	Results	Conclusion
Hypothesis 1: Performance expectancy has a positive effect on behavioural intention to adopt and use OER.	Not significant (Beta = -0.187, $p < 0.069$)	Not supported
Hypothesis 2: Effort expectancy has a positive effect on behavioural intention to adopt and use OER.	Yes significant (Beta = 0.250, $p < 0.005$)	Supported
Hypothesis 3: Social influence has a positive effect on behavioural intention to adopt and use OER.	Not significant (Beta = -0.094, $p < 0.366$)	Not supported
Hypothesis 4: Facilitating conditions has a positive effect on behavioural intention to adopt and use OER.	Not significant (Beta = -0.170, $p < 0.083$)	Not supported

Challenges Facing Instructors to Adopt OER in Higher Education

Finally, instructors were asked to provide their opinion as to why instructors in HLIs in Tanzania do not use OER in teaching. The following are some of the challenges mentioned by instructors.

Technology.

Some HLIs in Tanzania are still faced with inadequate ICT infrastructure which hinders the adoption and use of OER in teaching. In some institutions access to computers is still limited while some are faced with unreliable internet services and low bandwidth. Below are some of the comments from instructors:

> ...lack of facilities and equipment like computers, intranet and reliable internet connections....

> ...lack of facilities, reliable power and slow internet connection and unreliable

> ...Readiness and willingness are problems. But the availability of ICT facilities is a limiting factor.

Awareness of intellectual property and copyright issues.

The study revealed that some instructors do not have knowledge about copyright and intellectual property issues. In this regard, instructors do not know which resources should be shared in the public domain, and which rights should be reserved to the institution or to the authors. For example, one instructor said "...I don't have knowledge on the existence of OER and how to use OER but also fear to share my materials with fear of copyright issues..."

Relevance and quality of OER.

This study found a majority of instructors could not find resources which are relevant to their contexts. Moreover, some of the instructors are suspicious about the quality of OER and other resources from the internet. Here are some of the comments from instructors:

> ...Many of the OER are not exhaustive enough. Many are shallow, not complete. In order to use them, you need to take them as a starting point but you may need to edit to a big percentage to suit your context as per the syllabus.

> ... the irrelevance of most of the material available on OER to our course content/outline."

> ...I don't trust the authenticity of internet based materials.

> ...in my institution in particular, the available OER does not fit much to the curriculums (which are competence based), although they are helpful in instructional composition.

Awareness about the existence of OER.

Another important finding was that some instructors are still unaware of the existence of OER. This was evident from the comments below:

> ...we are un-aware of OERs and even if some have glimpse of it lack knowledge on how to access them...

> ...Most of them they are not informed, resourceful persons are few to help them adapt, there is no infrastructure set for them to adapt for OER in their colleges, most of lecturers are newbies to web 2.0 technology

...I think lack of information about the OER its
advantages and usefulness

...May be because, they lack some Technics on how they
can have access to web resources

...Most of them are not exposed/aware of the animal
called OER

...Most of them they do not know how to use OER. Lack
of knowledge

Moreover, some who are aware of OER pointed out that they do not have the skills and knowledge to access and use them.

Discussion

This study set out to explore challenges and instructors' behavioral intentions to adopt and use OER in teaching. One of the most interesting findings was that many instructors are aware of the existence of OER (83% of instructors) and they were willing to share their course notes freely via the internet (84.6% of instructors). The study also found that the proposed model explains 12.2% of the variance (Adjusted R Square = 0.122) to adopt and use OER in HLIs. Moreover, the study did not find any significant effect on instructors' intention to adopt and use OER using three factors namely facilitating conditions, performance expectancy, and social influence. In general, therefore, it seems that there are factors other than these four which can be used to predict instructors acceptance' to adopt and use OER.

On the other hand, we found effort expectancy to have significant positive effect on instructors' intention to adopt and use OER. These results suggest that instructors believe OER will be easy to use and free of efforts. The findings are consistent with similar studies, Percy and Belle (2012) and Dulle and Minishi-Majanja (2011), which assessed the acceptance of OER in Africa and open access in public universities in Tanzania respectively. These findings have important implications for OER and OER repository developers. They should improve the user-friendliness and ease of use of OER and OER repositories in order to attract more instructors to adopt and use them.

Some instructors described inadequate ICT infrastructure as one of the challenges they are faced with when adopting and using OER in teaching. These findings are consistent with a similar study conducted at the Open University of Tanzania (Samzugi & Mwinyimbegu, 2013). This study found a low level of internet connectivity and an inadequate number of computers were hindrance factors to adopt and use OER. According to Bateman (2008), despite commonalities that exist amongst African

countries, there also exists considerable diversity in terms of infrastructural and contextual challenges. In some countries, ICT infrastructure is improving very fast compared to others. For example, Ngimwaa and Wilsona (2012) found low technology levels was not a hindrance factor to adopt OER in a study conducted in Kenya, Uganda, and South Africa using a survey of 19 participants from TESSA.

Similarly, the Government of Tanzania has been improving ICT infrastructure by rolling out SEACOM marine fibre cable and has exempted all ICT facilities from import taxes (Lwoga, 2012). The SEACOM marine cable has reduced telecommunication costs by 95% (Swarts & Wachira, 2010) as well as increasing bandwidth up to 155 MBps (Lwoga, 2012). Some institutions are already connected and many will be connected in the near future (Mtebe & Twaakyondo, 2012).

Moreover, we found that some instructors do not use OER due to unawareness of copyright issues related to OER implementation. Unexpectedly, 84.6% of instructors were willing to share their course notes freely via the internet. Therefore, there is an urgent need for institutions to create awareness of copyright issues in order to enable instructors to adopt OER and share their resources via the internet. It seems that this is a big problem as several studies (Hoosen, 2012; Percy & Belle, 2012) that were conducted in Africa had similar findings. Institutions should be advised to make use of Creative Commons licensing which has already addressed various license options that can be attached to OER (Sclater, 2009).

The study also revealed that some instructors could not find OER relevant to their curricula or their context. This could be attributed to the fact that many instructors are not aware of the OER repositories with resources relevant to their courses. In addition, some instructors were suspicious about the quality of OER and materials from the internet in general. However, instructors should be advised to use existing quality assurance procedures set within their institutions to choose OER for their courses (UNESCO & COL, 2011).

In fact, the responsibility of ensuring the quality of OER chosen, and how they are integrated into teaching activities for a particular course, resides in instructors themselves (Butcher, 2011; Dinevski, 2008). Once this is explained clearly to instructors, definitely they will start adopting and using them. At institutional level, a majority of institutions in Tanzania do not have institutional policies that encourage instructors to create and share educational resources. Existing policies were developed when OER was at an early stage of implementation. For example, UDSM ICT policy was developed in 2006, while that of OUT was developed in 2009. Unless institutions review their existing policies, it will be very difficult for institutions in Tanzania to benefit from OER initiatives as any effort to do so will encounter several challenges that can be resolved by policies. According to Butcher (2011), at least four main policies need to be reviewed for smooth implementation of OER in a given institution. These policies are:

intellectual property rights and copyright policy, human resource policy guidelines, ICT policy, and materials development and quality assurance policy.

However, many institutions in Tanzania do not have expertise to develop OER enabled policies. These institutions can still benefit from organizations such as SAIDE, OER Africa, and UNESCO which have been supporting HLIs in Africa to review and develop policies that enable friendly adoption and usage of OER. For example, OER Africa has recently supported University of Ghana and the Kwame Nkrumah University of Science and Technology to review their policies (Ngugi, 2011). As a result, the efforts spent to develop course content have been valued the same way as effort spent to conduct research and are part of promotion considerations.

Recommendations for Future Research

The proposed model for this study accounts for 12.2% variance in the behavioural intention to adopt and use OER in teaching. Although this is an acceptable percentage in social science research, it is clear that there are other factors that can be used to predict behavioural intention to adopt and use OER. Considerably more work will need to be done by adding new factors to the UTAUT model in order to predict behavioural intention to use OER in teaching. Some of the factors that can be considered are attitude, information quality, and awareness, which were used by Percy and Belle (2012) and Dulle and Minishi-Majanja (2011) in similar studies.

Furthermore, individual perceptions change over time as users gain experience (Venkatesh et al., 2003). Therefore, the results of this study should be considered as perceptions and intention to adopt and use OER at a single point in time. Future research should validate this model in order to apply the findings at a given time. Despite these limitations, this study provides insights on factors that contribute to successful adoption of OER in higher education in Tanzania.

Conclusion

The advantages of OER to enhance education in Sub-Saharan countries like Tanzania are well documented. However, the perceived benefits cannot be realised if instructors do not use these resources to embrace their courses. There is a need to find reasons behind low uptake of these resources in higher education in order to identify corrective measures that will help institutions to maximise usage of these resources in Tanzania. Accordingly, this paper was set to explore challenges facing instructors to adopt and use OER as well as elicit their behavioural intention to use and adopt OER.

We found that performance expectancy, facilitating conditions, and social influence did not have a statistically significant effect on instructors' behavioural intention to adopt and use OER. However, instructors believe that OER will be easy to use with effort

expectancy having positive effect on intention to adopt and use OER. We also found that unreliable internet connection, quality of OER, and lack of awareness of copyright issues related to OER are the main challenges hindering instructors to adopt and use OER. The findings of this study can help institutions in Tanzania to find strategies that will maximize adoption and usage of OER in teaching.

Acknowledgement

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Appendix

Data collection instrument

Challenges and Instructors' Intention to Adopt and Use Open Educational
Resources in Higher Education in Tanzania

Dear Colleague, greetings. My name is Joel S. Mtebe from the Department of Computer Science and Engineering, UDSM. I am conducting a small study to find out reason behind slow adoption of Open Educational Resources (OER) in teaching in Higher Education Institutions (HEIs) in Tanzania. Despite thousands of freely available educational resources in the public domain, many instructors in HLIs have not been adopting them to improve the quality of existing teaching resources. The study is purely academic work designed to help institutions overcome existing challenges for smooth adoption of OER in teaching and learning. Your willingness to participate is very much appreciated

1. Your responses will be treated in confidence and used for the purposes of this study only.

2. Completion of this questionnaire is completely optional.

3. For further information contact Joel S. Mtebe jmtebe@gmail.com +255715 383366

Note. For the purpose of this study, OER is defined as free course materials on the internet that are openly to use and adapt for teaching and learning

1.   Full name (option)..

2.   School/College..

3.   Have you ever shared your course notes with other lecturers?

        a) Yes   b) No

4.   Can you share your course notes via internet for people to access freely? why?

        a) Yes   b) No

5.   Have you ever heard about OER before?

        a) Yes   b) No

Performance expectancy (Please choose by ticking (✔) on the appropriate box

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I would find OER useful in my courses					
7. Using OER will enable me to accomplish course development activities more quickly					
8. Using OER will increase learning outcome of my students					
9. The use of OER will allow me to have access to more information about my courses I teach.					

Effort expectancy (Please choose by ticking (✔) on the appropriate box

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. My interaction with OER websites will be clear and understandable.					
11. It would be easy for me to become skillful at using and integrating OER into my courses					
12. I would find OER easy to use.					
13. Learning to use OER websites will be easy for me.					

Social influence (Please choose by ticking (✔) on the appropriate box

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. People who influence my behavior will think that I should use and integrate OER into my courses					
15. People who are important to me will think that I should use and integrate OER into my courses					
16. The lecturers and other staff at my University will be helpful in the use and integrate OER into my courses					
17. In general, my University will support the use of OER in teaching and learning.					

Facilitating conditions (Please choose by ticking (✔) on the appropriate box

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
18. I have the resources necessary to access OER					
19. I have the knowledge necessary to use and integrate OER into my courses					
20. OER is similar to other course content I use for teaching					
21. A help will be available when I get problem in using and integrating OER into my courses					

Behavioral intention to use OER (Please choose by ticking (✔) on the appropriate box

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
22. I intend to use and integrate OER into my courses in the future					
23. I predict I would use and integrate OER into my courses in the future					
24. I plan to use and integrate OER into my courses in the future.					

25. In your own opinion why instructors in higher education in Tanzania do not use OER?

THANK YOU

Athabasca University

Introducing a Learning Management System at a Russian University: Students' and Teachers' Perceptions
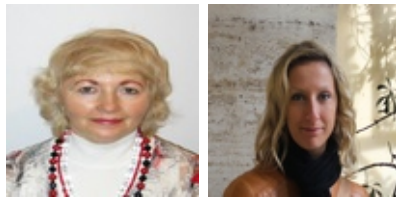
Natalya Emelyanova and Elena Voronina
National Research University Higher School of Economics, Russian Federation

Abstract

Learning management systems (LMS) have been proven to encourage a constructive approach to knowledge acquisition and support active learning. One of the keys to successful and efficient use of LMS is how the stakeholders adopt and perceive this learning tool. The present research is therefore motivated by the importance of understanding teachers' and students' perceptions of LMS in order to anticipate possible issues (problems) and help to build a productive learning environment and a committed user community. The paper looks at this process at a Russian university (National Research University Higher School of Economics – HSE) where the system is being implemented and examines the following issues: qualification and readiness of the stakeholders to use LMS and their perceptions of the system's convenience, effectiveness, and usefulness. The research reveals remarkable divergence of students' and teachers' perceptions of various aspects of LMS which must be considered when raising the effectiveness of the system and building commitment to e-learning. They are analyzed and explicated in the present paper.

Keywords: Higher education; e-learning; online learning; learning management systems; LMS

Introduction

E-learning appeared at the end of the 20th century and has quickly become a new learning paradigm, having proved to be an effective educational technique (Alfadly, 2013; Boeker & Klar, 2006; Mijatovic, Cudanov, Jednak, & Kadijevich, 2012). It supports students' active involvement in the learning process and prepares the shift towards student-centered education. Effective e-learning enhances collaboration and communication thus encouraging group activities and a constructive approach to knowledge acquisition (Lin & Hsieh, 2001). The growing use of online forms and systems of learning such as learning management systems (LMS) or virtual learning environments (VLE) and their rapid spreading are an appropriate response of higher education systems to current processes of integration and building of a global information society. This paper investigates the adoption, usage, and integration of an LMS at HSE by examining the perceptions of two stakeholder groups – students and teachers.

Teaching and learning through learning management systems (LMS) seems to be initially intended for distant education which is reasonable because online studies is the only way to acquire knowledge if you are far away from the learning environment. However, their usage may be extended to support face-to-face and blended delivery. In conditions where the number of contact hours is diminishing and there is a need to develop the learning skills of students the demand for using technology is increasing. It allows learners to perceive information at their own pace, and for teachers it can become a valuable tool to provide an individual approach and improve their existing teaching practices in general. Obviously, there are a lot of learning patterns and every student has their own ways of perceiving knowledge that cannot be effectively catered for in the classroom settings (Graf, 2007), so technology should enhance learning, meet different interests, and result in successful learning outcomes. Thus, educational institutions are striving to provide faculty with LMS and encourage its effective use.

Literature Review

The challenges that modern education should now respond to, including the degree of its virtualization, suitability for stakeholders, and the value of innovations, are now being discussed the world over. The body of works on LMS adoption and acceptance is constantly growing. The problem is being examined from different sides: administrative (Naveh, Tubin, & Pliskin, 2010), faculty (Almarashdeh, Sahari, Zin, & Alsmadi, 2011), and students (Naveh, Tubin, & Pliskin, 2012).

Much of an e-learning program success or failure can be attributed to how it is organized, managed, and adopted. Many researchers indicate a multidimensional character of the problem of learning management environments' perception, acceptance, and success. For instance, "critical success factors" (CSF) (Freund, 1988) have been grouped into several categories depending on the focus of the study: instructor, student, information technology, and university support (Selim, 2007);

intellectual property, suitability of the course for an e-learning environment, building the e-learning course, e-learning course content, e-learning course maintenance, e-learning platform, and measuring the success of an e-learning course (Papp, 2000); student characteristics, student-student interaction, effective support, learning materials, learning environment, and information technology (Benigno & Trentin, 2000); another conception (Volery & Lord, 2000) identifies three groups of CSFs: technology, instructor and students' previous use of technology. Another study (Soong, Chan, Chua, & Loh, 2001) names the following e-learning CSFs: human factors, technical competency of both instructor and student, e-learning mindset of both instructor and student, level of collaboration, and perceived information technology infrastructure.

The effectiveness and success of e-learning are determined by the skills and commitment of the instructor. It is believed that the effectiveness of e-learning depends not so much on information technology but on how the instructor makes use of the IT (Collis, 1995). The important instructor characteristics affecting e-learning success are IT competency, teaching style, attitude, and mindset (Webster & Hackley, 1997). These should be expressed by effectively managing an LMS-based course and by using and encouraging feedback and two-way communication with students.

The next to be emphasized is willingness to adopt new technology (Abrahams, 2010). The adoption of educational technology is a complex issue; often instructors' pedagogical conceptions and values do not include using ICT in educational settings even if technology does not constitute any difficulty for them (Steel, 2009). Consequently, ubiquitous implementation of e-learning is limited by the absence of a holistic view of what should be done to make it effective and resistance to change amongst academic staff (Blin & Monro, 2008; Keaster, 2005). Personal innovativeness and its antipode computer anxiety are therefore another challenge that may be critical for the success of LMS. Personal innovativeness in an information technology context is an individual's attitude reflecting a tendency to experiment with and to adopt new information technologies independently of the communicated experience of others (Al-Busaidi & Al-Shihi, 2012a). This is often difficult for academics for various reasons: lack of experience, skills, and technological mindset (Watts, 2007).

Adopting this new approach to education would require another considerable investment – time. Although one of the main goals of ICT in education is to speed up the process, many scholars underline that continual management of the e-course makes instructors' work very time consuming (Abrahams, 2004; Gillard, Bailey, & Nolan, 2008).

Another important issue is the effectiveness of learning management systems which can be analyzed through several parameters: the extent to which LMS is used by stakeholders and their satisfaction (Naveh, Tubin, & Pliskin, 2012).

According to recent research, the following factors influence student satisfaction with learning management systems: course content (Selim, 2007), perceived usefulness

(Sun, Tsai, Finger, Chen, & Yeh, 2008), perceived enjoyment, computer literacy (Liaw, Huang, & Chen, 2008). On the other hand, instructors' satisfaction is impacted by technology experience and personal innovativeness (Al-Busaidi & Al-Shihi, 2012b).

It is necessary to consider that every study in the area of e-learning has a specific focus prioritizing such different issues as technical, social, psychological, and pedagogical. These factors influence perceptions, adoption, and success of LMS in every specific case.

In our research we assume the following factors as the most important: administrative support, as the system is under implementation at the university and various organizational, structural, and infrastructural issues inevitably occur. To this we add the technological aspect, for the same reason, as the system is under construction. However, the results of our study reveal that the most influential factor appeared to be the human factor, namely perceptions and attitudes of two groups of stakeholders: students and teachers. These ideas are consistent with international studies in terms of identification of major areas of dissatisfaction and perceptions of quality online teaching and learning (Weaver, Spratt, & Nair, 2008) and the importance of the role of teachers for the successful implementation of LMS (Steel, 2009). For many Russian universities using online learning systems is a new experience and we consider it relevant to study and highlight probable challenges.

Research Questions

The authors posed the following research questions :

1. What are the stakeholders' perceptions of the learning management system?

2. What is the connection between perceptions and usage?

Hypotheses

Having studied the corpus of works on LMS adoption and acceptance and the reports on the implementation of the system at HSE, we thus assumed:

1. Students and instructors at HSE have the necessary computer skills to embrace LMS and it will be easy for them to use it. If both groups, students and teachers, are confident computer users, we assume that there will be no resistance to using LMS.

2. Perception of LMS as an innovative and effective educational tool shall arouse students' and teachers' commitment to and interest in e-learning. To verify this, we analyzed the results of the survey with respect to the stakeholders' opinions of the following LMS parameters:

- perceived usefulness (Davis, 1989);

- perceived convenience (Yoon & Kim, 2007);

- perceived effectiveness (Lowerison, Sclater, Schmid, & Abrami, 2006).

3. LMS is being introduced at HSE in addition to face-to-face learning. Thus, we hypothesize that the combination of these types of instructing shall lead to increased control over the students' academic progress.

4. Assessment is an important part of the educational process. Tests in LMS are an objective assessment tool and reflect the real picture of student achievement. Therefore, students may welcome taking final tests through LMS rather than taking an exam face-to-face with the teacher.

Method

The study aims at investigating the students' and teachers' perceptions of LMS and their commitment to it.

The target population consisted of students and instructors of HSE – Nizhny Novgorod campus. The survey was anonymous and respondent confidentiality was maintained. The procedure was as follows: The questionnaires in a paper format were administered at random to students in classes at the end of a lesson and then collected by a coordinator. All the students present agreed to participate in the survey. The instructors were approached in staff rooms and asked to fill in the questionnaire. Everybody present in staff rooms at the moment agreed to complete the questionnaire. The data were entered in computer programmes (MS Excel, MS Word) and then processed.

Two separate questionnaires were designed for students and teachers. The questionnaires contained closed and open questions as well as questions based on a 3-point scale (2-*poor*, 3-*average*, 4-*good*).

One questionnaire was administered to bachelor and master students from the Faculties of Economics, Management and Business Informatics. The sample consisted of 109 students. The demography was as follows: 25% of them were men, 75% were women. The age of students was 18-21.

The questionnaire for students consisted of two parts. The first part was offered to students irrespective of their exposure to LMS to find out if they had heard about or had used LMS at least once. Both groups were asked about their perceptions and attitudes to LMS. After that. those who had the experience of working with LMS were given the second part of the questionnaire aimed at getting students' feedback on the system.

Another questionnaire was administered to instructors. Its purpose was to get information about teachers' perceptions and attitudes and their willingness to introduce

the system into the learning and teaching process. Twenty-three teachers from different faculties participated in the survey. The demography of the teachers was 21.7% of men and 78.3% of women. The age of the teachers was between 30 and 60.

Organizational and Technological Environment

Until recently, there has been little use of distant forms of learning in Russia which is often explained by the following reasons: unsatisfactory level of development of ICT and poor technological base. Today, however, preconditions for wider use of online learning are becoming more explicit. Moreover, technical capacities sometimes surpass the implementation of e-learning concepts and ideas by the Russian academia. At the same time, to successfully withstand the competition both in the domestic and international market of educational services, a modern university must incorporate the latest technologies in its educational programs and academic life. This encourages active involvement of all stakeholders and enables interaction among them.

Incorporating LMS into teaching and learning processes is a trend which is "becoming ubiquitous at universities around the world, adding a virtual dimension to even the most traditional campus-based institutions" (Coates, James, & Baldwin, 2005). Being innovative, flexible, and pedagogically effective, LMS may provide support and enhance traditional ways of learning (Georgouli, Skalkidis, & Guerreiro, 2008).

Being fully aware of these benefits, aiming to realize its innovative potential and increase competitiveness, HSE has been engaged in the institution-wide deployment of LMS at its four campuses. The system is functioning in a pilot mode and is subject to modifications required by students and instructors. The aim of the LMS project at HSE is to build a single information learning environment for the university. Its tasks are seen as

- to provide students and teachers with convenient tools to manage face-to-face and distant learning,

- to assist in mastering new learning methods,

- to support best practices of using ICT in teaching.

HSE aims at expanded LMS use, ensuring involvement and support from top management levels.

As of October, 1, 2012, 27% of teachers and 43% of students in all HSE campuses use LMS on a regular basis, the LMS diffusion thus reaching the critical mass point (Abrahams, 2010b); 6% of all disciplines is supported in LMS. Training courses and seminars where new tools and features are presented to users regularly take place. Besides supporting, organizing. and administering disciplines, LMS is used to manage certain educational projects in HSE. An example of this is the experimental international English Language examination (in IETLS format) conducted in 2012 for

more than 1,000 students (Ob itogakh UMD v 2011-2012 uch. godu., 2012). Therefore, the study of stakeholders' perceptions of LMS at HSE is needed to identify barriers and constraints as well as features to build on.

Among the four campuses, the HSE campus in Nizhny Novgorod chosen for the research is rated second (after Moscow) in terms of the number of teachers who use LMS (76 out of 213), third in terms of registered/active LMS users among students (674 out of 3,036), and fourth in terms of the number of LMS-supported courses (33 out of 1,084).

Findings

Hypothesis 1

Verifying our first assumption we questioned students whether they are at ease with computers and the Internet. Students were asked a number of questions about their computer literacy, use of Internet, and frequency of usage. It turned out that the respondents were confident computer and Internet users; moreover, their use of the Internet was quite frequent: 98% reported using it every day and only 2% every other day. The time spent on the Internet is as follows: 47% of respondents spend more than 3 hours daily browsing the Internet, 26% devote 2 or 3 hours of their time, a few of the respondents (9%) spend more than an hour a day, 18% say they are committed Internet users and they are always online. The results show that students find no difficulty browsing the Internet, and searching for any information they need for their studies.

We wondered what aims students pursued browsing the Internet so often. It is worth noting that the aims of using the Internet are various: 93% use the Internet for information search and for communication with their peers, 57% use it as help for writing their course and diploma papers, and only 19% use the Internet for search of educational and learning programs (the total number does not make 100% as the respondents were free to choose any number of options). This is consistent with other studies which concluded that there was comparatively little growth in "educational" Internet use (Stationery Office, 2009).

Summing this up, we see that students at HSE are confident PC and Internet users and we can presume that LMS will present no significant difficulty for them.

Perceived ease.

At present, the number of students who have been exposed to LMS is 91 out of 109 questioned which means that 83.5% have used the LMS and 16.5% have only heard about it. It should be noted that out of 18 students who did not have any experience of using LMS, only one student said he would need some help while using the system. The rest were sure they would have no difficulty working with it. The majority of students

(59%) indicated they could cope with the system without any help. Eighteen percent of the respondents indicated they did not need any special LMS training courses and if they had any problems they could address their peers for help, and only 14% found it difficult to use.

As for teachers, they see computer literacy as part of their professional qualification. With respect to LMS, all the teachers are familiar with the system: 56% of them have worked with LMS, 31% intend to use it in future, and only 13% have no experience of using it.

Moreover, 79% of teachers point out that they have already completed the training course in LMS provided by the administration and are quite able to use the system. Only one respondent indicated that the system is difficult to operate. Nevertheless, among them the system is used by 40%; the number of those who intend to use the system makes 33%. The rest are undecided.

We can conclude that both groups of stakeholders have the necessary computer skills to embrace LMS and the system is perceived by the majority of them as easy-to-use. Nevertheless, not all teachers are engaged in using LMS and accordingly students do not have a chance to benefit from the system in their learning process. It means the problem is rooted not in the perceived complexity of the system but elsewhere.

Hypothesis 2

We presume that using this innovative system will arouse students' commitment to and interest in learning. Thus, we wondered how students perceive the system's convenience, usefulness, and effectiveness.

Perceived convenience.

Students were asked to evaluate the convenience of LMS based on a 3-point scale (2-*poor*, 3-*average*, 4-*good*). The percentage of students selecting each response was as follows: 39% estimated the convenience of LMS as average, 36% of respondents indicated that the system is good, and 25% assess the system as poor. The mean score of convenience is 3.1. The convenience of the system is evaluated as slightly above average.

From the teachers' perspective, the convenience of LMS was perceived as average by the vast majority of respondents , 77%, poor by 15%, and the lesser part (8%) evaluated the system as good. The mean score of convenience is 2.92.

Analysing the results we should point out that although the mean scores nearly coincide across the groups, a significantly higher percentage of teachers perceive the convenience of the system as average, whereas students' answers are distributed more evenly among the options.

Perceived usefulness.

With respect to usefulness of LMS, 40% of students indicated its importance for uploading and storing materials, 34% of respondents consider that LMS makes the

process of learning easier, 14% believe it fosters the learning process. The rest are undecided on the issue. As for teachers' perceptions of usefulness of LMS, 47% of teachers claimed that the system is effective for uploading materials, 21% suppose that it makes the learning process easier, and 31% think that it fosters learning (see Table 1). Teachers' and students' perceptions vary in many aspects of usefulness of LMS. Instructors misjudge the usefulness of different features of LMS, and they are unaware of the students' perception of LMS usefulness.

Table 1

Students' and Teachers' Perceptions of LMS

Options	% of respondents, students	% of respondents, teachers
Important for uploading and storing materials	40	47
Makes the learning process easier	34	21
Fosters the learning process	14	31
Undecided	12	1

Teachers evaluated basic LMS parameters and mean scores were calculated, based on a 3-point scale (2-*poor*, 3-*average*, 4-*good*). Graphics were assessed as 3.13, interactive features as 3.26, storing and categorization of materials as 3.29. The lowest score was given to flexibility and customizability, 2.86. It may be explained by the fact that the system is still being developed.

Among the functions estimated, storing and categorization of material ranked the highest. The explanation lies in the analysis of activities that instructors undertake in LMS. Sixty-seven percent of teachers upload materials, 67% publish home assignments, 44% use online grade book, and 44% test their students through LMS (the total number does not make 100% as the respondents were free to choose any number of options). In instructors' view, all these activities are supposed to contribute to the learners' involvement in the system and help ease their learning.

Communication being one of the hallmarks of higher education, we wondered how students view the communication through LMS. Only 8% agreed this tool is valuable, compared to 92% who report that they use corporate e-mail or social networks, which are more effective. It shows that LMS is not used by teachers as a means of facilitating collaboration and interaction with students and it does not help to enhance students' involvement in using it.

The results show that the attitudes of students and teachers to the parameters of the system are rather varied both inside each group of stakeholders and between the groups. Teachers and students are nearly unanimous with respect to LMS's importance for uploading and storing materials. It is worth noting that there is a considerable gap

between their perceptions of LMS as a tool fostering the learning process and making it easier. The proportion of teachers who say that LMS enhances the learning process is two times higher compared to students, whereas a significantly higher number of students (as compared to teachers) view LMS as making the learning process easier.

Perceived effectiveness.

A significant majority of students (47%) perceived the system as inconsistent with their learning purposes. Thirty-seven percent view the system as suitable for presenting and storing material, and 15% indicate that the system facilitates the perception of the material. Slightly over one third (34%) of the respondents claim that the system makes the process of learning easier.

Effectiveness is assessed by teachers in terms of time investment, coverage of students, and speed of test results processing and grading. Teachers were to assess these factors on a 3-point scale (2-*poor*, 3-*average*, 4-*good*). Among the positive features of LMS teachers mentioned coverage of students (score is 3.6); the speed of test results processing and grading was given a score of 3.53.

The score given to the time-saving feature was only 2.57. From the teachers' perspective, work with LMS is very time-consuming: 68% of teachers indicated such an aspect as time-consuming and none of them said that the LMS is a time-saving educational tool. It is quite natural, as teachers have to design the course, manage its web-site, prepare the content and tests, and monitor the whole process. It requires time and effort and often discourages teachers from using the system (50% of instructors were reluctant to use the system because of this reason).

As for students, their opinions about time investment vary. Twenty-five percent considered the system as time-saving, 19% as time-consuming (See Table 2).

Table 2

Time Investment

Options: LMS is	% of respondents, students	% of respondents, teachers
Time-saving	25	0
Time-consuming	19	68

Fifty-eight percent of teachers believed that it is not always reasonable to use LMS (for students the percentage is 49). However, when asked how many subjects should be available through LMS, 63% of students and 65% of teachers indicated they would like to have all subjects in LMS, 27% of students rejected the idea, 10% are still undecided. Thirty-five percent of teachers are now reluctant to accept the idea.

We can presume that the majority of teachers and students are equally committed to using LMS and are therefore supposed to be interested in working with the system. However, when asked whether it was interesting or enjoyable for them to work with LMS, none of the students described the work with LMS as increasing interest in learning and only 2% perceive it as enjoyable, while teachers perceiving work with LMS as interesting or enjoyable is 10%. Apart from this, 21% of teachers believe that LMS appeals to students and arouses their interest and commitment to the learning process. Instructors, therefore, misinterpret the students' interest in LMS which may lead to their being complacent as far as course design and management are concerned.

Our hypothesis that using LMS will increase a computer-literate academic user's commitment and interest had a two-pronged outcome: On the one hand, most users at HSE accept LMS and find it rather easy to use; that is, students welcome the idea that they can get easy access to all tasks and materials they cover in class at any time and any day. They can see home assignments, deadlines, all the necessary materials, and additional information which is very convenient for preparation. However, they do not consider it interesting, contradicting what teachers think on the subject.

Hypothesis 3

LMS by nature is transparent, so the progress and achievement of any student can be viewed by any LMS user, which makes students more concerned about the value of their contributions and grades received through the system. HSE has a system of ratings which are published on the corporate site and available to users. Being ambitious and striving to be the best, a lot of students place a great value on their online image and rating within the system. That is why their results in LMS are of vital importance for the whole picture.

LMS is supposed to be a valuable tool in assessing students' individual progress and measuring their achievements. We can presume that using LMS will help to increase control of students by the teacher.

Students were questioned whether LMS was effective as a control tool of the knowledge they received. The results showed that nearly half of the students (47%) reported that LMS does not give a real picture of their academic achievement, 36% indicated it is possible to cheat on the system by consulting the Internet, 26% believed in the effectiveness of LMS, and 15% thought it is easier to exert control using LMS. The main aspect which the respondents emphasized with respect to the effectiveness of LMS is that it permits teachers to test students' knowledge within a limited time frame. However, an increase in control using LMS was indicated by only 32% of the respondents, while 58% claimed the opposite. They felt that teachers' control of their learning process had decreased.

We see that using LMS for testing students' knowledge is perceived by quite a few students (43%) as not always reasonable as you can get the wrong picture. Teachers, on their part, are convinced that using LMS in addition to face-to-face learning increases the teacher's control over the learning process of students (45%), or are undecided on

the point. It shows the discrepancy between teachers' and students' perceptions of LMS as an effective control of academic progress and achievement (See Table 3).

Table 3

LMS as an Assessment Tool

Options	% of respondents, students	% of respondents, teachers
Control increased	32	45
Control decreased	58	Undecided

LMS is not viewed by the majority of students as an effective tool in managing their learning process. Nearly 60% of students feel a lack of control from teachers when working with LMS; we can suggest that teachers rely too much on LMS for the control of students' progress by uploading different tests. Students might have an impression that teachers delegate part of their responsibilities to the online system and make themselves redundant, which is in line with other studies (Blin & Monro, 2008). At the same time, according to the analyses of the teachers' answers, we see that although 45% stated that control increased, the bigger part had no opinion on the point. It means that they have the wrong picture of their LMS use as an effective assessment tool which is not the case in the eyes of the students.

Hypothesis 4

Students at HSE are very concerned about the assessment of their academic progress. Learners expressed their opinions about the possibility to get a higher grade through LMS and gave their reasoning. Forty-one percent said it is possible to get a better grade because of the system's unbiasedness. Yet, 59% believed it is impossible because the grade will be less objective. As for teachers, their opinion was somewhat different. Thus, 44% claimed that it is possible to get a higher grade which is consistent with the students' opinion. But only 25% believed that it is impossible to get a higher grade through LMS than otherwise (See Table 4).

Table 4

Objectivity of Grades through LMS

Options	% of respondents, students	% of respondents, teachers
It is possible to get a higher grade	41	44
It is not possible to get a higher grade	59	25
Undecided	0	31

From their experience, most teachers did not view tests through LMS as an objective evaluation tool of students' progress. Sixty percent of them believed that students can get some assistance through the Internet or their peers. But 31% of teachers saw the positive side of doing online tests thanks to the possibility of generating individual tests for learners. Still, they should not limit themselves to designing and uploading tests, but make use of interactive activities and other benefits which can be provided by this valuable learning tool.

It is evident that students would hardly prefer taking final tests through LMS rather than having face-to-face interaction with teachers. When asked how they would prefer to take their final tests and the reason, they gave the following answers: 33% wanted to see the teacher's reaction to their answer, 46% indicated that it is more pleasant for them to communicate with a person rather than a machine (67% of instructors chose the same option), 46% hoped to correct their answer seeing the reaction of the teacher. However, the smaller part of teachers and students would like to use LMS, giving the following reasons: 16% of students would like to use LMS motivating their choice by psychological factors, for 13.7% LMS was less stressful, 12% believed LMS helps to better focus on the task, 15% said it is easier to cheat. (The whole number does not make 100% as students were free to use any number of options.) In the instructors' opinion on the subject, LMS allowed them to conduct the exam faster (17%) and to follow the prescribed format (11%). Our hypothesis that LMS would be preferred by both groups of stakeholders as an assessment tool was not confirmed.

Students' grades are published in the online grade book which is available for LMS users. Students were asked their opinion about the online grade book. It was as follows: 35% were positive about it, 24% liked the idea of having their grades online to be able to follow their progress, 27% were indifferent, and 14% had a negative feeling of exposing their marks online, and they disapproved of the idea of their grades being available for everybody to see. Teachers had their own opinion about using grade book, their main concern being that it was not always appropriate to expose all grades in LMS (43% of instructors indicated this issue); the second one is that it is time-consuming (36% believe so); and another problem is that the grade book was inconvenient for using (14%

chose this answer). However, 24% valued the opportunity to see students' progress dynamically.

To sum up, we can conclude that grade book is an integral part of LMS and that students are more eager to monitor their academic progress through their grades being published online conversely with teachers. Therefore, more research is required as to what influence grade book has on students' willingness to adjust their learning efforts to the desired results.

Conclusions

The idea of using LMS in classroom settings is to facilitate learning and enhance students' commitment and involvement as well as learning outcomes. However, it is too early to claim that teaching and learning practices at HSE are being transformed with the help of LMS.

 The analysis showed that both groups, students and teachers, are at ease with computers and using LMS is not perceived as presenting any significant difficulty for them. It is a vital prerequisite as user perceptions are important for the success of the system, however not all learners perceive it as user-friendly. Moreover, for a number of students perceived ease of use of LMS does not imply its usefulness as a learning tool.

Nearly the same number of students and instructors favor having all subjects available in LMS. At the same time, they are not completely satisfied with the convenience of the system.

Perceptions of students and teachers coincide in terms of its usefulness as a bank of course materials. As for using other tools such as testing, doing tasks online, and communication activities, not all students express the desire to use LMS. One of the explanations can be that students are used to face-to-face learning and prefer this for their learning process.

The opinions of both groups differ with respect to the system usefulness, appropriacy, and interest for the students. Teachers' perception of LMS being interesting for students to use did not find its confirmation in the study. Most frequently used LMS tools, such as testing and grading, are also viewed differently by teachers and students. Judging by students' perceptions of the grades received through LMS, some of the students do not trust the objectivity of the system and are not inclined to be assessed through LMS. They do not really view it as a true reflection of their academic progress. Other students perceive the system as a more objective tool of assessing their achievement and would like to have a chance to get a higher grade for their tests or other assignments. At the same time, for teachers the situation here is somewhat controversial. On the one hand, a number of teachers rely too much on LMS, viewing it as an additional tool of students' academic achievement. As a result, some students feel a lack of control of their progress and become less involved. On the other hand, quite a few teachers have a similar

opinion as students that the system does not show an objective picture of students' progress and believe these results can hardly be trusted. Teachers seem to either overestimate or underestimate the rigour and objectivity of LMS.

Having analysed the issues related to LMS adoption and use at HSE and recognizing the importance of its successful implementation, we conclude the emphasis should be laid on the human factor. Educators should be a driving force of innovation and bring university education to the next level. How teachers use the system depends on their involvement and belief in the effectiveness of this learning tool. Their commitment could translate into developing valuable online pedagogies and training materials thus engaging learners in the process of using the system to their own advantage. How enthusiastic and engaged teachers with an e-learning mindset could inspire students to embrace LMS requires further research.

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Rethinking Dropout in Online Higher Education: The Case of the Universitat Oberta de Catalunya

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Abstract

In recent years, several studies have been carried out into the reasons why students drop out of online higher education, following the rise in the relative weight of this form of education. However, more effort has gone into analyzing the causes of this phenomenon than into trying to characterize students who drop out, that is defining what a dropout student is. But obtaining a proper definition of dropout is just as important as describing its causes. It also appears that the definition of dropout is very sensitive to context. As one of the main findings of this article, we reach a pure empirical definition, at a programme level, of students who drop out of an online higher education context with non-mandatory enrollment. This definition is based on the probability of students not continuing a specific academic programme following several consecutive semesters of "theoretical break", and is highly adaptable to institutions offering distance education with no permanence requirements, that is ones offering the possibility of taking breaks. Our findings show that there are differences regarding the number of consecutive semesters that define dropout depending on whether the programme requires previous experience or not. Additionally, we observe significant differences in the dropout rate between specific programmes, as well as a higher level of dropout in the first semesters. Analyzing the reasons behind these facts should help higher education institutions to make more sound and efficient decisions.

Keywords: Dropout; early dropout; higher education; online university; distance education; learning analytics

Introduction

University dropout is a major issue and should be seen as a failure of the higher education system to create an outcome (graduates) after having invested a significant amount of resources, normally publicly funded (OECD, 2012). However, the financial costs of dropout are only part of the total costs: Non-pecuniary (or affective) costs – more difficult to measure – are also important for dropout students (Johnes, 1990).

It should be noted that university dropout is a multidimensional phenomenon that needs to be correctly defined before any thorough analysis of its causes can be carried out. One of the authors who has put great emphasis on creating a university dropout doctrine is Vincent Tinto (1975). Tinto stresses the importance of reaching a good definition of university dropout, which he sees as essential as detecting the causes of this dropout (emphasis added by authors):

> Despite the very extensive literature on dropout from higher education, much remains unknown about the nature of the dropout process. In large measure, the failure of past research to delineate more clearly the multiple characteristics of dropout can be traced to two major shortcomings: namely, **inadequate attention given to questions of definition** and to the development of theoretical models that seek to explain, not simply to describe, the processes that bring individuals to leave institutions of higher education. (p. 89)

In a more recent vision, Lee and Choi (2011) have reviewed research on online course dropout. The results of this analysis reveal that so far research has focused mainly on analysing the causes of dropout on a course level. As stated by the authors, there is a need for a definition of dropout: "Future studies, grounded in a clear, standard definition of the term 'dropout', should be conducted in order to investigate dropout factors which prevail across different online courses" (p. 603).

Nowadays, high levels of university dropout are a concern for most governments with developed university systems. For example, in Spain, the Conferencia de Rectores de las Universidades Españolas (CRUE Conference of Spanish University Vice-Chancellors) has established an arbitrary definition of the dropout rate as the percentage of students who have not enrolled for either the academic year when they should theoretically finish their course or for the following academic year, with respect to the total number of students who enrolled on this course in the initial semester. This definition applies to both brick-and-mortar and online universities (CRUE, 2008). Although the CRUE definition might be valid for brick-and-mortar universities, where students value their courses as their main priority over other professional or family duties, it does not seem to be as valid for online or open universities, where the majority of students have bigger

work and family commitments, and where, therefore, they are more likely to take breaks (semesters without enrollment).[1] The main challenge lies in the fact that even if a given student fails to enroll for several successive semesters, it is impossible to be 100% sure that this student has definitively dropped out of their programme, as they may simply be taking a longer break. We can therefore conclude that the official definition of dropout in Spain does not reflect the specific characteristics of online higher education.

According to the aforementioned official definition of dropout rate for the Spanish university system, it can be seen that the Universitat Oberta de Catalunya (UOC) has a higher dropout rate than brick-and-mortar universities: 39% and 26%, respectively (CRUE, 2008). However, throughout the rest of this paper, the official definition of dropout will be questioned. As mentioned, the very nature of the UOC – and the majority of institutions that provide adult distance education – justifies the effort of finding a tailored definition of dropout.

Therefore, the main aim of this paper is to define dropout in online higher education at programme level, following an empirical process based on an in-depth analysis of enrollment data. The definition reached using this methodology, although bearing in mind the special characteristics of UOC, should be suitable to other open/online institutions that offer courses of a certain length with non-mandatory enrollment and no (or indulgent) permanence requirements. Anyway, differences between institutions have to be considered. For example, concerning the "time limit to graduation" (which does not exist at UOC), the Open University (UK) establishes a maximum time limit for all undergraduate qualifications to be passed, while in Athabasca University (Canada) some programmes allow a maximum term to complete the degree requirements; furthermore, students should remain active in the programme or they are required to re-enroll and pay a reactivation fee. Other important aspects would be the meaning of "open". For example, OU UK and Athabasca do not have admission requirements, which is not the case of UOC, or the possibility of enrolling in flexible dates (which is possible in Athabasca).

The rationale of this research is that the official dropout definition does not capture the true nature of dropouts in online (or distance/open) institutions, so no comparison between higher education institutions can be done. Furthermore, the definition of dropout given in this paper can be tailored to each degree, as it captures the differences in the enrollment and break sequences of the students for each one of the programmes analyzed. Being closer to reality, this definition also allows us to know when dropout really happens, usually before the official definition does. This early detection enables institutions to promptly react to potential dropouts.

To obtain a specific dropout definition, we undertake an empirical quantitative analysis on the basis of a statistical representation. We should stress that this definition of

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[1] In the case of the UOC, a 100% online university, most students study for twice the theoretical course length. The university's enrolment regulations permit this and also allow students to take a break between two academic semesters.

dropout will be established from an institutional perspective, that is without considering students' perspective; in this way of thinking, students may drop out from the point of view of the university, but they may be fully satisfied with the teaching experience, having achieved their personal learning objectives, and may not consider themselves to be a dropout case. Therefore, from an institutional point of view, the definition of dropout will always be harsher than reality.

Existing Definitions of University Dropout

The difficulty of defining dropout was already acknowledged in traditional face-to-face education. Tinto (1982) dedicates an entire article to this objective, stressing the different possible definitions of dropout depending on the individual or institutional perspective, and Astin (1971) says that it is impossible to find a perfect classification of dropouts versus non-dropouts any time while students are still alive, as there is always the possibility that they may return to college. Only a good approximation would be possible:

> (…) the term 'dropout' is imperfectly defined: the so-called dropouts may ultimately become non-dropouts and vice versa… But there seems to be no practical way out of the dilemma: A "perfect" classification of dropouts versus non-dropouts could only be achieved when all the students had either died without ever finishing college or had finished college. (p. 15)

Therefore, dropout (both as an "institutional problem" and as a "definition challenge") has been inherited by distance education from its traditional face-to-face counterpart. As an "institutional problem", recent studies indicate that online courses have significantly higher student dropout rates than conventional courses (Tello, 2007); as a "definition challenge", the special characteristics of students, with greater work and family time constraints, make the dropout decision more complex than simply an "academic" one. The summary of online dropout studies given in Lee and Choi (2011) shows the heterogeneous nature of definitions of dropout (see Table 1): as a formal process not always asked for (Finnegan et al., 2009), as simply "not starting" the course (Kemp, 2002), as a voluntary withdrawal entailing financial penalties (Levy, 2007), and so on.

Table 1

Heterogeneity of Dropout Definitions (Extracted from Lee & Choi, 2011)

Author	Year	Dropout definition
Castles	2004	Dropout: students who had formally withdrawn, had left without notifying the university, or did not complete a course during a semester
Cheung and Kan	2002	Dropout: students who were awarded fail or resit
Dupin-Bryant	2004	Dropout: student who did not complete a course during a semester
Fennegan et al.	2009	Withdrawal: (1) withdrawers-had to withdraw from the course officially; (2) successful completers-completed the course receiving a grad of A, B, or C; (3) non-successful completers-received a grade of D or F or an incomplete
Frydenberg	2007	Dropout: students who registered but dropped prior to class start, prior to start of instruction, during the orientation week, or after the orientation week
Ivankova and Stick	2007	Dropout: students who withdrew or were terminated from the program
Kemp	2002	Non-completion: students who did not commence work on their course, withdrew from their course, or received an academic failing grade
Levy	2007	Dropout-students are those who voluntarily withdraw from e-learning while acquiring financial penalties
Moore et al.	2003	Non-completion: students who received a grade of F or officially withdrew from the course
Morgan and Tam	1999	Non-completion: students who did not enroll in the following semester
Morris et al.	2005	Withdrawal: students who completed the official withdrawal process. Non-successful completers: students who received a grad of D, F, or an incomplete
Perry	2008	Withdrawal: centre withdrawal (student unable to fulfill the program requirement to complete two courses per year), academic withdrawal (students who fail two courses in the program), and student withdrawal (students who leave for reasons not obviously related to centre or academic requirements)
Pierrakeas et al.	2004	Dropout: including those students who enrolled in at least one module, but failed to deliver one project; who did not complete some or all of their assignment, but indicated they would continue their studies; who would not re-enroll at a future date; who enrolled in multiple courses, who had successfully completed some but not all of their assignments, and had indicated they would not re-enroll at a future date
Pigliapoco and Bogliolo	....	Dropout: students who did not renew the enrollment at the end of the first year
Shin and Kim	1999	Dropout: students who fail to register after three consecutive terms of non-enrollment
Tello	2007	Non-persistence: students who filed paperwork with the Registrar's office declaringwithdrawal from a course prior to the final grading period
Willging and Johnson	2004	Dropout: students who dropped out of the degree program after starting their first course

Lee and Choi (2011) point out that

> Many of the studies (13 studies, 37%) we examined provided no clear definition of dropout from online courses. Furthermore, although some studies did explicitly define the term "student dropout," their definitions were not consistent with one another, which made it difficult for us to compare dropout factors and retention strategies across universities. (p. 596)

The dropout definition given in this paper sets the basis of a potentially standardizable dropout definition due to the fact that it is based on the objective analysis of students' enrollment behaviour, far from administrative or even academic arbitrarity. Therefore, this definition would, on one hand, serve the objective of giving a more precise image of the dropout problem at UOC and, on the other hand, set up a measure that is adaptable to other institutions that have similar enrollment requirements to UOC. Additionally, it should be stressed that the analysis considers data for the entire student population, not just a sample, which, attending to Lee and Choi (2011), makes it possible to generalise the results.

The rest of this paper is organised as follows: The next section describes the methodology and data used to reach a definition of dropout. This definition is based on analysis of the enrollment behaviour of students on the programmes considered throughout the course of their academic life. The Results section explores the outcomes given in the previous section in greater depth. First, we analyse the differences between programmes with regard to the minimum number of consecutive break semesters required to consider this a case of dropout. Then, this value is used as a parameter to calculate the levels of final and first semester dropout. Finally, the last section summarizes the conclusions and future research in this subject.

Data and Methodology

Since its inception in 1994 as a purely online university, the Universitat Oberta de Catalunya (UOC) has been able to position itself among the main universities of the Catalan and Spanish university systems. Most of the students at the UOC (currently more than 60,000) are adults who have a profile that hardly could fit into the traditional university system, thus finding in the UOC an opportunity to start or continue their higher education grades, in a very innovative environment (Sangrà, 2002). The intensive use of ICT for both the teaching/learning processes and management allow researchers and practitioners to obtain data about what happens in the UOC Virtual Campus, which is continuously being improved according to such findings. This study is the result of trying to answer a very simple question: "What is the real dropout rate for students taking the <whatever> degree?", putting the emphasis on "real." In order to do

so, we decided to analyze the enrollment patterns of all available data at UOC, to see whether there is a simple way to establish a criterion to differentiate breaks from true dropouts.

The data used in this paper are gathered from UOC academic databases. Data have been validated according to UOC internal privacy policies. For this initial study, only student enrollments are analysed. During a period of 26 semesters, UOC received 62,450 new students enrolled on officially recognised degrees in Catalan; 13.3% of them finished a degree, whilst 57.6% dropped out of their studies. These figures only include students who have been enrolled in enough semesters to establish a criterion for dropping out.

The following variables are available: IDP, an identification code, unique to each student, which allows individual and at the same time anonymous monitoring; student's gender; student's date of birth; semester of the student's enrollment; codes of the subjects enrolled on by the student; final grades obtained in the subjects; number of credits that the subjects carry; and, finally, the academic programme, for example, Law or Computer Engineering. Specifically, there is a record for each subject enrolled on for the officially recognised degrees in Catalan from the start of the university until the end of the 2008/2009 academic year (in all 1,169,262 records). Note that enrollment at UOC is opened each semester (twice a year). A total of 19 degrees was offered during this period. Only valid enrollments were included, that is ones that have been formalised and paid for, thus excluding enrollments that were subsequently cancelled. A total enrollment history was provided for 84,230 students, although only 62,450 (those on the 16 programmes with enough available information) were analysed. This study ignores the pilot cohorts for programmes that began at the start of the university that limited student access during the first semester to a closed number and which, for administrative purposes, offered no access to new students during the second semester.

To analyse dropout, we only need to know whether a student is enrolled or not during a specific semester. Therefore, only the "IDP", "semester of enrollment", and "academic programme" fields were considered. The information from these fields was used to generate 17 files, 16 for each programme and a general file for all programmes, each of which contains a record for each student. These students are those who enrolled on one or more semesters for the programme during the period in question. The records generated have the following coding (as an example, a random record is selected):

10104;1;1;1;0;1;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0

Here, the first number is the IDP, followed by a binary string for the semester record ("1" = student enrolled at least in one subject, "0" = student not enrolled in any subject). In this case, this student was enrolled during their three first semesters; they took a break for one semester, enrolled again for one semester and never enrolled again during the next 16 semesters. The specific nature of this string is that, for analysis purposes, all enrollment sequences have been put in the "same starting position", that is, the first semester when each IDP is enrolled on each degree is considered to be the same for all

students on this degree. Obviously, the first element after IDP is always "1" (the first enrollment of each student). Finally, notice that the sequences "113000;1;0;0;0;0;0;0" and "10728;1;0;0" are different as more enrollment history about the first student is available for analysis (specifically, 7 semesters as opposed to 3). Our goal is precisely to determine the length of the trailing zeros that best captures dropout.

Once the enrollment sequences file for each programme is generated, the frequency of break sequences (i.e., of sequences of one or more zeroes) can then be analysed. This is performed through a pattern information analysis process that computes the longest break sequence (with "1;0;...;0;1" format) within each enrollment sequence for each individual, with the feature that if, for example, a student has taken a break once over five semesters and another one over two semesters, they will only be computed as having taken a break over five semesters (i.e., the longest one). Note that this process does not take graduates into consideration, as this could have led to them being considered as taking a break or abandoning their studies when they have in fact obtained their degree. Similarly, from a programme performance perspective, students are considered to have dropped out of a particular programme even if they move to another one.

Table 2

Analysis of the Break Sequences from Law (left) and Market Research & Techniques Studies (right)

N	Law degree			MR&T degree		
	NS	%	Accum. %	NS	%	Accum. %
19	2	0.03	0.03	---	---	---
18	1	0.01	0.04	---	---	---
17	0	0	0.04	---	---	---
16	9	0.11	0.15	---	---	---
15	9	0.11	0.26	---	---	---
14	8	0.11	0.37	---	---	---
13	18	0.23	0.60	---	---	---
12	14	0.18	0.78	---	---	---
11	12	0.15	0.93	---	---	---
10	15	0.19	1.12	---	---	---
9	27	0.34	1.46	---	---	---
8	37	0.47	1.80	5	0.29	0.29
7	29	0.37	2.27	3	0.17	0.46
6	50	0.63	2.90	6	0.35	0.81
5	**69**	**0.87**	**3.77**	7	0.41	1.22
4	107	1.35	5.12	3	0.17	1.39
3	173	2.18	7.30	**30**	**1.75**	**3.14**
2	304	3.83	11.13	40	2.33	5.47
1	815	10.27	21.40	141	8.21	13.68
0	6239	78.60	100	1483	86.32	100

Note. N is the number of consecutive semesters of break; *NS* is the number of students in such a situation.

For exemplification purposes, Table 2 shows the probability of having a break of N semesters for the Law degree (with 7,938 students and a history of 24 semesters) and the Market Research and Techniques (MR&T) degree (with 1,718 students and a history of 14 semesters). Columns in Table 2 are as follows: The first column gives the number of consecutive semesters of break (namely N); the second column gives the number of students enrolled on the Law degree who take a break of length N; the third and fourth columns give the percentage of such students with respect to the total number of students on the degree and the accumulated percentage, respectively. Columns 5-7 give the equivalent data for the MR&T degree.

It can be seen that there are two students on the Law degree who take a break of 19 consecutive semesters, which may be surprising but shows the wide diversity of online students' enrollment behaviour. Nevertheless, in order to define dropout, we are interested in establishing a threshold for what we consider to be a reasonable period of break time. As shown in bold in Table 2, only 3.77% of Law students take a break of five or more semesters. In the case of MR&T students, a similar percentage (3.14%) is found corresponding to three semesters or more, showing a relevant difference between academic programmes. In short, if we define dropout as taking a break of five or more semesters for the Law degree, we are assuming an error smaller than 5%, which can be considered reasonable. However, dropout has to be defined for the MR&T degree as having a break of only three semesters to give the same error assumption. Note that the fact that a Law student has the "1;0;0;0;0;0" string in their enrollment sequence is not sufficient information to see whether they will drop out, as we need an additional semester as mentioned above. This additional semester at the end of the sequence indicates whether the student has effectively dropped out (1;0;0;0;0;0;**0**) or not (1;0;0;0;0;0;**1**). Following this criterion, we are able to label each student with a sequence of N or more zeroes as a dropout.

Therefore, a definition of the dropout rate for a specific programme would be reached empirically as being the proportion of students who have taken a break for N or more semesters out of the total number of students enrolled on the programme during the period in question. N is determined using the maximum probability of the 5% error rate in classifying the student as a dropout once they have taken a break of N or more semesters for that specific programme. As the choice of this threshold of allowed error directly determines the number of consecutive semesters that define dropout, it is interesting to look at the resulting number of semesters for thresholds of 1% and 10%, as shown in Table 3.

Table 3

Number of Consecutive Semesters that Define Dropout for 1%, 5%, and 10% Error Threshold

Programme	Threshold: 1%	Threshold: 5%	Threshold: 10%
Business Sci.	11	5	3
Tech. Eng. in CM	10	5	3
Tech. Eng. in CS	11	5	3
Tourism	6	3	2
Catalan Language	10	4	2
Law	11	5	3
Humanities	10	5	3
Psychology	7	3	2
Business Admin.	9	4	2
Labour Sci.	7	4	2
Political Sci.	7	3	2
Audiovisual Comm.	5	3	2
Documentation	8	4	3
Market Res. & Tec.	6	3	2
Psycho-pedagogy	12	4	3
Computer Engineer.	8	4	3

As expected, the threshold value used has a major effect on the value of the number of semesters that define dropout; additionally, it would also affect the percentage of dropout for each course. It should be noted that a 1% threshold seems to be quite unrealistic, as would imply in many cases waiting for 10 consecutive break semesters or more before deciding that a student has dropped out, even worse than with the official definition. On the other hand, a 10% assumed error seems to provide more uniform results, but we consider it to be excessive for our analysis purposes.

Results

On the basis of the work set out in the previous section, we establish a definition of dropout for each programme. Using an error threshold of 5%, the specific programme in question is highly relevant. Although, logically, the definition of dropout in qualitative terms is the same for all courses, repeating the probability analysis carried out for all programmes gives different quantitative definitions depending on the values of the parameter of this definition, that is different N values for consecutive break semesters.

Differences between Programmes

Table 4 provides a summary of the values associated with the 16 programmes analysed. For each programme, Table 4 shows the minimum number of consecutive break semesters needed to be considered a case of dropout is N; the maximum error; the number of semesters[2] defined in the curriculum of each programme, the number of semesters since the programme began and the number of students (NS) with at least N+1 semesters used in the analysis. Finally, the last three columns make reference to the percentage of students obtaining the degree (accredited), the total dropout value, and finally the percentage of dropout after the 1st semester.

Table 4

Summary of Results by Programme

Programme	N	Error	Length (sems.)	Data (sems.)	NS	Acc. (%)	Total dropout	1st sem. dropout
Business Sci.	5	3.78%	6	26	16,818	16.6%	54.3%	24.91%
Tec. Eng. in CM	5	4.11%	6	22	5432	9.8%	66.8%	29.47%
Tec. Eng. in CS	5	4.46%	6	22	7496	8.7%	65.6%	28.44%
Tourism	3	3.38%	6	14	1889	9.6%	49.7%	26.10%
Catalan	4	3.89%	8	22	1194	6.5%	58.9%	25.88%
Law	5	3.78%	8	24	6149	10.2%	54.0%	26.72%
Humanities	5	3.75%	8	24	5396	7.4%	64.3%	28.34%
Psychology	3	4.58%	8	18	7674	3.8%	56.5%	28.81%
Business Adm.	4	3.75%	4	22	3778	38.2%	40.9%	21.33%
Labour Sci.	4	2.82%	4	16	3114	34.5%	44.8%	23.35%
Political Sci.	3	4.27%	4	16	867	21.7%	49.5%	26.53%
AV Comm.	3	2.67%	4	14	1070	21.9%	43.7%	21.12%
Documentation	4	4.48%	4	20	2440	32.3%	50.3%	23.07%
Market R. & Tec.	3	3.14%	4	14	1374	32.4%	38.0%	18.05%
Psychopedagogy	4	4.86%	4	26	4354	25.4%	54.2%	25.01%
Comp. Eng.	4	3.36%	4	16	1541	30.1%	37.3%	15.96%
TOTAL	4	4.35%	---	---	62,450	13.3%	57.6%	24.91%

As shown in Table 4, the number of semesters that define dropout in each programme has a particularly relevant variability. This figure varies between three and five semesters. Note that these figures are quite conservative, since using an upper bound of 10% would have reduced the number of consecutive break semesters, as can be seen in Table 3.

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[2] Before the European Higher Education Area (EHEA) reorganization, programmes were divided in short (1st cycle, three years), long (1st and 2nd cycle, five years), and 2nd cycle (two years).

Initial analysis of these results shows that there appears to be no relationship between the type of programme content, that is technical or humanistic, and the number of semesters that determines dropout. For example, in the case of Computer Engineering, the value is high (5 semesters), but it is the same as in the case of Humanities. On the other hand, it does seem that in programmes where students have prior higher education experience related to the curriculum they are studying (in Spain known as "second cycle" degrees[3]), dropout is decided with fewer semesters than on programmes where this experience is not required (known as "first cycle" or "first and second cycle"). Specifically, it can be seen that, for first-cycle or first-and-second-cycle programmes, up to five degrees have an $N = 5$ semesters value, Catalan language has a value of $N = 4$ and Psychology has a value of $N = 3$. For second-cycle programmes, there is no degree with an $N = 5$ semesters value, and the majority of programmes have a value of $N = 4$. From a different perspective that would in some way confirm our results; recent research at the UOC (Carnoy et al., 2011) shows that students taking shorter degree courses at UOC are much more likely to complete their degrees.

Total Dropout and First Semester Dropout

As stated previously, official criteria for quantifying dropout are not applicable in order to have a perception of the whole dropout problem. As an example, the cohorts of two representative programmes have been compared according to both dropout definitions. According to the official definition of dropout, we need to wait until the 8th or 10th (Business Science and Humanities, respectively) semester in order to measure it. On the other hand, following the definition proposed in this paper, the dropout is detected when it really happens, mainly at the first semesters.

With such definition, the percentage of dropout students can be computed for each programme. Concerning total dropout, it can be seen[4] that for the group of first-cycle and first-second-cycle programmes, Tourism and Computer Engineering seem to have a lower/higher dropout level than the rest of the degrees of this group, respectively. For the group of second-cycle programmes, differences are weaker and only the programme of Psychopedagogy would seem to have significantly higher dropout proportion values than the rest of the programmes in the group.

It is important to notice that dropout in the first semesters seems to follow a similar pattern across all programmes, as the probability of dropping out is very high the second semester, then rapidly decreases until it reaches a relative plateau in approximately the sixth semester (Grau-Valldosera & Minguillón, 2013), as shown in Figure 1. The proportion of first semester dropouts over total dropout follows a quite regular pattern (with values concentrated in an interval between 43% and 52%), which

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[3] It should be borne in mind that the data for this study belongs to programmes with a structure before the existence of the European Higher Education Area (also known as the Bologna Process).

[4] For more details on the statistical analysis process applied see Marascuilo (1966) and Natrella (1963).

would confirm the importance of first semester dropout (Roberts, 1984; Tyler-Smith, 2006). This similar behaviour shows that some reasons for dropping out are out of the scope of a single programme, and that there must be reasons related to the institution and/or the inherent characteristics of the learner (level of motivation, e-learning readiness, etc.).
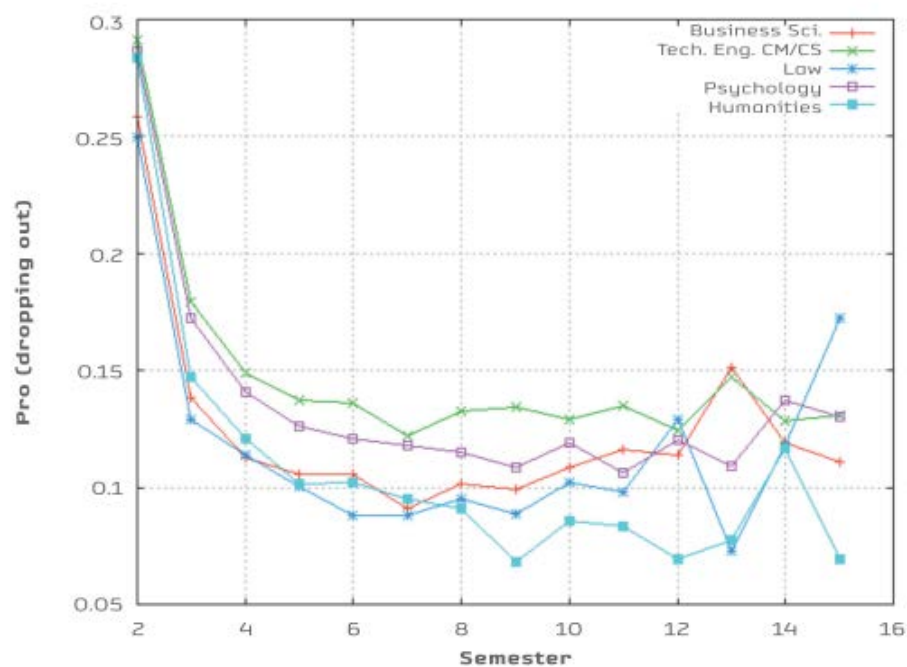

Figure 1. Probability of dropping out before starting a new semester.

Conclusions

This paper deals with the formulation of a definition of dropout that is suitable to online/distance higher education institutions with relaxed enrollment requirements, such as the Universitat Oberta de Catalunya. It should be noted that the dropout official definition in Spain does not reflect the nature of online higher education. The goal of reaching a definition can be seen as key by bearing in mind that most UOC students are adults with work and family commitments as well as those linked to continuing education and, therefore, have a greater tendency to take academic breaks. However, this is not an easy goal to achieve, due to the fact that these break periods could be interpreted as either exactly that (i.e., periods of rest) or, at some point, as indicators of having definitively dropped out of their studies. Nevertheless, the term 'definitively' cannot be taken literally since in most cases students are allowed to restart their studies if they want to.

Given the difficulty in describing dropout at the UOC and other institutions that offer distance higher education with no (or low) permanence requirements, we have focused

on finding a suitable parameterized definition for dropout, taking into account programme characteristics. This definition, based on empirical data and very close to students' enrollment behaviour, overcomes the different "time limit to graduation" institutional regulations of distance higher education institutions, permitting some generalization. Other aspects like the degree of openness and the flexibility of enrollment dates, which are particular to each institution, can be also considered.

The proposed definition uses the minimum number of consecutive semesters of non-enrollment (i.e., N) that enables us to classify a student as a dropout for a specific programme. We should stress, however, that this N is different for each programme, and that herein lays the potential for the definition of dropout reached in this paper. As conjectured, a "one-size-fits-all" definition for dropout cannot be established at university level in order to really understand the dropout problem. None of the definitions for either brick-and-mortar or distance universities include a unique definition of dropout that takes account of the probability of restarting courses after one or more break periods (so a student would not be considered a dropout case). Furthermore, our definition allows us to detect dropouts before the official definition establishes a student is a dropout.

The definition is highly sensitive to the characteristics of each programme. In programmes where prior higher education experience is required, the decision to drop out is made more quickly (on average, almost one semester before) than in programmes where such a condition is not needed. This may be due to students having clearer objectives in these types of programmes, which are based on completed studies (a previous degree). It is also related to the shorter theoretical duration of such degrees. With the dropout definition in hand, significant differences can be exposed between programmes of similar duration with respect to the total (or final) dropout values.

Another output of the analysis is the detection of high dropout indexes in the first semesters, which could be caused probably by "the clash between the student (becoming a student again for adult learners with different expectations and personal situation) and the institution (methodology, support, etc.)" (Grau-Valldosera & Minguillón, 2013). Early dropout detection will help institutions to take corrective measures without waiting for the official definition to be applicable. It is important to remark that a more finely tuned analysis of dropout students should help educational institutions allocate their increasingly scarce resources in their fight against dropout. In fact, some institutional actions can be taken during the very first semester, as an important percentage of dropouts occur in such a period, for instance, reinforcing mentoring strategies and promoting closer relationships between the student and the institution by means of a personalized channel (i.e., a mentor), rather than expecting the student to use the traditional channels for obtaining institutional support.

Additionally, it should be noted that the main analysis conducted in this paper, which allows us to establish whether a student can be considered a dropout or not, is the starting point towards undertaking a close study of the characteristics of students who

drop out. Such a study will be based on data already collected, such as the age and gender of students as well as other variables related to the number and kind of subjects taken every semester. The addition of new variables not collected yet should be considered also, as the result of a qualitative analysis extending the one undertaken in this paper and also from a review of previous research on this matter. Examples of variables that could be related to dropout are motivation (Hartnett et al., 2011; Paas et al., 2005), previous education (Poellhuber et al., 2008), e-learning readiness (Dupin-Bryant, 2004), and perception of connectedness (Bolliger & Inan, 2012). Such variables might also reveal potential areas of improvement. For instance, if e-learning readiness is a barrier, future students could be attracted and retained by offering them free preliminary courses about becoming an online learner.

Given that dropout is a complex, multifaceted problem, the option of adopting a design based research methodology seems to be the most plausible. This would imply following an iterative process (Shavelson et al., 2003), and considering at all moments the solutions to this problem as unfinished implementations (Stewart & Williams, 2005). Higher education institutions need to be continuously analyzing dropout semester after semester, in order to build reasonable models. Once the characteristics of dropout students and the causes of dropout have been determined, establishing corrective actions (Woodley, 2004; Tyler-Smith, 2006) that have a positive effect on reducing dropout should report benefits both at institutional and personal levels, especially for those students who have given up the fight with a sense of not having achieved their learning objectives, and, more dramatically, for those dropping out after their first semester. Future research based on the dropout definition built in this paper will include the creation of mathematical models for predicting dropout at a given semester and identifying the underlying causes, which might be different. More concretely, we are interested in establishing a threshold for differentiating between early dropout and mid-term dropout, which is probably closer to the concept of attrition and caused by different reasons.

Acknowledgements

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The Reciprocal and Correlative Relationship Between Learning Culture and Online Education: A Case from Saudi Arabia

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Abstract

The purpose of this paper is to build on the insights of educators regarding the relationship between culture and online learning. More specifically, this paper aims to explore the ways in which students' culture of learning is changing as a result of the introduction of various modes of online learning. It also aims to explore the ways in which culture and cultural values affect the application and success of online-learning strategies. Particular attention is directed to learners' perceptions of the advantages and disadvantages of online communication. The paper is based on primary data drawn from undergraduate female students' responses regarding how online education is changing their learning culture and how their culture is influencing online education. Sixty-seven undergraduate Saudi female students participated in the survey. The literature in the field of online and distance education is explored to help answer these questions. The participants indicated that online education helped them to challenge some cultural norms, enhance their learning culture, and improve their communication skills.

Keywords: Online education; distance education; cultural implications of online learning; Saudi Arabia online learning; online education and cultural issues; integrative approach

Introduction

Challenging traditional, face-to-face methods of teaching and moving towards innovative, student-centered approaches are crucial trends in contemporary education. Online education in particular is emerging as an important feature of higher education in all fields. Over the last decade, educational programs worldwide have begun to employ online learning as an essential part of the delivery of courses and even of entire programs, to the extent that it is now part of the higher education mainstream in many countries. "Students are demanding more courses and programs to be offered online. Yet, in light of the growing population of learners from various cultural backgrounds engaged in online education..." (Wang & Reeves, 2007, p. 1), there is an urgent need to understand how culture affects online education and, conversely, how online education affects learning culture.

Culture, as defined by Hofstede (2005), is "the collective programming of the mind that distinguishes the members of one group or category of people from others" (p. 4). These differences in programming largely account for differences across cultures. It is clear that cultures and cultural values around the globe are changing in unprecedented ways as a result of the exponential growth of communication-exchange channels, an important aspect of which is the increasing ease of access to online courses, programs, and information. "Learning culture" is a concept that overlaps with "culture" but is also distinct. Learning culture can be defined as the ways in which students perceive their educational materials, their class discussions (whether in-person or virtual), their teachers/professors as knowledge providers or facilitators, and the meaning and purpose of education (as being either a means to a specific objective like a particular career or an end in itself). The culture of learning is currently undergoing a rapid transition worldwide, including in the Middle East. Saudi Arabian students, for example, have begun to participate in this communications exchange and, in consequence, their culture of learning is changing in ways that could not have been anticipated even two or three years ago. These students, both female and male, are now able to access learning resources such as journals, magazines, periodicals, and intercultural communication forums that would not be available to them but for their connection to the Internet. The unprecedented openness to new educational resources and cultural perspectives is leading Saudi Arabia's younger generation to become less traditional and strict in their views. Other Saudi scholars such as Alenezi (2012) and Al Seghayer (2013) have indicated that online learning is opening new opportunities for Saudi students to question traditional assumptions of what learning is. The implications of this process for the Saudi culture as a whole are reinforced by the fact that the youth component of the Saudi population (i.e., those under age 35) currently stands at 65% of the total.

This paper aims to explore the ways in which Saudi students' culture of learning is changing as a result of the introduction of various modes of online learning. It also aims to explore the ways in which culture and cultural values affect the application and

success of online-learning strategies. Particular attention is directed to learners' perceptions of the advantages and disadvantages of online communication. This research analysis is based on observations of two groups of Saudi female university students as they began to integrate online-learning systems into their studies. The analysis also draws on the key literature relating to online learning.

This paper submits that online education and culture have a reciprocal and correlative relationship. In this paper I explore how the culture of learning has changed for Saudi students as a result of using online learning and how online learning and teaching, notwithstanding their structural issues and obvious infrastructural weaknesses, have helped students change their perceptions. This paper explores the emergence of online education globally and in Saudi Arabia; issues, controversies, and problems; traditional education as the backdrop to Saudi online learning; and, finally, the findings of an empirical study on the same.

Research Context

Saudi Education: The Traditional Approach

Since the advent of public education in Saudi Arabia in the 1960s, the Kingdom has adhered to a traditional educational culture. This system is premised on the transmission of information from the professor or teacher ("the power") to the students ("the empty vessels" / "the disempowered"). Paulo Freire (1970) has developed a similar analogy to describe this approach, which he calls the "banking system of education"; this is an educational approach that resembles "an act of depositing, in which the students are the depositories and the teacher is the depositor" (p. 53; p. 72). The banking system of education is the antithesis of what Freire advocates – an education that announces the importance of dialogue, engagement, and equality, denounces silence, and deplores oppression.

Saudi education continues to manifest many aspects of the banking system. In accordance with Freire's analogy, Saudi professors and teachers do not usually engage in dialogue with students over the course of the learning process but instead they impose information that is often irrelevant to students. Indeed, critics of the Saudi curriculum and pedagogy point out that the Saudi education system does not reflect the experiences of the majority of students and that much of what they learn is largely irrelevant to their lives and careers, especially in the curriculum that was used prior to the implementation of a reformed curriculum in 2009 (Hamdan, 2012, 2013; Almutairi, 2008; Duignan, 2012). On standardized tests, Saudi students are often expected to provide answers that may have little or no connection to their background or context. This is also the situation in most Arab Muslim universities and schools.

In my experience, as both a student and a teacher in the Saudi education system, critical thinking is not emphasized. By critical thinking, I refer to two elements. The first element is gaining a deeper understanding of issues and problems and the second element is examining and evaluating arguments from multiple points of view (McPeck, 1981). My perspective is that students continue to learn from a very young age that knowledge and "truth" are fixed, that all claims to truth are either black or white, and that what is taught in school or university is therefore unquestionable. While the roots of this phenomenon fall outside the scope of this paper, it should be acknowledged that the Saudi approach of focusing Islamic school curricula on only one school of Islamic thought may train students to think rigidly and to exclude diversity. If on the other hand students were exposed to a range of Islamic perspectives, they would have an early opportunity to expand their critical-thinking skills. The school of Islamic thought that is predominant in Saudi Arabia is based on *Hanbali*, which is named after Ahmed bin Hanbal who was a Muslim scholar and a great Imam of Fiqh (Islamic jurisprudence). Hanbal helped to provide one of the main interpretations of the main texts, the Holy Quran and Sunna. Quite apart from the authority of Hanbal's scholarship, the salient issue is the gap between theory and practice. The general books, media, and focus of society from the early 1980s to less than a decade ago promoted only the Hanbali interpretation of Islam and this contributed to the exclusion of a diversity of perspectives. This narrow approach does not represent the essence of the Islamic faith, especially given the extensive evidence of diversity in the Quranic texts and in the Prophet's (Peace Be Upon Him) narrations. This narrowness is not only true in Islamic societies but also in the West when on the one hand the law supports multiculturalism while on the other hand many right-wing voices call for exclusion of diversity**.**

Despite the continuing dominance of rote memorization and passive learning in the Saudi education system, there are also many reasons for optimism. There is great enthusiasm surrounding the emphasis of King Abdullah Bin Abdulaziz on education as a tool of empowerment. This emphasis is exemplified by a drive to achieve a position of scientific leadership in the Arab world, by participation in international scientific competitions, and by the establishment of the King Abdulaziz and His Companions Foundation for the Gifted (Mawhiba), which is a new centre to promote talent and innovation. A reformed curriculum is in the process of being implemented in schools and many innovative measures are being considered and implemented both by the Ministry of Education (which oversees K-12) and by the Ministry of Higher Education or MoHE (which oversees all colleges, universities, and other post-secondary institutions). One of these innovative measures is the promotion of online learning, which is opening up teachers and students to look beyond the strictures of the banking system of education.

Global Emergence of Online Education

Although many observers initially considered online learning to pose a threat to the concept of classroom-based instruction and its delivery of experiences, it is today

generally considered to be a complement to classroom instruction. Online education is increasingly being acknowledged by educators as encouraging students to take greater responsibility for their own learning and as "…offering more self-paced learning alternatives and providing a richer interactive learning environment than learning from text" (Newton, Hase, & Ellis, 2002, p. 162). Wang and Reeves (2007) note that "College and university students in the USA increasingly view online components of their courses as commonplace as textbooks and other traditional resources" (p. 2). Online education and embedded online communication in higher education courses and programs are no longer considered luxuries or mere supplements to learning but, rather, are treated as integral parts of higher education in many parts of the world. This is true not only of North American and European institutions but also of institutions in Saudi Arabia. These trends coupled with the emergence of the global knowledge-oriented economy have not only encouraged governments to provide the infrastructure for web-based instruction but have also necessitated a significant increase of investment in internet technologies to increase access to educational resources.

Online Education in Saudi Arabia

Online learning, including distance education by online means, has received increasing attention among Saudi educators as a way of increasing the accessibility of higher education. This type of instruction offers access to many students who aspire to study at the university level but live in remote areas or are working to earn income and therefore are unable to physically attend school. Distance education is an aspect of online education that continues to offer great untapped potential. As Al-Khalifa (2009) remarked, Saudi Arabia "has been slower than many nations to move into distance education and that it has a very short history of using printed, electronic, or broadcast means for students who are not physically on site" (para. 1).

The need to expand access to higher education is one of the main factors driving the ongoing growth of online learning in the Kingdom. In addition to the desire to make university education available to students who are located in rural areas or who are currently employed, there are powerful demographic forces at work. According to the latest national statistics, by 2009 Saudi Arabia's youth population had reached 65% of the entire population. Many high-school graduates were unable to find places at the national universities and approximately 100,000 are currently studying abroad on scholarships at higher education institutions in such countries as the United States, the United Kingdom, and Canada. Online learning offers the prospect of expanding the total number of students who can be enrolled in Saudi universities without actually requiring increases in the physical capacity of the universities and associated facilities. Public and private higher education institutions in Saudi Arabia cannot accommodate the increasing number of high-school graduates who wish to obtain a university degree and thus it is paramount that online learning and certification become part of the structure of higher education. Another factor encouraging the implementation of online learning is the visual learning style of many Saudi students. Online approaches, which of course

incorporate visual learning, can therefore enhance the traditional and relatively passive approaches to education. This new mode of teaching offers great potential to make students more self-directed and engaged.

The Saudi Ministry of Higher Education has begun to acknowledge the need to adopt online technologies in order to offer opportunities to the increasing numbers of students graduating from high school. According to Tony Bates (2009), a consultant who runs many e-learning workshops and provides e-learning training across the region, some of the more forward-thinking leaders of Saudi education have been exploring online education over the course of the last decade:

> King Fahd University in Dhahran has been working closely with UBC in Canada since 2003, with staff from King Fahd University visiting UBC for workshops a few times over this period. The use of e-learning at King Fahd University for Oil and Petroleum, for instance, had become widespread, both to support classroom teaching and in a hybrid mode, with a mix of reduced classroom time and online learning. (para. 3)

These workshops have been part of the plan of the Ministry of Higher Education to study the feasibility of offering online education blended and integrated with traditional methods of course delivery.

As of 2013, many Saudi universities were well advanced in integrating online learning into almost every undergraduate program. Major universities are currently implementing or have already fully implemented web-based instruction through Web CT or Blackboard as a companion to all their classroom study programs. According to Mirza (n.d.),

> MoHE has just recently established a national centre for e-learning and distance learning which aims to support in the creation of electronic educational material, and provide an electronic venue for faculty members of any local university to utilize in creating e-courses through its own Learning Management System. (p. 4)

There are currently large numbers of undergraduate students enrolled in online degrees in all major Saudi universities. Some students are earning bachelor's degrees in business administration, Arabic language, Islamic studies, sociology, and history that are exclusively online. In 2011 a new electronic university was established with three colleges and an enrolment of more than 20,000 students across the Kingdom (ses.edu.sa). Nevertheless, there remains considerable reluctance among some stakeholders to introduce entirely online degree programs, including among leaders within the Saudi Ministry of Higher Education. In addition, the MoHE remains

unprepared to accept or qualify anyone with an online qualification from any foreign institution, even from such renowned universities as MIT, Harvard, and Stanford which offer some online programs. These concerns stem from the fact that the very nature of online program delivery can raise doubts about whether students are in fact submitting their own work and, by implication, about the fairness of the evaluation of students' performance.

Literature Review

Advantages of Online Education

The literature concerning online learning has greatly expanded over the last decade. Studies have indicated that online learning enables institutions and/or instructors to reach new learners at a distance, increase convenience, and expand educational opportunities (Bourne, McMaster, Rieger, & Campbell, 1997; Hara & Kling, 2000; Hill, 2002; Hofmann, 2002; Owston, 1997; Rourke, 2001; Schrum, 2000; Song et al., 2004). Studies have typically emphasized the key characteristics of successful online learners; Ohara (2004) has summarized some of the main work of researchers in this area. Ohara's primary finding was that online learners – out of many characteristics such as level of engagement, the ability to deal with uncertainty, and the willingness to try new things – have most notably displayed internal locus of control, which is the ability to exercise a degree of personal, internally driven control over key life decisions (Cooper, 1990; Altman & Arambasich, 1982; Parker, 1999 as cited in Ohara, 2004, p. 51).

Among the many advantages cited by researchers with regard to offering online learning opportunities to students are "[v]alidity, relevance, ease of editing and updating, use of visuals and minimal text and the potential for interaction both with the content and with peers or facilitators" (Newton, Hase, & Ellis, 2002, p. 163). To these advantages Ohara (2004) added the proposition that

> ...student satisfaction – as identified through comments after the class ends – is generally higher for those students who have immersed themselves in the program by participating in scheduled and informal online chats and maintaining a steady stream of comments in discussion forums. (p. 51)

Disadvantages, Issues, and Controversies

Some researchers have argued that "technology is culturally, morally, and politically neutral – that it provides tools independent of local value systems which can be used impartially to support quite different kinds of lifestyle" (Pacey, 1983, p. 2). However, a strong case can be made that this is a misconception, particularly of the Western world, towards what are typically identified as "developing" countries (formerly known as "Third World" countries). Part of the problem is that the West to a great extent has adopted a set of beliefs or a world view whereby, as Tony Jackson says, "the Third World is portrayed as a vast refugee camp, with hungry people lining up for food from the global food aid soup kitchen" (Pacey, 1983, p. 57). Yet, "this view is false" (Pacey, 1983, p. 57), not least because there are many countries in the Eastern part of the world such as China and India that are no less technologically advanced than those of the Western world. Technological advancement is not neutral because it differentiates between powerful and less powerful nations in terms of access to sophisticated technology in such a way that the success of some countries often comes at the expense of other countries.

Some studies have indicated that back-and-forth interaction with other individuals is one of the keys to online success – more so than in traditional settings such as the lecture hall or the classroom which generally allow only for one-way communication from the professor or teacher to the student (Picciano, 2002 as cited in Kim, Liu, & Bonk, 2005). However, Picciano (2002) did not identify the specific elements of online learning that enabled students to be successful nor did he outline the parameters governing their success. Kim, Lei, and Bonk (2005) argued that, especially in asynchronous conferencing, online learning fosters rich interactions and in-depth thinking because it provides participants with a greater amount of time in which to process other participants' statements and to formulate their responses. The study by Kim, Liu, and Bonk (2005), as well as a few others like that of Benbunan-Fich and Hiltz (1999), suggest that online interaction helps improve students' skills in the sense that they are able to provide more detailed answers to cases and problems by means of online discussion; however, these studies offer no details regarding the skills that were improved and the specific ways in which online learning helped students to build their social-interaction skills and other skills. Finally, Ohara (2004) indicated that some students

> ...doubt the technology and their ability to use it properly and require reassurance from their instructor before they begin to trust the technology. Some students never learn to trust and never reduce their uncertainty with the technology. (p. 51)

Cultural Impact

Despite the growth in literature concerning online learning, there has been little emphasis on the ways in which online learning and the unprecedented openness of online communication have been changing learning cultures around the world in general and that of Saudi Arabia in particular. One of the few examples is Moon (1999), who suggests that "open communication in online forums is offering examination of beliefs [*sic*] systems and cultural assumptions" (as cited in Cameron & Limberger, 2004, p. 434).

Similarly, there has been little emphasis on the ways in which culture affects the application and success of online learning. Indeed, "Although few would disagree that cultural factors are important in theory, there is surprisingly little published literature concerning the cultural aspects of online learning and teaching, and there are even fewer research-based studies on the subject" (Gunwarandena, Wilson, & Nolla, 2003 as cited in Wang & Reeves, 2007, p. 2). There remain many pertinent aspects of learning culture that have not yet been discussed in the higher education literature. For example, inadequate attention has been thus far accorded to the effects of online learning on such aspects of students' learning culture as locus of control, empowerment, and the inherent tensions between individualism and collectivism and between autonomy and agency.

An especially insightful study by Tapanes, Glenn, Smith, James, and White (2009) focused on the cultural diversity of online learning and on the perceived effects of conflict levels of individualism, collectivism, and tolerance of ambiguity. This article, like many others, highlighted the differences among people from a variety of cultural backgrounds in terms of the extent to which they demonstrated individualism, collectivism, and intolerance for ambiguity. However, the study did not discuss the extent to which – if at all – exposure to online education contributed to enhancing students' actual learning. Another study by Pattison (2003) explored how students from diverse cultural backgrounds who were drawn together in a program to train counselors reflected on their experience as online learners and in particular in online discussions. Pattison's approach is based on an individual-centered orientation that makes the individual the primary user and beneficiary of online-learning technology.

The lack of research into how online communication and other forms of technological advancement are influencing Eastern countries, their peoples, and their cultures is in part a reflection of the lack of advancement in the field of online learning in many of these countries. This is why there seems to be a near absence of understanding of the ways in which online learning is influencing different countries of the Eastern world. This absence is particularly acute given the fact that many countries are trying to adapt to new methods of learning. This type of understanding is not a luxury but a necessity as most societies around the world become increasingly knowledge-based.

Theoretical Framework for the Study

Cultures

Important research about cultures has differentiated between high-context cultures and low-context cultures. The definition of culture articulated by Hofstede and Hofstede (2010) is that "every person carries within him or herself patterns of thinking and feeling and potential acting that were learned throughout their lifetime" (p. 2). They defined high-context cultures in which direct communication is minimal because most of the information is in the immediate physical and social environment and little is encoded. This type of communication is common in collectivist cultures such as that of Saudi Arabia. This reflects the great significance of body language in general and of gestures in particular. A low-context culture, on the other hand, is "one in which the mass of information is vested in the explicit code which is typical of individualist cultures" (Hofstede & Hofstede, 2010, p. 89). When information is embedded in an *explicit* code, few if any contextual details or clues are provided to the receiver regarding the message and the meaning is almost entirely enveloped within and understood through the actual words that are communicated. According to Gupta (2010),

> High context cultures are ones in which people tend to be indirect and formal communicators. People from low context cultures tend to be direct and informal communicators. Groups that have high context communication styles combine verbal and nonverbal messages to convey the entire meaning. A listener must read between the lines and add nonverbal nuances to fully understand the message. (para. 9)

Similarly, according to Borisoff and Victor (2007), "In high context cultures, members rely heavily on inferred meaning while in low context cultures people strive hard to find a literal meaning" (as cited in Corvette, 2007, p. 104). Borisoff and Victor (1989) also found that

> ...high-context cultures include the Chinese, Korean, Japanese, Vietnamese, Arabian and Greek cultures as well as, to a lesser extent, the Spanish and Italian cultures (as cited in Corvette, 2007, p. 103). Saudi Arabia would be classified as having a high-context culture whereby context is of great significance to the discernment of meaning. (p. 23)

In online communication, context is not able to play as great a role as it plays in many other forms of interaction. Given the fact that online communication is effected by

written means, it follows that the study participants were not able to offer any subtle, non-verbal cues through tone of voice and body language, which are critical aspects of face-to-face communication in the Saudi culture. When learners engage in online communication, the role of context is far less significant than in conventional communication and this, in turn, affects their locus of control. Saudi female students – the group from which the subjects of this study were drawn – usually display external locus of control and this impairs their ability to independently make major decisions in their lives. In high-context cultures such as that of Saudi Arabia, people are especially willing to use social power to accomplish their goals. Given the fact that the use of the Internet impairs the traditional, non-verbal means of communicating social power, it follows that Saudi students' engagement in online learning is teaching them to become more independent and to take charge of their own decisions.

Empowerment

In this study, I specifically acknowledge the fact that learning is both a personal and a social endeavour. According to Piaget (2000) and the constructivist theorists, learning is not a product transmitted from the more knowledgeable party (the teacher/instructor) to the less knowledgeable party (the students). Rather, from a constructivist point of view, learning is achieved in an environment in which the student is at the centre of the learning process and the role of the teacher is to act as a learning facilitator. Online learning provides an opportunity whereby students can construct their own understanding and their own knowledge with less pressure from teachers, peers, and family members. For instance, the Internet makes it much easier for students to conduct research and to learn about perspectives that may be quite different from those presented by the professor/teacher and in the official textbook(s). Furthermore, online education is geared to the fact that learning is a social endeavour as well as to the collectivist character of the Saudi culture. According to Vygotsky (1992), learning to a great extent occurs as a result of personal interaction, not just between instructors and students, but equally importantly [good] among students themselves. I argue that in Saudi Arabia students learn best when they are immersed in an educational context that promotes interaction among peers. "Social constructivism is therefore a theory of learning empowerment within which students are conferred agency in the learning process, higher levels of responsibility over learning and choices about what, where and how to learn" (Renner, 2006, p. 4). Renner (2006) continues by stating that "Learning is both personal and social. It is personal to the extent that individual students must construct their own understandings. These understandings are subsequently regulated and tested through social interactions" (p. 4).

Methodology

The primary method of gathering data for this study was a survey. There were 12 survey questions (Appendix B) and 100 copies were sent out to students. Participation was voluntary as indicated in the letter of information (Appendix A). Students were reminded that they could withdraw from the study at any time without any penalties and they were asked to bring the written answers to the following class and submit them to the teaching assistant.

Validity of the Questionnaire

The validity of the questionnaire was explored through the use of experts: a professor emeritus whose specialty is curriculum and online learning, and two external educators. The professor was also asked to judge the clarity of the wording and the appropriateness of each item and its relevance to the main research questions being asked. The experts were asked to consider the following questions:

1. What do you think the questionnaire measures? Does it represent assessment principles and the content of the course?

2. Is it appropriate for the sample/population?

3. Is the questionnaire comprehensive enough to collect the information needed to address the purpose and goals of the study?

The professor's feedback and directives were used to further refine the questionnaire. The validity of the questions was also checked by inviting three educators whose backgrounds are in curriculum and online learning to provide feedback and to explain the extent to which the questionnaire addressed the main research foci. Some parts of the questionnaire were changed in accordance with the feedback from the referees.

The reliability of the questionnaire was explored through a pilot study involving 30 students who were not part of the larger study. The responses collected from the pilot study were analyzed to determine the level of consistency between the stated advantages and disadvantages on the one hand and the stated preferences on the other hand. There appeared to be internal consistency among these respondents' weighted advantages-disadvantages, their preferred assignment, and the justification for their choice. This result was taken as evidence of the questionnaire's reliability (internal consistency) in this low-risk study.

The Participants

The study participants were all female first-year undergraduate students at two Saudi universities in which the medium of instruction is English. Because of the gender segregation of the Saudi education system – males are taught only by males, whereas women may be taught by males and females – the researcher only had access to female

students. These students attend a variety of colleges: Interior Design, Business Administration, Nursing and Health Sciences, and Engineering. The majority of the students in this study had not previously made intensive use of technology for studying or for other educational processes. This course was their first experience with online learning as a mandated part of their education.

Students were required to access the course material online, to engage in online discussion with classmates and professors in the discussion forum, to upload their assignments, to obtain their grades and professors' feedback online, to take their tests and exams online, and to communicate their feedback regarding every aspect of the course. Indeed, it is a requirement of these students' university programs that they access their courses via Blackboard and some may take blended courses combining traditional and online learning, which could be perceived as strange for some of them as it would be their first experience with online learning as a mandated part of their education. The course the students are taking with me is one of the early courses that requires them to use online learning. Students take online courses and they interact with their professors and student colleagues through online discussion forums. Many universities and colleges in Saudi Arabia have over the last five years established online communication forums to supplement and reinforce face-to-face teaching. But these particular institutions went further in mandating participation in online learning as a condition for graduation.

Data Collection Procedure

The researcher informed the students of the rationale for the study and provided them with an information letter and consent form. These asserted that there would be minimal risk associated with participating in the study because anonymity and privacy would be assured, and because the results of the study would not influence the students' course grades. Participants were made aware of the fact that they could withdraw from the data-collection process at any time. Students were given the consent form before the beginning of the data collection. They completed the questionnaire in the last week of classes, a process that required about 20–30 minutes. Anonymity was maintained by asking respondents not to write their names on the answer sheets and to submit them to the TA.

The researcher received and began to analyze the data only after the final examination and the submission of the course grades. Of the 100 participants who provided consent forms, 67 returned their answers. Follow-up interviews were conducted with a random selection of 20 participants. Informal discussions were held with each participant to provide enriched views on whether and to what extent there exists a reciprocal and correlative relationship between online learning and culture. The researcher made field notes of the discussions for later analysis.

The analysis of the responses to the completed questionnaire began with an assessment of the descriptive data drawn from the students' feedback about how they perceive online learning and the culture of learning – whether the latter has been influenced by the advent of online learning. The analysis of the open items and field notes from the interviews (coding, constant comparison) was completed after reading and re-reading the short answers, using constant comparison. Representative responses, quotes, and field notes were selected to illustrate the themes and to serve as evidence for the assertions related to each research question.

The methodology used for this study had two main parts. The first involved an analysis of the discourse surrounding online integrative or blended education. This emphasized Saudi Arabia, a country where this is a new strategy in education as well as a new area of research. The second part of the study involved an analysis both of personal observations and of a survey created by the author and distributed among Saudi female first- and second-year undergraduate students from various classes of two major universities. All 67 of the participating students had experienced the integrative approach to online education through the requirement to use online learning as part of their university studies alongside traditional methods of education.

Prior to distribution, the survey was examined by an ethics committee and by professors at other institutions. The survey was undertaken in person and was data-driven, with a view to exploring how students' culture of learning had changed as a result of accessing and working with an integrative approach to online learning. The survey questions were supplemented with probes designed to steer students' thinking towards the relationship between learning culture and online education. The survey data were coded, themed, and analyzed according to their relevance to the research question. The results were read and re-read by the author to find similarities and differences in respondents' answers to the questions. As indicated below, there was a general consensus among the respondents that online education had positively influenced their learning experiences and outcomes.

Results and Interpretation

As explained above, Saudi university students come from a school culture that teaches them to rely on the teacher as the sole source of and conduit for knowledge. The strong hold that the traditional approach to education has on the minds of many students leads some of them to resist approaches that place them at the centre of learning – and this is especially the case when they have to engage in discussions as a precondition for learning. Online learning helps to address this tendency to resist by offering students a multitude of new opportunities to interact with classmates and professors in relation to their learning experiences.

During the research study, the more reluctant students received encouragement from the course professors and this helped ensure that these students became active participants. Not long after the introduction of online learning, virtually all the students had become much more familiar with the methods of navigating internet sources and of interacting online with their professors and colleagues. Many students began to appreciate the positive effect of these new learning opportunities on their critical-thinking skills, cognitive skills, and oral and written communication skills, as well as on their general knowledge. Students' engagement in online communication cultivated new experiences and cultural interactions with their classmates and professors – experiences and interactions that not only helped to enhance written and oral communication skills but also to expand their understanding of the various issues discussed. Students also displayed more personal control over their learning. While the possible difficulties associated with online learning have already been outlined and need to be acknowledged by educators, the participants in this study did not single out any single major challenge that they faced.

One might argue that it would be a stretch to think that online learning can actually have an impact on a culture of learning in a relatively short time frame. This would surely take time, especially in a large society/country like Saudi Arabia with deep historical roots and entrenched traditions. Nevertheless, many Saudi students are acquiring a new culture of learning as a result of being introduced to online communication and web-based instruction. One of the core elements of this new culture of learning is the shift from unilateral communications from the professor to the students to a multilateral approach. Within this emerging approach, not only are communications between the professor and the students much more two-way but the students are also receiving opportunities to interact with each other in a classroom setting. Thus, thanks to online learning, Saudi students are being moved closer to the centre of learning.

The Students' Feedback: Embedded Themes

Some themes emerged from the data and in this section I discuss some of the points that repeatedly appeared in the students' feedback, in the professors' observations, and in the field notes. The emerging themes were mainly related to the changing learning culture in such areas as time-management skills and learning skills. From the data it appears that the students believe that online education gives them greater control over the learning process, including the ability to post their feedback and assignments online and to discuss points that interested them in the readings. This greater control is what is moving the students to the centre of the learning process and is therefore helping to change the learning culture.

When students were asked about how the integration of online communication affected and influenced their learning experience, the new interaction opportunities were frequently emphasized. As one student explained,

> It allows us to talk with the teacher directly and be able to be updated quicker.... Any question about an assignment is usually assigned faster. It also makes the learning experience much more rewarding as we are able interact with the teacher and get feedback regarding small segments of the assignment.

Another student noted that "Online education helped us connect with other students and instructors easily and spontaneously." This point was echoed by the observation that "...online communication improves the process of learning. It enables students to be in touch with their colleagues and instructors other than saving their time when it's time for registrations and arranging schedules."

Yet another student commented that "Not being allowed to drive some days makes it hard to go to school, and *using online education and Blackboard allows me to post my assignment on time without having to worry about getting to school for that purpose*" [emphasis added]. Indeed, several respondents were very pleased with the fact that they could access their courses at any time and in any location.

A number of students narrated and indicated that online courses taught them to plan their time better and to rely on reading more in order to achieve better results. One said "when I go online I used to spend less time on reading and more on browsing various sites now I read much more when my instructor pose a question." Another said "online learning disciplined me to read much more than before" and another suggested "I award myself everytime I learn something new to read more and arrange my time better." These quotes reflected their ability to achieve long and short term goals and their self-discipline which were clear in their feedback of the interview questions. One of the short term goals was to overcome their disinterest in reading and they were able to read their books online, while the long term goal was implicit in these students' abilities to think outside the box and be at the center of learning rather than being empty vessels for their teachers.

Many students emphasized that the *accessibility offered by online education* is one of its greatest advantages. They explained how the use of online technology affects their learning experience in a variety of positive ways, including sharpening their thinking and broadening their horizons. As one student explained, "When you meet new people through online learning... you will learn from their experience and share your ideas and thoughts with them." Another student elaborated on the theme of expanded access to knowledge in stating that "It connects us with things that are not easily available in books.... The concept of learning through books and going to the library is diminishing in face of online learning and online access to books and journals."

Many students were conscious of the *cultural impact of online learning*. According to one student, "Online education is starting to change the culture.... It's now accepted that

people study online and obtain their degrees and are able to continue with their education." Another observed that "...online education is changing the culture because we are now becoming increasingly dependent on the Internet and this is changing the culture of how we deal with one another." An especially perceptive student captured the reciprocity between online learning and culture: "Online education is expanding the culture which in turn influences education and how we view education.... It is definitely changing our thinking in a positive way.... Yet our culture is [also] influencing technology in that it is controlling it."

The vast majority of respondents agreed that this new approach to education "...is changing the culture by providing people with learning material that comes from different sources that present different perspectives and aspects of that material." One student emphasized that online education is opening up brand new opportunities for her as a female:

> I believe that culture is influencing online education
> because it is not simple for us girls to travel abroad for
> higher education in our society. Therefore I think that it
> motivates the female to turn to studying online due to
> our limited options.

A few students noted possible negative cultural consequences. One suggested that "People can get addicted to technology if they over use it." Another argued that online learning has a negative aspect because it reduces the frequency of face-to-face interactions. Some other students agreed that online communication has the disadvantage of sometimes sending a different message than that which is intended. However, for the majority of respondents, the major disadvantage of online learning is related to the unreliability of internet connections, largely resulting from censorship aimed at blocking access to sexual and political Web sites. Some respondents also indicated that it is sometimes impossible or extremely time-consuming to log onto the Internet.

Discussion of Students' Learning Culture

Culture is relevant to this research in that the researcher tested how Saudi female students' learning culture – through a representative group of participants – has been influenced by their online learning engagements. As discussed above, Saudi Arabia has a collectivist culture with high-context communications and minimal coding, though this was not specifically considered in the academic study in relation to online learning. The ways in which and the degrees of success with which female students interact, benefit, and grow with online learning need to be explored in greater depth over an extended time period. Although there were some limitations on access to online education as a result of poor or inadequate internet infrastructure as well as some technical difficulties, the study participants found it to be indispensable to have unlimited access to the

Internet. They also argued that their introduction to online sources enabled them to gain experience with different ways of thinking, different styles of writing, and different approaches to improving their communication skills. They also learned to become more persistent as a result of the slowness of Saudi internet connections.

The students' participation in the online discussion forum included learning more about their own values, beliefs, and attitudes. Before joining the online integrated discussion forums, the students did not realize the diversity of perspectives among them. This is an example of how online forums can serve as a platform for promoting greater understanding of the diversity of cultures and opinions within the same society, as well as for fostering greater appreciation for how cultural differences impact learning. These outcomes of online forums, as well as the internalization of locus of control, help to build students' communications abilities in the workplace and elsewhere.

Based on personal observations of the students' online communications on discussion boards and of their abilities to engage with each other on a daily basis in regard to various aspects of what was discussed in the classroom, it was evident that their online discussions towards the end of the year displayed significant improvements in their skills in presenting their own perspectives. These constant observations were noted regularly so that they could be revisited during the data analysis, and notes were taken that made these observations and field notes into a form of transcript. These observations were made by two professors who were constantly engaging in the dialogue, both virtually and face to face. The observations and field notes significantly enriched the survey data from the participants.

Online programs encourage students to learn at their own pace and to interact at their own level. In one of the discussion forums, students were asked to respond to some assignments relating to ethical concerns and cultural issues associated with cross-cultural communication. This discussion was enriching and may have challenged some of their existing deep-seated misunderstandings, judgments, and assumptions about different cultures. Another quality that students embraced is self-discipline, which is a necessary condition for success in a globalized world. Throughout their engagement with online learning, the students displayed their ability to work independently. This is particularly significant in that online education, in combination with traditional approaches to learning, enhances students' communication abilities, academic skills, and level of self-motivation – especially with respect to topics that are relevant to their lives. After a semester of using online education the students demonstrated better personal management skills, including the ability to set achievable goals. Online education therefore helped students to be more successful and to have higher levels of satisfaction after an initial full-year engagement.

Students' Empowerment

The participants in this study showed a great deal of personal empowerment as a result of engaging in online learning. Students' empowerment was one of the main highlights of this study. As discussed above, Saudi students usually are not directly engaged in the learning process but, rather, are educated through lectures alone. According to this traditional approach, students are required to abstain from discussions or other kinds of direct participation in learning and, in consequence, they do not contest, negotiate, discover, or share their understandings. However, after employing the blended approach, which included participating in online discussions, most of the students in the research sample demonstrated a keen interest in moving beyond the rote-learning tradition. In other words, the students demonstrated a greater appetite and aptitude for interactive learning – for an educational approach that is premised on bilateral and multilateral communications as opposed to the traditional unilateral approach. A new willingness to engage in critical thinking and self-directed learning was also one of the most notable effects of the implementation of online education. Unlike under the old model of instruction, students who engage in online learning are more likely to display their autonomous identity – an identity that emerges through the acquisition of skills that serve as the scaffolding for the acquisition of knowledge. "Scaffolding" refers to the structure of skills that enables students to reach new levels of educational and personal development.

Solutions and Recommendations

Students must be able to understand the protocols and guidelines for using online communication before joining online communities. These protocols concern the ethical standards that are necessary for students to become responsible users of online resources. Some of these ethical standards include respecting privacy, maintaining security, and avoiding plagiarism and academic dishonesty. Yet, despite such concerns, it appears from this research study that few concrete measures are being undertaken to address them. Unfortunately, in Saudi Arabia the centralized server has in many cases proved to be detrimental to learning, as it is often used to prevent or restrict access to important web sources because they touch on controversial issues of a political, sexual, or religious nature even if these are related to educational fields. Centralization helps to standardize procedures and practices, but it can also be used to limit students' access to many valuable internet resources. Thinking should not be restricted or censored, regardless of the subject. This restriction should be studied and discussed further, with a view to its eventual reform.

Gender segregation is pervasive in Saudi Arabia. All education is completely separated from grade one up to and including higher education, with the only exception being the final years of medical school, where male students are seated in rows in front of female students. This study focused solely on female students' responses to and participation in online learning. Future studies would benefit from the addition of input and analysis

from male students. A comparison between male and female responses would allow for critical analysis of the discourse that surrounds male and female education.

Another recommendation is to enhance students' level of computer literacy in order to boost their confidence in participating in online integrated courses. In order to overcome the various challenges associated with online culture, students and instructors must be vigilant about students' disregard for or lack of knowledge about the privacy protocol. This protocol includes the requirement for students to respect both professors and classmates and to avoid disclosing personal information to each other and on the Internet except where absolutely necessary. Clear instructions must be provided. It cannot be expected that students who are encountering a progressive education philosophy for the first time and who are the products of the traditional approach to learning would know what should and should not be done to protect their privacy with a view to allowing them to reach their full potential in online discussions. Another protocol applies when students use other people's ideas in posts; specifically, they need to learn when and how to give credit to the author or the creator.

Learning styles differ widely among individuals (Kolb, 1984) and building an awareness of this is important in online-learning processes. In saying this, it must be acknowledged that students' ability to successfully use online education is also related to the fact that "distance education is inherently accommodating of a variety of learning styles" (Dille & Mezack, 1991 as cited in Dabbagh, 2007, p. 218). With various media such as video, audio materials, and the delivery of text via the Internet, students who tend towards visual, spatial, auditory, or text-oriented learning styles are being accommodated through online learning.

Future Research Directions

The trend towards employing online learning in the vast majority of post-secondary academic programs worldwide is having a significant impact on learning cultures. Yet, despite this widespread integration of online learning with traditional education, there remains little research into the factors that make online learning a significant part of undergraduate students' learning experiences. The observation put forward by Bourne et al. (1997) a decade and a half ago that "The way learners acquire knowledge in on-line settings has not been extensively studied" (p. 39) still largely holds true. Newton, Hase, and Ellis (2002) suggested:

> The widespread rhetoric of promises for more flexible access to training and the subsequent rapid adoption of these goals by government, educational institutions and industries have not been accompanied by an understanding of the factors and processes that contribute to effective implementation of online learning. (p. 157)

Some of the questions that remain unexplored more than 10 years later relate to cultural values and the ways in which they are influenced by online learning and open online communication. Are those higher-education institutions that are offering courses to diverse learners around the world paying enough attention to differences between cultures? Should online courses be designed to reflect the culture of the audience? How is access to sources of online learning influencing learners and their respective cultures? What cultural challenges do instructors encounter when planning e-learning courses? To what extent is e-learning adaptable to non-Western students' needs and cultures?

More research is needed to explore the importance of asynchronous group discussion in the online context. Studies by Henri (1992) and Garrison (1992) have experimented with the ways in which computer asynchronous classes are exhibited and affect students' learning, yet research is needed to examine the difficulties that are specific to online learning culture. Relevant online learning strategies should be implemented to help students become more creative in using their various skills.

Future research should also examine the ways in which online education is affecting teachers and instructors – specifically whether it is affecting the teaching culture, the course management, the teaching strategies, or some combination thereof. Detailed qualitative studies could provide great insight into blended online courses. A possible project might be to identify students across various cultures who are taking the same online course and to interview them regarding the ways in which and the extent to which their cultural identity has been thereby influenced. Online communication is a tool for crossing geographical boundaries and thus it could be used to connect cultures and build bridges of understanding to a greater extent than has hitherto been possible.

Conclusion

This paper demonstrates that online learners' culture of learning is influenced by online education and vice versa. It also provides ideas on how students' learning can be enhanced in the process of connecting to one another and to their professors. It furthermore provides insight into the ways in which the introduction of online learning can complement traditional teaching approaches and, in turn, positively impact students' learning cultures. The evidence shows that students' cultural background influences their perception and performance in online learning environments in the sense that some students from some cultures require more help than some students from other cultures in order to become independent learners (Almutairi, 2008).

This study analyzed student-student and student-instructor interactions reflecting students' engagement in and benefits derived from open and online learning. Students revealed how their engagement in online discussion improved their critical-thinking skills and allowed them to think deeply about various subjects in ways that would not be possible if it were not for online learning. Students' engagement in online learning helps

them to develop greater planning and time-management skills as well as greater self-discipline. Students in the study displayed an improvement in their abilities to set short- and long-term goals. These students' excitement for and involvement in many of the aspects of the technology available to them made online education an outstanding vehicle for the improvement of their skills. Traditional learning approaches are still dominant in most Saudi classrooms. Nevertheless, online education is in the process of being introduced and many universities are employing blended learning strategies that are constructing new learning realities for students. Students' learning culture is clearly being positively influenced by online education – an approach that enables them to actively participate in discussions, to engage in self-directed learning, and to construct their learning by drawing on and creating their own experiences. Thanks to online learning, the traditional unilateral approach to education is being supplemented and even changed to reflect a more multilateral ethos.

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APPENDIX A

Letter of Information

Informed Consent Letter

 Online Learning

Dear Participant:

My name is Dr. Amani Hamdan, Assistant Professor. This is an invitation for you to participate in our research in which I seek to explore your learning experience using online learning programs asynchronously and/or synchronous. The data from this project will be used for scholarly presentations and publications.

In this study, written surveys will be the primary methods for gathering data. If you agree to participate, you will provide short answers in the survey.

Your identity will be maintained confidential in the project and any write up. The original or raw data will be stored under lock and key, and only I as sole researchers will have access to the raw data. If you choose to provide your written reflections this will be kept confidential, all the data will be kept two years after the research is complete, after which the raw data will be destroyed.

Your participation is voluntary and you may withdraw from the study or refuse to answer any question at any time. As a participant in the study, you will at no time be judged, evaluated or be at risk of harm. Neither your name nor the institution's will be revealed in any written reports. Once I receive your permission, we will follow up to arrange a suitable time for the interview.

Sincerely,

Appendix B

PART One:

Interview Questions

Name:

Institution:

Number of years using online learning:

1) How integrating online communication affecting and influencing your learning experience? (short answers) 6 line minimum

2) How online education is changing the culture or culture influencing online education?

3) How online education is changing you and how is online education influencing you?

4) What do you perceive your teacher role in online learning? What about your role?

5) How frequent do you use online for educational purposes?

Part Two:

6) How frequent do you use Web Ct or Blackboard to access your courses online?

   a) 1-10 hours

   b) 10-20 hours

   c) More than 20 hours

   d) More than 40 hours

7) How frequent do you engage in online discussion on Web Ct or Blackboard?

   a) 1-10 hours

   b) 10-20 hours

   c) More than 20 hours

   d) More than 40 hours

8) How many courses have you taken online

    a. 1-3

    b. 3-5

    c. 7-9

    d. More than 10

9) How frequent do you use online educational activity per week?

    e) 1-10 hours

    f) 10-20 hours

    g) More than 20 hours

    h) More than 40 hours

10) What web pages do you use most?

    a) Google

    b) Ask me.com

    c) Wikipedia. com

    d) Others (specify)

11) Do you benefit from learning online? How?

12) Do you feel safe to state your opinion in an online learning course more than how you feel in a traditional classroom?

13) Are you more motivated to engage in online discussion than in a traditional classroom?

Athabasca University