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Second World Conference on
Blended Learning 2017

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APRIL 26-28, 2017
HOSTED BY THE INTERNATIONAL ASSOCIATION FOR BLENDED LEARNING
51 DOCKSIDE DRIVE | GEORGE BROWN COLLEGE
www.iabl2017.org

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DEAN'S MESSAGE

WELCOME TO IABL 2017. THIS IS A LANDMARK EVENT FOR BLENDED LEARNING.

On behalf of the Centre for Arts, Design, and Information Technology, It is my pleasure to welcome you to IABL 2017.

We are pleased to partner with the International Association for Blended Learning to organize the Second World Conference on Blended Learning. This is a unique opportunity to show the great leaps that blended learning technology and research to the greater academic community.

I believe all the attendees will greatly benefit from the conference's panels, speakers, and programming. I wish you all a wonderful time at IABL 2017.

LUIGI FERRARA, MRAIC, OAA

Dean
Centre for Arts, Design, and Information Technology
George Brown College

PREFACE

IABL 2017, The 2nd World Conference on Blended Learning, was offered by the International Association for Blended Learning (IABL; http://iabl.org/). This year's conference was organized and hosted by George Brown College with support from IABL. The IABL conference was held on April 26–28, 2017 in Toronto, Canada, one of the key cultural and educational centres in North America.

The conference sought to incorporate the diverse perspectives of researchers, teachers, professors, administrators, trainers, instructional designers and developers, technology experts, and students representing a range of educational learning and training contexts, as well as socio-cultural backgrounds. Contributions from across the globe representing all educational sectors, plus a wide variety of industries were included in the program. Cutting edge blended learning research, solutions, strategies, and practices were presented and discussed by leaders in the field. Current and ongoing research findings resulting in new ideas, innovative practices, and experience were also shared.

The International Association for Blended Learning (IABL) is an international non-profit organization whose goal it is to transform global education through its on-going contributions to the field of blended learning. The IABL aims to promote excellence in teaching, training, and research in blended learning through the engagement of international scholars and practitioners to meet the needs of today's global learners.

IABL is the custodian of the annual IABL conference series organized as a key knowledge and research exchange forum where professionals and practitioners share their expertise, experience, and research in blended learning. The annual IABL conference is also a networking event for participants from all over the world who represent a variety of contexts, cultures, and perspectives.

PREFACE

The IABL conference invites critical inquiry and debate on theories, approaches, principles, applications, and the implementation of blended learning across educational and training settings. IABL2017 main themes included the following:

• Pedagogy of blended learning
• Blended learning in practice
• Design of blended learning
• Technology in blended learning
• Future of blended learning
• Blended approach to corporate training
• Blended learning for special needs learners
• Blended learning in language acquisition
• Blended learning in K-12
• Blended learning in higher education
• Blended learning for development/in developing countries
• Blended learning in teacher professional development

The IABL 2017 Proceedings documents the contributions of this year's conference. Proposals from across the globe and all educational sectors were submitted and carefully considered for inclusion in the conference program. All submissions were reviewed by at least two referees from the IABL 2017 international program review committee based on the full text of the submitted manuscript for short and long papers, and on abstracts for practitioner presentations, posters, demos, panels, and workshops.

The submissions for short and long papers were subjected to a double-blind peer review and evaluated on the basis of the originality of the work, the validity of the results, chosen methodology, writing quality and the overall contribution to the field of blended learning. The abstracts were reviewed based on the originality of the work and ideas, their applicability and practicality in the blended learning field, writing quality and the overall contribution to the field of blended learning. The authors were encouraged to incorporate the reviews and feedback in preparation of the final versions of their papers. All the approved submissions which were presented at the conference are included in the proceedings.

PREFACE

The IABL 2017 proceedings hence comprise the following categories of papers and other presentation types:

- Full papers (3500-5000 words in length) are printed in their entirety; they report on original and significant work in research, development, and applications regarding one or more aspects of blended learning.
- Short papers (2000-3000 words; full text included) describe new work or work that is still in progress, relevant to one or more aspects of blended learning.
- Keynotes (brief abstracts provided): two world-renown experts presented their keynotes, namely, Professor Dr. Ron Owston from York University, Toronto and Dr. Mary Donohue from Donohue Mentoring System™. They shared their expertise in blended learning to inform future blended learning research and practice.
- Panels (500 word abstracts provided): 4-5 people presented their views and arguments on a specific theme or issue related to blended learning, and subsequently discussed them with the audience.
- Pre-conference workshops (500 word abstracts provided) offer an opportunity for hands-on skills development in blended learning and teaching.
- Industry showcases/Practitioner presentations (300-500 word abstracts included) shared best practices in teaching and training in the blended learning context.

IABL 2017, being a blended conference, invited both face-to-face and virtual presenters. The virtual presentations were delivered by presenters who could not attend the conference in person but whose papers had been accepted (in keeping with the Submission Guide-lines) for IABL2017. Each virtual presentation consisted of (1) a pre-re-corded video (paper presentation) and/or virtual presentation, and (2) a 10-minute synchronous presenter-audience chat via Skype. Virtual presenters were required to submit their proposal using the same guidelines as face-to-face presenters. They could choose from the following three categories: long paper, short paper, and industry showcases/practitioners presentation. All blended sessions were moderated by a session chair to ensure optimal interaction between the virtual presenter and the f2f audience.

PREFACE

These proceedings comprise the full text of all the regular and short papers that were accepted to be included in the conference program and abstracts of the other presentation types that were shared during IABL 2017. In total, 12 submissions were selected as full and short papers. Abstracts of 7 panels, 12 practitioner presentations, and 5 workshops are also included.

The authors who have contributed to these proceedings are researchers, practitioners, instructional designers and developers from both educational and commercial organizations representing 11 countries: Canada, Greece, Singapore, Saudi Arabia, Colombia, Spain, Turkey, Malaysia, Brazil, Netherlands and the USA. We would like to extend our thanks to all participants for their contributions to the conference program and to the IABL 2017 Proceedings. A special Thank you goes to the members of the international Program Committee for their expert contributions and dedicated assistance with the paper reviews and decisions.

I hope that these proceedings which represent knowledge and perspectives of various sectors and programs from diverse cultural and educational contexts, will assist you in implementing blended learning in your practice.
See you at IABL 2018.

Agnieszka Palalas, Ed.D.
IABL President

KEYNOTE - THURSDAY

DR. RON OWSTON

Dr. Ron Owston is a professor of education and former Dean of the Faculty of Education and founding Director of the Institute for Research in Learning Technologies (now IRDL) at York University, Toronto, Ontario, Canada. In June 2007, York University awarded him the honorary title of University Professor for his "extraordinary contribution to the University as a colleague, teacher, and scholar."

He has spoken at numerous national and international conferences, and published in a variety of fields including technology in education, program evaluation, and teacher development in journals such as Educational Researcher, Teachers College Record, Research in the Teaching of English, Journal of Computer-Based Instruction, Journal of Information Technology in Teacher Education, Journal of Computer Assisted Learning, Internet & Higher Education, and Journal of Research on Computing in Education.

His recent projects include: external evaluator for the ABEL/Learning Connections online teacher community, a study on games to support literacy at grade 4, and an evaluation of Moodle use and lecture capture in large undergraduate courses in York's Faculty of Health.

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SPEAKERS - THURSDAY

CATHY PILLAR

SUSAN HARPER

RAJAH LEHAL

JAKE HIRSCH-ALLEN

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SPEAKERS - THURSDAY

CATHY PILLAR
AMETROS LEARNING INC.

Cathy Pillar is a passionate market builder with 30 years of business and marketing experience in the technology and education sectors now turned start-up.

From 2001 to 2011, Cathy worked in progressive leadership roles with BlackBerry launching dozens of products and services in hundreds of countries ultimately driving exponential worldwide growth of revenue (+$20B annually – Dec/11) and subscribers (+70M –Dec/11). From 2012 to 2015, Cathy successfully managed her own consulting business focusing specifically on clients looking to develop their international strategies and drive global growth including a 9 month assignment with Desire2Learn where she and provided interim marketing support for EMEA, LA and AP regions while developing a global market prioritization model for the organization.

In January 2016, Cathy partnered with Dr. Robert Clapperton and founded Ametros Learning Inc. Ametros Learning improves student proficiency in communication through simulation-based pedagogy. Cathy holds an MBA from the Rotman School of Management, University of Toronto and an Honours BA in Economics from Wilfrid Laurier University.

SUSAN HARPER
IBM CANADA

Susan Harper is an IBM Canada Client Manager for Higher Education and Research Clients in Ontario. She currently sits on an Ontario College Computer Technology Advisory Committee and an IBM internal team related to employee experience & engagement. She also volunteers her time at Belinda's Place – a shelter for women at risk of homelessness in York Region. She has been at IBM for 29 years and has served in positions that range from operations, teaching, management and sales. Susan's current interest lies in the fields of analytics, cognitive computing and cloud. She has a certification in Professional Digital Selling from the Digital Marketing Institute

SPEAKERS - THURSDAY

RAJAH LEHAL
CLAUSEHOUND

Rajah Lehal, JD/MBA - Founder & CEO of Clausehound. Prior to launching Clause-hound, Rajah worked in the technology industry for over a decade. Rajah then completed his JD/MBA at Western University. Rajah worked at Stikeman Elliott (the top Canadian transactional law firm) and Clyde & Co (a large international law firm) as a technology transaction lawyer, before solely founding and growing the law firm Cobalt Lawyers which he grew from zero to four hundred clients, and which has a team of six full time team members as well as contract employees.

Rajah has also launched Multiplicity Media with a co-founder: Multiplicity is a tech blog and entrepreneur education events group that has hosted nearly two hundred events in Toronto (http://multiplicity.media/). Both Cobalt Lawyers and Multiplicity are now being operated by their respective management teams. Rajah is focused on the growth of Clausehound (his third business) and is head of the Clausehound sales and marketing team.

JAKE HIRSCH-ALLEN
LINKEDIN CANADA / LYNDA.COM

Jake Hirsch-Allen is currently the Lynda.com Lead for Higher Education at LinkedIn Canada. He teaches at McMaster University, is on the advisory board of the Hot Docs cinema and founded Lighthouse Labs, Canada's foremost software development bootcamp.

A former intellectual property and international criminal lawyer, Jake was also Chair of Technology Committee of the Global Education Platform.

KEYNOTE - FRIDAY

DR. MARY DONAHUE

Named as one of the 18 Outstanding Women In Tech in 2015 by RdigitalLife, and Diversity MBA's top 50 under 50 in 2015, Dr. Donohue is a passionate advocate of revolutionizing today's workforce training through technology and internal talent. She believes passionately in the art of conversation, the value of team and outcome based training.

A cancer survivor who worked with Paul Newman, learned from Robert Kennedy Jr, made her movie debut with former Toronto Mayor David Miller, and was briefly (very briefly) a Supreme with Diana Ross, Dr. Mary Donohue is often described as a force of nature. As Founder of the Donohue Mentoring System™ she designs communication training that provide people with a roadmap to become people developers and achieve a better work/life balance.

Dr. Mary is a world-renowned speaker and TEDX presenter, television personality and columnist. Her work appears in the Huffington Post and Financial Post.

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SPEAKERS - FRIDEY

AMI SHAH

JANE JI

HOSNI ZAOUALI

WANDA BEDARD

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SPEAKERS - FRIDAY

AMI SHAH
PEEKAPAK

Ami Shah is a Co-Founder and CEO of Peekapak, an edtech startup that teaches social-emotional learning skills like self-regulation, empathy and team work in the class and home. Peekapak is backed by; Silicon Valley based accelerator, Imagine K12, the Edtech vertical of YCombinator and; the Unreasonable Institute.

Ami has earned a MBA from INSEAD. She has gained extensive marketing experience through roles at Procter & Gamble, and most recently, as Director of Retail Marketing at a consumer products start-up. Ami is passionate about improving youth education, and has previously taught in K-4 classrooms and advised and volunteered at education-related non-profit organizations.

JANE JI
SPRINGBAY STUDIO LTD.

Jane Ji is a long-time game designer and producer. In tandem with her team, she created the award-winning kids mobile game "iBiome-Wetland" and many games for online and social networks. Jane is an advocate for making engaging educational games to help inquiry-based learning in STEM classroom. With decades of experience in game design, Jane dedicates all her design skills to make fun play educational.

SPEAKERS - FRIDAY

HOSNI ZAOUALI
VOILÀ LEARNING

Hosni Zaouali is the co-founder of Voilà Learning, a TechEd social enterprise mandated by multiple school boards to create designed solutions for students and schools using Virtual Reality, Apps, gamification and online homework help.

This grassroots community leader has shown that it is possible to create a viable business while providing community programs, services and mentorship. Over the past 6 years, Voilà Learning has become an undisputed provider of educational solutions for thousands of families and students; helping disadvantaged schools in Canada, Somalia, Haiti and Ghana.

WANDA BEDARD
60 MILLION GIRLS

An MBA graduate of Hautes Études Commerciales (HEC) Montréal and a graduate of McGill University,B. Commerce, Wanda Bedard is founder and owner since 1991 of a manufacturing business in the custom sheet metal sector. Following a number of years as a volunteer with UNICEF Canada, Wanda Bedard established 60 million girls, a public foundation, in 2006. The organization is completely volunteer run and raises funds for education projects for girls in the developing world. 60 million girls has invested $2.5 million supporting 21 projects in 15 countries, with administrative costs of less than 1%, directly benefitting over 20,000 children.

Wanda is a member of the International Advisory Board of McGill's Institute for the Study of International Development (ISID). She has been a member of the jury for the Montreal YWCA's Women of Distinction Award since 2009. Wanda Bedard received the Queen Elizabeth II Diamond Jubilee Medal in 2012 She received the Laurie Normand-Starr Humanitarian Award in 2011 Wanda was awarded the $20,000 "International Service Award" from the Velan Foundation and the Rotary Club in 2009. She was the winner of the Women of Distinction Award by the Montreal YWCA in 2008.

SCHEDULE - WEDNESDAY

JOE GANCI
BUILD THE BEST eLEARNING EVER WITH ADOBE CAPTIVATE 9 AND FRIENDS

JIM KINNEY
DIGITAL STORYTELLING FOR PROFESSIONAL PRACTICE

TOM TSILIOPOULOS
USING VIDEO IN FACE-TO-FACE TEACHING PRACTICE

MAZIAR MASOUDI
USING MOBILE TOOLS TO BUILD ENGAGEMENT IN LARGE CLASSES

SESSIONS:

Literacy Uplift - Mobile Tools for Language Literacy

Using Mobile Tools to Build Engagement in Large Classes

SCHEDULE - THURSDAY

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SESSION ONE

Using Office Mix to Promote Active Learning

When Blended Learning Pedagogies go Beyond Physical and Prescriptive Boundaries

Engaging Faculty in Learning Analytics. There's a Qualitative Side too!

KEYNOTE: DR. RON OWSTON — Empowering the Learner through Blended Learning

SESSION TWO

Development of 21st Century Active Learning Spaces for Higher Education

Online and Mobile Technology in a K-12 Program

IABL2017 Facilitated Panel Discussion Proposal: Professor Role in a Blended Learning Environment

SPEAKERS

CATHY PILLAR & SUSAN HARPER
RAJAH LEHAL
JAKE HIRSCH-ALLEN

SESSION THREE

Becoming a Competent Person: The Potential of Blended Learning Usage in Technical and Vocational Education (TVET) Student Training Teacher

How Does your Course Sound? Practical Tips for Faculty Designing Accessible Online Content

Validating Digital Divide Instrument for E-Learning Environment

Mobile Technology in Dental Hygiene Education and Practice

Considerations for Implementation of Technologies in the Classroom- Examples from the Field

EssayJack: Revolutionising Essay Writing and Teaching Through Blended Learning

Assessment of MOOC Learning Objects Based on Student Learning Time for Technical Vocational Education and Training

Design Guidelines for Adult Literacy Mobile Learning Solution in a Blended Learning Context

Motivating Learners over the Long Haul

SCHEDULE - FRIDAY

SESSION ONE

Augmented Reality as a Hybridization of Place
Latin Acquisition in a Blended Secondary Course
Future-Ready Skills
Development of a Collaborative Game for Enhancing the Educational Process in Classroom
Blending On-line Tools for Large and Small Classes in Engineering Courses
Kavala's 6th Graders towards Mastering Mathematics: A Blended Learning Proposal at Disabled
Students' Side

KEYNOTE: DR. MARY DONAHUE

SESSION TWO

Avatars, Wikis and Group Work-Oh,My!
Video Demonstrating for Competency Training
Musical Safe Space
Key Considerations for Blended Learning
Practical Method to Develop Creative Hybrid Courses
Evaluating the Quantity and Quality of Interaction in Online Courses
Google Drive Listening Journals

SESSION THREE

Mindfulness in Education and How to Use Technology to Increase Its Impact in Blended Learning
Online Collaborative Mind-Mapping in Multidisciplinary Research Teams for Eliciting Bottom 40
Transdisciplinary Community Issues

PANELS

AMI SHAH & JANE JI
HOSNI ZAOUALI & WANDA BEDARD

SESSION FOUR

Mobile Context-Aware Learning for Biology in Secondary Education
Using Video as a Support in Face-to-Face Information Technology Courses
Mobile Game-Based Learning and MOOCs in Blended Learning at Higher Educational Settings
Flipping out: Education Strategies for Creating a Transformative Learning Environment

WORKSHOP INFORMATION

BUILD THE BEST eLEARNING EVER WITH ADOBE CAPTIVATE 9
JOE GANCI

Whether you've never used Captivate before, or you've used it for a long time, come learn how to create eLearning in a new way. This one day workshop will have you working hands on the whole time and is perfect for all levels of experience with Captivate 9, with different exercises for each level.

During this workshop, you will build a real eLearning lesson. In the process, you will learn to:

- Identify Captivate's features and where to find them

- Combine text, images, audio, video and animations optimally.

- Engage the learner with interactivity, including free form answers drag-and-drop, smart learning interactions and knowledge checks.

- Apply the Best Tips and Tricks in Captivate

- Track the Learner's Progress using SCORM or xAPI

- Design it so that it works on all devices!

WORKSHOP INFORMATION

USING MOBILE TOOLS TO BUILD ENGAGEMENT IN LARGE CLASSES
MAZIAR MASOUDI

Learn how to keep students engaged and make learning more fun with mobile and online tools. This hands on workshop teaches you about various mobile tools that you will be able to apply in your teaching practice.

During this session, you will configure and use mobile tools. In the process, you will:

- Discover various mobile tools

- Learn to configure them and integrate them into your classroom practice

- Learn various techniques helping you to build student engagement in large classes using blended approach

WORKSHOP INFORMATION

USING VIDEO IN FACE TO FACE TEACHING PRACTICE
TOM TSILIOPOULOS

Whether you're new to video or intermediate and advanced, this workshop is perfect for each level of experience with different exercises for each. This one day workshop will have you working hands on the entire time to build your own sample video lecture.

During this session, you will build a real eLearning lesson using video. In the process, you will learn to:

- Work with various video recording and editing tools

- Use various featured offered by the tools and discover where to find them

- Add subtitles and overlays to videos

- Publish videos to Youtube channel

WORKSHOP INFORMATION

DISCOVERY SESSION: DIGITAL STORYTELLING FOR PROFESSIONAL PRACTICE
JIM KINNEY

This product engagement session will allow attendees to discover, hands-on, how to quickly and easily the free Adobe Spark suite of tools to generate compelling, media-rich assets can provide opportunities for deep and expressive meta-narrative reflections about one's journey in learning.

During this session you will have an opportunity to query Adobe Education Leader, Apple Distinguished Educator Professor Jim Kinney (CADIT) and Jim Babbage, Adobe Senior Solutions Consultant for Education on strategies for integrating these tools and platforms into your classroom.

WORKSHOP INFORMATION

LITERACY UPLIFT – MOBILE TOOLS FOR LANGUAGE LITERACY
PRZEMYSLAW PAWLUK

Przemyslaw Pawluk, **George Brown College**
Agnieszka Palalas, **Athabasca University**
Vandra McQuarrie, **Literacy Nipissing**
Svetlana Lupasco, **TESL Toronto**
Phil Cowcill, **Development Made Simple**
Krista Hildner, **Development Made Simple**

According to the Canadian Learning and Literacy Network (CLLN), 42% of all Canadian adults between age 16 and 65 have low literacy skills. At the same time existing programs are struggling to address and support this population. Mobile technology can provide a support for adult learners.

During this session, attendees will be introduced to mobile tools for language literacy with the focus on the new mobile solution for language literacy learners.

EXHIBITOR INFORMATION

CLAUSEHOUND

Clausehound.com is a cloud-based contract drafting tool for entrepreneurs, early-stage businesses and small businesses alike. Clausehound's $10 per month do-it-yourself legal library hosts tens of thousands of legal clauses, contracts, news or blog articles, lawyer commentary and instructional videos. Our professional version offers a concierge service that assists entrepreneurs with answers to questions while trying to source an agreement.

Clausehound aims to make businesses and lawyers more cost-effective and productive.

ESSAY JACK

Created by award-winning educators, EssayJack is an interactive web platform that pre-structures student essays with text boxes, interactive tips and prompts, split screen composing, and a live word count. It reduces writing anxiety, procrastination, and plagiarism. The entire EssayJack platform can be customized by educators and allows for rubric-based feedback.

FORWARD VISION GAMES

Forward Vision Games builds cloud based financial simulation games to teach foundational financial skills to people in an engaging and impactful way through experiential learning. The company focuses on building financial capacity in indigenous people and First Nation communities.

IAMLEARN

IAmLearn is a membership organization to promote excellence in research, development and application of mobile and contextual learning. The Association wants to stimulate cooperation with national associations and communities on mobile learning.IAmLearn organizes the annual mLearn international conference series and manages the website to collate and disseminate information about new projects, emerging technologies, and teaching resources. The Association members build a future of learning through their research and application of technology in education and training.

EXHIBITOR INFORMATION

LEARNING GLASS SOLUTIONS

The Learning Glass is new technology for creating instructional video content using a transparent white board.

This allows instructors to maintain face-to-face contact with students, which provides a sense of connection with students, resulting in increased engagement and retention of material.

THE LEARNING PARTNERSHIP

In June 2016, The Learning Partnership launched our Virtual Reality Workplace Experiences as a tie-in initiative resource for our Take Our Kids to Work (TOKW) day program to address the perennial question of what kind of experience can we offer to students who have no place to go for the day, as well as for students who live in geographically remote or rural regions.

Utilizing a 4K 360˚ camera that has the capability to produce videos that are interactive via user input and compatible with virtual reality devices, we have produced over 15 videos that covers a wide variety of industry sectors and professions.

OPENPROCTOR

OpenProctor is the first of its kind academic integrity technology that strives to empower instructors with automated tools that promote accountability and academic integrity. It adapts to the individual learning styles, allows learners to maintain full control of their own learning environment, and work at their own pace using tools they like.

PARLAY IDEAS

Parlay is a discussion-based learning tool that allows teachers to track engagement, test for key skills and measure student progress both online and inside the classroom. We want to help student improve their critical thinking, develop their communication skills and foster a willingness to listen to others so they can take these abilities with them into the world.

EXHIBITOR INFORMATION

PEERSCHOLAR

peerScholar is an evidence based self- and peer-assessment web application. In a typical peerScholar activity, students submit their work (written or visual), see the work of their peers and give feedback, and then receive peer feedback on their work with an option to reflect and revise. Students can also engage in self-assessments and reflections at various points in the process.

REACTR

Praktik is an initial alpha prototype for an interactive module for students in various Nursing & Health Science rograms that have courework in measurement of vital signs. The module focuses on blood pressure testing processes, and offers students rich-media learning assets, interactive simulations of use of blood pressure equipment, and integrated self-evaluation modules for interpretation.

SESAME

Sesame enables educators and students to capture and assess all forms of student work, and connect evidence of assessment to learning outcomes.

SPONGELAB

The Enlightened League of Bone Builders is a mysterious new virtual reality experience for the HTC VIVE. In this anatomy-based puzzle game, you find yourself in a Victorian room filled with antiquities and scientific curios. The goal of the game is to build a complete human skeleton out of the pile of bones on the table in front of you.

EXHIBITOR INFORMATION

SPRINGBAY STUDIO

Springbay Studio creates games for educators and parents who champion sustainability, celebrate the beauty of our natural environments and appreciate our planet's complex environmental challenges. iBiome-Wetland: School Edition and iBiome-Ocean provide immersive, game-based learning that introduces kids to an inspiring cross-section of ecological habitats -- and empowers them with the knowledge they need to become true environmental stewards.

VOILA LEARNING

Voila Learning is an Education Design company based in Toronto that specializes in French language instruction. Voila Learning offers many programs including private tutoring, after-school homework clubs, and most notably, online homework help through the Virtual Immersion Campus.

On the Virtual Immersion Campus, students from all across the country interact with live French tutors and receive assistance for their French, Math, Science and Social Studies Homework, or play a game that allows them to practice their spoken French. The Campus uses elements of Intelligent Design and Gamification to appeal to the 21st Century learner and stay up-to-date with the changing face of education.

iABL¹⁷

PAPERS

Becoming a competent person: The Potential of Blended Learning usage inTechnical and Vocational Education (TVET) Student Training Teacher

Ridzwan Che Rus, Irwan Mahazir Ismail and Helmi Norman

ABSTRACT

Becoming a competent person amongst technical and vocational education and training (TVET) student's teacher are crucial in Malaysian context. Our education system especial- ly TVET now in transformation era towards higher economic income nation by 2020. The introduction of Malaysia Vocational Colleges (MVC) thorough TVET transformation need our instructor, lecturer or teacher equipped with knowledge, hard and soft skills and industrial experiences. As a TVET instructor, lecturer or teacher training centre in Universiti Pendidikan Sultan Idris (UPSI) we hope our graduates have a holistic skill with 21st century teaching and learning methodology. The question is, is it possible we integrate blended learning in term of formation skill, knowledge and industrial experiences. Our preliminary research using quantitative methodology and survey design thorough online encompass 20 student's teacher as a respondent. Findings indicate that there are big potential and opportunities to integrate blended leaning which is blend between traditional learning at workshop, classroom and support system using Facebook and WhatsApp. In promoting use of blended learning in TVET we suggest that lecturer use multi-platform and tools for teaching and learning and assessment.

Keywords
Technical and Vocational Education and Training, Blended Learning, Agricultural Educa- tion

INTRODUCTION

Blended learning have changed teaching strategies worldwide specifically in technical and vocation education and training (TVET. Therefore, TVET institutions should revise their strategies to adapt blended learning that helps in achieving their pedagogy goals towards heutagogy. E-learning makes available new educational practices for students, which is not possible in traditional classroom setting, has become a method that need attention (Cigdem, 2015) Teaching and learning (PDP) using blended learning concept in the field of technical and vocational education and training (TVET) has been widely used in almost all public universities in Malaysia. It is to respond to the Ministry of Education (MOE), Ministry of Higher Education Malaysia (MOHE) in general and Universiti Pendidikan Sultan Idris (UPSI) in particular for shaping global culture of human capital. Faculty of Technical and Vocational Education (FPTV), UPSI took up the challenge by making a number of courses taught integrating between meeting face to face in the classroom with independent study online using various mediums such as Facebook, and MyGuru3 the platform Learning Management System (CMS) and a variety of applica- tions other to create cross-interaction between lecturers and students, and students with a student. It is well known that the field of technical and vocational education and training requires students to be trained with the skills to do it yourself using psychomotor. Thus, the use of blended learning is suitable for diversifying methods to attract students to study a course in interactive and free. Figure 1 shows that ministry of higher education Malaysia encouraging higher education system towards hybrid learning.

Figure 1: Redesigning Higher Education
(Minister of Higher Education Malaysia, 2017)

Instructional Design Process and Blended Lessons Plan

Instructional design can be a volatile topic, often characterized by competing theories and differing philosophies. But in practice, value can be drawn from many instructional theories, and in the case of blended learning, different theories apply to different situations (Carman, 2005). As well as in schools, the lecturers provide UPSI need Lesson Plan called Instructional Design (RI). RI is a planning design by lecturer of the course that include all aspects of teaching and learning process in order to achieve the learning outcomes that have been set. The teaching and learning process does not stop just because it integrating activities face to face between lecturers and students as well as students who have been assigned to complete the task. Normally the field of TVET requires delivery of lectures in theory and practical implementation to strengthen the skills learned. There are a range of reasons why blended learning works particularly well for vocational education (Bliuc et al, 2012). For example, vocational learning usually requires learners to apply the abstract knowledge gained in formal educational settings in a workplace context (Butler and Brooker, 1998). One way of achieving this is by integrating workplace-based activities into the educational design, using online resourc- es to do so. To plan implementation of blended learning the following processes should be followed:

Regarding vocational college instructors' individual characteristics, first, there were significant differences between the instructors giving technical courses and the instruc- tors giving non-technical courses in favour of non-technical instructors in terms of perceived ease of use, subjective norm and technological complexity. Non-technical instructors believed that the LMS is easy to use and is not complex, their manager and fellow instructors support them for using LMS. Second, the findings suggest that age does not reflect a significant correlation with instructors' behavioural intention to use the LMS constructs (Cidem & Topcu, 2015). It was recommended that that work-related training (professional development) was required to maintain professional standing and excellence in diverse format. Also, in a bid to deploy blended learning in VET program delivery, VET educators were advised to find out short and long-term training (Machu- mu, Zhu, Sesabo, 2016).

RESEARCH PROBLEM

Previous studies show that there exists a big issue of the skills gap between the skills acquired during training in training institutions and also the skills required by the industry. This problem if not addressed will create problems competency training institutions especially student teacher that provide highly skilled teacher. However, previous researches have not demonstrated competency measurement indicator exists trainer. Information from the instructor, coach and also supervisor can be used to bridge the skills gap. This skills gap will be support thorough blended learning using Facebook and Whatsapp. Learners must be satisfied with the results of their learning experiences in order to remain motivated. A good virtual instructor will do this by providing learners with opportunities to use new skills, such as having them perform handson exercises that simulate their work environment (Carman, 2005)

RESEARCH METHODOLOGY

This study used quantitative design by adapting the methods of survey online. Descriptive information about the effectiveness of the use of Facebook and Whatsapp as a learning support tool is measured using questionnaires and interviews.

Sampling
A total of 20 students Livestock Production courses have been sampled in this study. All 20 students answered questions and interviews.

The instrument
This research used questionnaire and interview protocol for the purposes of data collection.

Implementation of the study
Step 1 - Create a Community of Learning through Group functions (Figure 2). For courses students VAA3013 Livestock Production Bachelor of Education (Agricultural Science) and Education.

Figure 2: Setting up Community of Practice

Step 2 - Use a variety of functions in the FB like sharing posts, add photos and files, making votes in the group and various other functions are added from time to time.

Step 3 - Starting Blended Learning with set of learning outcomes to be achieved. As examples of problem-based learning continues to be carried out as follows:
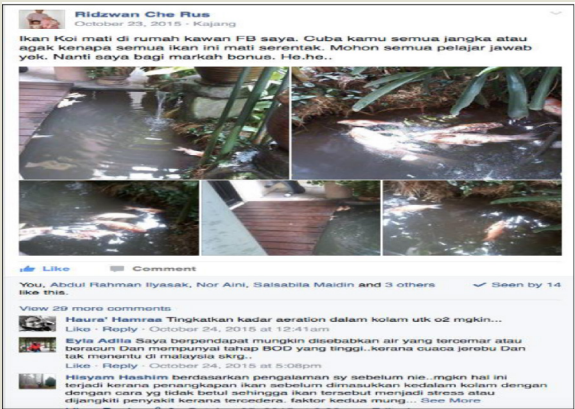
Figure 3: Case Scenario problem based learning

Figure 3: Case Scenario problem based learning

FINDINGS

Demographic
Demographic findings show that there are 20 students from 17 female trainees while there were 3 male trainees. Table 1 shows the following information:

Gender	Yes
Male	3
Female	17
Total	20

The findings showed that 94 percent of students strongly agreed that blended learning improve their understanding of the topic. Table 1 shows the findings of the review.

Item	Yes	No
I agree that blended learning was useful to help me understand more	19	1
I agree that blended learning was meaningful in this course	18	2
I agree that blended learning help me a lot in learning	20	0
	94%	

Data from interview explained details why blended learning help them a lot. Respondent A when we ask what their opinion towards integrating and blend mix mode of instruction said:

I can interact with my friend in Whatsapp and Facebook free and easy. We can discuss in the comment

This statement support by respondent B. He Said:

Livestock management course was very interactive because lecturer manage to blend face to face teaching in the class and sharing using Facebook

DISCUSSIONS

The results showed that the students agree that teaching and learning in a blended support their learning process. This finding is consistent with a blended learning objectives which is to increase interest and engagement in the classroom and outside the classroom. These findings related in a bid to deploy blended learning in VET program delivery, VET educators were advised to find out short and long-term training (Machumu, Zhu, Sesabo, 2016). Findings also showed that vocational learning usually requires learners to apply the abstract knowledge gained in formal educational settings in a knowledge and practical skills.

DISCUSSIONS

The results showed that the students agree that teaching and learning in a blended support their learning process. This finding is consistent with a blended learning objec- tives which is to increase interest and engagement in the classroom and outside the classroom. These findings related in a bid to deploy blended learning in VET program delivery, VET educators were advised to find out short and long-term training (Machumu, Zhu, Sesabo, 2016). Findings also showed that vocational learning usually requires learners to apply the abstract knowledge gained in formal educational settings in a knowledge and practical skills.

CONCLUSIONS

The use of blended learning methods in learning and teaching in the field of technical and vocational training can be done. It has added value in terms of practical and theory linking together in pursuit and also can be used as a learning support tool that can be accessed at anytime and anywhere.
Thank you to the management of Universiti Pendidikan Sultan Idris to award traveling grant for this conference.

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PAPERS

Blending On-line Tools in Engineering Courses
Feza Kerestecioğlu and Yasemin Bayyurt

ABSTRACT

On-line course materials such as videos, web pages and so on are generally assumed to be more effective with large classes as they provide a unidirectional medium of instruction. On the other hand, some on-line tools, such as, discussion boards and forums that aim to facilitate feedback between students and instructors outside the classroom environment seem to be useful if the class size is small. In this paper, we describe how we used a blended teaching and learning approach to improve learning in a medium size university class. It is a junior year undergraduate course offered in the Department of Electrical- Electronics Engineering at a foundation university in Turkey. There are 44 students in the class. The majority of students are familiar with the Blackboard Learn® platform used mostly in mass courses where the class size is over 200. The on-line component of the present course is making use of narrated videos of slide shows used in the lectures; short videos other than the videos of the slide shows that are publicly available on the Internet; weekly assignments based on course content and discussions on forums provided in the online learning system. In this paper, we describe our course design and its rationale in detail. We also present students' reflections on online and face-to-face components of the course content. The preliminary results of the study show that students seem to be involved in the course more when they have access to learning materials in different media.

INTRODUCTION

The teaching learning environment is important for successful outcomes in an educational setting. Advances and innovations in communication technologies enable instructors to shift from classical face to face instruction to blended learning that gives more autonomy to students in taking the responsibility for their own learning. In other words, blended (or hybrid) learning involves both face-to-face and online teaching and learning environments for students and instructors. In blended teaching and learning environments, both instructors and students can benefit from the best features of these two different media of instruction. As Ogrenci (2013, p.139) indicates blended learning gives the student "... the opportunity to advance in their own pace using e-learning techniques where the content can be delivered electronically (mostly online). In the classroom, on the other hand, activities are carried out that cannot be achieved in the online and/or digital environment." In general, after completing the weekly face-to-face component of the hybrid course, the students can complete the online requirements of the course (e.g. recorded lectures, activities, forum discussions, assignments and so on) anytime anywhere via using their personal computers and mobile devices (e.g. smart phones, tablets and so on). Horn and Staker (2015, p. 10) also state that blended learning enables students to "... develop a sense of agency and ownership for their progress and a subsequent ability to guide their learning." In sum, blended learning gives the students the responsibility to monitor their own learning process.

Besides its benefits such as personalizing learning and giving the students many chances to master the course materials through different educational media – i.e., face-to-face and online, blended learning also has some challenges for both students and instructors (Carman, 2005; Kintu, Zhu & Kagambe, 2017; Ocak, 2011; Owston, York & Murtha, 2013; Perez- Marin, Santacruz & Gomez, 2012; Shea, Li & Pickett, 2006; Singh, 2003;). As Kintu, Zhu and Kagambe (2017, p. 1) argue the effectiveness of blended learning can be challenged by a number of factors that instructors might not foresee while designing the face-to-face and online components of the course. As Hofmann (2014) indicates one of the challenges that both students and instructors may encounter is to what extent the students will use and benefit from the materials that are provided in the online component of the course. In addition, another challenge may be the technological difficulties that users may face while using technological devices to access the online component of the course materials. When confronted with such technological challenges and difficulties the students may lose their motivation towards the course content and drop the course all together. Although there can be shortcomings of use of blended teaching and learning, its major advantage is giving the students many chances to visit the online course content independent of restrictions that might be brought by limited time and space in traditional face-to-face component of the course. As Ogrenci (2013) indicates this may still be problematic for some students who need immediate feedback from their instructors that cannot be substituted by any instructional online tool. He also states that to date there is no agreed-upon instructional design for blended learning environments for maximum usefulness and productivity. In addition, the online teaching and learning environments are usually the online learning management or course management systems that are provided by the institutions that the instructors and students can easily access wherever they are. As Horn and Staker (2015) emphasize providing the online teaching and learning environments does not necessarily guarantee the maximum student-centered learning to take place, however, more research is needed to increase the benefits of such learning environments blended with face-to-face ones in different educational settings all around the world.

In this paper, we describe how we designed and implemented a blended learning course for engineering students studying at a foundation university in Turkey – that is, Kadir Has University. The first author of this paper is the instructor of the course. The rest of the paper consists of three sections. In the first section, the context of the study and the course design are explained in detail. In the second section, the preliminary results of the implementation of the course are reported. In the conclusion section, future directions, limitations and pedagogical implications of the study are presented.

CASE DESCRIPTION

In this section, we present the background information about the course, the innovative blended course design and the preliminary results of the implementation of this innovative instructional design.

COURSE AND CURRICULUM

In most electrical-electronics engineering undergraduate curricula students are exposed to science and mathematics courses as well as courses that comprise fundamentals of electric circuits in their first two years of study. It is the third year of the curriculum that is composed of engineering core courses when they are introduced to different areas of electrical and electronics engineering. Hence, a course in control systems is one of the indispensable blocks of an undergraduate curriculum. It is an interdisciplinary subject. In fact, courses with similar names and equivalent content can commonly be found in mechanical, computer or chemical engineering curricula. In this study, we collect data from

EE 352 Control Systems course that is taught to third year undergraduate students studying in the Department of Electrical-Electronics Engineering at Kadir Has University, Istanbul. The medium of instruction at Kadir Has University is in English. EE 352 requires a background on mathematics and physics, especially those on differential equations and matrix algebra. The objective of the course is to give students the ability of modeling and analyzing dynamical systems using this background. A catalogue form that contains the list of learning outcomes and other details about the course can be obtained from the online course catalogue of the university (http://bologna2. khas.edu.tr/ders/50002978/program/50000566).

HISTORICAL NOTES

The first author has been teaching EE 352 at Kadir Has University for 14 years. Initially, the teaching method of this course was quite traditional. That is, it was composed of weekly lectures given by the course instructor – i.e., the first author. The course instructor rarely referred to audio-visual resources on the Internet during the lectures. The grading was based on homework assignments, two midterm exams and a final exam.

The degradation of students' motivation, attendance rate, and therefore, performance, as well as plagiarism attempts in homework assignments increased drastically throughout the years. In addition, the students were not successful despite their efforts for cheating and plagiarizing from each other's assignments. Two years ago, in order to improve students' performance in the course, homework assignments were replaced by graded classwork. That is, during the class hours, students were first exposed to the course content via their instructor's lecture and problem solving sessions. Then the instructor asked them to work in pairs and solve an exercise on the topic that has been presented to them in the previous session. The expectations of the instructor in conducting the lectures this way were threefold:

· It would increase the popularity of lectures among students
· The students would be more motivated towards developing an understanding
  of the course content by focusing on the lecture.
· Pairing the students for the in –call activity would give the students a chance for
  the one, who understood the lecture less than her/his teammate, to make up
  for the knowledge gap.

During the last two years, it was observed that this technique had some positive effect on the perfor-mance of the students. Namely, the weighted average of all graded work, which include midterm and final exams and the classwork, has increased about 10/100 points. Nevertheless, the observation of the instructor was that since the homework is gone, the students delimited their learning process to the lectures. Thus, there must be still some room for improvement of the students' performances by motivating them for out-of-lecture activities. A blended approach is adopted for this purpose in this course during 2017 Fall term.

Current mode of teaching Online tools offer handy opportunities for including out-of-lecture activities in the teaching process. In this section, we present the implementation of a hybrid course we designed for the purposes of this study. In this blended course, in addition to face-to-face lectures, asynchro-nous, yet interactive tools are used. These include, videos, an online discussion forum and on-line homework assignments and their submissions. The interaction is established via Blackboard Learn® platform, which is used by many faculty members at Kadir Has University for teaching support.

The online part of the course is based on two activities. In the first one, the students can watch a course video. Rather than being a direct video recording of a lecture in the class or elsewhere, these videos are animated PowerPoint shows which are narrated by the instructor. After the completion of each chapter of the course in the class, the videos are made accessible to the students. The students can have access to the handouts of the in-class PowerPoint presentations before the lectures. They are expected to bring these PowerPoint presentations to the class. These handouts may be of limited help to them in preparing for the exams and for in-class assignments if they miss a lecture. On the other hand, the narrated PowerPoint videos refresh the students' memories and offer a quite useful summary for those who missed the class. At present, four of these recordings are now available on YouTube through these links:

https://www.youtube.com/watch?v=qZHUvQ7vXX0 (Introduction)
https://www.youtube.com/watch?v=Wm7G1GVSuAI (Review of Laplace Transform)
https://www.youtube.com/watch?v=jGa8l7P8tPw (Mathematical Models of Dynamic Systems)
https://www.youtube.com/watch?v=9qCZNxapRV0 (Transient Response Analysis)

The duration of these videos vary between 20 to 50 minutes depending on the length of the chapter. Hence, every two weeks or so, the students has to watch the course video and submit a homework assignment through the Blackboard Learn® platform. In a typical homework assignment, the students are required to write one or two textbook exercises and to providing the solution of these exercises. These assignments are submitted via using SafeAssign facility of the Blackboard Learn® platform, and they are checked for plagiarism.

The second activity involves watching videos, too. These videos are shorter public YouTube videos that involve either an application of a recently taught subject or a short lecture about it embracing an alternative point of view. After watching these videos the students are asked to answer a question in an online forum. The aim of this activity is enabling the students to see the relationship between content presented these short videos and the topics/problems they learned in their classes. They do this in an interactive discussion forum on e-learning platform of the course where the instructor as well other students can join in the conversation and present their opinions about the issues raised during the short videos and their connection to the course content. Interestingly, before replying the question, many students preferred or probably felt obliged to share a short summary of the video or their own reflections about it in the online forum.

The instructor replied to all of the contributions in the online forum to give each student feedback on their uptake of the materials; to correct any misunderstandings/misinterpretations of the course materials and videos; and/or to encourage the students to participate in the discussion forums and reply the questions if they did not already do so. The videos that are linked to the course materials can reached through the following links:

https://www.youtube.com/watch?v=vB7AA7B9hTI
(Project Apollo: "Lunar Orbit Rendezvous" 1968 NASA Mission Planning and Analysis Division)

https://www.youtube.com/watch?v=kbp9qWS-Bsk
https://www.youtube.com/watch?v=8Pgd-D00H0U
(Laplace Transform to Solve a Differential Equation, Ex 1)

https://www.youtube.com/watch?v=jOiOO7qloXQ
(Suspensions – Explained)

Each of these two activities and classwork constitute 5% of the overall course grade adding up to 15% of overall passing score of each student.

PRELIMINARY RESULTS

Student Profile

The above blending method is applied in 2017 Spring term in a class of 44 students. The majority of the student population (37) is taking the course for the first time. There are seven students repeating the course.

In the first lecture student are given user experience questionnaire. 33 students participated in this questionnaire. The results of the questionnaire are summarized in Table 1.

All of the students are native speakers of Turkish, who speak English as a foreign language. As already mentioned, in the Faculty of Engineering and Natural Sciences at Kadir Has University, the medium of instruction is English.

The majority of students prefers their textbook in electronic form alone or as accompanied by printed books. Most of them has taken at least one online course before they came to this class. The Turkish Higher Education Council requires all universities in Turkey to offer four compulsory mass courses – i.e., Turkish Language and Republican History. These has taken at least one online course before they came to this class. The Turkish Higher Education Council requires all universities in Turkey to offer four compulsory mass courses – i.e., Turkish Language and Republican History. These courses are offered in Turkish. In addition, Kadir Has University offers these courses in an online platform via use of Blackbord Learn® platform. This shows that on average the students are exposed to an online course at least three times before they come to this class. Very few of students has an online course experience outside the university.

Eight students stated that they took a blended course. Nevertheless, the courses they mentioned could not be considered as blended, since Blackboard is used in these courses only to post lecture notes and homework assignments. Interestingly, no one indicated that they have attended a blended freshman-year compulsory course that many of them must have already passed! This clearly shows that the students are not aware of the fact that they have already attended blended courses due to their unfamiliarity with blended teaching/learning designs and applications.

Native speakers of Turkish		33
Speakers of English as a foreign language		33
Speakers of other languages as a foreign language		11
	printed material	10
Prefers textbooks as	electronic material	7
	both, printed and electronic	16
Took an on-line course		28
Average number of online course involved		2.8
Took an online course out of the university		3
Took a blended course before		8

Table 1. Student Profile

Videos	Accessing Students	Total Access Times	Homework Submitted
Introduction	40	172	27
Review of Laplace Transform	34	107	23
Mathematical Models of Dynamic Systems	29	81	20
Transient Response Analysis	21	41	

Table 2. Course video access through Blackboard

Thread	Contributing students	Student posts	Instructor posts
Trajectory planning	24	32	29
Solving differential equations	22	27	16
Suspension systems	8	8	9

Table 3. Discussion board posting statistics

Participation and Reflections

Up to now 4 course videos has been published. Table 2 shows the hits they got through the link on the Blackboard platform. It is important to note that these videos may have been accessed more than the number given in Table 3 as some students had already subscribed to the video channel in YouTube. In other words, if they are already subscribed to the video channel, they may know about how to publish videos without visiting Blackboard Learn® system. All of the students who watched the online lectures, attempted to do the related homework assignment on the online platform system. The relative lower statistics of the last video is partly due fact that the deadline of the related homework was not over when we submitted this paper for publication in the proceedings. In general, a decrease in the access statistics of the Blackboard online platform was observed during the data collection period for the first part of the study. The forum discussions are conducted over three threads up to now. Blackboard statistics show that 28 students participated in at least one thread. The contribution statistics can be found in Table 3. A decrease in the number of discussion board participants was seen during the first data collection phase. Several students found these videos very useful in helping them to understand the course content. They made use of these videos especially before the exams. Since this paper presents preliminary results of this ongoing study and the qualitative component of the study has not been completed yet, we will not report the students' perspectives on online course materials anymore.

CONCLUSIONS

In this paper, we presented the implementation of a new instructional design adopting a blended teaching and learning methodology in an engineering course at a foundation university – i.e., Kadir Has University - in Turkey. The authors shared their innovative experiment on a course that the first author has been teaching for more than a decade in his university. The preliminary analysis of the implementation of this innovative instructional design showed that a blended teaching and learning instructional model at a university class can be beneficial for the students more than a face-to-face traditional class. In blended teaching and learning classes, the instructors can follow their students' progress closely in both face-to-face and online components of course. It is also more engaging for the students to listen to lectures in the face-to- face component of the course and then access the same lectures in the online Blackboard Learn® platform. The following quotes from students' responses to the survey questions reveal their opinions on the implementation of this innovative instructional design supports these views.

"I find the videos very useful. I use them while preparing for the exam." (Student A)
"We can wind and rewind the sections we want to listen to over and over again." (Student B)
"We can listen to the lectures that we missed thanks to the videos in the Blackboard Learn platform." (Student C).

In sum, we can confirm that the students who participated in this study found the implementation of a blended learning approach in their engineering course very useful. Although this is the case, there are also those students who are sceptic about the use of a blended teaching and learning instructional design in engineering classrooms. In the second section of the implementation of this study we will need to compare the views of the skeptical students with those students who find a blended learning applications useful. We also need to explore how much the course instructor interacts with the students to make sure that the learners benefit from online learning materials in various ways. In addition, in a future study, the opinions of the instructors should be included to see if there is a mismatch between the instructors and students' expectations from the course.

There are some limitations of the study. Firstly, instructors and students may not be familiar with the design and implementation of a blended learning instructional environment. This may cause some confusion for both groups. In order to overcome this problem, they might be given prior training or orientation before they start classes. Secondly, the instructors should be aware of the fact that some of the students might have difficulty in adapting to both face-to-face and online components of the course. They might get lost. The instructors should spend extra time on the online component of the course to keep students engaged with it. This can be demanding on the part of the course instructors and they may have difficulty in following the other students' progress effectively while paying attention to the ones who are having difficulty with the hybridity of the course content. Finally, this study is based on an engineering course offered one semester per academic year in one section, therefore, its results cannot be generalized to the whole population of students in similar courses in the department.

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iABL 17

PAPERS

Design Principles for an Adult Literacy Mobile Learning Solution in a Blended Learning Context

Agnieszka Palalas, Norine Wark and Przemyslaw Pawluk

ABSTRACT

Recognizing the risks of pervasive low adult literacy levels amongst Canadians and globally, our research project aims to design a mobile learning solution to support literacy training for adult learners in a blended learning context. This mobile solution will equip them with language and digital literacy skills needed to thrive in their communities and workplaces. This paper offers preliminary results of this research project investigating design principles for an adult literacy mobile learning solution. It provides definitions for design principles and guidelines. The paper also identifies, briefly discusses, and provides examples of the three key themes from the reviewed literature and interviews with experts during the Informed Exploration process in Phase 1 of this project.

INTRODUCTION

According to the Canadian Learning and Literacy Network (CLLN, 2017), 42% of all Canadian adults between the ages of 16 and 65 have low literacy skills. Unsurprisingly, new immigrants to Canada have the highest rates of low English language literacy (61%; Statistics Canada, 2012). Virtually unchanged rates among established immigrants (60%; Statistics Canada, 2012) indicate that existing programs may need to be redesigned to support this population. To exacerbate the problem, only 5-10% of eligible adults register in literacy upgrade programs due to various barriers that learners encounter, including time constraints and accessibility. Low literacy skills limit these Canadians' abilities to effectively participate in the digital economy or to realize their full potential in civic and personal lives. Recognizing the risks of pervasive low literacy levels amongst Canadians, the Literacy Uplift project intends to leverage the affordances of mobile learning (or m-learning) in order to promote and support literacy training for such learners.

This SSHRC-funded research project is being conducted in partnership with George Brown College, TESL Toronto, Literacy Nipissing, Development Made Simple, and Athabasca University. It is primarily aimed at Canadian adults (19 to 65 years old) from diverse cultural and educational backgrounds, who are either ESL or first-language literacy learners testing below Level 3 (using PIAAC Test; OECD, 2017), and their literacy instructors.

One of the purposes of the research process is to develop a set of effective m-learning literacy solution design principles that can equip Canadian adult first and second language English learners with the language and digital literacy skills needed to thrive in Canadian communities and workplaces. Based on these principles, a prototype of an effective m-learning solution will be produced and refined through iterations of design, development, feedback collection, and evaluation. Since low literacy skills are pervasive not only in Canada, but across the globe (UIS, 2016), the list of design principles and its instantiation in the form of the Literacy Uplift app will be adaptable to other similar literacy learning contexts as well.

Introducing a Mobile Literacy Solution: The Literacy Uplift App

Based on the preliminary needs analysis, literature review, and analysis of similar projects, the research team has determined that a m-learning approach is appropriate to promote learners' engagement resulting in increasing literacy to at least Level 3 (recognized as sufficient by Employment and Development Canada; Montigny & Jones, 1990) in order to facilitate their success in Canadian socio-cultural and workplace environments. This m-learning solution targets learners who lack reading and writing skills in English, regardless of their first language and any other language proficiency. It aims to promote the development of basic abilities in typing and printing, understanding sound-sym-bol correspondence, and reading survival words. Its focus is on the development of alphanumeric perceptual knowledge, word recognition, word knowledge (vocabulary), sentence processing, and passage fluency. The solution is being designed for a variety of learners' own mobile devices (a cross-platform solution).

Learners will be able to use the Literacy Uplift app on their own time outside of the classroom. The app should be introduced to the learner in the formal classroom and necessary support should be offered to initiate students' interaction with the app, hence setting them up for success. This blended learning environment will combine the in-class introduction to the solution with the app, transforming competencies and skills practiced in the classroom into sustained capabilities (Hase & Kenyon, 2001, 2013).

With this brief overview of the problem at hand and the intended mobile literacy solution in mind, attention now turns to the research design employed for this project

Research Design
This section details the objectives, research questions, methodology, and data collection methods for this project.
Objectives.
The key objectives of the Literacy Uplift research project are
:
1. Building knowledge through development of design principles and guidelines for an effective m-learning literacy solution;
2. Prototyping an effective m-learning literacy solution based on the principles and guidelines;
3. Providing technology and literacy training to participating students; and
4. Increasing accessibility of pedagogical design principles and guidelines to academic and non-aca-demic audiences.

Research questions.
The guiding research questions are:
1. What design principles and guidelines best facilitate the development of adult literacy skills in English?
2. How can these principles and guidelines be incorporated into a viable mobile application for adult literacy learners?

The Design-Based Research (DBR) methodology described in the following section has been chosen to address these questions.

Methodology: Design-Based Research.
This Design-Based Research (DBR; Barab & Squire, 2004; Design-Based Research Collective, 2003; Herrington, McKenney, Reeves, & Oliver, 2007; McKenney, Nieveen, & van den Akker, 2006; Palalas, 2012; Palalas et al., 2015; Reeves, 2006) study employs an iterative approach, allowing its results to reflect ongoing feedback from Ontario-based literacy instructors and student participants (literacy learners), m-learning design experts and m-learning developers from around the globe, and the George Brown College (GBC) Science and Communication Technology (SCT) students recruited to help develop and test the mobile app. This multi-cycle DBR approach (a modified version of the ILDF model proposed by Bannan, 2009) is comprised of three phases: (1) Informed Exploration, (2) Enact-ment, and (3) Evaluation (local impact). Each of the phases goes through multiple iterations, allowing for the refinement of the design and collection of up-to-date feedback.
.

Quantitative and qualitative data from pre- and post-test surveys, focus group discussions, and interviews from the respondent groups identified above are blended with literature reviews, in-situ observations, and researchers' observation and reflection notes through the three overlapping phases of the study.

This paper reports on findings collected and analyzed as part of the informed exploration of the first phase of this study. The results will be used to provide a solid foundation for the design, development, and evaluation activities in subsequent phases and iterations of the research process.

Informed Exploration (Phase 1)
One of the key research activities in this initial phase was to identify existing pedagogical and techno-logical design principles within the academic community, especially in relation to adult literacy and m-learning interventions. Two exploration strategies were employed independently and then merged to yield an initial set of design principles. The first strategy involved the review of selected literature and the second focused upon open-ended interviews with experts. These strategies and their synthesized results are discussed below.

Literature review.
The initial literature selected for review was purposely chosen by research team members who are experts in the fields of language learning, adult literacy, m-learning, and mobile technology for learning. Exploration of this literature resulted in the inclusion of some secondary sources as well. Fifty-five of the multimedia artifacts investigated contained references to, or lists of either pedagogical, technological, or both forms of design principles and guidelines. (A complete list of this literature is found in Appendix A.)
Defining design principles and guidelines.
An analysis of this initial literature review indicated that there was a need to clarify definitions for the terms, design principles and design guidelines. This second step began with a search of design-based research and technology-based literature from team members' libraries and related secondary sources for these definitions. Common themes and outliers among the definitions were then identified and coded independently by team members using NVIVO Pro 11 data analysis software. The coding resulted in an initial rough draft definition for the terms by each team member. Lastly, codes and rough drafts were shared, discussed, and synthesized to yield the following definitions.
Design principles are broad, high-level, generalized, universal recommendations that are based upon empirically-tested theories that can be applied across various contexts. Design principles:

1. Define and communicate key dimensions of educational design;
2. Consist of two interdependent dimensions:
a. Educational intervention characteristics (what the solution should look like – its content, appearance, and functionality), and
b. Procedures (how to develop that solution);
3. Are replicable. They are intended to be interpreted and adapted to suit local conditions and contexts; and are
4. Dynamic, flexible, and renewable. Through iterative cycles of interpretation, adaption, and practical application processes, new knowledge and understanding are defined which, in turn, regenerate existing design principles.

In contrast, design guidelines are defined as specific, practical, and testable criteria for how to best achieve design principles within particular contexts. Design guidelines are often expressed as statements of what should or should not be included in a successful design.

It is these definitions of design principles and guidelines that are used by the team to not only guide the rest of the study, but also to assist in re-sorting the initial literature review to distill a preliminary list of key design principles.

Identifying design principles for mobile-assisted adult literacy app.
The third step in the literature review process began by analyzing and re-organizing the lists of principles and guidelines found in the literature to align with the teams' definitions of principles and guidelines. Once this was done, pedagogical and technological principles were coded and distilled into a preliminary set of key literature-based principles. These were then compared to the primary principles identified from interviews with experts.

Interviews with experts.
Interviews with experts occurred simultaneously with the literature review in Phase 1. The interviews were conducted with seven world-renown experts in m-learning design, language learning, or both. The initial open-ended question asked was, "What are the key characteristics of an effective m-learning application for the described purpose and target audience?" The responses were coded thematically, synthesized, and compared to the literature review results.

Although the literature review covered a broad range of contexts while the interviews with experts were contextualized by the guiding question and a detailed description of the purpose and audience, these two independent investigations yielded surprisingly similar results. The analysis of these similarities led to the distillation of three primary design themes: mobility, learner-determined, and context, and their related principles. Each is discussed in greater detail below.

Key design principles for mobile-assisted adult literacy app.
Mobility: Design for the mobile learner.
The key theme that emerged from the analysis of the most frequent codes was that of Mobility. The corresponding design principle, Design for mobile learners, reflects recommendations from the experts and literature to consider the mobility of the learner as the central guiding principle and measuring stick in their design decisions. With the mobile learner as the pivotal element of the design, it is crucial to first understand and subsequently address distinctive behaviours, actions, preferences, and attitudes of learners (that are implicit to the learner-determined theme below) as they move across physical and virtual spaces. To optimize the mobility of the learner, the m-learning content and services should be accessible through a variety of platforms and devices. This allows the learner to start a learning episode on one device and continue on another; for instance, taking pictures of objects in his or her surroundings using a personal phone, then commenting on other learners' photos through a laptop, only to come back to the personal device to read others' comments while heading to work on the bus. Such a device-agnostic design offers more flexibility and continuity of learning as mobile learners employ digital technologies to access resources and interact with content, as well as connect, communicate, and collaborate with others across temporal and physical spaces.

While learning across multiple contexts (Crompton, 2014; Pegrum, 2014; Sharples, Taylor, & Vavoula, 2007), the mobile learner should be motivated to interact with the mobile application and engage in sustained practice. To enable seamless learning across time and various physical and social settings, the application should, according to one of the interview respondents, "ensure that the learning content and activities are segmented in a way that the learner can come and go without deterring the learning process or […] having to deal with technological hurdles."

As with the interviews, the central notion in the reviewed literature was that the design of a mobile learning solution needs to reflect the mobility of the learner. To illustrate, such a design needs to factor in the contextual dynamics of location, locomotion, timing, intimacy, and device exploitation in relation to learner mobility (Gualtieri, 2011).

Learner-determined: Respond to the learner.
As indicated by the first design principle above, the learner is the key agent in the learning equation. Analysis of the reviewed literature provided three views of the learner's role in literacy learning. The one view was learner-centric. This view focused upon learner needs or goals, although the locus of control over most aspects of learning was typically retained by the instructor. Some literature promoted the concept of learner-directed learning (Knowles, 1970), wherein the learner might control the learning context, but usually the instructor retained control over the learning process and task. However, the most prevalent theme that emerged was that of learner-determined learning, in which the learner controlled the learning task, process, and learning context (Hase & Keynon, 2001, 2013). Hence, the second key theme, Learner-determined, and its design principle, Respond to the learner.

The prevalent message found in the literature review and the interviews was "ask the learner, listen to the learner, and respond to the learner's wants, needs, and interests." In brief, design with the learner, for the learner, because of the learner. Terms such as learner-empowerment, learner choice, and learner control were frequently used in discussions on development of learning plans and learning delivery. For example, in their study incorporating mobile-assisted language learning (MALL), Cheon, Lee, Crooks, and Song (2012) learned that students must feel empowered with confidence to adopt mobile technologies for learning. In their empirical study on students with learning disabilities, Zheng, Gaumer Erickson, Kingston, and Noonan (2014) concluded that the learner's level of self-determination predicts academic achievement.

Finally, Arús-Hita and Rodríguez-Arancón (2014) suggested that learning is more effective when learners are involved in deciding "the learning pace, sequence, mode of instruction, and content" (p. 3). Arús-Hita and Rodríguez-Arancón also point out that promoting learner autonomy enables learners to learn outside of limited class time. This not only identifies the value of learner autonomy, but also highlights the importance of the mobile learner's dynamic, holistic, individualized learning context.

Context: Integrate environmental affordances in the design.
The significance of context in mobile learning has been highlighted in literature on m-learning since its early days, so it not surprising that Context has also emerged as the third major theme in our data analysis. According to our findings, the notion of context includes linguistic, personal (including the learner's prior experience and history), technological, and situational dimensions, with the latter being the external situational context of the learning event. According to our findings, this situational context comprises the following factors: setting (time, place, and environmental conditions), participants, and technological circumstances, as well as socio-cultural norms of interaction and behaviour.

For the purpose of this short paper, we shall focus on the dimension of context that earned the highest relative frequency in our analysis, namely the authentic context of the immediate environment (physical or virtual). The following design principle stemmed from the analysis: Integrate environmental affordances in the design. It is of utmost importance to design content and services that are relevant to the learner's immediate surroundings and to employ perceived environmental affordances. In other words, leverage the wealth of information offered in the given context.

Before moving on, it is critical to define what is meant by the term, affordance. The psychologist, Gibson (1979) first defined affordance as the inter-relationship between an organism and an object, rather than a property of the organism or an object in the environment (van Lier, 2000). According to van Lier, "What becomes an affordance depends upon what the organism does, what it wants, and what is useful for it" (p. 252). For example, a mobile phone may serve as a traditional phone for one user, a navigational device for another user, and a camera for a third user. "(I)ts properties do not change; it is just that different properties are perceived and acted upon by different organisms" (van Lier, 2000, p. 252).

The knowledge and understanding of the context and its affordances are necessary to provide meaningful situated practice based on interaction with the authentic learning content and activities appearing in the learner's surroundings.

Concepts such as relevancy, adaptation, and personalization identified in the interviews and literature review are interdependent, as they refer to adjusting the content and learning activities to the learner's internal and external context, allowing varying degrees of freedom, learner/system control, structure and progression, task types, themes and topics, support and scaffolding, feedback, and peer interaction, as well as the layout and levels of difficulty. For example, in the reviewed literature, Quinn (2011) recommends using navigable and adaptable pedagogy and intelligent technical architecture that incorporates geo-location and calendar features to tap into local contexts in order to deliver timely, relevant, and meaningful learning experiences.

CONCLUSION
This paper offers pre
liminary definitions for design principles and guidelines. As way of summary, design principles are broad, high-level, generalized, universal principles, based upon empirically-tested theories that can be applied across various contexts. They define and communicate key dimensions of educational design. They consist of interdependent educational intervention characteristics and procedures. Design principles are replicable, dynamic, flexible, and renewable in nature. In contrast, guidelines are specific, practical, and testable statements of how best to achieve design principles within specific contexts. These guidelines typically state what should or should not be included in a successful design.

The paper also identifies, briefly discusses, and provides examples of the three key themes from the reviewed literature and interviews with experts during the Informed Exploration process in Phase 1 of this project. These three broad design themes and their related design principles, in order of priority, starting with the most foundational one, are:
1.   Mobility: Design for the mobile learner,
2.   Learner-determined: Respond to the learner, and
3.   Context: Integrate environmental affordances in the design.

While a set of secondary interrelated design principles were also identified during the informed exploration of Phase 1, presentation of these secondary principles is beyond the scope of this short paper. Discussion of these secondary principles, as well as greater elaboration on the three key themes and related principles presented herein will be reserved for a future, more detailed presentation.

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APPENDIX A: PHASE 1 LITERATURE REVIEW REFERENCE LIST

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PAPERS

Development of a Collaborative Game for Enhancing the Educational Process in Classroom

Oldi Stefandi, Avgoustos Tsinakos, and Persefoni Karamanoli

ABSTRACT

Collaborative learning combined with augmented reality applications can create a pleasant environment in interaction with the school material (e.g. school book), in order to stimulate learning via the discovery of knowledge. Since the use of these technologies is at an early stage, this paper aims to highlight the potential of cooperativity in conjunction with augmented reality technologies and mobile devices. For doing so, an application was created based on Geology-Geography courses of the 1st grade of high school. The main objective of this paper is a brief description of collaborative learning theory and the technologies that are related to mobile devices and the presentation of the application's design and development procedure. The constructed application divides the class into groups and students collaborate via a quiz game for achieving common goals, with the assistance of augmented reality applications. Eventually, teachers score the results of each team and each student and uploads the grades, so that everyone can have access.

INTRODUCTION

The rapid evolution of technology and the competitive price from the construction Information Technologies & Communications (ITC) companies have made an undeniable fact the use of computers and mobile devices in everyday life (Glaroudis, 2012). These technologies are exercising now great interest in education with the countless possibilities and advantages they can offer to both students and instructors. Thereby, innovations in ICTs are gaining more and more interest of researchers because learning can take place through mobile devices without space or time limitations (Vavoula & Karagiannidis, 2005), since every educational method, which takes place either in the classroom or through advanced educational methods is designed for enhancing learning (Makridou-Mpousiou, Giouvnakis, Samara, & Tachmatzidou, 2005).

The use of mobile devices in the learning process, along with the existence of appropriate applications involving Collaborative games combined with augmented reality applications as a training environment, will maintain the characteristics that render them attractive to the learners. Consequently this may increase their interest for interacting with the textbook and acquiring knowledge either consciously or subconsciously. Therefore, the activation of the learner is a fundamental condition for achieving positive learning outcomes (Mparmpatsis, Oikonomou, Papamagana, & Zozas, 2010).

Purpose of this paper is the development of a collaborative game via mobile devices which, in combination with augmented reality applications, will divide the class into groups of three or four persons that will compete with each other in order to achieve goals. The scenarios of achieving objectives will require interaction with educational materials (eg schoolbook) and the performance of each group will be visible to every student.

Educational Technology

In the 1960s was introduced for the first time, the term educational technology and since then the ways of determining the concept have changed, however, a definition given by the Association of Educational Communications and Technology (AECT) based in the USA for Educational Technology is: "A systematic process involving materials, theories, human resources and knowledge for solving educational problems and improve learning". Hence, the term educational technology does not represent something new, because the search of ways to improve learning dates several years back (Vrasidas, Zempilas, & Petrou, 2005). Teachers usually, by "instructional technology" mean electronic equipment but researchers point out that the term should be changed over time by following the flow of the evolution of the available resources (Mountridou, 2008).

Through years several technologies, like slides, films, PCs, internet or laptops have been used for educational purposes. The emergence of laptops (Laptop, Netbook, Tablet) and the evolution of third (3G) and fourth (4G) generation mobile devices had as main objective the development of mobile services "anywhere" and "anytime" that offer to their users multimedia services with high transmission rate (Glaroudis, 2012). The use of mobile devices in the educational process is obviously new and constitutes a field of research in the light teaching methods, however the interest in learning through mobile devices is growing rapidly, along with the increase in educational applications. However, it should be mentioned that the level of technology that is available in each country is what gives the opportunity for educational applications (Thornton & Houser, 2004).

Concluding, some of the advantages and disadvantages of the educational technologies are listed below (Kotsari, 2014).

Advantages:
· Use the Internet as a source of knowledge and communication
· Opportunities for information and shaping attitudes and perceptions about the world

Disadvantages:
· Absorption of attention
· Social isolation and sense of dependence
· Reduce confidence

In the mid-1960s, the collaborative learning method was relatively unknown and largely ignored by teachers. Cultural resistance to collaborative learning was based on social Darwinism, with the assumption that students must learn to survive in a competitive world, and the myth of "rugged individualism" governed the use of individualistic learning. Collaborative learning has become an accepted and often preferable educational process at all levels of education, as it used at schools and universities in every part of the world, in every subject area and in students at every age (Johnson & Johnson, 2016). As collaborative learning methods is defined a learning system that allows small heterogeneous groups to work collectively in order to accomplish their goals and succeed when the team succeeds. In this way knowledge is not transferred but discovered through dialogue and students achieve better understanding through cooperation, since collaborative activities motivate and encourage students to participate in discussions (Johnson & Johnson, 2016).

Collaborative learning can be categorized in four types (Johnson & Johnson, 2016):

· Official collaborative learning
· Informal collaborative learning
· Collaborative Base Groups
· Mix of the above mentioned

Scientific studies also show that at all levels of education and various thematic areas, collaborative learning results in (Jones & Jones):

Greater understanding of the course by the students
· More appreciation and respect for themselves.
· More positive attitude towards school
· Improvement of the written and spoken word
· Development of critical thinking
· Highly satisfactory results for students who have learning disabilities and children with specialneeds

Learning Through Mobile Devices

In a society where everything moves at a rapid pace, the evolution of the learning process is necessary in order to exploit the technological resources available for making interesting the way of teaching. The use of mobile devices and the possibilities they offer have conquered a large proportion of our society, according to sales presented by mobile companies. Therefore, the interest of researchers focused to these technologies for a more effective and interesting learning via mobile devices (Aamri & Suleiman, 2011).

Learning through mobile devices includes the use of mobile technology, either alone or in combination with other ICTs. A definition that many researchers give to learning through mobile devices is: all forms of exploitation of the possibilities offered by mobile and wireless technologies and devices such as Wi-Fi, LAN, bluetooth, GSM, GPRS, GPS, 3G, satellite systems, mobile phone, tablets, PDAs, laptops, etc., without the student having to be located at a predetermined point for using them or the possibilities they offer (Vavoula & Karagiannidis, 2005; Glaroudis, 2012; Tsinakos & Ally, 2013; Ferry, 2009). Although the mobile industry is the most developed technologies industry (Molnar, 2014), emerging technologies like learning through mobile devices (mobile learning) have received little attention, especially in the context of remote informal learning. Research shows that it is still early to use mobile devicesin education, although wherever they were used produced positive results and are considered the most promising technology devices that will contribute to the future training, especially since a lot of computers in public establishments are out of date (Molnar, 2014; Balasubramaniana, Thamizoli, Abdurrahman, & Kanwara, 2010).

Mobile devices also offer a series of peculiarities that make them attractive for education including their costs compared with computers, the ease of transportation, the possibility for ubiquitous computing and the opportunity for independent learning and assistance to people with disabilities (Vavoula & Karagiannidis, 2005).

Concluding, learning through mobile devices may offer the opportunity for:
· Collaborative learning activities using mobile devices,
· Quiz via text messages (sms),
· Virtual chat messages e.g. language course through quiz via text messaging (sms).

Also, it must be mentioned that with the introduction of mobile devices in education, the aim is not to replace the traditional school, but the improvement of the educational process (Molnar, 2014).

The Need to Create Applications for the Incitement of Learning/Education

The need to create applications for stimulating education begins from the rhythm of life, which has grown in recent years. The training process is now considered for many students as a slow way of learning which cannot cause their interest for acquiring knowledge. However with the development of mobile phone companies that offer economical solutions, various connectivity features to the internet, communication ways, direct file transfer and virtual or augmented reality applications there are more than one reasons why mobile phones manage to gain more and more interest.

The use of mobile devices in education requires specific applications titled "educational software". A definition of the educational software may be the technology product designed to contribute to the assistance in teaching a subject following a particular educational philosophy and pedagogical strategy (Faust & Paulson, 1998).

Educational applications, adapted to the current pace and lifestyle, are designed to improve and stimulate education. For contributing positively to the development of children, it is recommended that they are used in an environment of cooperation and communication in order to develop the interaction and exchange of views within the training group (Clements & Sarama, 2002).

DESIGN OF THE APPLICATION

The current paper was an effort to apply collaborative learning in the educational procedure via the Geology-Geography course of the 1st grade of high school, in order for students to show more interest in the course and in general on the environment, by creating a collaborative - interactive space for them, thus extracting better results in learning and the way they react towards the environment. For the operation of the application it is required the use of a device with Android operating system, a database on the internet to store the students' responses and an Augmented Reality application for the cooperation of students with the schoolbook.

The application is divided into two menus that are joined by a main screen, the teacher menu and the student menu. Teacher's menu is parted from a password textbox and four buttons. These buttons lead to different actions and are the following:

· Students: Displays the students' list and selecting a student reveals the questions and answers asked and stored in the online database.
· Teams: Displays the list of teams and team questions and answers that each team has given and is stored in the online database.
· Delete a team: User can delete the answers given from each team.
· Exit: User can close the application.

After selecting the student's menu, user has to choose a team and fill the name and surname textbox.

Afterwards, user can access the student's menu, which contains six buttons.

Info: Contains information about the program and its operation.

· Aurasma: The application opens the Google Play URL which is uploaded and gives the user the ability, at first, to download the Aurasma application and afterwards to open it.
· Start: User can start playing the Quiz game.
· Evaluation: Displays the rating of the teacher. This button is visible only after playing the game.
· Correct Answers: User can find information about where to find the correct answers of the game in the schoolbook.

This button is visible only after playing the game.

· Exit: User can close the application.

Development Tools
The tools used for the creation and development of the application are open source which means that anyone can use them for research or private purposes.

· MIT App Inventor 2: This platform enables the user to create mobile applications without any programming skills. It uses a Lego logic where different components are chosen and combined in order to produce a program. It can enables the creation of offline and online applications that may embed pictures, sounds videos and also connection with social networks and e-mail accounts. Via
· MIT AI Companion creators can check the exact appearance of the application in a smart phone/tablet, also it enables users to download their application and store it in their devices. The biggest advantage of this platform is the fact that the application can be created without programming knowledge and without sacrificing important aspects of the initial thought (Karamanoli & Tsinakos, 2016).
· Aurasma: A platform that provides an easy to use environment that does not require programming skills, something that can make easier the extended use of AR from teachers at schools. Also it is easy for a child to get familiar and use the Aurasma application, as it only has to scan images with a tablet or a smartphone. More specifically Aurasma is compromised from two different applications, "Aurasma Studio" where a user is able, after creating a free account, to view and create his own private or public "auras" and Aurasma "Viewer" which enables following various channels and having access to AR features (Karamanoli & Tsinakos, 2016)
· MySQL: A software that enables the creation and use of an online database. It provides users the ability to set, create, use and delete a database (Suehring, 2002)..
· PHP: A popular and general-purpose, interpreted scripting language that is especially suited for web application development but also is used as a universal programming language (Achour, 2016).
· WinSCP: WinSCP (Windows Secure Copy) is a free and open-source simple file transfer protocol (SFTP), file transfer protocol (FTP), web distributing authoring and versioning (WebDAV) and secure copy (SCP) client for Microsoft Windows for file transfer between a local and a remote computer with maximum security. Also it offers scripting and basic file management functions (Boze, 2002)

DEVELOPMENT OF THE APPLICATION

Purpose of this chapter is the brief presentation of the development of the application, through images of the application's basic features from the MIT App Inventor 2 platform.

The application consists of two main menus, students' and teacher's. These are connected by a single main menu, which is composed of three buttons, each of which leads to a different action. These buttons are Teacher, Student and Exit.
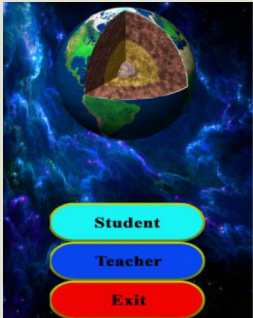

Figure 1: the Main Menu

Teacher

By pressing the Teacher button, a screen appears that asks users to fill their username and password in order to be able to get access to the content. If users insert wrong username or/and password, then the application will ask again for the correct data. After entering the menu, user will be able to use the four buttons that have been described to the designing process, Students, Teams, Delete Team and Exit. Figure 3 shows a part of the programming procedure for the game in the MIT App Inventor 2 platform related to the Teams button. With this element, teachers can select a team and have access to the answers that this team has sent on the database. After selecting a team (A, B or C), the variable global url takes the price of the url that leads to the according file of the server, where the answers are stored. Afterwards, the set Web_group.postText takes the price of the global url variable and makes the connection with the server.

Figure 2: Teacher main menu
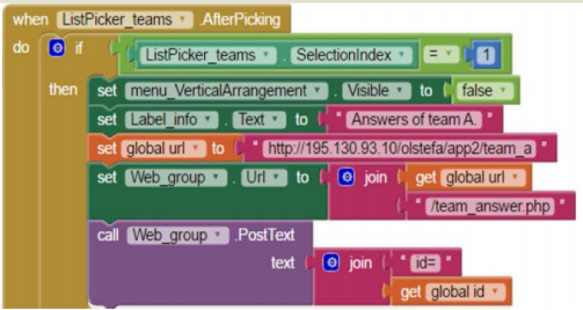
Figure 3: Teams button

Student

This button at first will transfer user to another screen in which they will have to choose the group they want to be a member of, as it can be seen in Figure 4. If the necessary fields are empty (FirstName_a_-textBox and LastName_a_TextBox) the call Notifier1.ShowAlert feature informs the user that he has to fill the empty textbox with the following message: "Please insert your name and your surname." If the required fields are not empty, which means that the user has already filled them, then the set Web_add_team_a.Url (also team_b and team_c, according to the team that the user has selected) component connects the globalURL_team_a variable with the insert_team.php feature. Finally the call Web_add_team_a.PostRext component links the textboxes' data with the name and surname files. After selecting a group and checking the New Player box (if the user is a new player), users will have to fill in a form with their name and surname in order for the program to be able to store their answers on the database.
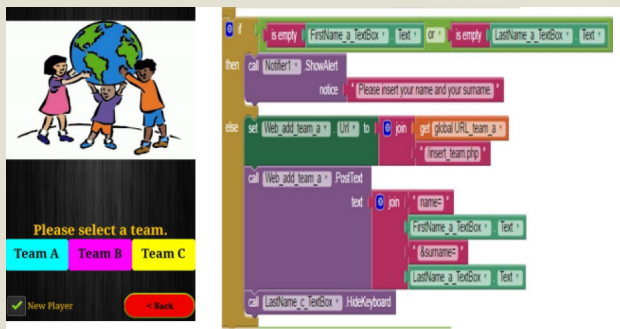
Figure 4: Group selection screen and coding

Afterwards, users will have access to the four buttons linked with this menu and are described in the designing section. These four buttons are: Info, Aurasma, Start and Exit.

Figure 5: Students menu

When users select the Aurasma button, they will be able to download and use this specific platform for scanning some images from the schoolbook and have access to four videos that are related to the content of the images. As it has been already mentioned AR is considered an easy and interesting way of engaging students' interest and this is why it has been used in the application.

The Quiz game is considered to be the most important part of the application, and this why it will be analyzed extensively. After pressing the Start button and prior beginning the game, users will watch a short video related to ecology. Afterwards, another screen is loaded and the game begins. Figure 6 shows a part of the programming procedure for the game in the MIT App Inventor 2 platform. The basic structure is that Question_Label gets the content an element from the global Question_list component and the same applies for the Answer_List View with the global Multiple_choices. The global index variable is responsible for getting questions and multiple answers that match. Afterwards the answers are stored to another variable that has the form of a list. Finally, answers are send to an online server with the call Web_update.Post.Text feature.
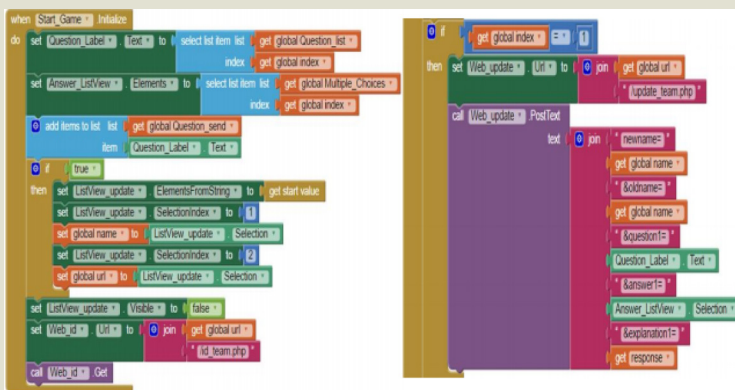
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Figure 6: Quiz programming

To the first player of each team the questions, the multiple answers and a countdown clock are displayed. By choosing one of the possible correct answers appears a notice which shows the selected answer that contains a textbox where the player has to justify the answer. Both the answer and the justification are uploaded on the online server regardless of whether they are correct or wrong. Also, the answers are accompanied from a sound which indicates if they are correct or not. In the case that the player does not manage to select an answer in the default time, the answer that is saved on the database is "End of time".
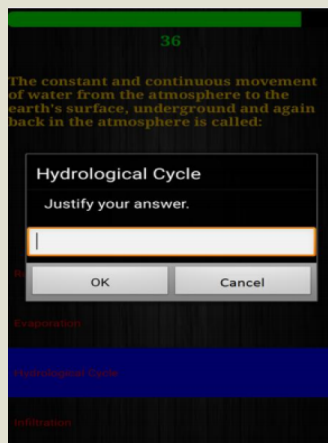
Figure 7: Justification textbox

After finishing with the game, user has now access to a new screen which contains two buttons, Correct Answers and Menu. The first button enables the player to find information about where to find the correct answers of the game in the schoolbook while the second one is for returning to the main students' menu.

For the next players in the same group, the process is the same, except that when the questions and answers are show it is also displayed a notification that the question has already been answered by one or more team members. At the same time, another button appears that enables the access to answers that other players have given, enhancing this way the collaboration between teammates.
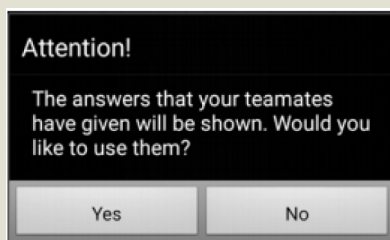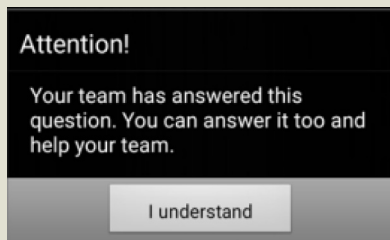
Figure 8: Collaboration between players

Each group is set to consist of four people. The forth member of each team has the most important role, and has to answer the questions really carefully, since these answers will be stored and finally evaluated from the teacher as the "team answers". For this player the replying procedure is the same, but after finishing the game the next screen contains one more button, Send, which is for emailing to the teacher that this team has answered the questions and is available for evaluation.

Finally, all team members, after pressing the Menu button return to the students' menu, which is enriched with two buttons, the Correct Answers which has already been mentioned and the Evaluation which allows users to see the scores of all teams.

Figure 8: New students' menu

CONCLUSIONS

Summarizing and in an effort to make a review of the present project, it would be better if the features and benefits of the created program are the first to be presented. More analytically, regarding the collaborative game application that was developed in the present paper provides: clustering of class, comfort and convenience in handling, potential justification of responses, possibility of communication with the teacher, visibility of score of each team and additional incentives for exploring the book with the use of AR. Also, form the teachers' point of view, it enables the direct monitoring of test progress for each student or each team, at any time or place. Another important factor is the cost, where in this case, can be considered as low since specialized equipment is not required. The only needed equipment is a WiFi portable device with build on camera like a smartphone or a tablet, a wireless network and the schoolbook.

Furthermore, it should be mentioned that the application has not yet been tested under real conditions and as a result, there cannot be a solid statement upon its use. Further research should explore the usability of the application with the conduction of a study and also the incorporation of other features like: importing questions from the database to the application in order to be used as a weekly test, the ability to store, long-termly, results for comparing them at the end of each year and determine the progress and finally the extension of the method to other school courses.

Technology in education is akin to sword that can protect someone but also hurt him depending on the hand that holds it. So is technology, which depends on the purposes and intentions of its users. Concluding, the use of mobile devices combined with collaborative educational applications that interact with the learning material, allow for an education without the limitation of space or time, which manage to assist the students and especially students with learning difficulties or special needs (Vavoula & Karagiannidis, 2005).

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iABL¹⁷

PAPERS

Engaging faculty in learning analytics.
There's a qualitative side too!
Marie Lippens

ABSTRACT
Teaching online requires careful planning, monitoring and reflection. The process of Learning Analytics (LA) can help teachers observe, inquire and evaluate their practice. Still, LA is not widely adopted by online teachers towards this end. This mixed methods exploratory case study seeks the perspective of experienced faculty of online graduate studies to describe insights gained through the process of LA. Course data was extracted from the Learning Management System (LMS) and presented to faculty in several forms. Discourse analysis was also performed, grounded in the contextually-appropriate Community of Inquiry (CoI) model (Garrison, Anderson & Archer, 1999). Faculty were interviewed, asking them to assign meaning and elaborate on the dynamics observed. Findings indicate that engaging faculty in the quantitative and qualitative process of LA is a powerful way to assess course dynamics, link to theoretical grounding, contrast to faculty observations and perceptions, and engage faculty in a community of practice.

INTRODUCTION
The field of LA provides many examples of applicable to teacher practice such as monitoring, flagging, measuring engagement and aligning learning theory to course design elements (Avella, Kebritchi, Nunn & Kanai, 2016). The statement below represents the most widely accepted definition of LA:

> Learning analytics is the measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs. (Siemens 2013).

Still, widespread access and use of the LA process, in an ongoing effort to improve teaching and learning, is not apparent (Siemens, 2013). It seems obvious that available data should be used to strengthen online course quality in today's high stakes educational environment. There are many reasons why this isn't as simple as it sounds (Manzoor, 2016). This study endeavours to illuminate the faculty perspective on the use of LA to inform context-specific, data- and theory-grounded improvement measures in teacher practice and learning design.

PURPOSE STATEMENT
The purpose of this study was to explore how teachers may use LMS data to assess course design and delivery in online graduate courses. Mor, Ferguson and Wasson (2015) contend that "learning analytics offers a powerful set of tools for teacher inquiry, feeding back into improved learning design" (p. 221). To act on this assertion in the context of higher education, a set of online graduate courses were chosen. Teachers of these courses were not only established content experts, but career teachers with broad and long-term experience teaching online. An in-depth perspective from faculty was sought to understand the data from their courses, and how it reflects practice and design to achieve and maintain success. Informing the discussion was an analysis of the dynamics within these courses, and how the LMS data may be used to evaluate, reflect and revise teacher practice.

REVIEW OF THE LITERATURE

Learning analytics

Learning analytics as a field is now a well-established research area with interest exploring the possibilities of data analytics in education. The Society for Learning Analytics Research (SoLAR) is an international, inter-disciplinary network of researchers with a robust and growing influence. SoLAR organizes the annual International Conference on Learning Analytics Research and Knowledge (LAK), now in its 7th year. In addition, SoLAR publishes the international peer-reviewed open-access Journal of Learning Analytics, which has advanced dissemination of the most recent and innovative findings of the field since 2014. Research has reported on broad activities such as advances in digital technologies, predictive tool development and social network and cognitive mapping and modelling. Most recently, tutorials introducing novel methods such as epistemic network analysis, automated content and network analysis of social media, and text coherence analysis, as well as design of visual learning analytics guided by educational theory have been described (Gašević & Pechenizkiy, 2016). Research is clearly outpacing adoption and one of the reasons is the complexity and diversity of learning situations involved. Dawson, Mirriahi & Gašević (2015) observe that theory plays a crucial role, with two sides to consider: that theory-grounding is necessary to interpret large-scale data sets, but at the same time these large-scale data sets may lead us to build new theoretical understandings. Siemens (2013) observed that the challenge lies in bridging the cross-disciplinary divide between information and communications technology (ICT) professionals and education professionals, and this challenge still persists today. Future goals of learning analytics include finding ways to use analytics to not only predict learner achievement, but to guide learners along the way (Gašević, 2015). A key step in this direction is to form an explicit link between educational theory and learning data (Gašević, Dawson, Rogers & Gasevic, 2016). For teachers of online and blended courses, there is a practical seed to sow, which can begin with the use of learning data to inform an evolving, creative process that links theoretical underpinnings to learning design principles.

Community of inquiry (CoI)

Online learning scenarios usually consist of a series of interactions that the student must work through. However, simple interaction alone does not adequately describe the conditions that create rich learning environments (Garrison & Cleveland- Innes, 2005). The concept of presence is an important one for distance learners. In the context of graduate level online learning, a collaborative-constructivist model applies, which is the basis of the CoI. Lipman (1991) provides a comprehensive discussion of this basis. He notes that influencers like George Herbert Mead (1934), John Dewey and Charles Pierce recognized that inquiry is guided by situations, and that participants in this inquiry lend their qualitative presence to the situation. Building on this, Garrison et al (1999) developed the seminal Community of Inquiry Model. Central to this model is the definition of three types of presence: social, cognitive and teaching. These elements are interdependent and together they are essential to the educational experience. Social presence is considered to be the contribution of individuals to allow expression, communication and group cohesion, which has a primary function to support cognitive presence (Garrison et al, 1999). Cognitive presence "is a function of sustained communication over time on important content" (Luyegu, 2015). It is defined and operationalized by the Practical Inquiry Model by four phases: a triggering event, exploration, integration and resolution (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson & Swan, 2008). Teaching presence can be considered to have two functions. The first is in the design of the learning experience and the second is in its facilitation (Garrison et al, 1999). Teaching presence is evident when structure, instruction and/or support is provided by the teacher to students, individually or to the group.

The model and each of the three presences have and continue to be the topic of many research efforts, with some refinements and validating support, including the incorporation of learning analytics (see, for example, Arbaugh et al, 2015). In a ten-year review of the model (Garrison, Anderson & Archer, 2010), the authors mention their hope that future work will use the framework to predict learning processes and outcomes from an individual course/program perspective, which has now begun to materialize (Rockinson-Szapkiw, Wendt, Whighting & Nisbet, 2016).

RESEARCH QUESTIONS

These questions stem from the observation that online teachers are not widely using learning analytics to inform data-and theory-grounded decision support in their practice. This, even though the literature supports the notion that LMS data can capture detailed information that tell us a great deal about the unique dynamics of online courses.

Research Question 1: By engaging experienced online faculty in the process of learning analytics, grounded in appropriate learning theory and learning design concepts, what insights can be gained?

Research Question 2: What is the faculty perspective of the use of learning analytics to inform ongoing course design/delivery decisions? What are the opportunities and challenges?

METHODS AND PROCEDURE

Sample and study design

Two faculty were recruited for this study who teach selected courses in an online graduate program at a Canadian open online University. The courses exhibit a clear foundation in a well-known theoretical framework for online learning, which is the Community of Inquiry (Garrison et al, 1999). Following this framework, several levels of student interactivity, including collaborative work, peer support and discussion-based activities are offered. From a learning design perspective, these types of course activities offer a rich and varied environment in which deep, meaningful learning may occur (Garrison & Cleveland-Innes, 2005).

Faculty participants are highly educated in their field with 10+ years' experience teaching online courses at the Graduate level, as well as at least 4 years' experience teaching the courses included in this study. Interviews with such individuals provided valuable insight about the data extracted from their courses. Inclusion criteria ensured that faculty have sufficient experience teaching online to openly discuss online learning principles, and that they have enough experience with the individual course under study to provide a rich, reflective perspective to the data. Multiple iterations of their courses were used in this study.

Students in the program are required to take the first two core courses as prerequisite to subsequent courses. For students entering their third and subsequent courses, two of which were chosen for this study, this requirement aligns recent student experiences and prior knowledge lending a measure of validity to the analysis of their behavior patterns for this study.

The study was conducted in three phases.

Phase 1: A preliminary survey determined current perspectives and practice of faculty regarding the use of learning analytics to improve their courses and their practice, including a look at the data available to them.

Phase 2: Quantitative collection and analysis of LMS data was visualized and presented to faculty. Course structure was determined and described from a learning design perspective and interaction patterns were assessed using the Community of Inquiry (CoI) framework.

Phase 3: Follow-up qualitative inquiry sought faculty perspectives on the data presented; how it informs learning design and how faculty might or might not see the data put to use.

Data Analysis

Multiple iterations of LMS course data was extracted in the same form available to faculty, which amounts to an activity log (excel file), and a text file (discussion forum discourse). The data was anonymised and assessed according to three predetermined constructs:

1. Learning design visualizations. A week-by-week course activity timeline (Figure 1), as described in Lockyer, Heathcote & Dawson, (2013), and supported in Bakharia et al., (2016), was developed. This graphic is compared to the weekly planned activities (course design) to understand the relationship between course design and student activities.
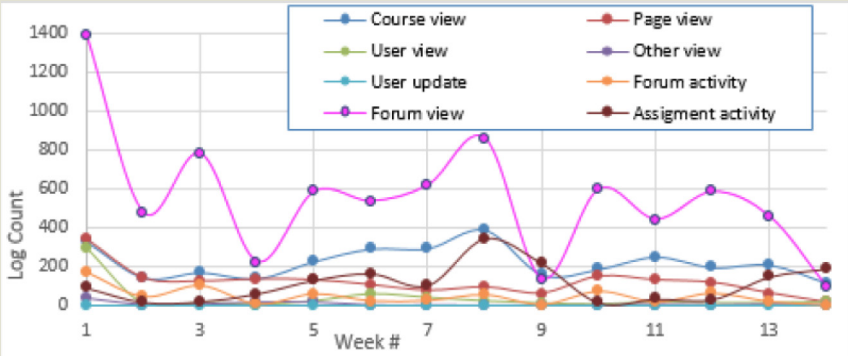
Figure 1. An example of the learning design visualization graphic

2. Log hits as a proxy indicator of total presence. Total log hits are visualized by a stacked bar graph (Figure 2), showing each activity type per user for each iteration of each course.
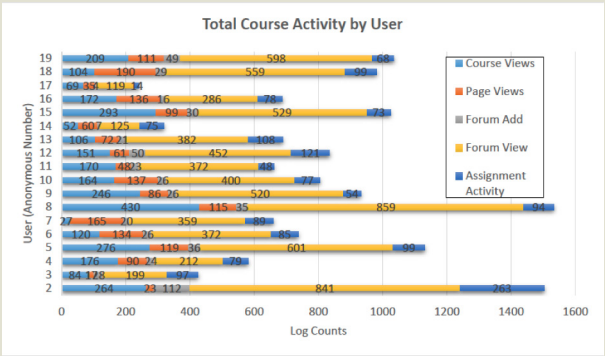
Figure 1. An example of the learning design visualization graphic

3. Discourse assessment, carried out according to the Community of Inquiry coding template (Garrison et al, 1999) to quantify the three types of presence (cognitive presence, social presence and teaching presence), as well as the sub-elements for each of these types, for each discussion forum (Table 1) and for each user (Table 2). As faculty would not have the time to perform such a systematic analysis of the overwhelming volume of discourse contained in these courses, (an average of 37,000 words and more than 300 coded passages per course) this analysis was likely to be a new representation of the course for faculty to reflect on.

	Disc Forum 1	Disc Forum 2	Disc Forum 3
Cognitive Presence	169	56	49
1 : Exploration	30	3	16
2 : Integration	93	40	27
3 : Resolution	11	4	0
4 : Triggering Event	35	9	6
Social Presence	104	38	38
1 : Emotional Expression	7	8	8
2 : Group Cohesion	47	20	17
3 : Open Communication	50	10	13
Teaching Presence	31	19	7
1 : Building Understanding	24	17	2
2 : Direct Instruction	2	0	3
3 : Instructional Management	5	2	2

Table 1. Quantitation of the elements of the Community of Inquiry within course discussion forums (partial list only)

	Student 10	Student 11	Student 12	Instructor
Cognitive Presence	21	22	39	3
1 : Exploration	8	4	9	1
2 : Integration	10	17	25	0
3 : Resolution	0	1	0	0
4 : Triggering Event	3	0	5	2
Social Presence	9	14	29	9
1 : Emotional Expression	2	3	4	5
2 : Group Cohesion	5	6	16	4
3 : Open Communication	2	5	9	0
Teaching Presence	0	0	0	60
1 : Building Understanding	0	0	0	45
2 : Direct Instruction	0	0	0	6
3 : Instructional Management	0	0	0	12

Table 1. Quantitation of the elements of the Community of Inquiry within course discussion forums (partial list only)

Faculty were provided these representations, without additional explanations, and subsequently interviewed. Interviews were qualitatively coded to extract common themes and unique ideas from participants. Lastly, the data from each course was contrasted to the faculty perspective, looking for new insights emerging from the process.

DISCUSSION

The Use and Form of Analytics Data

Faculty participants expressed their belief that LMS data is important to the practice of monitoring and reflecting on their courses. This finding is often mirrored in the literature (Van Leeuwen, Janssen, Erkens & Brekelmans, 2015; Mor et al, 2015). However, simply providing the data in its crude form resulted only in its superficial use, such as the monitoring of log hits. Important information about teacher and learner activities can be gathered beyond simply counting user actions.

Learning design visualizations: Visualizations based on theory-grounded constructs were able to provide more specific information linking course design and teacher practice to student behaviour data. Qualitative input from the teacher was vital to the accurate interpretation of this data. Learning design visualizations showed that course activity dynamics were stable across the three iterations of course 1 and the two iterations of course 2. Activity trends corresponded to scheduled LMS-logged activities, alternative planned activities or conscious decisions made by the teacher during the course, such as redirecting student attention. Rodríguez-Triana, Martínez-Monés, Asensio-Pérez & Dimitriadis (2015) support the idea that planned activities (scripting) should be linked to monitoring activities in an iterative fashion to continually inform design choice in online learning environments. This is clearly a simple and feasible approach for teachers of online courses, requiring minimal technical knowledge or time to access and visualize.

Log Counts: Visualizations of LMS log counts appeared to provide some insight for teachers to reflect on. Although the use of log count data is somewhat superficial, it has been linked to predictions of student engagement and success in many simple and large-scale studies. (See, for example, Morris, Finnegan & Wu, 2005; MacFadyen & Dawson, 2010; Zhou & Winnie, 2012; Kang, Liw, Kim & Park, 2014.) The courses in this study showed recurring trends in log count activity, such as high activity counts for the teacher(s) and large differences in total activity between users. Teachers had established a stable and active presence in their courses. Regarding the variance in logged student activity, faculty noted several instances where low log activity had nothing to do with low engagement in the course, but rather the variation was due to either some pre-negotiated alternative form of activity or simply varying technology preferences on the part of the student. For example, some students chose to download and print all content at the beginning of the course, whereas others chose to access resources directly from the course pages daily.

Overall, log counts as a data source in these courses did not provide useful information to teachers. On the surface, the data seemed to be telling us something about the interaction patterns and presence of users. Upon deeper inspection, the wide array of course activity that occurs outside of the LMS logs made the log hit counts an incomplete measure of total presence. It would not be wise to take such data out of context of this course, for example, into an institution-wide data system, to try and assess the interactivity of the course or student performance metrics in any way. Richards (2011) makes this point eloquently when he says "Learning Analytics is not simply about counting hits or mapping discussions, it is about intelligent and thoughtful interpretation of data in the context of human activity".

Discourse Analysis and the CoI
Discourse analysis based on the CoI as an applicable pedagogical framework in this case study was able to provide new insights of the course dynamics. It was noteworthy that the timing and extent of the CoI dynamics, even the sub-elements of each presence, were unique for each course and remained stable over multiple iterations of each course.

Course 1 was consistently characterized by high levels of all of the 3 CoI presences (cognitive, social and teaching) at the beginning of the course, with cognitive presence dominating the discourse. Over time, levels of teaching presence decreased most, and levels of cognitive and social presence also dropped but stabilized by the end of the course.

Course 2 had a consistent but slightly different set of dynamics, dominated by social presence early on, with highest cognitive and social presence throughout and much lower, but stable, levels of teaching presence.

For both courses, CoI presence totals per user varied widely. Those with the highest CoI presences were not always the same as those with the most log hits in Moodle. Aside from special cases where alternative activities from discussion forum participation were arranged for students needing them, the measures of total CoI presence were more qualitatively aligned with student performance in the course than log counts according to the teachers. Intuitively, this finding makes sense since the CoI framework captures specific and deliberate efforts to engage in the learning process rather than just patterns of page clicks.

Insights Informing Teacher Practice
The stable CoI footprint, even with fluctuating enrollment numbers and a wide variation of student participation levels, is an interesting way to look at the intersection of course design and teacher practice. The course design elements and the quantitative LMS data alone does not provide a sufficient basis for the difference between the two courses. Insights from faculty make a lot of what the data shows much clearer. Far beyond the planned learning activities, grading structure and nature and timing of assignments, the leadership of the teacher had a powerful influence on the dynamics that shape the CoI. Especially early in the course, extensive teacher activity is dedicated to establishing a well-defined structure, which could be rigid or open. Structural elements such as discourse and course work expectations; modes of communication and a certain level of social connection set the tone for the entire course. The work of Phirangee, Demmans Epp & Hewitt (2016) mirrors the idea that the instructor plays a large role in the establishment of a learning community. This is one reminder that there is still a lot of research left to be done. Experienced, successful online faculty have valuable insights to guide us. Additionally, outreach and flexible solutions for students that are struggling to conform to the predetermined course structure clearly allows more students to be successful.

RECOMMENDATIONS

This exploratory case points towards some important practical and research avenues worth further attention. First and foremost is to encourage and enable faculty of online and blended learning to engage in the process of learning analytics. If we invest in the provision of technology support and the expertise of data scientists who can meet the information needs of faculty, the potential is twofold: we will maximize the incorporation of collected data to inform teaching and learning decisions, and we will encourage data-grounded experimentation and collaboration that will surely advance diversity, success and knowledge in online education. Second, with the explosive growth of online and blended courses going on at this time, new teachers are moving into online scenarios in droves. In order for these teachers to be successful, they must possess pedagogical knowledge and not just content knowledge. Mentorship, team teaching and sharing of course data can reveal a great deal to a novice teacher and so allow them to start with solid grounding and support. I propose that learning analytics must become a collaborative effort for teachers, and must be supported by their institutions. Openness in teacher practice is a key ingredient for success.

Further research is recommended on several fronts. A broad study of successful, experienced online teachers is necessary to characterize the many possible dynamics of teacher inquiry. More collection and assessment of course data grounded in learning theory is encouraged, including the intriguing "humanistic", or emotional precursor that may prove significant to the broadly used and studied Community of Inquiry model.

CONCLUSIONS

Still a work in progress, this study mirrors our work as teachers of blended and online learning. The possibilities are endless as we work to shape a new, modern form of higher education. What we do know is that there is no magic recipe for online or blended learning, and no one is an expert on their first day. To propel ourselves and this growing practice toward successful ends, we must make our teaching and design decisions based on the information available to us – all of it. This includes more than just static or summative quantitation. It involves our people, evolving realities, various perspectives and complex, ever-changing systems and environments. It involves experimentation with theoretically and empirically grounded strategies. Armed with the tools of collaboration, transparency, innovation and reflection, the sky is the limit.

ACKNOWLEDGMENTS

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Evaluating the Quantity and Quality of Interaction in Online Courses
Jaime Cará Junior

ABSTRACT
It is possible to find a large variety of concepts of interaction in academic literature and yet it might seem relatively unclear what 'interactivity' and 'interactive media' mean. There are so many different views and approaches that it can be challenging to conciliate and practice all idealizations of what is or what should be considered as interaction. In addition, the positiveness surrounding the concepts and dthe frequency of their use seem to cloud and obscure our practices, because it fossilizes certain assumptions. Because of misconceptions of interaction, we continue to rely on traditional (and not necessarily effective) tools and activities, or at the risk of searching for and developing digital resources to be included in online courses mostly for their appealing design. It is imperative that we discuss the underlying problem in some of the most common concepts of interaction, showing how old models of communication permeate them and how adverse this can be for designing online courses. We will present an alternative concept of interaction in articulation with a concept of presence as an effect, not as an absolute state, and draw some of the most important implications of this concept for online learning course design. There is more at play than just the "quantity" of interaction, meaning that there are different qualities of interactions, which are determined by a set of factors that are described in this paper, that might promote different states and events. Some of these events and states are likely to be more productive, for which the online course designer should seek.

INTRODUCTION

Discourses about the connectivity provided by new technologies contribute to ideological formations in which interaction and especially interactivity are idealized and exacerbated as pure positivity. This romanticizing is counterproductive and obscures the prospection of alternative practices for online courses. Having in mind everything that is desired and idealized for online education, what does technology already offer us and what technologies do we still need to develop? Or, better yet, what do we want for online education? Maybe we do have everything we need, but we might not be making the best choices in terms of how to apply all the technological possibilities that we have.

There is a conceptual problem that might prevent us from answering these questions more accurately. By assuming that interactivity is a trait or a set of attributes that a technology or a flow of actions might have, we also presume that an online course is as interactive as the technologies and the people participating are. This idea of interactivity might imply the assumption that there are inherent elements in technology that can guarantee interaction. Worse than that, it implies the assumption that the more interactive the better for the learning process.

In this paper we argue that an online course should not only account for a certain the quantity and intensity, which we approach as frequency, but also to certain qualities of interaction. The frequency, intensity, variety and qualities constitute the factors of interaction that might promote a more productive presence of learners and a better learning experience. To do so, we will discuss the underlying problem in some of the most common concepts of interaction, showing how they are permeated by old models of communication and how adverse this can be for online course design. Then we will present an alternative concept of interaction in articulation with a concept of presence as an effect, not as an absolute state, and some of their implications for online learning course design.

On the one hand, we cannot continue to believe that online interactivity should mirror face to face interaction, nor should we continue to resort the most commonly resources used in online courses, such as texts, images, chatrooms, forums, and videos. These resources are poor in terms of producing effects of presence and, consequently, poor in terms of interactivity. It is no coincidence that online courses have such high dropout rates, even nowadays. On the other hand, we cannot design online courses around digital resources presumed to be interactive and productive, as if there was something inherent in technology that could guarantee learning. It is about time we question what kinds of interaction are more productive for a given didactic and educational purpose and then question what technology can already offer us and what still need to be developed.

THE "OLD" IN NEW FORMULATIONS

Many researchers argue that it is relatively unclear what 'interactivity' and 'interactive media' mean and that the positiveness surrounding the concepts (which is related to the frequency of their use) are reversely proportional to their precision and actual content of meaning. They defend that the interaction and interactivity are overused and underdefined concepts. Its high frequency usage and positiveness only prove the concept to be relevant (not overused), and its lack of precision and actual content of meaning means that the concept is misdefined (not underdefined).

Interactivity can be seen both as an activity and as a property (attribute or quality). As an activity, it is considered as an action or a communicative event. As a property, it is not exactly taken as the communication itself or the co-construction of something via interaction, but as what qualifies them or as what allows for communication and interaction to take place. In other words, interactivity would be something like an attribute that interaction (or certain types of interaction) may or may not have.

The heterogeneity of the most common definitions of interaction and interactivity, in a way, is all seeming. The differences we can find are not a result of alternative theories or significant distinction of assumptions. They are mainly a result of focus switching. The definitions alternate focusing on:

- the object, medium or technology's attributes or characteristics
- Attributes or qualities of actions by the individual over other people or over objects, media and technologies
- the activity or action of individuals over others or over objects, media and technologies
- the activity or action of objects over the individual.

Focusing on the attributes of the object tends to lead to taxonomic definitions, since objects are considered as channels, means or resources that are ready and that contain characteristics. Focusing on attributes of actions tends to produce definitions of interactivity as an absolute state, because actions are given, selectable and describable by characteristics that are either present or absent. Focusing on activities frequently leads to concepts of interactivity as a continuum or as a taxonomy that also varies from more to less interactive.

Some researches operate with the assumption that interactivity has dimensions that qualify and/or define what it is. For example, Heeter (1989) conceives six dimensions:

(1) complexity of the available choice. This dimension uses "complexity" in a very specific, even corrupted, sense because it works as a synonym of the amount of options for the selection of information. The bigger the selectable options are, higher will be the interactivity. This dimension of interactivity, also referred to as "selectivity", concerns the extent to which the users are provided with a choice of available information. (Heeter C. , 1989, p. 222).

(2) application by the user. This dimension presupposes an active-passive dichotomy and establishes that there is more interactivity when the individual puts a greater amount of effort to participate or, better yet, when there is more that the individual should do to participate. For example, watching TV would be less interactive than playing videogames.

(3) responsivity. This dimension more clearly situates or restricts interactivity to the object, since the "thing" would be more interactive as it responded more or better to the actions of the subject.

(4) monitoring of the information. This dimension measures interactivity as the possibility of a user to be able to quantify (more or less precisely) and differentiate the activities that occur between people (mediated by a technology) or between people and a given technology.

(5) possibility/Easiness of adding information. This dimension also measures interactivity in a given technology in terms of how easy it is for a user to add information that is accessible to the greatest number of people.

(6) facilitation of interpersonal communication. This dimension refers to the extent that a given technology can facilitate or enable interpersonal communication.

Heeter's six "dimensions" are in fact "traces", "characteristics" or "attributes" that aim at addressing the principles that, in order for interaction to take place, it is necessary that actions occur in a two-way road, that individuals engage in an activity, and that such activity provides tangibility and more options of content (Heeter, 1989: 225). By talking about the implications of "new technologies", Heeter discusses how they allow for a more interactive experience and proposes a description of interaction. However, Heeter's six dimensions do not fundamentally break with the traditional model that the author herself proposes to revisit and represents as follows:

Figure 1. Traditional Model of Communication (Heeter 1989, 1949: 218)
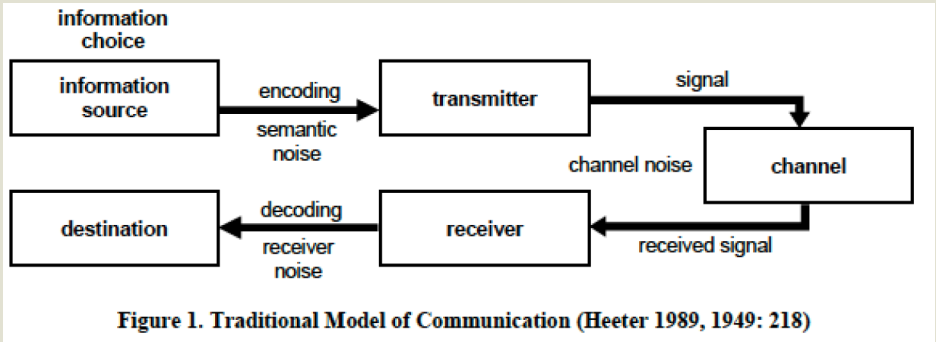
Heeter rearrange and redefines these elements without questioning the model that entails them. She does not break with the idea of a "channel", for example. She only goes as far as to state that the channel allows for more or less interaction as it offers more or fewer choices for the user (source) or as its properties enable or facilitate monitoring and the adding of information, and personal communication. All this can still be represented in a system with a two-way arrow alternating the positions of source and destination.

Heeter carried this research out before Web 2.0. This means that the ideas of responsivity and active performance of the receiver can be considered advancements regarding the concept of interaction. Still, despite the development of description terminology and "new" elements that come into play, the model by Heeter is based in a logic of linear causality, in which things happen in chains, in sequences and/or in a two-way road, through neutral channels. This model constitutes a set of properties that can be satisfied by different degrees (continuum) and be classified (taxonomic model) according to a setoff given distinct features.

Many formulations post Web 2.0 are also fundamentally linked to this logic. McMillan & Downes (2000) propose a definition of interactivity based on other six dimensions. These are: (1) direction of communication; (2) timing flexibility; (3) sense of place; (4) level of control by the individual; (5) responsiveness; and (6) perceived purpose of communication.

The model by McMillan & Downes also constitutes a set of traces that can be more or less satisfied and thus be used to suitably arrange the interactive "objects" to create a taxonomy. Compared to what Heeter proposes, the authors advance the concept as they develop two points: timing flexibility and sense of place. The authors create the dimension of timing flexibility to refer to how synchronicity should be at the disposal of the necessities and expectations of those who interact. This means that the real-time speed ideal that is commonly included or implied in interactivity conceptions, should reconcile with the flexibility of interaction timing, for that is also a key feature in making interactive media more appealing.

Sense of place is the dimension that refers to the virtual space created by the cyberspace, to which individuals are "transported" as they communicate (Mcmillan & Downes, 2000: 169). These are two important advancements because they open room for us to articulate the concept of responsivity with synchronicity and so problematize the constitution of the so called "virtual space". We could ask: Is an immediate automatic answer interactive? Is an asynchronous human response interactive? Could an automated response be sensed, recognized or perceived as a human response? Could a human response be perceived as automated? However, this articulation in not sufficient to question, for example, how exactly this virtual place is constituted. It is assumed that this place exists "there" (wherever it might be) and that this is where those individuals go, without questioning or considering alternative hypothesis. In a previous research, for example, we argued that individuals do not go "there". In a way, they constitute the place[2]. Such advancements are thus underdeveloped and do not lead to a rupture with traditional models. The "virtual space" is interpreted as an "electronic space", made by the convergence of many resources and mediated interactions:

> Some of the factors that may help to create a sense of place include greater use of multiple types of media and greater opportunity for interchanges among the participants. (…) [T]he more interactive that a computer mediated communication environment becomes, the more likely that the individual will feel that he/she has been transported to a virtual place. (Mcmillan & Downes, 2000, p. 14)

The underdevelopment of this element is evident in the circular argument presented by the quote: the more interactive, more the individual feels that he/she is "there". The more the individual feels he/she's "there", the more interactive. Should we take the perception of a virtual place as a dimension of interactivity, or a result of it? As we argued previously, it is important that we study, far more deeply, what exactly the virtual space is.

Reviewing the literature on the terms interaction and interactivity[3] from a Deleuzian perspective evinces that many (if not most) of their multifarious definitions can be approached as a set of rewordings or paraphrases with different focal points and minor disagreements on epithelial levels. These definitions are still fundamentally derivative from the traditional communication model and its logic of linear causality. Such logic becomes even more evident as we concentrate on consensus points:

- Two-way communication, with interchangeable roles between transmitter and receiver
- Qualification of interaction as "active" or "passive"
- Coordination between synchronicity and responsiveness
- Sense of place
- Control over the environment, actions and its results.
- Possibility of content manipulation, of form and of the dynamic of a given environment.

To apprehend this logic of linear causality in a closed system, we can compare the scheme in figure 1, which summarizes these points of consensus, with the traditional model of communication that we presented previously.

Figure 2. Main Points of Consensus Regarding Interaction

Although the scheme in Figure 1 may look radically different and more complex than the traditional model of communication, for the former accommodates more elements and presumes no passive role between interlocutors, it is not much more than a more elaborate way to incorporate terms and ideas that are consistent with an internet-era mindset, with no fundamental change. Most globalized societies are highly influenced by neoliberal values. It is no coincidence that academic consensus and common sense claims that interactivity and interaction should:

- be flexible, engaging, dynamic;
- empower the individual;
- provide choice;
- show possibilities;
- involve the individual in an experience; and
- entertain

Frequently enough, the idea of interactivity and interaction is conveyed to entail much of what an individual can be presumed to desire in a neoliberal society. At the same time, however appealing these definitions may be, and despite how "right" they might seem4, these definitions do not overcome a model constituted of channeled actions that circulate in closed system, governed by a logic of linear causality, and that affects and is affected by the elements of this system. In summary, the research area has been working on advancements of an outmoded scheme, when in fact we need to rupture with it.

AN ALTERNATIVE VIEW TO BETTER COMPREHEND AND PROMOTE INTERACTIVITY

As we said previously, it is widely accepted that new communication technologies are interactive and that their interactivity is key to a successful online course. The widespread concept of interaction is treated as something fundamental to the educational process so that the people, the resources and the educational environment itself is much better the more interactive it is. This conclusion is not a problem in itself. The problem is that the idealizations submerges interactivity in positive qualities in a way that makes the concept unproductive and unhelpful to design online learning environments and resources, and to establish the people's roles in online courses. The idea of interactivity is frequently used in its adjective form: interactive. This idealization might create some apparent paradoxes, as the one that takes form in questions such as: do new technologies bring us closer together or make us more alienated? We say "apparent" paradox because, evidently, it is not about being closer or less close together, more or less connected. It is about new ways of relationships and about a reorganization of the public and private spheres of the ways of life since the emergence of cyberculture.

The idealization of interactivity also feeds on the association of "criticality" and "seriousness" with the ideas of "boredom", and "disinterest", and on the association of "acting" and "doing" with "motivation", "involvement" and "entertainment". Motivation is, indeed, a buzzword related to the general idea of interaction. Interactivity is not associated with situations such as a "serious" talk, but to things that "get the attention" and mobilize the individual to (want to) do something or to engage in an event. This kind of idealization, we argue, leaves in the shadows the discontinuities and constitutive conflicts of what it means to interact.

To tackle this issue, we have to problematize the heart of wide spread concepts of interaction and interactivity. We must question:

- the closed system that supposedly explains the process of interaction
- the idea of interaction and interactivity as an activity and a property;
- the positiveness surrounding the concept

As we discussed previously, the concept of interactivity is yet to overcome old communication paradigms and the closed systems in which they are conceived. The first researchers in Information Theories considered that communication was simply a process of message transmission. According to this perspective, this process consists of "a source and transmitter as a starting point of the message, a code responsible for the organization and consequential comprehension and sharing potential of the message, a channel through which the source may transit, and a receptor that the message aims to reach and influence" (Santaella, 2004: 158).

When this model was criticized, there was not a paradigmatic break with what is more fundamental in it: message transmission. The criticism focused on the fact that the message transmission happened "as in a linear one-way flow" (Santaella, 2004: 158). Other models and concepts have emerged (pragmatic model, negotiation concept, functional model, etc.) from this criticism, and they are held as advancements, for they "do not place the transmitter in a privileged role, but rather they focus on the process dynamics" (Santaella, 2004: 158). This perspective realizes that the messages are not closed (they are subjected to "noise"); that interlocutors exert influence over one another in message production; that meaning is not only interpreted from the verbal message; and that the message exchanging (and the message itself) is complex. But the idea of exchanging messages is still very much present. Indeed, there seems not to exist a communication model in which there is no "transmitted message" or no "flow of message". As paradoxical as it may seem, it is as if the traditional communication model had been "changed" to remain "the same".

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4 Besides their academic consistency and coherency, commonly enough these definitions simply sound "right" and constitute the common sense.

The concepts of interaction and interactivity are highly influenced by this communication model for two main reasons. First, because it is an important concept in the communication areas of study. Second, because the face to face conversation is taken as a key referent in terms of interaction that online education should try to reproduce or simulate. The result is that the concept of interaction seems to be subject to the same logic of transmission: not necessarily transmissions of messages, but flows of actions. Interactivity is apprehended as an event or a set of transmissions/flows of actions. However dialogic (because of features such as co-constructions and mutual influence) and complex (because of features such as sense of place) the concepts may seem, they can ultimately be reduced to a closed system and a process of transmission of actions in which there would be a source and a transmitter as starting points of actions; a materiality that accounts for its objectification and the sensitive potential of the actions; a medium where (a channel through which) the directional actions "flows", and a reception point which the action aims at reaching and that should react to it. This idea of interaction is subjected to the same kind of criticism that the traditional communication model faced: action was too simple, predictable, not subjected to interference and interpretation, and happened in a single direction (transmitter-receiver), without taking into account all the complexity of the interactive event. From this criticism, models that start to differentiate interaction and interactivity have emerged. They are models that propose advancements similar to those that we described regarding the communication model: participation and intervention of the parties, bi-directionality of actions, multidirectional influence among participants, etc.

Another aspect that we have to question is the idea of interactivity as an activity and a property. Such idea, on the one hand, presumes that the parties' presence is prior to interaction, meaning that it is pre-existent and pre-established, and that works as the fundamental requisite for interaction to take place. On the other hand, it also presumes that a given object (say, a video-game) might 'contain' features of interactivity in itself, meaning that interactivity consists of intrinsic features that a given object might or might not have, or that it might have in different degrees. Either way, we find ourselves facing an essentialist concept of interaction: it is either a set of traits that certain objects might contain, so that interactivity is a consequence of the use of an interactive object, or a set of traits that the parties' actions might have, so that interactivity is a consequence of the kinds of actions that are presumed interactive. This idea is not only derived from a logic of linear causality, but also constitutes a circular reasoning.

Alternatively, we defend that presence is not a given, not an absolute state, but a virtuality[5] and an effect. In the same way, interaction is not a flow of actions, but the very process (actualization[6]) that produces effects of presence. As a virtuality, presence is a condition and, as an effect, it the result of interaction.

Semiotics comprehends that presence is the effect of a penetrating object in a spatial-temporal domain in which the subject's perception is exerted to evaluate the intensity and extensity of the object's value and embodiment, given that intensity derives from the force with which we are affected by the object's values and embodiment, and the extensity accounts for spatial and temporal references. (Fontanille & Zilberberg, 2001, pp. 124-125). This means that a given entity is present when its materiality produces effects of meaning that are cognitively interpreted or lived by a given individual. Specifically, the semiotics of sensory experiences treat presence as a sensory dimension of the meaning or a meaning that happens by contagion (Landowski, 2002) as a kind of direct and immediate encounter between enunciative instances in act, that is, here and now. In this sense, presence is something like a co-presence among objects or individuals.

Going beyond this concept, we conceive presence, first and foremost, as a problematic field constituted by virtualizing forces, in a way that it does not necessarily have material qualities (be it as soma or as physis) or, in other words, does not have a tangible body (Cará Jr., 2011). Being present and being absent are not mutually excluding conditions and, ultimately, are not even conditions. Alternatively, they are effects made by certain relations, materiality and events. That is, as we talk about presence, we should not treat it as "a thing", a substance, not even as quality of a substance. Presence is contingent and cannot be apprehended if not by its effects. Thus, effects of presence are not contained in bodies, individuals, situations or in any other thing, and it does not take place in a flow of actions. Rather, it takes place in the relation among actions, individuals and objects. This relation is what we can call interaction.

A given individual or object is not simple either present or absent. It can be perceived more or less present and more or less intensely present by quantitative and qualitative aspects of presence, respectively. Taking into account that the effects of presence are actions or events, quantifying presence would consist of accounting effects that take place in a given space and time interval. As for the qualitative aspect of presence, the indication of its intensity is more complex and involves sensorial and material characteristics, responsiveness (for its relational characteristics), meaning making, and timing (for its relationship with now). This means that it is possible to assert that a given individual or object can be more or less frequently present, and more or less intensely present.

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5 Virtuality is not understood as representing a sterile reproduction or simulation of reality deprived of existence, but as the transcendental horizon with the potential for the new to emerge. The virtual a differential field that constitutes the condition for real experience, or better yet, the condition of genesis of real experience. (Deleuze, 1968/2006)

6 Actual is the product (not as a substance, but as an event) of the very process that resolve, integrate, or actualize a virtuality, anchoring it to a specific place and time. (Deleuze, 1968/2006)

At this point it is important to note that effects of presence do not transport us to a given place and time. As we argued previously, when you speak on the phone, you're not transported to the place where your interlocutor is, neither is he or she transported to where you are. And yet, you two might gesture during the conversation as if you were facing each other. In fact, effects of presence can constitute us here and there in a rhizomatic web of relations. Not surprisingly and without any estrangement, we're always "here", even when "here" does not coincide with the space where our body is (Cará Jr., 2011), always constituted in relation to another presence.

Finally, the positiveness surrounding the concept of interactivity should be questioned because it can be approached by any sort of intrinsic positive or negative quality. Only its effects can be positive of negative. If an individual is not literate in gaming, he can play the most amazing game (for some players) and yet miss most of the supposed interactive elements. The interaction does not coincide with this individual's playing (his/her action of playing), for it is actually the relation between his/her actions and the game's events. The stronger and richer this relation is, the more intense the presence is. However, it is not possible to determine how this relation will be established, for it depends on a number of contingent factors, namely, relevance, socio-affectivity, sensorial experience (meaning making), and cognitive and metacognitive processes.

Relevance concerns the role of individual and collective actions of the ones involved in practices towards a "transitory whole", an outcome, or a milestone. That is, it involves the perception we have of the importance of our intervention to the outcome or the sequencing of things. By "outcome" we do not mean the learning result, but the perceivable (not necessarily tangible) product of students' doings. When a student is assigned an activity such as "listen and repeat", one can expect some learning results (such as some degree of automatization of the patter being repeated). However, the outcome of this activity coincides with itself: the outcome of "listen and repeat" is the listening and repetition themselves. When a student is given an activity such as "listen and type in", no matter how well the user experience was designed, it is still poor in terms of interactivity. The audio is ready made and the best that the students can do is repeat it the way they hear. In this example, we should ask ourselves "what could the students do with the audio?" What if they could ask a question or comment about some specific part and get some feedback? What if students could answer each other's questions and reply to each other's comments? What if they had to solve some kind of puzzle by combining different audios and finding hidden clues in the comments inserted in parts of the audio? In these cases, reproducing what they hear (either by saying or typing the words) is not the main goal, but a means to an end. One might believe that just because the page is well designed and the activity is digital, it can be considered interactive. But activities such as "listen and type in" are a perfect example of poor[7] pedagogy transported to online courses.

The cognitive and metacognitive element refers to the way we can mobilize different cognitive and metacognitive functions at different stages of development, such as organizing, planning, manipulating, arranging, seeking, focusing, checking, assessing or evaluating, deciding, relating/personalizing, making associations, making inferences, contrasting, exploring cues, figuring something out, making predictions, transferring, adapting, applying, recognizing, substituting/replacing, paraphrasing, using or creating visual representations, devising, finding, confirming and applying patterns/rules, grouping, classifying, taking notes, acting out, summarizing, and cooperating.

In short, "the amount of" interaction and how "fun" it is should not be at the core of the principles of online course design. We should evaluate interaction for its qualities, not exactly to determine which kinds are better (taxonomic view), but to understand its qualitative potential in regard of the learning process. Reading a book, for instance, can be "just as interactive" as playing video-game. No resource and no activity in themselves "contain" qualities of interaction, which can only be realized when we consider the rhizomatic relation (in) between person(s) and events and activities.

Articulating the factors that we described (relevance, socio-affectivity, sensorial experience (meaning making), and cognitive and metacognitive processes), we proposed three intersected groups of reflective questions, aiming at evaluating the quality of interaction.

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7 This kind of activities might well be rather important to specific goals, such as creating automaticity. But is has a limited potential in terms of interaction.

- What is the dynamics of students' grouping and arrangement?
- To what extent do the students' interventions contribute to a perceivable (not necessarily tangible) event or product?
- To what extent do students' interventions relate to one another?
- What are the relations of power-knowledge that are established among students and between students and teacher?

Effects of Presence

- To what extent does the activity disrupt naturalized and neutralized "facts"?
- To what extent does the activity present itself as a problem or prompting that mobilizes cognitive operations?
- Which cognitive operations are at play in the activity?
- What is the variety and complexity of such operations and how do they relate to what students can do on their own and what they can do collaboratively?

- In which modes of meaning does the activity requires the students to make meaning?
- To what extent does the activity promote students' understanding of the place and position(s) from which they speak and of how such place and position(s) includes and excludes them from certain social practices?

(Meta)Cognition

Meaning Making

Meaning making and processes of identification

Intensity and quality of effects of presence

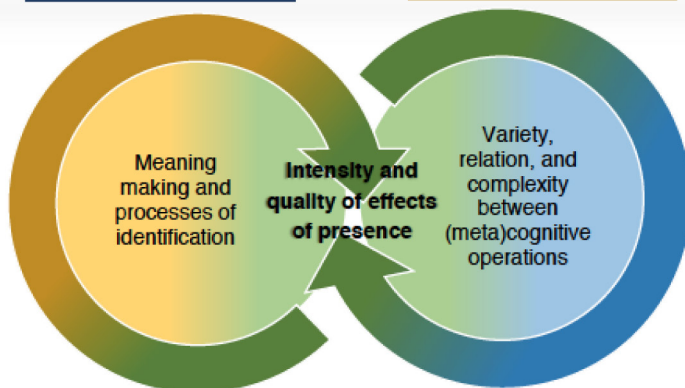Variety, relation, and complexity between (meta)cognitive operations

Figure 3. Critical framework for Evaluating Interaction

IMPLICATIONS FOR ONLINE COURSES

Although most (if not all) approaches to online learning assumes that promoting "interaction" in paramount, most courses seem to rely on face to face referents of interaction, using "traditional" activities (forum, chat, video-class, texts, etc.), or resort to cutting edge technologies (the ones presumably interactive), without much critical thinking regarding how effectively productive the course can be. Just because students are kept busy (doing lots of activities) or entertained (by advanced technologies) in the course, it does not mean that they are immersed in high-quality interaction.

There is a creative and productive potential in the conflict that is inherent to interaction, since it implies relations that produce states of things and events, and the online course should constitute a favorable environment for the realization of such potential. The main challenge of online courses is also its main objective, which is to promote opportunities for students' presence in high-quality interactions.

Having in mind all that we have discussed, online course designers should avoid:

- replicating face to face models to online courses
- devising activities around "interactive" resources or tools
- focusing on the total studying hours in a linear sequencing

Replicating face to face models to online courses has too main problems. The first one is that it neglects the specificities of online environments and their potentials and constrains. In a language face-to-face class, for example, one can smell an orange to learn the meaning of "citric". This cannot be simply replicated in an online course. On the other hand, animations in online environments open room for experiences that cannot be directly "translated" into face to face activities. The online course designer has to ask questions about the nature of what is to be taught (Is it meaning-based? Is it visual content? Audio content?) and consider didactic possibilities in the relation between content and (possible) digital practices. Besides, many face to face models might still be permeated by traditional and teacher-centered practices, which are not compatible with online courses.

Devising activities around "interactive" resources or tools is a problem because, as we discussed, no technology is intrinsically interactive. Still, many online courses might digital resources solely for their appealing effects (mainly when marketing the course). We should not be applying resources in online courses. We should be developing them for didactic and mnemonic purposes. Online course designers should plan the kind of interaction that should be promoted, that is, propose didactic solutions that have a greater potential to account for the factors of interaction, and then choose of develop the technology for it. We must focus on the affordances of technologies (considering questions of literacy and situated practices) put to educational purposes, not on the technologies themselves. There is a greater chance of learning to take place when the students are more intensely present.

Finally, we should avoid focusing on the total studying hours in a linear sequencing because learning is not linear, but an intricate process. Besides being more intensely present, it is also important to be more frequently present for learning to take place. The online course has to be an "inconspicuous" part of the students' daily life. It does not need to be literally unnoticed, but it cannot be constituted by a set of unfamiliar practices that are perceived as artificial and that does not resonate with "real" practices in which the student is engaged daily. The online course is better designed when it does not "wait" for the student to log in, but it calls upon the student to take action and keeps him/her logged in only for as long as the activities are truly fruitful. It is not only about how often the system invites the student to log in, but also about how interactive the invitation is. For example, an e-mail message starting with "dear student" is far less inviting than a notification on the student's phone calling him/her by his name. The numbers of times that the student accesses the online course is maybe even more important than the time that he/she spends in a row. This means that online tutors and course designers should monitor the number of hours in between logins (trying to keep this number as low as possible), the average number of daily logins, as well as the relevance of the activities done each time. There is a greater chance of learning to take place when the students are more frequently present.

Having in mind all that we should avoid, online course designers should seek for:
• refining the semiotic domains of user experience (UX) design towards the effects of presence and digital learners
• experience design, meaning that the true potential of the digital word is not replicating the face to face world; it's true potential is being digital.
• creating problem-solving based activities and environments in a variety of modes of meaning
• planning the studying hours in a rhizomatic sequencing, meaning that the "next step" is not a given and is not the same for everybody, but is a result of a combination of factors (the student's choices and interests, what the student is able to do on his own versus what he can do with some collaboration, etc.)

FINAL REMARKS

From reflecting upon interaction and interactivity and the implications for online learning, it is possible to draw some conclusions. First, both in academic discourse and in common sense, interaction is exalted as something that should always be harmonious and enjoyable, which neglects the tension and conflicting relations that are constitutive of interaction. We criticized that, defending that a great portion of the creative potential of interaction lies on the processes of resolution and negotiation of conflicts and tensions. Second, we can state that there is no course or activity that is not interactive, and the alternative concept of interaction that we presented does not imply labelling the best or worst courses and activities for their lack or abundance of interaction. We simply raised awareness for the fact that there is more at play than just the "quantity" of interaction, meaning that there are different qualities of interactions, which might promote different states and events. Some of these events and states are likely to be more productive, and that is what the online course designer should seek for. Third, we discussed how the analysis of the affordances of technologies can help us find the greatest potential and the limitations of didactic sequences and activities in terms of interaction. Lastly, we can conclude that we should avoid the trap of believing that the more "fun", the more interactive an activity can be. "Interactivity" and "fun" do not necessarily coincide, so the digital resources should not be included in an online course for their appealing characteristics. As we asserted earlier, it is about time we reflect upon the kinds of interaction that can be more productive for a given didactic and educational purpose and (only) then search for or develop the appropriated technology.

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PAPERS

Kavala's 6th Graders towards Mastering Mathematics: A Blended Learning Proposal at Disabled Students' Side
Foteini Evangelidou

ABSTRACT

Blended learning experiences a rapid growth as it has a lot of affordances to offer to diverse learning audience. The beneficial elements of blended learning support the learning growth of Learning Disabled (LD) learners, who struggle with their special learning needs and they meet obstacles in traditional educational environments. This paper constitutes a proposal for the development of a Mathematics online course for all 6th graders in Kavala, in Greece, aiming at blending the regular classroom students with learning disabled (LD) students, who attend integration classes and lack of equal opportunities in material access and students' interaction during the subject of Mathematics. The convenience, the flexibility, and the multi-dimensional features of an online course, combined with the face-to-face classroom experiences and instructors' presence, are considered to be a powerful tool for supporting the learning progress of LD students. The particular proposal focuses on the potential advantages of the online course Stars in Maths and suggests the basic instructional design principles for its development.

INTRODUCTION

Blended learning has emerged from the rapid rise of technology and its implementation in technology. Blended learning gains steadily the interest of the educational community, including teachers, learners, as well as educational organizations. The definition of blended learning has its basis on the content of pedagogical approaches, roles changing, conventional face-to-face learning in combination with the learning technologies defined as "anything that assists the acquisition or growth of knowledge or skill through communication, collaboration, access, interaction, and cooperation" (Fahy, 2016, p. 5). Specifically, according to the definition of Palalas (2015) "blended learning is a purposeful mix of learning theories and models that use more than one delivery method and tool to accomplish the intended learning outcomes while ensuring an engaging learning experience" (p. 6).

The affordances of blended learning have been supported from a wide variety of research studies. Among the wide range of blended learning beneficial aspects, student-centered learning, flexibility, team teaching, deeper learning and more engagement, multiple resources, better feedback on work, students' support and encouragement, as well as students' autonomy and metacognition development are identified as the most important elements of blended learning, which highlight its superiority from other traditional educational processes (Giarla, 2016). The variety of beneficial traits of blended learning can correspond to learners with special learning needs, considering that online processes are, on the one hand, basic component of blended learning, and, on the other hand, helpful for the learning development of students with learning disabilities (LD).

This paper proposes the development of an online mathematics course, supplementary to the 6th grade of primary school in Kavala, aiming at the facilitation of LD students and the improvement of their learning conditions. Moreover, the online course will be used as an interaction platform among regular and LD students in the subject of mathematics. The following sections explore the beneficial aspects of the online course for LD students' learning, and propose a design framework for the building of the online course.

The Framework of Learning Disabilities

The National Joint Committee on Learning Disabilities (1994) defines Learning Disabilities (LD) as "a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities" (p. 65). Some of the most common types of learning disabilities and associated deficits and disorders, include dyslexia, dyscalculia, dysgraphia, auditory processing deficit, visual processing deficit, non-verbal learning disabilities, executive functioning deficits, and attention deficit/hyperactivity disorder (ADHD) (Cortiella & Horowitz, 2014, pp. 3-5).

How Online Learning Benefits Learning Disabled Students

Learning Disabled (LD) learners often find obstacles in traditional educational contexts and get disappointed from their performance. Online processes offer unique opportunities for LD students, in order to have equal access to educational processes, satisfy their needs, promote their learning development, and achieve their personal learning outcomes. Particularly, the online learning benefits LD students in the following fields:

Convenience, Flexibility, and Self-Paced Learning
Online learning has a basic difference from traditional education - the flexibility (Hensel, n.d.). Specifically, online learning, providing both synchronous and asynchronous methods without time and space restrictions, offers "all the pacing allowances that allow learners the opportunity to study, practice, and review until their personal learning requirements are met and mastery has been achieved" (Fahy, 2016, p. 70).

Universal Design for Learning (UDL)
Online programs are designed in accordance with the principles of Universal Design for Learning (UDL), which provide: (a) multiple means of representation; (b) multiple means of action and expression; and (c) multiple means of engagement (Izzo, 2012; as cited in CAST). These principles serve the diverse needs of LD students, allowing the suitable accommodations for the instructional materials.

Structure
LD learners are positively influenced from a clear structure, without distractions, in their learning conditions. Online learning environments offers the appropriate structure needed by LD students through "cognitive organizers, clearly stated objectives, schedules and timelines, frequent embedded comprehension checks, integrated media, graphics, and illustrations, under learner control, multimodal presentations, and availability of one-to-one contact with the tutor" (Fahy, 2016, p. 69).

Student-Centered Learning
Students have active participation in learning processes, while the instructors are facilitators (Kassop, 2003), who support and encourage their students. The instruction can be adjusted on the personal needs of each student and become more individualized (Cortiella & Horowitz, 2014)

Interaction and Communication
Communication is crucial for human development and it is the basic component of being human (Dewey, 1958) as it includes mind, consciousness, intelligence, knowledge, intrapersonal, and interpersonal skills. Interaction can be considered one of the components of communication, as it refers to "all types of behavior in which individuals and groups act upon each other" (Wagner, 1994). Online learning, through technological tools, promotes the four basic types of interaction: (a) student-to-student, (b) student-to-content, (c) student-to-instructor, and (d) student – technology (Anderson, 2003; Schrum & Hong, 2002). Student-to-student interaction and student-to-instructor interaction are implemented effectively through both synchronous and asynchronous online tools. Stacey (1999) supports that this type of communication gives the students the feeling of belonging to a community and can create excellent relationships, and even friendships. These kinds of positive feelings are valuable for LD students, whose confidence and self-esteem play a vital role for their learning progress (National Adult Literacy and Learning Disabilities Center, 1995).

Assistive Technology
Assistive technology (AT) concerns devices that can counterbalance the disabilities, which LD students struggle with (Corley & Taymans, 2005). Online environments can employ assistive technologies, in order to serve the needs of LD students (Burgstahler, Slatin, Anderson, & Lewis, 2008).

ONLINE COURSE "STARS IN MATHS" FOR BLENDING REGULAR AND LD STUDENTS

Blended learning has the power to promote students' motivation, in order to achieve their individual goals (Latchem & Jung, 2010) following their own pace and needs. Blending conventional classroom with an online learning environment (such as the attendance of an online course) "take advantage of much of the flexibility and convenience" for students, who have the opportunity to participate in online learning processes while "retaining the benefits of the face-to-face classroom experience" (Dziuban, Hartman, Cavanagh, & Moskal, 2011, p. 17).

The Development of the Online Mathematics Course

The big concept of the proposal is the development of a Mathematics online course for all 6th graders in Kavala, aiming at the participation of students with or without learning disabilities, in order to have access to the same instructional material and employ interaction activities. The basic steps of the online course development include: (a) the needs analysis and assessment (Rosset, 1995) of the current conditions based on the problem model (Smith & Ragan, 2005), (b) the instructional proposal of the online course "Stars in Maths", (c) the instructional analysis-writing the goals and objectives of the online course (Northern Illinois University Faculty Development and Instructional Design Center, 2012; Smith & Ragan, 2005), (d) the instructional strategy (Athabasca University, 1990; Smith & Ragan, 2005), and (e) the students' assessment (Smith & Ragan, 2005).

Needs Assessment

Needs assessment sheds lights on the needs, which are the gaps between determined goals and the reality. It focuses on the desired outcomes and sets the basis for new instructional practices that constitute the solution for the existing needs, and improve the conditions of an organization or educational system (Hancock, 2003). The needs assessment of the current conditions of the 6th grade students in Kavala, focus on the questions: (1) What are the current public primary schools' conditions in the region of Kavala? (2) What are the requirements of the 6th grade for the subject of mathematics? (3) What is the situation, regarding the integration classes, where students with learning disabilities (LD) attend the subject of mathematics?

Currently, there are 68 public primary schools that are under the responsibility of the Regional Directorate of Primary Education of Kavala (including the city of Kavala, the island of Thasos, and the villages), which reports directly to the Hellenic Ministry of Education, Research and Religious Affairs. 38 primary schools support integrations classes (where students with learning disabilities, such as dyslexia, dyscalculia, and attention deficit / hyperactivity disorder (ADHD), attend some subjects - usually mathematics and Greek language – with another instructor separated from the regular class. 15 of the schools with integration classes are located in the city Kavala (out of the total 20 primary schools) and the rest 23 schools are dispersed in the island of Thasos and the villages. The usual number of students in the integrations classes are among two and five students, who have no interaction with the regular class during particular subjects, such as Maths (Hellenic Ministry of Education, Research and Religious Affairs, 2016; Regional Directorate of Primary Education of Kavala, 2016).

Moreover, the increase of the integration classes in the region of Kavala amounts to 20% for the 2016-2017 school year, due to the increase of LD students (KavalaNews, 2016). According to the official curriculum of the 6th grade, four school hours per week are devoted to mathematics. The curriculum and the subject goals are the same for both the regular and the integration classes. However, students in the integration classes often struggle in their effort to meet the requirements of the subject of mathematics. They need different teaching handling (Fahy, 2016), which sometimes is time consuming and four teaching hours per week are not adequate for completing the required curriculum. This situation entails with low LD students performance and grades in mathematics and the creation of observable learning gaps in the next grade. Finally, the limited available time sometimes has the result that LD students do not have access to the same instructional practices with the regular class and do not catch up with the curriculum.

Based on the information about the current conditions in Kavala's primary schools, the problem model is the appropriate, as the problem is observable. LD students are deprived of the total knowledge in mathematics, affecting their progression. Low grades, disappointment, low confidence and self-esteem are the negative results of this situation. Moreover, the current instructional context associated with the mathematics curriculum does not correspond effectively to the needs of LD students. Additionally, the instructional delivery and design affect meaningfully every dimension of the problem, concerning the needs of LD students. Changes and supplements in the instructional context are considered to contribute to the problem's solution. Figure 1 shows the problem's relationships.

Figure 1: Problem's Depiction
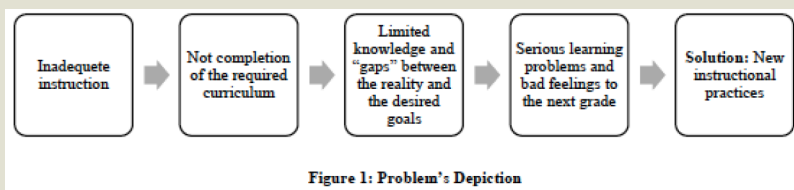
The Instructional Proposal

The affordances of online learning, as they were described in a previous section, can bridge the identified gap, laying the ground for the upgrading of the current instructional conditions in primary education, concerning both the regular and LD 6th graders. Blending online learning with the traditional classroom processes seem a beneficial solution for facing the current problems. Specifically, the proposal refers to the development of an online mathematics course, which will be integrated into the instructional practices of all primary schools in Kavala, be attended by all 6th graders, with or without learning disabilities, keep pace with the structure of the formal curriculum of mathematics, contain material in several forms (text, audio, video, etc.) and from multiple reliable resources, host discussion forums for interaction and feedback, and provide practice activities, collaborative assignments, quizzes and generally tasks for the comprehensive students' assessment in mathematics.

The online course will be named as: All Kavala's 6th graders are **"STARS IN MATHS"**- An online course for all needs. The "Stars in Maths" is an online course for self-regulated learning, dedicated to the 6th graders of Kavala, who constitute an audience with high rates of LD students. It consists of 6 Units, following the official curriculum structure.

The Instructional Analysis - Writing Goals and Objectives of the Online Course
"If the course designer is like an architect, then course goals are like the blueprint" (Noyd & The Center for Educational Excellence, n.d., p. 2). Specifically, learning goals are broaden statements built by the designers or instructors that answer to the question: What do we want our students to know or be able to do at the conclusion of this course? (Smith & Ragan, 2005, p. 7). Learning goals constitute the brief description of the desired learning outcomes by the end of a course. Learning objectives emerge from the learning goals. They "are different from goals in that objectives are narrow, discrete, intentions of student performance, whereas goals provide students with a global statement of intent" (Northern Illinois University Faculty Development and Instructional Design Center, 2012, p. 2).

The proposed online course will have as the basis for the development of its goals and objectives the Gagné's types of learning outcomes. In other words, the goals and objectives will focus on students' declarative knowledge, intellectual skills, cognitive/learning strategies, attitudes, as well as psycho-motor skills (Smith & Ragan, 2005).

The Instructional Strategy
The proposed instructional strategy for the development of the online course "Stars in Maths" is more supplantive than generative (Smith & Ragan, 2005). Students at this age need a more guiding instructional strategy, in order to correspond to their needs and cover any weakness and learning "gap". Blending the 5 P's (preparation, presentation, planned interaction, practice with feedback, performance assessment) design model (Athabasca University, 1990) with the events of the introduction – body – conclusion – assessment instructional strategy (Smith & Ragan, 2005) is proposed for the development of the online course, in order to meet the desired goals and objectives.

Student Assessment
"Assessment is probably the most important thing we can do to help our students learn" (Brown, 2005, p. 81). One assessment purpose is to examine the level of learners' competence. For this purpose the criterion-referenced assessment instruments are selected, as rest items tend to match the goals or objectives, the students' comparison and ranking is not the designers' intention, and learners' individual skills and weaknesses are determined (Smith & Ragan, 2005). The assessment of the online course "Stars in Maths" is consisted of the following three phases:

• Entry skills assessment: before the beginning of the online course, students will participate in several quizzes for checking the demanded prior knowledge, regarding the subject of mathematics of the previous grades.
• Preassessment: before the beginning of each new unit, students will participate in tasks for assessing what they already know, taking into consideration the objectives of each unit.
• Postassessment: completing each unit, students will be asked to check themselves for the new knowledge, acquired in the particular unit. Self-checking assessment tasks are very important for the learners, providing them with the feedback for their progress and the goals' achievement.
Assessment processes include a variety of assessment items, such as web-based pencil-and-paper testing, recall, recognition, and constructed answer forms, exercises with multiple choice, matching, completion and short answer questions, as well as links to other resources – online games.

CONCLUSIONS
"The most universal quality is diversity" (Montaigne & Hazlitt, 1842, p. 363). Not all students are the same. Learners have their personal needs, diverse characteristics and special preferences and demands. Learning disabled learners have their special needs too. These needs affect their learning operations and require different instructional approaches, in order to attain the desired learning goals. Blended learning offers valuable opportunities to LD learners; flexibility, convenience, communication, interaction, assistive technologies, straightforward structure, appropriate design, combination of conventional classroom learning with new innovative tools, self-paced and student-centered learning are some of the blended learning elements that meet the needs of LD learners.
The development of the online course "Stars in Maths" is proposed to supplement the traditional classroom learning and help all 6th graders in Kavala to have access to the same instructional material for the subject of Mathematics. The affordances of the online course are also beneficial for students with learning disabilities, as they have opportunities for self-paced learning, organized structure, interaction and multiple forms of material presentation. The diversity of the students' needs demand special instructional handling and blended learning, incorporating the proposed online course, is a dynamic support for their mathematics development.

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PAPERS

Key Considerations for Blended Learning
Khee Loon Foo and Wing Sum Cheung

ABSTRACT

This is an exploratory study of the key considerations for blended learning. We interviewed 7 subject matter experts in blended learning to find out the key considerations when individuals design and develop blended learning. According to the findings, key considerations include "no standard approach to blended learning", "common emphasis on pedagogical design and learning outcomes", "Risk of Excessive online learning in blended design", "choice of learning technologies – keeping it simple".

INTRODUCTION

Blended learning has been used in schools and organization for many years. In the recent, blended learning approach is one of the emerging treads in the knowledge delivery industry (Roony 2003), American Society for Training and Development outlined blended learning as one
The purpose of this study is to explore the key considerations for blended learning. Our major research agenda is to find out the key considerations for blended learning. Our research question is "What planning consideration do instructional designers take into account before embarking on blended learning?"

LITERATURE REVIEW

Definition of Blended Learning

Blended learning has been defined under numerous contexts to mean different things to different people. Broadly speaking, blended learning can be categorized into the following forms:

1. combining instructional modalities (or delivery media) (Bersin & Associates, 2003; Singh & Reed, 2001).
2. combining instructional methods (Driscoll, 2002).
3. combining online and face-to-face instruction (Ward & LaBranche, 2003; Young, 2002).

Vague as it may appear; the first two propositions as listed above are centered heavily on the impact of "media versus method" on learning (Kozma, 1991, 1994). Unfortunately, both of these positions does not offers clarity on neither the attributes of blended learning nor adequately explains its appeal, because they are too generic and end up literally encompassing all learning systems. The third proposition more accurately reflects the historical emergence of blended learning systems and is the foundation of the working definition in this research. This is also the most commonly accepted and generic definition of blended learning (Sharma & Barrett, 2007). Blended learning is often conceptualized as the incorporation of various Computer Mediated Communication (CMC) learning activities to conventional face-to-face learning (Graham, 2004).

The biggest draw of blended learning stems from its ability to combine the positive attributes of the two learning environments, face-to-face learning and e-Learning (Bonk & Graham, 2006). There seems to be something almost transformational about blending the interactive and social nature of classrooms with the self-paced environment of e-learning as each can deliver specific methodologies better than the other.

According to Richard Clark (Clark, 2012), with the advent of the Internet the 21st century classroom learning has a great affinity to the use of Internet and digital learning platforms, engendering the blending of both the interactive and social learning both within and outside of the traditional classrooms space. Some of the enablers of this new form of learning includes web 2.0 tools including Twitter, Facebook, and blogs; in the process effectively transforming the e-learning environment as a single mode of learning. Many of these emerging learning technologies have seen different applications and include options such as on-line help systems, digital repository holding rich library of information made available to different learner groups.

Computer Mediated Communication (CMC)

Building upon the commonly accepted definition of blended learning; that of combining CMC with face-to-face instructions; it is instructive to note that blended learning is very much centered on how communications facilitates the learning process both in the online and offline domains. Online learning is a term commonly used to refer to usage of the Internet to enhance learning and instruction. The advent and exponential growth of the Internet has resulted in new trends and uses of learning environments. In the context of blended learning, the Internet has given way to an "evolutionary transformation" (Garrison & Vaughan, 2008) particularly in universities or institutions of higher learning where such web-based systems are more readily available. These systems have been employed as new learning communication platforms that enable greater social interaction with students beyond the classroom space and more flexible learning environments in terms of economic and administrative considerations (Bates &Poole, 2003; Garnham & Kaleta, 2002; Singh, 2003). These technology enabled mode of learning is term Computer Mediated Communications. The variety of communication means (via Web 2.0 tools) can help students feel connected through the robust albeit virtual interaction of online communication both asynchronously or synchronously. Asynchronous communication is defined as "instruction and / or communication that takes place at different times, in different locations, eliminating obstacles related to time and travel constraints" (Fenton & Watkins, 2010, p. 233). Synchronous communication is defined as "instruction and /or communication that occurs in real time, whereby students and instructor exchange information at the same time and, most likely from different locations" (Fenton & Watkins, 2010, p. 240).

In this regard, the online interaction space is different from face-to-face instruction in a traditional classroom setting because the latter is often seen as a form of public communication, while online interaction is more akin to interpersonal communication (Wang, Walther & Hancock, 2009). In some cases, the communication is similar to intrapersonal communication between the learner and the computer mediated systems (Smith & Kurthen, 2007), a good example being e-journaling. In some ways, this communication through blended leaning approach may make the acquisition of knowledge easier. In essence, blended learning entails communication process that involves transference, expressing, sharing, collaborating and disseminating of information, values and individual perspectives. Some students have explicitly expressed this affinity towards computer mediated learning. In fact, they may even brand the conventional didactic style of traditional classes to be archaic or boring. In the conventional one way face-to-face course, some students may have difficulty engaging actively in the learning process. CMC provides a very viable alternative to break away from such conventions.Consistent with research on the topic; technology provides diverse channels of communication for educators (Verhoeven & Graesser, 2008) to effectively motivate their learners. By way of illustration, a student may feel inhibited to response in class because he is unsure of himself, but can be embolden and reassured after online consultation or research. This observation was substantiated by Shen, Wang, and Pan (2008), which found that blended learning in classrooms may increase student engagement and interactivity.

While the benefits of CMC are clear, it is important to note that not everyone is able to adapt to this form of learning. Studies have shown that the students' attitude have a major impact on the successful implementation of using technology in learning (Lee, Yeh, Kung & Hsu, 2007). This sets the context and value proposition for face-to-face learning.

Face-to-face Learning

Face-to-face learning refers to the didactic style of instructional, typically in a classroom setting. Although CMC or e-learning has the potential to allow for a much greater degree of personalized and self-pace learning, it is a poor substitute for face-to-face interaction. This is the limitation of a fully e-learning class, where the direct personal interactions are completely replaced by learning in the virtual space. Classroom interaction is not completely replaceable as students need to receive the direct human feedback instead of results from or mediated by a computer. Technologies will not be able to fully replicate the interpersonal contact between humans. Hence, in any blended learning design it is not just the ability to see the content, but also to experience this content by looking into the eyes of the people we interact with. The ability to quickly communicate a lot more than just the course content is a critical aspect of face-to-face learning.

This form of learning mainly involves the instructor presenting new knowledge, and / or conducting practical hands-on during class time. As a learning methodology, it clearly revolves around the instructor. Much of the learning outcome is directly dependent on the experience level and motivation of the instructor. Hence, the quality of instruction and experience of the learners may vary accordingly. This mode of learning is not without its share of drawbacks. For a start, face-to-face sessions are constrained by classroom time. This directly limits the time available for students to reflect deeply about a particular subject matter. In a classroom setting, it is also difficult for the instructor to direct specific questions to individual students, and to create opportunities for all the students to get involve or contribute towards any discussion. Consequently, these drawbacks in face-to-face sessions translate to limited student –student and student-instructors interaction (Hew & Cheung, 2003; Wong, Hew & Cheung, 2009).

In this regard, it is clear that both forms of instruction on their own; CMC and face-to-face; have clear strengths and limitations in their individual components of learning. This sets the context for under-standing the benefits of blended learning and the value proposition for any form of blended learning design seeks to leverage the best of both modes of learning in an integrated fashion that caters to the needs of all learners.

METHODOLOGY

Premised on grounded theory, qualitative research interviews would be the main research methodolo-gy to gain deeper insights on the design considerations as applied by instructional designers and advocates of blended learning. The interviews seek to describe and the meanings of central themes in the life world of the subjects and to understand the meaning of what the interviewees say (Kvale, 1996). This methodology allows the interviewer to pursue in-depth information around the topic. (McNamara, 1999). The research would reach out to various groups of instructional designers, teachers and educators (seven interviewees) to understand their key considerations about blended learning. Each expert had at least 5 years' experience in designing blended learning. Their key considerations may provide the foundation for further research.

The qualitative research interview design for this study is made up of four major stages, adapted from Stake (1995) and Creswell (2003) which consist; focusing the study, collecting the data, analyzing an interpreting the data, and constructing and presenting the findings. A purposeful sampling approach was used where we selected the participants "on the basis of knowledge of the population and the purpose of the research" (Kayrooz & Trevitt, 2005, p.157). The participants are currently working in various instructional designer roles catering to the needs of different learner groups ranging from young students to adult learners. The participants themselves include five males and two females aged 35 to 55 years old.

FINDINGS

Convergence on the Accepted Definition

The research question seeks to address the design principles that occupy the minds of instructional designer whenever they design blended learning packages. Beginning with the very fundamental understanding and definition of blended learning; it was evident that while there are many definitions and modalities, the participants are unanimous in the definition they accept with reference to the term blended learning. One of the participants stated that:

"Blended learning is the combination of Face-to-face learning with Computer Mediated Communications in some proportion" (Participant A),

While other participants said:

"The key behind blended learning is how we blend conventional classroom face-to-face learning with some form of online e-learning"; and "Blended learning must entail some measure of online learning" (Participant B).

One participant further qualified his perception of the two modes of learning that characterize blended learning:

"If it is a complex subject matter or something sensitive which requires urgent attention, face-to-face communication will be preferred"; "face-to-face is a necessity to avoid any misunderstanding and for building stronger inter-personal relationships";and "for project co-ordination, face-to-face will be more effective because it offers greater clarity and saves time especially when I need immediate feedback from whoever I am engaging. Computer mediated communication, on the other hand, is used to facilitate and encourage interactions amongst the learners and with the instructors which will allow different or alternative perspective of any subject matter to surface." (Participant C)

All the participants did also qualify that the media used in blended learning environments are not limited to the Internet or computers as learning platforms. Some cited their own personal examples, and the way they implemented blended learning using mobile technologies, including smart phones, laptops, tablet PCs and even digital content on CD ROMs. All of these comprise the mobile communi-cation culture of today's students (Milne, 2006).

Instructional Designers' Motivation for Embracing Blended Learning

It was instructive to gather from the interviews conducted the motivation for the instructional designers in adopting blended learning as a strategy in instruction. Understanding these motivations provides the basis for an in-depth understanding of the different approaches they used to determine the right blend. According to one instructional designer:

"Blended learning capitalizes on the collective strength of each learning models and eliminates their individual weaknesses. Let me just cite the immediate benefits I have reaped from adopting the blended learning approach for my classes. Firstly, my students will have greater autonomy, being able to select between CMC, peer-to-peer learning, self-paced and the conventional face-to-face instructional learning. This autonomy that comes with blended learning allows a wider span of learners' needs to be met. Different people have different affiliation to a certain learning style and learning approach, because of their individual upbringing and also personality. Just to elaborate the point further, I have observed certain introverted students who are very passive in a face-to-face classroom session, but once they get to the online learning environment, they become very active and literally a very different person. The online environment provides that "aura of security" that breeds confidence in students to interact at a deeper level." (Participant D).

Another instructional designer also highlighted the flexibility that blended learning offers:

"Some of my students have also benefitted from the flexibility that blended learning offers in terms of time and space of learning. This is especially true for many of my adult learners who having work and family commitments, struggle with fixed time to be in campus. The blended approach allows many of them to circumvent this problem by managing their self-pace learning online and attending the face-to-face campus session as the need arises."(Participant C).

This translates to a pace of learning that is determined not by the ability of the weakest student, but customized to a pace that is "comfortable" by each individual learning abilities and competence. The participants' comments illustrate that many of their learners value the learning flexibility due to family, work and other external commitments (Gosper et al., 2008; Macdonald, 2008). In their experience, for many of their students, blended learning and the flexibility it offers with regards to the time and place of study is crucial for their consideration into the program that they ultimately select.

From a reach and information accessibility perspective, instructional designers' motivation to employ CMC stems from its ability to bridge peripheral users by connecting them across an entire organization. What this means is that the students now have access to a wider pool of subject matter experts as compared to the one instructor in the conventional classroom setting, and significantly enrich the level of interaction.

For the faculty, they have the flexibility to engage all the students online and provide on-site support for students that need extra support through personal tutoring or conducting small group sessions. These face-to-face sessions are hence focused to address specific needs, making the learning sessions very efficient and effective.

No Standard Approach to Blended Learning

Talking to the different instructional designers, it is apparent that while they may agree on the generic definition of blended learning, the consensus as far as approach ends there. A consistent theme that emerged from the interviews is that there is no one standard way or approach to developing blended learning packages by instructional designers. Each instructional designer has their own weighted issues and considerations when designing blended learning packages from ground up.

The instructional designers are guided by their own personal training and learning experiences. In the course of the interviews, it appears that their earlier exposure to blended learning has strong influence on the approach they individually adopt. Two of the instructional designers choose to adopt a deliberate and structured approach guided by the ADDIE model. Their rationale for this approach is predicated on having a comprehensive ground up approach, starting with an in-depth analysis of the learners' needs and their profiles and then customizing the blended package based on the context of the subject matter and also the technical proficiency of their learners.

"The process I adopt is fundamentally based on the ADDIE model. I start by first analyzing who are my learners. This usually involves a detailed understanding of the make-up of my class by knowing the profiles of all the students in my class. Specifically for a blended learning package, I would check the IT literacy of all my students and their prior experiences with learning online. I would also ascertain the profile of my students; whether they are adult learners from the industry or students. A good understanding or profiling of my students will help me scaffold the learning modules and contextualize the learning in a progressive and relevant manner.

Next, I would scope the learning objectives of my students. The learning objectives are predicated on what the school requires of the students but also what the students themselves would like to attain in the course of their learning. By engaging my students, I gain a better understanding of what would better incentivize their individual learning process. The end product of this phase of analysis would essentially become the desired learning outcomes I map out for all my students.

Once the needs and learning domains are clearly identified, I develop my instructional or blended learning strategy. Based on all the learning content that needs to be covered, I would map out the best method or mode of instruction that best suit the content delivery. I must add here that the choice of instruction, whether face-to-face or online, is predicated on several considerations; it stems from complexity of the content, to the instructor's preference and experience.

Once the mode of instruction has been decided, I will focus on monitoring the participation of my students in the various learning activities. It is here that their individual performance is tracked and periodic feedback on progress given so that remedial actions can be taken along the way. This I will do till they submit their final assignment.

Another important planning consideration for me in the design of blended learning packages is the resources made available to me. Resources are key because often in blended learning, there is a need to acquire certain learning software, or hardware solutions. Although such infrastructural cost can be mitigated by using various free or low-cost web resources, due consideration on resource allocation is still necessary from a system maintenance perspective. In my experience, starting a blended learning package is easy, but maintaining it can prove to be a real challenge."(Participant E).

The other five instructional designers adopt a "trial and error" approach that is synonymous to the Rapid Prototyping model. This approach entails a quick prototyping of a blended learning package with a typical 50-50 blend between face-to-face and CMC learning. The designers who use this approach relish on the fact that it is not easy to determine the correct mix of learning modes in any blended learning design. Hence, instead of focusing on getting it correct at the onset, they prefer to calibrate the media and mode of blended learning as the learning progresses. It should also be noted that the designers who adopt this model is usually constrained by limited resources in terms of money and time. The circumstances usually necessitate a more expeditious form of implementation.

"As mentioned earlier, the important measure for blended learning lies not in the proportion of learning modes, but rather the learning effectiveness in attaining the intended learning outcomes in the course of implementation. However, from a practical view point, I usually start off with a 50-50 proportion and from there I would make adjustments to the learning modes based on the feedback I get from the students themselves. This is what I call rapid prototyping and it allows me to formulate an instructional model or learning package that is customized to a specific learning environment quickly with minimum overheads. I adopt this approach of rapid prototyping because in my work place, time is a huge constraint and I needed a way to model my learning packages in the shortest possible time."(Participant E)

Common Emphasis on Pedagogical Design and Learning Outcomes
Two consistent patterns emerged through the course of the interview with all the instructional designers. It was observed that all the instructional designers were unanimous in what they perceived as key considerations in the design of blended learning packages. The first pertains to the importance of having very clear pedagogical design and the second is to have clearly defined learning outcomes as definitive measurement of learning effectiveness.

Pedagogical approach as the driving factor
All the instructional designers cited the clarity of the pedagogical approach as the single most important factor to guide and shape the overall design effort. The pedagogical approach here refers to the specifics of the instructional approaches and strategies to be used. The pedagogical approach influences the instructor's and students' roles, and has a direct impact on the learning motivation, interaction, and cooperation in the course (Ertmer & Newby, 1993). Therefore, deciding on the best pedagogical approach to meet the specific needs of the blended course is a crucial step in the overall design process. When questioned further what the instructional designer meant when they are talking about pedagogical design, the designer explained that this has to do with how the learning will take place through what they called the "concept of use". The concept of use underpins how the entire usage is encapsulated within the design. Two of the instructional designers explained that blended learning is not just about translating conventional learning of face-to-face classroom learning to digital or e-learning content. It is also not just about incorporating the use of e-learning content alongside with face-to-face classroom learning. Rather it involves an intricate and tight coupling of learning in each of these media to deliver and drive home the required learning content. One instructional designer provided an example to illustrate the point:

"An important factor to achieve successful implementation of blended learning is the pedagogical consideration. By this I mean, the designer must be very clear how the desired learning outcomes can be achieved. This requires a clear understanding of how the different components in a blended learning package will contribute towards the overall learning experience. A clear concept of use or how the different elements of the blended components will contribute to learning must be clearly documented. A good blended learning package is defined at the heart of it by its pedagogical design and not just be the loose coupling of technologies with face to face learning. This point must be emphasized to all instruction-al designers."(Participant F).

Another common focal point for the instructional designer as far as blended learning is concern is the clarity of the learning outcome in the design of the learning package. All the designers reiterated that the learning package must be developed with the learning outcome as an end in mind. According to the interviewees, the learning outcome provides the ultimate waypoint in measuring how well the learning package is meeting the needs of the learners. A learning package may have the most comprehensive learning technologies, or even very interesting content, but if it is not meeting the needs of the learners, it is irrelevant and ineffective. Hence, in the design process, it is of paramount importance that the instructional designer does not lose sight of this ultimate objective. In this regard it is imperative that the designer define the learning outcomes and establish a clear understanding with the learners what the learning package sets out to achieve at the very onset of the learning process. Only with this clarity can both the instructors and learners have a defined yardstick to measure learning progress. Many of the instructors use this to do evaluation and have used formative evaluation to make variation to their blended learning package. They also agree that these modifications and refinement to the overall learning design greatly aid in the successful implementation of the learning package.

Risk of Excessive Online Learning in Blended Design

One of the observations (made by three of the interviewees) resolves around the proportion of e-learning that should be incorporated in any blended learning package. In the interviews conducting, many designers agreed that while it is difficult to establish a fix proportion of blend between face-to-face and e-learning in any blended learning package, the general rule of thumb is to avoid having too excessive an online learning design. The measure of excessiveness was understandably subjective, but three of the instructional designers suggested no more than 40% of online activity based on their experience. In any blended learning design, the online learning media pre-supposes certain behaviors in the learners. The nature of the online learning requires the learner to exercise self-discipline, individual ownership towards the learning outcomes (or motivation to learn) and discipline before it can achieve it desired learning effects. This is especially true for online learning conducted in an asynchronous manner, held outside of classroom space. From the experiences of the various interviewees, the designers noted that many of their learners are inclined to compromise on the online learning demands whenever they face competing demands. This occurs regardless of the learner's age group. One of the instructional designers attributed this to overwhelming demands in daily learning and work:

"I would not advocate that any blended learning package be designed with over-emphasis of the online experience. In our local context; many of our students, regardless of their age and learning motivations; struggles with such conflicting priorities and demands which affect their learning commitment. Hence, when student are given the autonomy in learning, many of these online learning components will inadvertently run the risk of being "dropped" or receive minimal effort in the interest of other competing demands. In my experience, blended learning packages with too heavy of an online component are more susceptible to higher attrition." (Participant D).

Choice of Learning Technologies – Keeping it Simple

Another concern that all instructional designers share in blended learning is in the selection of the technologies that designers embrace in their development of the blended learning packages; particularly for the online learning environment. The choice of technology has a direct impact on how the learner learns and interacts with one another; it also weighs heavily on the instructor who needs to keep the system available and reliable so that the students themselves can trust the learning systems. As one designer puts it very aptly:

"In all our blended learning the foremost element of concern is not about content, but rather it is about accessibility to the content can be enabled through ease of use of technologies. If the student doesn't succeed in setting up their access to the system then they won't be able to learn via an on-line system. This has implications for the provision of technical support to enable student participation and would need to include some form of technical support from help desks. The issue of accessibility and quality of online access is therefore a quintessential element that impact students' motivation to learn. If this is a problem, the blended learning cannot proceed." (Participant C).

Simply put, the technologies that are finally selected must enhance the learning process for both the learners and instructors who are facilitating the entire process. When asked about how the instructional designers themselves select their choice of technology, many highlighted the need to keep the use and implementation simple. As one designer puts it:

"Effort in implementation translates to the time needed to explore, train and sustain the system. Every time a new technology is identified, considerable amount of time is needed to explore and to understand its potential and limitations. Some technologies may appear to be very promising, but it may require a certain level of expert knowledge or skill before it can be fully exploited. In such instances, the instructors need to cater training time to level up the trainers and students. These can be very extensive and hence time consuming. The effort to sustain continued operation and maintenance of the system must also be taken into context. In essence, the effort needed to implement the technology may add up to be more that its value add (effort for implementation > value add of technology) and in such instances, it becomes an interference to the learning process."(Participant G)

Another instructional designer emphasized the importance of getting this right from the onset as it has a direct impact on longer term sustenance of the blended learning program:

"My experience with many of my learners (teachers) has indicated that the technology infusion process is not too difficult and is something that both students and instructors can pick up fairly quickly. This is so because of the many technical solutions available today. Also, the accessibility of Internet into many homes and mobile apps on many of our consumer electronics products has help to ease the learning curve associated with many of these learning technologies. An important consideration is the choice of technology we introduce to the learning process. To help the technology assimilation process, an instructional designer must learn to pick a tool that is easy to learn and implement. Hence, simplicity of tools will greatly aid in the training of both learners and instructors and would not become a hindrance to the blended learning implementation."(Participant B).

It would therefore be important to reiterate that with the fast rate of technology infusion, instructional designers will have no shortage of options when it comes to selection of technology to aid in the learning process. However, it is important for all instructional designers to go for technologies that are easy to implement, easy to use and easy to maintain in order to derive the desired outcomes from any blended learning packages.

CONCLUSIONS

In our study, the seven instructional designers who worked in Singapore shared with us that the key considerations for blended learning. The key considerations are "no standard approach to blended learning", "common emphasis on pedagogical design and learning outcomes", "Risk of Excessive online learning in blended design", "choice of learning technologies – keeping it simple". Due to the limitations of the number of instructional designers involved and they all worked in Singapore, this study should be repeated in other parts of the world to confirm the key considerations for blended learning. In addition, the finding may inspire other researchers to explore further the design approach for blended learning.

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PAPERS

Mobile Technology in Dental Hygiene Education and Practice
Lizelle Tucci and Caroline Park

ABSTRACT

The adoption of mobile technology in the education of health care practitioners has become more widespread. As a result, blended learning environments that include the classroom and clinical teaching environments have been on the rise. As more dental hygienists work in independent settings, the use of mobile technology at the point of care is essential to provide optimal oral health care. Very little work has been done to study the adoption of mobile technology in dental hygiene practice and education. The purpose of this study is to identify the current use of mobile technology in dental hygiene education, and dental hygiene clinicians', educators' and students' perceptions about this use. Results reveal that mobile technology use in dental hygiene education is still in its infancy. Educators and students value their use and feel that mobile technology can enhance dental hygiene practice. Based on the initial findings, the adoption of a blended learning environment may be prudent. Collaboration with governing bodies to create best practice guidelines for the clinical use and increased dialogue amongst educators must be encouraged to discover and promote champions for change.

INTRODUCTION

Mobile technology such as smartphones and tablets is an umbrella term for mobile hand held computers increasingly used in health care environments. Health care practitioners use hand held computers primarily for administrative tasks and to direct clinical work. For example, physicians use mobile technology in their medical practice for decision support, as well as collecting and accessing data. They are also favored for reasons of convenience, portability, connectivity, inexpensive cost, and ease of access to software (Free et al. 2010). A popular adoption of mobile technology has been in the education of medical residents and other health professionals (Luanrattana, Than Win, Fulcher, & Iverson, 2012; Siddiqui, & Jonas-Dwyer 2013). This includes the use of mobile technology to help access pertinent information at the point of care in the training of pharmacy, radiology, and more recently nursing students (Applegate, 2010; Chatterley& Chojecki, 2008; Moloney & Becarria, 2009; Siracuse & Sowell, 2008;Wu, 2014). In particular, there is a growing body of literature exploring their use in nursing education. This has been stimulated by mandates from organizations such as the Canadian Nurses Association (2006) and the Canadian Association of Schools of Nursing (2011) that have recognized the need for the incorporation of new technology and the promotion of blended learning environments into nursing education. Similarly, the College of Dental Hygienists of Ontario (2009) practice guidelines for educators encourages the use of appropriate technology to encourage blended learning environments to enhance student learning. Very little research has been done to study the use of mobile technology in dental hygiene practice and education. In the literature that was reviewed, benefits and barriers of mobile technology use in nursing education were described. In addition, strategies for the successful integration of mobile technology into current curricula were outlined. Based on the benefits, health professions such as dental hygiene may want to use mobile technology in practice and education. It is important to identify the current use of mobile technology in clinical practice and education, and dental hygiene clinicians', educators' and students' perceptions about this use. This would provide information about the current use and understanding of mobile technology in practice as they relate to dental hygiene and as they compare to practices in other health professions. Such information would be useful in planning purposeful integration of mobile devices into education.

Dental Hygiene Practice

The dental hygiene profession in Canada has made great strides in establishing self-regulation and self-initiation of practice. Dental hygienists were previously required to work under the guidance of a dentist. With ability to self-initiate practice, many are setting up mobile practices to visit clients that are in rural settings, home bound, community health centers, cultural communities, and stand-alone dental hygiene clinics. In these settings, dental hygienists become part of an interdisciplinary health care team providing optimal oral heath care to a growing diverse population. Independent practice for dental hygienists requires increased access to health information at the point of care. It also requires communication with various health care providers to ensure proper safe care. Mobile technology resources provide the support needed to achieve competencies required in information-intensive healthcare delivery systems (George et al., 2010). Mobile technology allow for immediate access to important knowledge for practice as well as solidifying professional confidence by allowing the student to provide immediate patient feedback (White et al., 2005). While several articles have been published on the use of mobile technology in nursing education, little work has been done in the application of mobile technology in both dental hygiene practice and education (Covington & Claude-pierre, 2006). The lack of knowledge in this area creates a disadvantage for dental hygienists who must be able to participate in an interdisciplinary health care team.

PURPOSE OF STUDY

The purpose of this study is to identify current use and perceptions of use of mobile technology in dental hygiene practice and education and the identification of benefits and barriers for the adoption of mobile technology specific to the dental hygiene profession. Two research questions will be addressed. (1) What is the current use of mobile technology in dental hygiene education in Ontario? (2) What are these faculty and students' perceptions about using mobile technology in dental hygiene education?
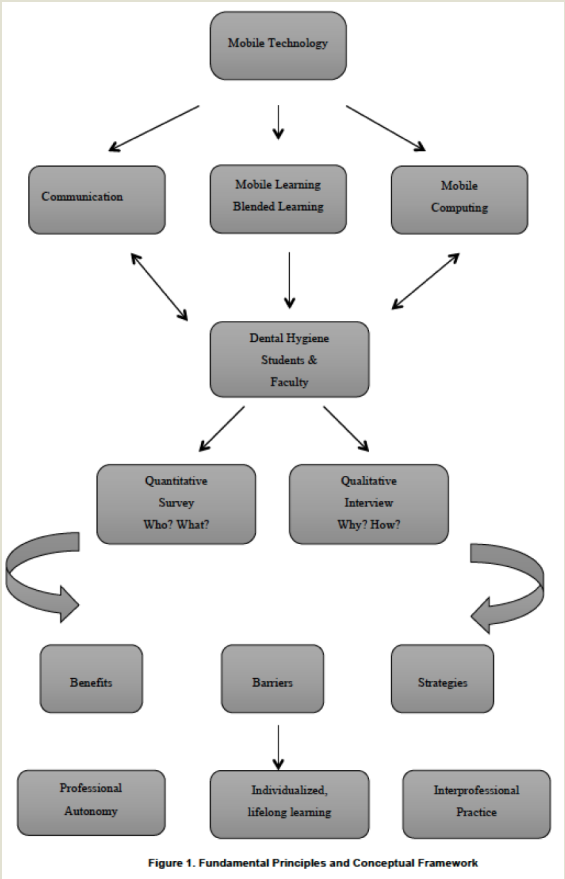

Figure 1. Fundamental Principles and Conceptual Framework

METHODS

This study involves a qualitative mixed methods design of descriptive statistics with descriptive interpretation of interviews. Quantitative data provided detail on the current use of mobile technology in dental hygiene education and practice. Qualitative data identified unknown processes of mobile device use and further developed fundamental principles that guided this study.

LimeSurvey was used to identify demographic information, mobile device use and patterns, and details of the potential use of mobile technology in dental hygiene education. This included descriptive statistics. Qualitative descriptive methodology provided the methodological framework for describing and analyzing follow up telephone interviews.

Qualitative description is inquiry that seeks to describe a specific phenomenon or experience from the participant's perspective. It is considered the most transparent of methodologies as it commits to describing data in the direct language and perspective of the participant (Sandelowski, 2000).

Sampling and Recruitment

Participants included faculty and students from the sixteen accredited dental hygiene schools located in Ontario, Canada. Contact information for these schools was obtained from the Commission on Dental Accreditation (CODA) website. The potential population sample for faculty and students was one thousand.

Purposive sampling was used to gather participants for telephone interviews. Inclusion criteria were respondents who agreed to participate in a telephone interview and responded to initial contact.

Data Collection and Analysis

The online survey questionnaire with information letter and informed consent was sent via email to faculty and students by the program director of each school. Descriptive statistics were obtained through univariate analysis. Frequency distribution and central tendencies described specific variables. Descriptive statistics were obtained through univariate analysis. Frequency distribution and central tendencies described specific variables.

Telephone interviews were subject to inductive content analysis. Content analysis is used in qualitative description and involves analytic strategies that are of common practice to other qualitative methods (Elo & Kyngas, 2007; Miles & Huberman, 1994).

RESULTS

Ten of the sixteen accredited dental hygiene schools in Ontario participated in the study. From the ten participating schools, there was an estimate of ninety dental hygiene educators and six hundred dental hygiene students. Thirty-three dental hygiene educators participated in the online survey and five participated in a telephone interview. Fifty-seven dental hygiene students participated in the online survey and of these, seven participated in a telephone interview. A 37% response rate was achieved for dental hygiene educators with a 10% response rate from students in the participating schools.

DISCUSSION

Dental Hygiene Educator's Use of Mobile Technology and their Perceptions of use

Overall, there was a discrepancy between educators' use of mobile technology and their perceptions of use. Educator participants valued their use in the classroom and the clinical teaching environment but most did not integrate them or were prohibited from doing so. Authors that studied technology acceptance amongst educators have also reported the inconsistency between perceived benefit and technology adoption. Despite the benefits of mobile technology in education, there has been limited integration into practice due to lack of effective professional development, school policies that do not support mobile learning, and educators' beliefs about the role of technology in the curriculum (Aldunate, & Nussbaum, 2013; Moran, Hawkes, & Gayar, 2010). These findings are similar to results in this study. Educators felt that unfamiliarity with technology, lack of training and administrative support, and the ban on use of mobile technology within the clinic were significant barriers to use.

Students' use of Mobile Technology and their Perceptions of use

Students' use of mobile technology and the associated applications was more diverse than that of their educators. For example, they frequently used text messaging as well as Facebook to support communication and learning experiences with other students. Dental hygiene educator participants mainly used course management systems to communicate with students. These findings are similar to research done by Guidry and BrckaLorenz (2010) who compared student and faculty academic technology use across disciplines. The authors found that students reported more use of some technologies than faculty. In addition, students and faculty used course management systems more often than any other technology. It was suggested that this was due to students' use of tools that were not required but were useful in communication with other students for study. Conclusions by Guidry and BrckaLorenz (2010) shed some light on findings from this study. Several institutions that participated in this study used WebCT/Blackboard as a required course management system. This is why both educators and students used the course management system as their primary form of communication and main resource tool. For the most part, educators did not promote the use of applications or resources that were not required

Barriers, Benefits, and Strategies for Implementation

Overall, there appear to be several conflicts between current use of mobile technology and views of use by both educators and students. Educators value their use within the classroom and clinic however they have not been able to integrate them into their teaching. This was predominantly due to lack of familiarity with technology and their expressed need for training. They also saw the need to integrate mobile technology within the clinical teaching environment however; most schools have banned clinical use.

Educators felt that students' required instruction or guidance on how to use mobile devices for educational purposes both inside and outside of the classroom. Contrary to this, students' seemed much more comfortable with their use and their use of applications was consistently more diverse than that of their educators. The age of educators was considered a factor in the slow adoption of technology. The significant disconnect between educators and students prohibit the growth of mobile technology use in dental hygiene education.

Mobile technology use by dental hygiene educators and students is viewed favourably. However, work is required to help both educators and students integrate them into education. It appears that dental hygiene students are actively integrating mobile devices into their learning. Despite the push by students, educators feel that they are unprepared to guide their students on proper use in both the classroom and clinic and indeed prohibit them in many clinical settings.

The findings from this study support previous dental hygiene, dental education, and nursing education research. Overall, the new finding is the inability through prohibition for most dental hygiene students to use mobile devices within the clinical environment due to issues of infection control and privacy. This becomes a major barrier that impedes their clinical knowledge acquisition and patient care.

There appears to be a wealth of information and many best practice guidelines to help both dental hygiene educators and students understand the appropriate use of mobile technology within the clinical environment. Future work involving the collaboration of governing bodies and dental hygiene educators to facilitate best practice guidelines for their use within the clinical environment for both students and practicing dental hygienists is needed. This information would specify how dental hygienists should use them within their practice environment.

Identifying a faculty champion for change to support both student and educator use of mobile devices is key in the proper adoption and acceptance into current curricula. Results from this study reveal a subset of educators who feel strongly about their use in the education of dental hygiene students and have started to integrate mobile devices into their teaching methodology. These educators are potential champions for change and their value must be recognized and supported. In addition, introducing faculty support through administration with training and education is also necessary for faculty to become more familiar with new technology.

Implications for Dental Hygiene Education and Blended Learning

The results from this study reveal preliminary findings of mobile technology use in dental hygiene education. In this study, both dental hygiene educators and students favour the use of mobile devices in a teaching and learning environment. Several benefits, barriers, and strategies for implementing mobile technology into current curricula were highlighted.

Based on initial findings, the adoption of a blended learning environment may be prudent. Overall, educator interview participants were quite experienced in incorporating mobile technology into their teaching and felt that their use had a positive effect on students' learning. They appreciated the ability for students to access information anywhere and at any time supporting a learner based education. Most participants asked students to use a mobile device to research information pertinent to both class and clinic.

Dental hygiene students are also favoured a blended learning environment. Students felt that the use of mobile technology within the classroom allowed them to look up information that was not clear to them during a lecture. They also felt that it allowed them to do work when and where it was most convenient for them. In addition, students felt that they were able to communicate better with their peers and educators. This was an asset especially when students worked in groups and were required to contact classmates with whom they normally do not keep in touch with.

These findings are consistent with findings nursing literature. According to Park, Van Neste-Kenny, Burton & Kenny (2010), nursing students utilized the Internet to access information during class. The access to immediate information during group work provided pertinent real time information for discussion that enhanced group learning. In addition, learning was more efficient since students were able to access missing information immediately instead of waiting to review the information during the next class a week later (Park et al., 2010).

Nurse practitioner students identified the ability to access volumes of information on mobile technology as a positive impact on their overall learning experience (Koeniger-Donahue, 2008). Senior nursing students recognized that information found through their mobile technology was timelier than traditional textbook references available to them allowing them to remain current in practice (Brubaker et al., 2009; Kenny, Park, Van-Neste Kenny, Burton & Myers, 2009). In a study that looked at nursing students' information seeking behavior with mobile technology, the majority of students felt that the it allowed them to answer current clinical issues and questions (Miller et al., 2005).

Current entry to practice guidelines for dental hygiene encourages blended learning to support student education. Incorporating mobile learning into dental hygiene education supports this guideline. The goal of dental hygiene education is to prepare students to transition into an interprofessional practice setting. As other health professions such as nursing use mobile technology in education, it is important to ensure that dental hygiene students are familiar with their use relative to the needs of their practice.

CONCLUSION
Mobile technology such as smartphones and tablets are increasingly used in the education of health care providers. There is a growing body of literature exploring their use in nursing education including the benefits, barriers, and strategies for successful implementation. Very little work has been done to study the adoption of mobile technology in dental hygiene practice and education. As more dental hygienists work in independent settings, the use of mobile technology at the point of care is essential to provide optimal oral health care. The findings from this study sheds light on the current use of mobile devices in dental hygiene education and describes the perceptions of use by both dental hygiene educators and students. Results reveal that mobile technology use in dental hygiene education is still in its infancy. Despite this, both educators and students value their use their teaching and learning and feel that a blended learning environment can improve dental hygiene practice. Educators' lack of comfort with technology and the ban on clinical use were significant barriers. Although there has been some discussion of remedies to over come these barriers in the nursing and some from a dental hygiene perspective, the ban of mobile technology use in the clinical environment obstructs a blended learning environment. Ultimately this impedes work to integrate them into full practice. Based on the initial findings, the adoption of a blended learning environment may be prudent. Future work may also include collaboration with governing bodies to create best practice guidelines for the clinical use. In addition, dialogue amongst educators must be encouraged to discover and promote champions for change.

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PAPERS

Musical Safe Space
Jaco van den Dool

ABSTRACT

Learning music as a subject proves to be a point of contention for students of the Primary Education BA program in the Netherlands. Two firmly rooted cultural dispositions are at play here. First, arts education holds a marginalized position in the curriculum of education in general (Schildt-Mol, 2011), but particularly in this BA program, with a mere 20 hours per year. Second, as a result of this marginalized position, students face musical activities in a traditional classroom setting with stage freight and insecurities.

To combat both dispositions, blended learning could offer valuable insights and solutions. Blended learning is often defined as the integration of digital tools with face-to-face education (Garrison and Kanuka 2004; Graham 2004; Macdonald 2008; Oliver and Trigwell 2005; Poon 2013). In the context of this study, students have the chance to immerse themselves in musical learning within online communities and the classroom, rather than only learning within the traditional classroom setting.

Drawing on this theory, the research group of Codarts University of the Arts undertakes innovative work to research the ways in which digital tools can improve musical skills of Primary Education BA students. In collaboration with Leiden University we build a digital safe space for students to develop musical skills at their own pace through the medium of peer feedback. To determine whether the feedback website rendered a positive effect on musical skill development, we designed and conducted an experiment. The first group of 25 students underwent the experimental procedure of learning musical skills from the peer feedback website, coupled with weekly traditional face-to-face education. The control group of 25 students only received traditional face-to-face education. They were expected to master musical skills independently, without peer feedback.

Preliminary findings indicate significant increased engagement due to the encouraging feedback website in which students can safely explore their musical skills. According to the students, intensified blended peer feedback learning through an interactive website coupled with face-to-face learning significantly enhances engagement in musical learning. Subsequently, students experience less stage freight and insecurities.

INTRODUCTION

Students live in a world of unlimited access to information. In a diversity of ways, they absorb and process this information with blended modes of learning, drawing on a variety of digital tools and sources. Within the professorship 'blended learning', Codarts undertakes innovative work to research the ways in which digital tools can improve student engagement, study results, and learning strategies within the more traditional education in the fields of dance, music and circus. Different from more academic settings, blended learning within performing arts studies is still in its infancy. Learning an instrument or a choreography is predominantly bodily driven, whereas academic courses require a mainly cognitive involvement. Blended learning within the latter has proven its value and benefit for study engagement and study results (Garrison and Kanuka 2004; Graham 2004; Macdonald 2008; Oliver and Trigwell 2005; Poon 2013), while the effects of blended learning within performing arts studies remain largely unexplored Besides implementation of blended learning within the conservatory, the professorship 'blended learning' has the obligation to disseminate research results to other institutes. Among those are education institutes including performing arts in their curriculum, such as Primary Education BA program, Hogeschool Rotterdam. They offer mandatory music training to BA-students following a full time (elementary school) teacher training course. Since these students usually have no professional background in music, the learning process turns out to be a challenge.

Learning music as a subject proves to be a point of contention for students of the Primary Education BA program in the Netherlands. Two firmly rooted cultural dispositions are at play here. First, arts education holds a marginalized position in the curriculum of education in general (Schildt-Mol, 2011), but particularly in this BA program, with a mere 20 hours of music per academic year. Second, as a result of this marginalized position, students face musical activities in a traditional classroom setting with stage freight and insecurities. Limited time for music and musical insecurities could be combatted with a blended approach. Both constraints are at the heart of this study.

To combat the both dispositions, blended learning could offer valuable insights and solutions. Blended learning is often defined as the integration of digital tools with face-to-face education (Garrison and Kanuka 2004; Graham 2004; Macdonald 2008; Oliver and Trigwell 2005; Poon 2013). In other words, blended learning merges online approaches with classroom activities, catering to various learning strategies of students. In the context of this study, students have the chance to immerse themselves in musical learning within online communities and the classroom, rather than only learning within the traditional classroom setting.

EXPERIMENT

Drawing on this theory, the research group of Codarts University of the Arts undertakes innovative work to research the ways in which digital tools can improve musical skills of Primary Education BA students. In collaboration with Leiden University we build a digital safe space for students to develop musical skills at their own pace through the medium of peer feedback. Students submit their musical pitch in video format in the gallery and are assigned to peer review a number of pitches on specific musical skills criteria (see image 1 below).
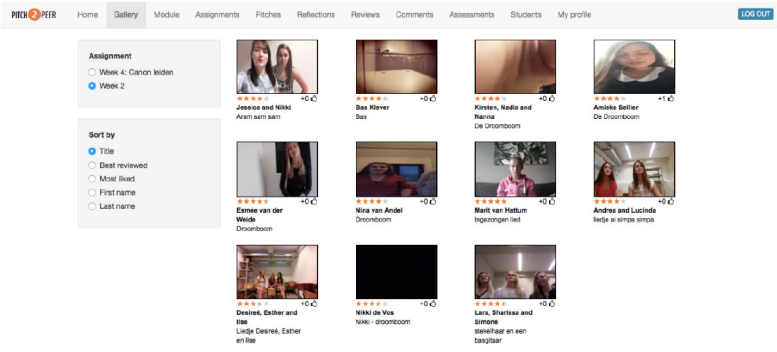

Image 1. Video gallery

To determine whether the feedback website rendered a positive effect on musical skill development, we designed and conducted an experiment. The first group of 25 students underwent the experimental procedure of learning musical skills from the peer feedback website, coupled with weekly traditional face-to-face education. For each assignment the experimental group of students was divided in smaller units of 3 or 4 students. Every student had to write a song and upload their video on the musical safe space website. Each individual student was required to provide feedback based on a criteria list, provided by the teacher (see image 2 below). The general rule was that a student can only receive feedback after providing it. Subsequently, all students were involved in the learning process. Upon processing the received feedback, the students were asked to upload an improved version of their song. In the final phase, the teacher provides feedback. Finally, the students uploads the final improved version of the song. In addition to peer-feedback-learning, the teacher offered tutorial videos (to prepare the students for a theoretical concept), gamification elements (students were able to rate songs), and a forum for discussions.
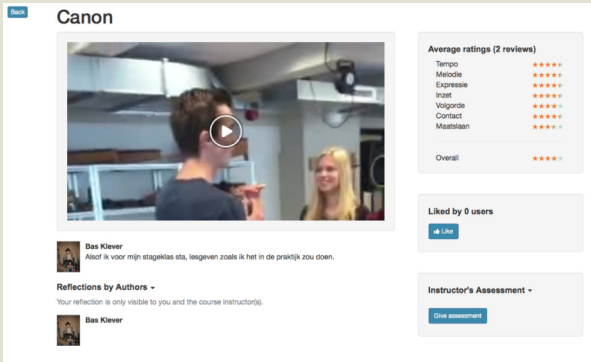
Image 2. Rating and criteria list

The control group of 25 students only received traditional face-to-face education. They were expected to master musical skills independently, without peer feedback. This experiment aimed at collecting quantitative data, relating intensified peer blended feedback learning with improved musical skills and less musical inhibitions. We conducted a pre-test and a post-test with a survey and a musical skill-test.

PRELIMINARY FINDINGS

At the moment of writing the experiment is not fully conducted. The complete dataset is expected for analysis in May 2017. Unfortunately, we can only present a two significant preliminary findings. First, we found that the peer-feedbackgroup demonstrated an significant improvement of 29% in pitch acquisition against 3% improvement in pitch acquisition within the control group. Apparently, the feedback website enabled the students to fully immerse themselves in the melodic material in a flexible and safe way. They could measure their pitch to those of their peers and check the right pitch without being directly exposed to others. Second, our data indicates that music technical skills (vocal technique) improve by 16% within the feedback website compared to a lower improvement of only 10% within the control group. As with pitch improvement, technical skills improve due to the safe and experimental nature of the feedback website. Aside from written feedback, thee website provides students with video material which they use as reflection for their own bodily posture. Correction by means of self-reflection and peer-feedback feeds into refined bodily postures which directly results in improved vocal techniques.

Furthermore, the findings indicate significant increased engagement due to the encouraging feedback website in which students can safely explore their musical skills. Albeit expected to encourage students' engagement, the forum was not widely used. Apparently, text-based interaction between peers on musical activities seems difficult. This is largely due to the ineffability of musical activities. In other words, it is very difficult to reflect on musical activities with words. The knowledge clips, however, proved to be more conducive to student engagement. Based on the results of the student viewing system, students even watched more videos than required. According to the students, intensified blended peer feedback learning through an interactive website coupled with face-to-face learning significantly enhances engagement in musical learning. Subsequently, students experience less stage freight and insecurities.

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PAPERS

Online Collaborative Mind-mapping in Multidisciplinary Research Teams for Eliciting Bottom 40 Transdisciplinary Community Issues

Helmi Norman, Norazah Nordin, Melor Md Yunus, Fariza Md Sham, Mohamad Azlan, Shah Zaidi and Mohamed Ally

ABSTRACT

Transdisciplinary research is an approach that addresses societal or community issues by interdisciplinary collaborations via interconnections between the fields of science and society. As research teams in transdisciplinary research are multidisciplinary, or in other words comprise of teams that come from multiple disciplines, perspectives and understandings within these teams suffer from the issue of mutual or common understanding. Past studies have indicated that collaborative mind-mapping could enhance the group dynamics in such multidisciplinary research. Yet, research on collaborative mind-mapping in transdisciplinary research is still lacking. Moreover, past research has also indicated that there are limited studies that have been conducted to cater for transdisciplinary community issues using online collaborative mind-mapping. As such, to address the issues and fill the gaps, the study investigates the use of online collaborative mind-mapping in multi-disciplinary research teams for eliciting bottom 40 (B40) transdisciplinary issues. This study taps into a research that was conducted in collaboration with the Economic Planning Unit, United National Development Programme (UNDP) and the Universiti Kebangsaan Malaysia (National University of Malaysia). The software used for online collaborative mind-mapping was Coggle. Research findings indicate online collaborative-mind mapping could be potentially utilized as an approach in collaborating in multidisciplinary research teams as well as in eliciting transdisciplinary community issues.

INTRODUCTION

Marginalized communities are frequently in need of solutions in overcoming their issues and problems. Low-household income families, such as the Bottom 40 (B40), are in need of these solutions to socially mobilize them out of the B40 into higher incomes (e.g. Middle 40). In addressing these societal or communal issues, research teams are usually developed from multidisciplinary fields, in which experts from various fields ranging from social science to science are brought together to cater for problems that arise from these communities (Jahn et al., 2012; Brandt et al., 2013). Yet, as such teams are multidisciplinary, perspectives and understanding from such teams suffer from the issue of mutual or common understanding. Previous research has reported that online collaborative mind-mapping can enhance group dynamics in such settings as well as facilitate co-construction of knowledge in multidisciplinary teams (Liu et al., 2014; Lin et al., 2015). In addition, past studies have indicated that there is a lack of studies that have been conducted to cater for transdisciplinary societal or community issues using online collaborative mind-mapping (Wu et al., 2013; Kagan, 2015). As such, the study investigates the online collaborative mind-mapping approach applied in a multi-disciplinary research team for eliciting B40 transdisciplinary issues.

COLLABORATIVE MIND-MAPPING

Collaborative mind-mapping is an approach to facilitate the discussion of scientific knowledge by co-construction of knowledge in research team as well as collaborative negotiation of relationship on maps (Lin et al., 2015). Collaborative mind-maps assist team members to improve mutual and common conceptual awareness among team members, especially in team which consist of multidisciplinary team members (Luke et al., 2014; Lin et al., 2015). The approach also helps research teams to have a collaborative visualization of ideas in which the approach can be used a social thinking tool to facilitate knowledge construction (Hung et al., 2014; Lin et al., 2015). As compared to individual mind-maps, collaborative mind-maps could potential consist of conceptual understanding of a subject matter as the discussion is rich and collaborative between team members (Liu et al., 2014; Lin et al., 2015). This can be linked to social constructivism by Vygotsky (1978) and the social learning theory by Bandura (1977). Here, the social learning theory is linked as new knowledge is constructed to social interaction between others while social constructivism is connected by the fact that knowledge is also constructed in a social environment with the incorporation of other actors and culture in social settings (Lin et al., 2015).

ONLINE COLLABORATIVE MIND-MAPPING

Previous online collaborative mind-mapping tools have lacked the synchronous feature. This has caused research teams to face issues in understandings one another's ideas in the maps (Lin et al., 2015). Current online collaborative mindmapping tools have addressed this issue by allowing users to collaborate in real-time. Two examples of real-time software for online collaborative mind-mapping is MindMup (http://mindmup.com) and Coggle (http://coggle.it). Both software allow for creation of online mind-maps and both allow for sharing of maps via Google Drive. Coggle allows for integration of images and links via its map branches while MindMup allows for file attachments. In addition, Coggle also has a revision history feature, in which users can go back to a specific version of the mind-map based on the time changes were made and revert to the original version of a mind-map.

THE CASE STUDY

Participants
The study was part of a larger study conducted with participants who were 25 researchers in Universiti Kebangsaan Malaysia or National University of Malaysia (UKM). The participants were from a multidisciplinary research team that consisted of UKM professors, associate professors, senior lecturers, lecturers and research assistants from various faculties and institutes. The research team worked on a study that was coordinated by the Economic Planning Unit (EPU) in collaboration with United National Development Programme (UNDP) and UKM, which investigated the issues of the Bottom 40 (B40) communities across all six regions in Malaysia consisting of North, South, Central, East, Sabah and Sarawak.

Data Collection and Analysis Methods
In the larger study, issues of B40 communities were elicited from the open space technology (OST) approach (citation) which was aimed in capturing issues from the community perspective. Participants of that study were B40 communities and via the OST approach were given the opportunity to voice out concern, issues, and potential solutions to current problems that existed within their communities. The OST sessions ended with voting sessions that outlined the prevalent B40 community issues. These issues were then transcribed by the UKM research team were thematically analysed via the online collaborative mind mapping approach using the Coggle software. The software allows for teams to create mindmaps both in synchronous and asynchronous modes and this assisted the UKM research team to collaborate online in eliciting the B40 issues.

The online collaborative mind-mapping approach was conducted based on the concept model of transdisciplinarity by Jahn et al. (2012) and the ADDIE (analysis, design, development, implementation, and evaluation) model as follows. First, in the analysis phase, the issues that were transcribed from OST sessions were inserted in the mind-maps according to the six regions. The issues were included via the inductive thematic analysis carried out in five phases (Braun & Clarke, 2008): (i) familiarizing with the data; (ii) generating initial codes; (iii) searching for themes; (iv) reviewing themes; and (v) defining and naming themes. Here, the issues of the society are elicited with the multidiscipline research team. Second, in the design and development phase, the themes were revised according to small groups of research teams (according to zones, e.g. North) and themes were further refined. The themes were reviewed and revised with the whole research team collaboratively. Finally, in the implementation and evaluation phase, the entire process was re-conducted until the themes achieved saturation and consensus was received from the team. This produced the final framework of B40 transdisciplinary community issues (Figure 1).
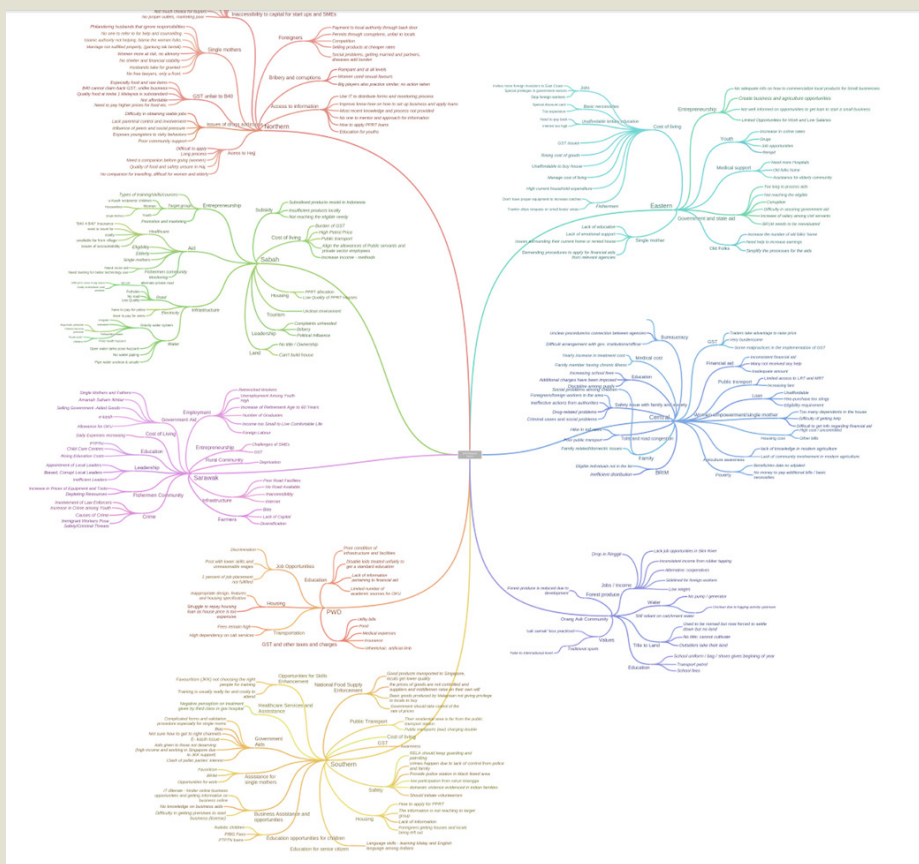
Figure 1: Final framework of B40 community issues

IMPLICATIONS OF THE FINDINGS

The implications of the study are as follows.

1. A Platform for Elicitation of Transdisciplinary Communal Issues

In the study, online collaborative mind-mapping could be used as an approach to elicit transdisciplinary communal issues from the B40 community. The approach is beneficial as it allows multidisciplinary research team members to gain mutual understanding and agreement on elicited issues. As the research comprised on team members from multiple disciplines such as social sciences, economics, education, engineering, as well as science and technology, the online mind-mapping approach assisted the team to have a common visualization of the issues, hence allowing the team to achieve a consensus on the elicited B40 issues.

2. A Collaborative Process of Co-constructing Knowledge

Online collaborative mind-mapping could also be utilized as an iterative process of co-constructing knowledge. Lin et al. (2015) studied on the effect of collaborative concept mapping in learning with Google Docs and Google Chat. They discovered that the online mapping approach can be used to co-construct common knowledge collaboratively by negotiation and development of relationships in the maps. It was also revealed that collaborative visualization of ideas assisted in knowledge construction in which learners exhibited deeper conceptual understanding of learning.

3. An Iterative Process of Generation of Themes

The mind-mapping approach can be used as an iterative process to generate themes related to transdisciplinary issues. In the study, the themes were iteratively revised within the online collaborative mind-mapping period (i.e. three months). For example, for the first month, there were five B40 major themes that were elicited from the eastern region. and expanded to seven themes over the two-month period. The shift in themes were also noticed in the period, in which the themes were further expanded and refined which expansion of sub-themes, where there were 39 themes in the second month , and 33 in the final month.

4. A Real-time Collaboration Tool

The Coggle software utilized in the study is a collaboration tool by Google that allowed team members to create mindmaps collaboratively in real-time as well as asynchronous manner. This environment allowed for real-time collaboration and interaction, thereby facilitating knowledge sharing among the multidisciplinary research team (Lin et al., 2015). Moreover, the tool enables team members to track previous changes by all the members that have collaborated in the team via its revision history feature and allows team members to go back or make copies of previous changes made. The feature not only allowed to avoid accidental or unwanted changes to the mind-maps, yet allowed understanding of historical revision of themes and how the themes were changed/renamed to create a new or revised theme.

CONCLUSION AND FUTURE DIRECTIONS

The paper has discussed the investigation of online collaborative mind-mapping as an approach to elicit marginalized community (B40) issues in multidisciplinary research teams. Some future directions are suggested as follows. First, with regards to online collaborative mind-mapping as a platform for elicitation of transdisciplinary communal issues, it would be interesting to investigate on the iterations of online collaborative mind-maps in other target audiences such as middleincome and higher-income households and other modes such mobile learning (Nordin et al., 2010; Ally & Samaka, 2013). Second, in terms of online collaborative mind-mapping as a collaborative process of knowledge co-construction, it would be beneficial for future research to investigate the extent of co-construction via quantitative techniques such social network analysis (Norman et al., 2015). Third, with regards to online collaborative mind-mapping as an iterative process of theme generation, it would be interesting to study whether other types of thematic approaches would be appropriate to be used with online collaborative mind-mapping. Finally, the Coggle software was selected as the tool for online collaboration. Investigation on other tools such as MindMup would be interesting to weigh benefits and limitation for online collaborative mind-maps in different contexts. In sum, it is hoped that the paper would benefit educators and researchers interested in future studies in online collaborative mind-mapping.

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PAPERS

Using Video as a Support in Face-to-Face Information Technology Courses

Przemyslaw Pawluk and Tom Tsiliopoulos

ABSTRACT

The purpose of this study is to analyze the usage of the video by students and impact of video recordings on students' satisfaction in information technology courses. Our goal is to encourage other technology teachers to apply video as a supporting technology in their practice. The study is based on the anonymous feedback submitted as a course evaluation by students and statistics collected through the hosting service. In this paper, we show how video can be utilized in IT classes, we discuss our experience with this technology and present results of the analysis. The issues, limitations and recommendations are also discussed in this work.

INTRODUCTION

"Acquiring and developing knowledge about programming is a highly complex process. It involves a variety of cognitive activities, and mental representations related to program design, program understanding, modifying, debugging (and documenting)". (Rogalski & Samurc̨ 1990, p. 170) At the same time, students value more programming by themselves more than learning by themselves. (Lahtinen et.al, 2005) While teaching information technology (IT) courses, especially programming and networking, we observed many challenges that student experience and that are caused by limited time committed to the practice in the lab. We observe that students are multitasking and bring various distractions into the classroom environment such as mobile phones and social media apps. Those factors affect their effectiveness of the in-class practice. Due to those factors, students who, for various reasons, require more time to complete assigned tasks, often are not able to follow tutorials presented in the lab and complete their work even with detail written instructions or lab manuals. In addition, as discussed by Ronchetti (2010), teacher is helping the students only during one third of the learning process, because for a four-credit course (four hours of instructions per week, 56 hours per semester), students are expected to commit twice as much time for the individual or group work. Thus, students often seek additional sources of information and reach for online video tutorials of various quality that often create more confusion. In such situation, their educational success is jeopardized. This situation triggered our search for tools to augment out teaching methods and support our students in the learning process.

The video recording and production process, even few years ago, has been complex, hence using video as a teaching tool required significant overhead both in terms of cost and time. This situation changed dramatically with the advent of YouTube and mobile phones with high resolution cameras. "YouTube has become part of the tapestry of our student population. We can stick our heads in the sand and ignore YouTube, or we can use it to motivate students." (Adam & Mowers, 2007). Video have been successfully applied in various areas of education including culinary courses (Brown, 2013) or mechanical engineering courses (Coller & Scott, 2009). IT courses, are however, lacking this kind of support.

Considering the ease of use of the currently available tools such as YouTube live streaming, the overhead is significantly lower than it used to be few years ago. This ease of use was one of the enablers allowing us to apply video in the teaching practice.

OVERVIEW OF VIDEO USAGE

Video application in teaching is not a novel idea (Meisel, 1998). In fact, Fernandez et al. (2011) list three categories of videos used in teaching, namely: demonstration videos, narrative videos and recorded lecture sessions and claim that the later one is the most popular among the three mentioned categories. It has been widely adopted in teaching, especially in medicine (Stefanidis et. al, 2007) or courses focussed on skills acquisition such as cooking (Stitt, 1996; Taber-Doughty et. al, 2011) and engineering (Coller & Scott, 2009, Foertsch et. al, 2002). Tutored Video Instruction (TVI), in which video is part of the learning session and tutor has an ability to stop and interact with learners, has been assessed by Anderson et. al (2001). Video has been also used as a content delivery tool by Ronchetti (2010) who pointed several benefits as well as disadvantages of this approach. Adam & Mowers (2007) pointed various ways of using YouTube in the learning process and show the impact it has on student's motivation and approach towards education.

OUR APPROACH

One of the most frequently pointed issues in the IT lab classes, was the need to get more support in practice outside of the class. Even when students are provided with lab manuals, some details are often omitted from them or assumed obvious. Students practicing outside of the class, experience often roadblocks resulting from the lack of those details and tricks that are pointed in the lab practice but not documented. It was a motivation for us to extend our practice and apply video as a supporting technology.

As opposed to the Ronchetti's (2010) approach, the face-to-face interaction and tutoring are our main teaching tools. The main tool in our teaching practice is face-to-face lecturing and tutoring. Lab demonstrations are crucial element of those interactions. Video has been added to the teaching practice as a supporting tool intended to mitigate the need for additional support outside of the teaching hours.

Our goal was to provide this support without generating overhead. Hence, the idea was to record the tutorials as they were delivered in the lab. Recordings were divided into approximately 45-55 min sessions, which gives two videos per class. During the session, the instructor's screen and voice are recorded with YouTube.

Tools

No special tools are required to be installed on the instructor's nor students' machines. YouTube live streaming is a Google and YouTube technology that allows for screen and voice recording with a browser. The requirements listed by YouTube are following:

- Most recent version of Google Chrome, Firefox, Internet Explorer, or Safari
- Operating system: Windows 7+, Mac OS X 10.7+, Ubuntu 10+, or Linux OS 11+ (64-bit)
- Internet connection with 1+ Mbps

As the technology is fully on-line, there may be connection related issues experienced. To assure continuity of the recordings in case the Internet connection is lost, additional recording software was used. In our case Camtasia (Windows) or Quicktime Player (Mac) have been used for off-line recording.

Methodology

The video in the courses that we have taught was intended as a supporting technology. It cannot be clearly classified using the classification proposed by Fernandez et al. (2011), as it contains the recorded lecture with elements of video instructional video. Every week, lab sessions were being recorded using YouTube live streaming tools. The sessions were scheduled for two hours. Such a long session, would not be effective as a video (Hazlett, 2015), we limited the recording session's length to average of 50 minutes and we were recording two videos during a single face-to-face session. It is significantly longer than recommended 6-9 minutes, however, in our approach it is not a sole instructional tool as opposed to the case described by Hazlett (2015). Moreover, in our approach, the video has to show entire step-by-step process from the lab. Videos were immediately published to the YouTube channel managed by the instructor and grouped into a playlist labeled with course code, week number and session symbol (e.g., COMP305 W2016 Week 3).

To avoid privacy issues, only screen and voice of the instructor were recorded during the session. Also, class discussions handled at the end of the session were not being recorded.

Feedback and Observations

Most of the viewers (97%) did access the recording on-demand, however, there is a visible trend showing growing interest in watching the live streaming of the session. The average watch duration (plotted for each video on Figure 1.) shows that students do not watch the entire recording in one session. The overall average view duration is 5.6 min and even for live streaming the average view duration is 18 min which is only 35% of the average recording duration. This observation is consistent with the literature recommendation for the length of the instructional video (Hazlett, 2015) that we already mentioned.

The statistics show also, that students use the video in two ways. A small group of students accesses the videos immediately after the video is posted to review the content of the lab and likely to practice the work done in the lab. Significantly larger group uses the videos immediately before the examination period. This trend is shown by the graph on Figure 2.
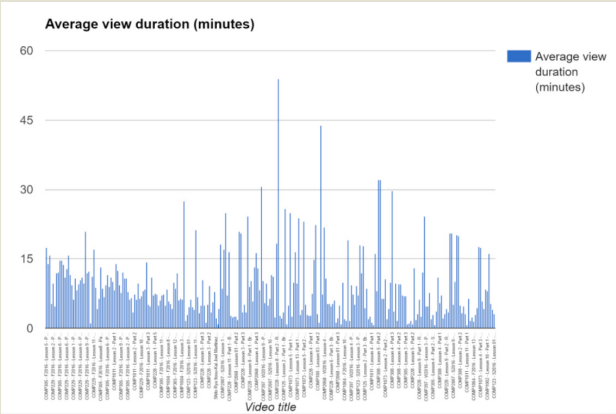
Figure 1. Average view duration
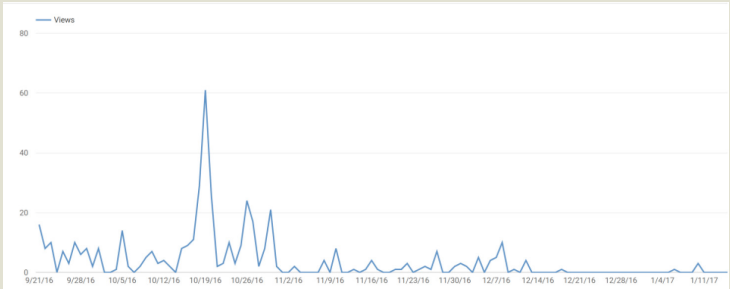
Figure 2. The view statistics of a sample video on game development.
The highest number of views is on October 19th
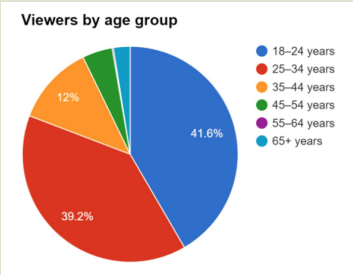(a day before the mid-term exam)
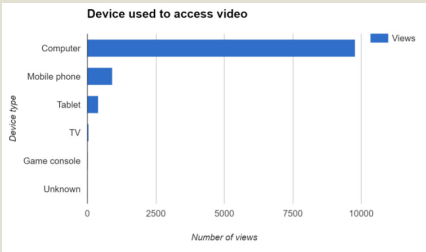

Figure 3. Number of views
by device types

Figure 4. Viewers by age group

The most popular device used to access the video is computer, as shown on Figure 3. There is, however, growing group of users watching videos on their mobile devices (phones and tablets). Considering the type of the content, such trend was expected. It also means, when combined with a short viewing time, that students access video to watch specific part while practicing.

As the videos published in the channel are public, ultimately, they are available to users from around the world. Most of the viewers of the channel are from Canada and United States. We noticed, however, significant number of viewers from Asia and Europe.

Based on the feedback volunteered by students in the comments section of the course assessment and in the informal feedback provided to us, video in the format discussed in this work is perceived as helpful support in the individual practice. The most often mentioned issue in the feedback was the sound quality, especially when the educator is walking away from the computer and microphone.

Issues and Problems

Recording a face-to-face session minimizes the effort required to record the session. It, however, does not minimizes the postproduction effort. The term postproduction refers to all activities occurring after recording individual session segments (Lynne et. al, 2005). In the learning context, it would include trimming, rerecording of some parts, adjusting audio settings and, captioning.

Captions provide deaf and hard of hearing users access to the audio component of web videos (Kushalnagar et. al, 2013). For video to be fully accessible to individual with disabilities, it must have closed captioning (CC) for deaf or hard-of-hearing viewers and video description for blind or low-vision users. (Griffin, 2015) Time required to CC a one minute of video, based on our experience, is approximately five to ten minutes. For two hours of session recordings, we would require five to ten hours to create high quality CC. This is unrealistic in the college setting in which in-class time is ten to fourteen hours per week.

On the other hand, the solution that is less time consuming, is the automated captioning system offered by YouTube. This option is not accessible immediately to the users as YouTube requires time to process and caption the video. It also is often inaccurate, especially in cases when speaker's accent is stronger.

Significant issue for educators who use blackboard or whiteboard while lecturing is the fact that the drawings are not visible in the recording. This problem can be mitigated by using software tools (MS Paint, PowerPoint or Keynote and many other tools available on the market).
Finally, the educators are often afraid of how they will sound and look in the recording. They are also afraid of the issues with technology such as Internet connection failures, hardware issues or recording quality. For each of them, however, there are precautions that allow to mitigate those problems. It was mentioned that, to mitigate the Internet connection failures an additional recording tool has been used. With the use of YouTube life streaming tools, the educator can perform recording from virtually any computer that has the Internet connection. The quality of the video recording, especially the quality of sound, depends on the hardware used to perform recording. We recommend usage of external microphones to improve the sound quality, especially when laptop is used for recording.

CONCLUSIONS

The video has been proven to be an effective instruction tool in various domains. It is shown here that in information technology courses, where acquiring and developing knowledge about programming is a highly complex process, video can be used as an effective supportive instructional tool. Application of video is nowadays easier because of the recording tools availability and easy access to hosting platforms such as YouTube.

With the limited time committed to the personal practice during the lab, video recording of the lab tutorial was appreciated by students and used, especially before the examination periods. Viewing patterns confirm the observations and recommendations from literature and show that even for long (40-50min) videos, students spent only about 6 minutes (18 minutest for live streaming).
A major issue pointed in this work is the postproduction process that includes to close captioning, cleaning and rerecording of parts of the video. This process is expensive; the time required for this process is assessed as three to five times of the video recording. Thus, videos produced in our courses are not closed captioned or they use automated closed captioning which is inaccurate. As it may be perceived as an issue, in our courses video is not a main instructional tool and it is used as a reference by students.

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PRESENTATIONS

Avatars, Wikis and Group Work—Oh, My!
M McLean, Lisbia Romero, Amineh Olad and Marlene Bell

What happens in a hybridized learning environment when constructivist pedagogy and problem-based learning approaches meet Universal Design for Learning (UDL) and Inclusive Design (ID) principles and practices? A team of instructional designers and educators at George Brown College have been exploring this questions as they create and pilot a new teaching model for blended Child and Youth Development course. Their preliminary answers and the resulting course design challenge conventional College teaching methodologies and suggest new possibilities for blending synchronous and asynchronous learning, while also addressing some of the logistical problems inherent in fully online models. This poster presentation will showcase the use of five avatars, developed with student input and assistance, as cognitive pegs anchoring the acquisition of analytical skills and the critical exploration of theory by learners who are new to the field of human development. The presentation will demonstrate how use of the avatars is rooted in a constructivist pedagogy that utilizes a Problem-Based Learning approach (PBL) to motivate students working with the avatar of their choice to explore solutions to issues connected to child and youth development.

Unfortunately, digital inclusion is not always present in the rush to apply digital solutions to issues that address learner engagement and interaction. This presentation will map a specific strategy, grounded in Universal Design for Learning (UDL) practices and Inclusive Design (ID) theory, that maximizes the role distributed cognition plays in learning, and experiments with the use of collaborative learning tools in the online environment. Additionally presenters will share ways in which the hybrid model potentially allows for higher-risk learning activities than a fully online learning environment, while providing opportunities for reflective engagement that are not always possible in face-to-face classrooms. Finally, the presentation will feature quotes from learners about their engagement in the early stages of the project to develop this innovative course.

Augmented Reality as a Hybridization of Place
Christopher Holden

Augmented Reality (AR) games and other interactive experiences, whether in terms of design or play, have been investigated by many educational researchers, practitioners, and others over the last decade, often with the intent of making new connections between learners, place, and content. Briefly, AR is more than a means by which a smartphone's camera feed can be layered with other media representations. It is a general ethos whereby hybrid worlds are created from both pieces of the apparent physical world and pieces that represent either fictive or non-apparent aspects of place (data overlays for instance), and this can be accomplished through a great variety of mechanics. Though AR has been approached from a variety of perspectives aligned with understanding and improving learning, specific to blended learning is the rather visceral hybridization of place AR makes possible. Both online and traditional learning environments tend to organize learning as place agnostic. The anywhere, anytime ethos of online learning erases place entirely, while the timetables and classrooms of traditional instruction remove learning and learners almost entirely from the world in which the content has consequences. AR helps us to think about place as something that can be malleable and shared across distance and time, but also something that might either be leveraged towards specific learning goals, or as the ultimate theater for that learning. In the long term, AR's focus on placing action and thought *in situ* can help researchers and educators aim for learning that is difficult to approach in a classroom or LMS. AR is not a panacea, but allows us to both find latent meaning within a situation and to imbue a place with new meanings. In this session, I will briefly review earlier AR work from language learning contexts, and establish the diversity of approaches researchers and educators have taken with just a single design tool, ARIS. This possibility space turns out to be far larger than a default assumption of AR media as an instructional format. I will also share some enthusiasm for expanding these experiments greatly, as the pioneering work of others has made it now possible for essentially anyone with a bit of time to join in. Starting with the existence of free, easy-to-use design toolkits like ARIS, and the prevalence of mobile devices in most contexts, and further supported by the direct help of pioneers through extensive documentation, tutorials, and forums, widespread exploration of the affordances of mobile media like AR for learning is possible like never before. In the coming years, a collective knowledge can emerge from this groundswell to influence not only our future perceptions of this medium or genre but the intersections of place and learning broadly.

PRESENTATIONS

Developer Picks: Using Articulate 360 to Promote Active Learning
Chih-Ling Leung (Chilli), Amineh Olad and Evelyn Chan

Three developers from George Brown College's e-Learning and Teaching Innovation department believe that integrating online delivery methods in teaching and learning is crucial to the success of higher education. The developers will share their favorite technologies that they use and support.
This hands-on workshop will be broken down in two sections. In the workshop the developers will walk participants through their creative process, describing key elements that you will need in order to create an eLearning object. It will be a hands-on session, it will give you the chance to develop an eLearning object!

Participants will use Articulate 360 to create the interactive learning content. The developers will provide prepared materials for participants to use. Participants will follow the developers' step- by- step to create an online deliverable in Articulate 360.

Objectives:

• Recognize the educational technologies that George Brown College is currently using and supports
• Plan an online deliverable interactive project
• Create a multimedia learning object with Office Mix

Designing Blended Learning Activities For People with Disabilities
Christopher Holden

People with disabilities constitute a great part of our society, considering that they amount to 15% of the global population. Disabled people in Greece struggle with multiple challenges, such as unemployment, insufficient knowledge upon educational opportunities, as well as lack of appropriate assistive technologies for their accessibility to the internet and digital information. Blended learning is founded on the use of the internet and leverages its affordances, in order to benefit students for their learning development. Disabled students should have the appropriate media for accessing the same learning opportunities as the students without disabilities.

The Advanced Educational Technologies and Mobile Applications (AETMA) Research Lab is focusing on the improvement of the living conditions of people with disabilities, especially in the field of education. Therefore, the current paper investigates the ways in which a blended learning web-based course can be developed to provide training services to users with disabilities in order to improve their learning. On one hand, distance learning requires online tools that offer accessibility features and educational content that adheres to accessibility standards. On the other hand, in a blended learning scenario, in-person teaching has to take place, which poses significant challenges for accommodating content delivery to a classroom with people of different types of disabilities.

The paper discusses the design and implementation issues of blended learning courses which are targeted at people with disabilities.

EssayJack: Revolutionising Essay Writing and Teaching Through Blended Learning

Anthony Cantor and Lindy Ledohowski

Created by award-winning educators, EssayJack is an interactive web platform that pre-structures student essays with text boxes, interactive tips and prompts, split screen composing, and a live word count. It reduces writing anxiety, procrastination, and plagiarism. The entire EssayJack platform can be customized by educators and allows for rubric-based feedback.

EssayJack was launched in beta in 2015, and by the spring of 2016 Cambridge English and the British Council named it one of the world's best English Language Teaching Digital Innovations, and the EssayJack platform has just been short-listed by the London Book Fair judges in the Educator Resources category for their International Awards which will be announced in March 2017.

It offers patented technology that helps learners and educators engage with Anglo-American essay-writing conventions, and is based on sound pedagogy and decades of in-class experience. Scaffolding, chunking, and interrogative methodologies form the core pedagogies underpinning the technology, and many of the features are informed not only by our founders research, scholarship, experience, and publishing about good writing, but also on the foundational work by Gerald Graff and Cathy Birkenstein in They Say, I Say.

Our core philosophy is that digital educational tools work best in conjunction with solid in-person pedagogical practice. To that end, the entire EssayJack platform is customizable by educators and can be integrated into in-class practice. It can also be used on demand by students 24/7 wherever and whenever they might write, allowing the lessons from the class to be reinforced for students outside of the class.

In addition to being customizable, to supporting classroom teaching practice, to allowing for outside-of-class work, and breaking the essay-writing process into manageable chunks with interactive guidance and prompts, the EssayJack platform demonstrates another core aspect underpinning theories of blended learning, namely facilitating interaction between and amongst student peers. Peer review or formative review is a core pedagogical tool in the toolkit of many educators, and EssayJack supports peer review with a built in rubric and scoped commenting options allowing for and encouraging focused peer review.

All of these functions of EssayJack reflect our conviction that educational technology should enhance the learning experience and enrich classroom practice.

We would like to opportunity to demonstrate EssayJack at IABL2017 in order to showcase a dynamic, successful and interactive model of blended learning that is revolutionising essay writing for teachers and students.

PRESENTATIONS

iABL 17

Flipping Out: Education Strategies for Creating a Transformative Learning Environment
Howard Gerhard and Amineh Olad

This presentation explores the efficacy and education strategies of a flipped classroom model for students studying Canadian history. We will discuss the advantages and disadvantages of a technology-driven course development process and the faculty and student experience, in contrast to traditional teaching mechanisms. Rich survey data from 117 students, gathered through end-of-term questionnaires and two focus groups, will be drawn together with the practitioners' own reflections, providing insight into both teaching and learning experiences. Data collected from the Learning Management System (Blackboard) will also be analyzed to determine user behaviour patterns in addition to the questionnaires. A key driver for the development of this brand new course (Happy Birthday Canada: 150 Years) was to make groundbreaking moments in Canada's history relevant for first year students enrolled in multiple program disciplines and from rich cultural backgrounds. Another driver was to intersect universal design for learning and accessibility compliant material with innovative technology-enabled teaching strategies, which would empower students to be agents of their own learning.

We created this course to facilitate strong engagement with the course material. Our presentation will delve into the online techniques used to ensure that all course content was accessible and mobile compliant through multimedia, infographics, video, PowerPoint and word document formatting processes. The in-class teaching strategies were created to foster a collaborative learning environment. Group problem-solving work, group presentations with designated roles, and creative activities that promoted active learning ensured that students with learning exceptionalities and English as a second language learners were well supported by their peers. In addition, the in-class, mobile-driven assessments will be analyzed for learning effectiveness.

These strategies will also highlight the necessary relationship between the professor (as subject matter expert) and educational developer (education and technology expert). Many post-secondary institutions offer teaching and learning services to faculty who wish to implement technology-enabled solutions for learning.

Future-ready Skills
Crystal Lim

Future-ready Skills – The world we live in is increasingly VUCA, volatile, uncertain, complex and ambiguous and we're all struggling with modern problems such as digital distraction, stress, loneliness and dealing with change.

As the technology evolves rapidly, we too must urgently upgrade our internal OS, mindset and habits so that we surf the waves of change rather than sink. At the National University of Singapore (NUS), we pride ourselves as being on the forefront of innovation and thus we decided to take a radical approach to dealing with preparing our students for the future. Hence, in January 2016, the innovative blended learning Roots & Wings programme was made an essential part of the student curriculum for all freshmen. Roots & Wings aims to teach students essential skills and mindsets to unlock their potential and prepare them to lead a happy and meaningful life in the VUCA world ahead.

The programme was formulated based on student and industry feedback that developing social emotional intelligence was of crucial importance for students to be prepared for the future, regardless of what career they were aiming for.

Every year, over 7,000 students participate in the Roots & Wings module and we have received tremendously positive feedback on the relevance of its content as well as commended its innovative teaching methods. The module is based on the latest psychology, neuroscience and leadership research. Through a combination of experiential learning and interactive technology, students are taught social emotional intelligence based skills. The programme comprises of a 90 minute interactive Opening Workshop followed by 10 weeks of on-line e-seminars, weekly activities, discussion forums and projects, and ends with another 90 minute Closing Workshop.

Roots" stands for personal skills where students will be taught:
• Focus – Learning to train one's attention and curb distraction
• Self & Interpersonal Awareness – Learning your strengths and challenges, emotional literacy and sensing
• What's my Operating System – Learning about how to self-regulate, manage stress and adopt a healthy growth mindset
• Happiness and Resilience – Learning the essentials of a happy and meaningful life, and how to bounce back from adversity

"Wings" stands for interpersonal skills which include:
• Sensemaking – Understanding different perspectives
• Empathic Communication – Listening and communicating on a deeper level
• Collaboration & Networking – Developing collaborative mindsets and teamwork skills

Roots & Wings allows students to maximise their potential, encourage diversity of thought and collaboration, and to reduce reactivity as they manage stress during times of complex change.

Students learn to view the world through different lenses and adopt different perspectives, build positive relationships and use their strengths in the service of others and the wider community.

Students also learn crucial career preparation elements such as personal branding, networking skills and develop awareness of the industry landscape.

Feedback from the 7,000 students who have participated in the programme has been very positive, with 87% of students agreeing that the content was relevant and useful and 92% agreeing that teaching had been effective.

With Roots & Wings, the National University of Singapore seeks to support the development of the whole student – not just their academic skills, but their character and values as well. These, in conjunction with the world-class academic and research skills gained at NUS, will give them the necessary tools to thrive in a fast paced and complex future.

Google Drive Listening Journals
Nicola Carozza

"Listening in a second language is not something that is just picked up" (Schmidt, 2016) but a skill that requires top-down, bottom-up, and metacognitive approaches. Listening journals focus on building comprehension and reflection for learners of all levels, grades, and subjects. The relevance that students find in listening material contributes to the activation of schemata, motivation, and autonomy they feel and develop as language learners. Thus, the greater the motivation and engagement, the more autonomous learning which occurs (Kemp, 2010). Once appropriate audio/video materials have been chosen for the students or by the students, online moderation, via Google Drive, allows instructors to set-up, monitor, and provide feedback on student work. Using Google Drive/Google Docs as a platform, listening journals are easily created and modified, and it makes student work accessible anywhere at any time. Students reap the benefits though extrinsic (material they can relate to or are interested in) and intrinsic motivation (the desire to do better, be better, and succeed). The reflection piece associated with the process allows students to think about how far they have come, where they need to improve, and what they think they need to do in order to get there. With today's technology and wide array of resources, students have access to all sorts of information from which they can learn, and with the implementation of Google Drive as a platform, ease of access is created for both the instructor and learner. Perhaps there was a time when people believed listening skills would develop naturally, and therefore, listening was possibly not a major focus in the ESL classroom, but as we focus on the whole learner, listening and learning to listen in order to comprehend and understand is a practiced skill that can be explored through listening journals.

PRESENTATIONS

How does your course sound? Practical tips for faculty designing accessible online content.
Ian Craine

Making online course content accessible to students with a variety of sensory and physical abilities is good design practice and it is also a legal requirement in many jurisdictions. For example, in Ontario, the Accessibility for Ontarians with Disabilities Act (AODA) and in the U.S. the Americans with Disabilities Act (ADA) mandate a certain level of accessibility in online content for educational institutions. A common requirement is to design online teaching resources that are accessible to users with sensory (visual, auditory) or physical challenges. The task of doing this often falls to faculty, who are sometimes ill-equipped to know how to do this effectively.

Students with auditory challenges can usually be provided with alternate means of delivery for audio content such as captioning or transcripts and as a professor I have found this to be fairly straightforward to provide. This talk will focus mostly on designing online content for users with visual challenges as I have personally found this to be the most difficult to create. Specifically, I will discuss how to design your teaching materials so that they are more comprehensible by someone using screen reader software. As faculty, we are often provided with some basic design guidelines for visual delivery of online materials, such as the size of font, simple rules about colour (e.g. do not use red-green to signify a contrast), and general thoughts about tables (e.g. only use when necessary and avoid using them as a way to lay out screen elements). Despite some basic training in these areas, I found I was still struggling to create truly accessible materials, mostly because I really didn't appreciate how a visually-challenged student might experience the online components of my course. So I decided to try and test out my course as a visually-challenged student might experience it. And in this talk, you will experience some of that too. I used JAWS, the most widely-used screen reader software to experience my course as I designed it. Most academic institutions have this software or something similar that faculty can try out, perhaps through their student services department. In this talk, you will experience a variety of web content being read out to you by screen reader software. You will learn through experience practical tips on how to design and format your content to ensure it is as accessible and comprehensible as possible.

Latin Acquisition in a Blended Secondary Course
George Argyris

This presentation places particular emphasis on the integration of technology-mediated activities so as to enhance the traditional design and delivery of Latin in Greek upper secondary education. In the intervening years, major curricular changes have taken place, which, among others, signified Latin teaching exclusively in the third grade, being formerly taught in the second grade, as well. Nonetheless, third-grade students, who wish to pursue tertiary studies in humanities, are required to attain mastery of the Latin language to satisfy all admission standards.

Given the consequences of a multifaceted crisis on the Greek educational system, the suggested guidelines are aligned with the pedagogy of lifelong learning, involving the augmentation of the learning experience through innovative and cost-effective solutions, aiming at:

• meeting the requirements dictated by the national curriculum for Latin teaching in Greece based on practical recommendations, which might also suit diverse blended language learning contexts,
• the adoption of technology-enhanced instruction for the improvement of student engagement and development of up-to-date competences, going beyond the conventional textbook-centered teaching mode, and
• the inclusion of digital tools and resources, which are considered essential for in-depth Latin acquisition and complementing instructor-student and student-student communication in interactive ICT-based and responsive environments.

The Google Apps for Education suite is proposed to foster asynchronous language learning, involving documentation storage and remote word processing. The implementation of synchronous web conferencing addresses Zoom's groupware features, which facilitate online multi-user sessions, offering wide access to multimedia elements.

Motivating Learners over the Long Haul
Phil Cowcill and Krista Hildner

Have you ever worked on a project in which the client wants you to create a rich and engaging course but you have been given a page-turner budget to work with? (It may not be a matter of whether this will happen, but when.) How do you engage users and retain their interest? As a professional developer, writer, subject-matter expert, or instructional designer, you're often tasked with creating a learning environment that will ensure that the learner retains as much of the information as possible.
The endowed-progress effect could be an answer. The term may be new to some, but it is something most educators have been doing in bits and pieces. When properly planned and thoughtfully implemented, it can help motivate (dare we even say manipulate?) your learners to complete the assigned training. Most learners are not aware that you are manipulating their motivation, but those that do may thank you.

What is it
One of the best ways to describe the endowed-progress effect is to use a common marketing activity as an example: Imagine going to your favourite coffee shop one morning. When you arrive, the cashier presents you with a coffee card. If, on subsequent visits, you buy nine coffees, the 10th one is free. So, you continue to visit your coffee shop until you get your free coffee. Each time you buy your coffee and get your card stamped, you feel that you're making progress toward an attainable goal. That is essentially what endowed progress is.

Tips on Implementing
Properly implementing endowed progress as a tactic does require some thought and planning at the start. Considerations to keep in mind follow:

• Give something away at the start.
• Give something to the learner that requires a minimal effort.
• Build momentum and offer prizes or rewards quickly.

For example, recently, we built a time-based app for a client. The learner could answer only so many questions in a day and had to come back the following day to answer the next set of questions. To get them started, we gave them a "ribbon" when they filled out their information. After they finish entering their personal information, we provided them with a second ribbon for filling out their personal budget. So, before answering any questions, they had already received two ribbons that would eventually lead to their certificate. Simply put, they are motivated by their perception of how far they had come and they can see the end. Perception is key.

Carrot and Stick
This type of motivation is a very soft version of the carrot-and-stick metaphor. The stick is that you should perform some sort of activity. If you perform that task successfully, you get a carrot. Although this strategy is effective, keep this question in mind: What does the learner consider a carrot? If you offer a reward that has no value to users, they are less likely to complete the task. You can take steps to ensure that your learners are more likely to complete the tasks given to them. In a marketing study done on behalf of a car wash company, customers were handed one of two cards. On one card, there were eight icons, one of which was stamped during each visit (the ninth car wash was free); the other had 10 icons (the 11th wash was free). Both required the same number of stamps; however, on the 10-icon cards, as a thank-you gesture, the first two icons were already stamped. The result of the study was that cards with two free stamps were redeemed twice as much. People worked for the carrot.

How to use the Stick in Your Projects
It's usually easy to keep the carrot in mind, but what about the stick? This approach needs to be taken gently. You have probably heard the phrase "Don't go to bed angry," which is related to the Zeigarnik effect. Bluma Zeigarnik, a Russian psychologist, found that people often remember unfinished tasks more than they remember finished tasks. If you go to bed still angry at a person, that's an unfinished task that stays with you. If you resolve the issue, it tends to melt away. In a study Zeigarnik conducted, she found that servers managing several tables tended to remember customers that had not paid their bills versus those who had settled their bills. To apply the Zeigarnik effect, remind the learner of unfinished tasks. Once the task is completed, reward the learner.

Moving Forward
If you're relaxing at home, take the time to play a game. While playing your game, look to see how that game employs the endowed-progress effect. Look for the carrot and stick and how it motivates you to action. Looking at how games motivate us to action can show us ways to motivate our learners to action. Borrowing lessons from the theory of motivation inherent in the endowed-progress effect, and combining it with what we already know about gamifcation, can help us change the perceptions of our learners and increase motivation, retention, and fun!

PRESENTATIONS

Online and Mobile Technology in a K-12 Program
Joanna Fernandes, Paul Satura and Anthony Pauk

At the Toronto Catholic District School Board, teaching 21st Century fluencies of digital literacy, creativity, innovation and collaboration are essential for the future success of our students. In this practitioners' presentation attendees, will be presented with various approaches to the blended learning used at St. Brigid Catholic School. The team representing school management, primary, junior and intermediate divisions will discuss how blended learning, learning management systems, and multi-modal approaches are used to delivering the Ontario curriculum in an engaging way.

Practical Method to Develop Creative Hybrid Courses
Lisbia Romero, Sue Fleming and Chih-Ling Leung (Chilli)

The purpose of this presentation is to describe a practical method implemented to develop a creative cost control course for the school of hospitality at George Brown College. The framework implemented included the following four components:

Identifying needs. The process of course design is initiated with a face-to-face meeting between the e-Learning team and the faculty member who will be teaching the course. In the first meeting, the faculty member informed us that the target audience for the course is students who have to combine work and school. As a result, the students needed the flexibility offered by a hybrid course. The faculty member also informed us that students often find this course difficult and struggle to pass it. They face difficulties with concepts, such as fixed and variable costs, and breakeven and yield percentages, especially in the application to real--life settings.

Finding a solution. With the needs identified, the challenge was to develop a contextualized course with opportunities to apply knowledge and skills. With this purpose in mind, we had several brainstorming meetings to identify how to embed and contextualize the learning objectives to promote engagement, to focus on doing more than on knowing, and to provide flexibility.

Deciding on a path. We decided to adopt a story approach to situate learning in a context and help students visualize the application of abstract cost concepts in real life. It is documented that people have the ability to make sense of the world around them through stories. According to the situated cognition perspective, stories are effective for learning because they are grounded in a context. We decided to create an introductory and entertaining story using the course components and concepts that attracted and maintained the students' attention. Additionally, we created short stories to contextualize abstract concepts and illustrated their use with real scenarios.

Getting Results. The result of this team effort was a creative course with real life examples and stories that will help students apply knowledge and skills in a similar manner to how they will be applying them in their professional fields.

Evaluating results. The course was taught for the first time during the fall 2016 semester and the informal feedback gathered from students shows that the videos and entertaining anecdotes clarified and cemented concepts, making it easier for the students to understand and retain information related to cost control. However, formal research needs to be conducted to determine the effect of this hybrid course in student achievement as well as their level of engagement and satisfaction.

PRESENTATIONS

Unified Blended learning student ID allocation based on IPv6 and 4G technologies
Ali M. Alshahrani

Blended learning in recent years could be the most important type of education because of its large flexibility in the time and place. In addition, it combines the latest online media with traditional classroom methods. Therefore, the importance of blended learning in the future is motivating researchers to enhance the services provided by this kind of educational systems. In this paper, we propose a new approach that will present a unique and unified worldwide student identification number for students enrolled in educational institutions which are based on blended learning methodologies. The proposed technique depends on using two of most today's advanced technologies which are: IPv6 addressing system and the 4G mobile technologies. This approach aims to ensure the flexibility of transition (degrees upgrading or major changes) between different blended learning organizations within the organization itself or between different organizations.

Validating digital divide instrument for e-learning environment
Hudiya Adzhar, Aidah Abdul Karim and Fariza Khalid

This study explored the psychometric properties of an instrument for measuring digital divide in the context of e-learning environment. The instrument had been administered to 97 education postgraduate students in one public university in Malaysia. Data from the study were fitted to the Rasch partial credit model using the Winsteps program in which the unidimensionality, reliability and person-item distribution map of the instrument were examined. The analysis showed all items in the instrument meet the Rasch model expectation and thus have a potential in measuring digital gap for e-learning environment in higher education.

Video Demonstrations for Competency Training
Martha Glenny

The paradigm for hand skills education that we have been working with since the mid 20th C was adapted for post-secondary education from the apprenticeship model of imparting skill. This pedagogy has been successful.

However, the contemporary learning environment has changed substantially: learning has expanded beyond the physical classroom, and financial pressures increase class sizes and lower instructor / student ratios. The question for me was how to retain the very necessary one to one instruction in creative skills education within the current educational ethos?

A Learning Management System (LMS) provides an out of the classroom space for learning theory and knowledge. However, this alone is not enough for competency training. The critical in-person demonstration shown to a small group needed an effective alternative. Technology is now at a place where creating 10 to 20-minute skills demonstration videos is within reach of educators.

In videos, students can watch 'my hands' working with the skill while I explain what I am doing, pointing out tips and pitfalls. By uploading the video to a video sharing site, students can access the demonstration as often as they wish. During class time, I can move through the room observing and correcting, and acknowledging success as they practice the skill on exercise pieces. I move from the front of the room to being attentive to each student's learning.

The positive outcomes I have observed are: the learning of skill is advanced; a higher quality is observed in the out of class work; there is good in-class attendance; and I can discover areas of difficulty for individual students and do one to one coaching during the class period.

PRESENTATIONS

When blended learning pedagogies go beyond physical and prescriptive boundaries

Liliana Cuesta Medina and Elena Bárcena Madera

This workshop has a twofold purpose: firstly, it reports results from a comparative study that examined blended learning (BL) language educators' practices in tertiary level institutions; secondly, it explains how to use these results to structure effective guiding principles in BL pedagogies for this field of study. Following a mixed method design, the authors collected data from language educators' artifacts, surveys, and interviews to identify their BL practices and gradual adaptation to blended and online language teaching/learning environments. Preliminary findings from the present study, conducted in two countries (Spain and Colombia), have revealed different challenges and adaptations that educators have confronted during their own training and professional service, mainly concerning aspects of planning, delivery, and assessment. Regardless of the context in which teachers are situated, our study demonstrates that educators take on a number of roles and transformations as they come to understand the rationale behind BL practices. Furthermore, they learn to make effective use of digital technologies as necessary initial stages that lay the groundwork for the subsequent success of teaching performances. Additionally, we found that deficient design and development of BL tasks, lessons, and (even) courses are often caused by lack of adequate training in online and BL pedagogies, not to mention the 'automatic' tendency to transfer face-to-face content to online environments. Moreover, the participants in the study lacked appropriate experience with regards to assessment practices that would have helped them control and evaluate their actions as BL educators in a systematic way. Moreover, that would have allowed their students to control their own academic and self-regulatory skills while immersed in the BL environment.

Based on these findings, we mapped a series of guidelines to support language educators beginning their engagement with BL practices. In this workshop, we address the design, development, and evaluation of tasks, framed upon a discussion of approaches and models drawn from the research literature. Furthermore, we discuss the relative efficacy of different strategies for the design and assessment of BL tasks, as well as create a route for the development of effective BL skills (for both educators and learners), framed on the principles of the self-regulation of learning, interaction, collaboration, and multimodality—core principles that should be nurtured throughout modern educational contexts. Finally, the workshop analyzes specific case studies in detail to illustrate both faulty and non-faulty design principles, and reproducible handouts will be provided to participants to be used in different target contexts. Overall, in this workshop, participants will learn to recognize and apply their teaching capacities to enhance key aspects of technology-based language BL education.

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PANELS

Assessment of MOOC Learning Objects based on Student Learning Time for Technical Vocational Education and Training

Irwan Mahazir Ismail, Zainal Abidin Sayadi, Helmi Norman and Norazah Nordin

Recent years have seen the growth of massive open online courses (MOOCs). The quality of MOOCs is usually assessed based on the time students spend in learning at these learning environments, termed "student learning time". Factors such as the quality of MOOC learning objects contribute to student learning time. Yet, previous studies have indicated that there is a high dropout rate in MOOCs for technical vocational education and training (TVET). The studies have reported that this caused by the fact that design of learning objects in MOOCs should be tailored for TVET students' learning styles. Moreover, MOOCs for TVET education should be based on outcome-based education pedagogical strategies. As such, to solve these problems and fill the gaps, we investigate student learning time in development of MOOC learning objects. The investigation is carried out using a developmental research approach where instruments such as surveys interviews were used for data collection. The study was conducted at Universiti Tun Hussein Onn Malaysia via random sampling and was analyzed for via quantitative techniques (descriptive analysis) and qualitative techniques (thematic analysis). The findings indicate that student learning time can be utilized in designing MOOC leaning object based on student profiles (in this case, TVET students). The findings could be used to assist TVET institutions to develop quality learning object for MOOCs.

Considerations for Implementation of Technologies in the Classroom—Examples from the Field

Scott Dunham, David Starmer, Steven Lester, Aaron Teitelbaum and Shehab El'Hashemy

Implementation of technology into the classroom environment can have many positive effects on students, including increased engagement and deeper learning. Careful planning with an orchestrated implementation strategy is imperative to maximize success. Our 4 esteemed panelists will share their experiences (both positive and negative) from integrating technology into their classrooms. This interactive session will provide attendees examples of operational tactics for successful integration into their own programs, and considerations for future development.

PANELS

Development of 21st century active learning spaces for higher education

Imran Yazid, Norazah Nordin and Helmi Norman

Traditional lecture halls have becoming too common. The advancement of the current technology has enabled learners to access wide range of information from outside of the classroom, thus needing a more flexible learning space to cater these changes. Recent studies have shown that many of the current physical learning spaces are designed to promote different types of pedagogy. In Malaysia, studies focusing on designing physical learning spaces are still lacking. Such studies are needed to ensure that learning spaces in Malaysia have the support to the needs of the 21st century learners. In solving the problem, a 21st century active learning space known as Student Innovative Learning Hub has been developed at Faculty of Education in Universiti Kebangsaan Malaysia. The study has investigated the differences of learning experience between traditional learning space setting and 21st century active learning space setting. The learning hub has been designed based on seven principles of learning space design developed by the Space for Knowledge Generation Project. This study is a part of a collaborative research on Higher Education Active Learning Spaces Project under Australian Innovative Research Universities and Malaysian Research Universities Network. A survey on user experiences has been carried out and the data have been collected in a period of four months, focusing on differences of learning experience between the traditional setting and the current setting. Findings have shown that learners prefer the 21st century active learning space setting as it enables them to have more flexible learning experience, compared to the traditional setting. Findings have also indicated that the 21st century active learning space setting can motivate learners to participate in class and achieve higher grades.

Mindfulness in Education and How to Use Technology to Increase Its Impact in Blended Learning

Agnieszka (Aga) Palalas, Anne van de Velde, Geoffrey Soloway and Craig Mackie

Latest discoveries in neuroscience combined with 35 years of scientific research in mindfulness and more recent exploration of the applications of mindfulness in education, have demonstrated that learners can train their mind to respond to stimuli in a purposeful controlled manner leading to attention regulation and cultivation of "healthier" learning habits. Some of the key benefits of mindfulness practice for students include improved readiness to learn, academic performance, attentions and concentration, self-reflection and self-calming, social and emotional learning, healthy relationships, holistic well-being, tools to reduce stress, and impulse control. At the same time, learner-centred contemplative teaching practices support learners' introspection, reflection, and their cultivation of awareness of themselves and others, thus providing the foundations for successful learning process and outcomes.grades.

This blended panel (with two panelists present face-to-face and two - virtually) is chaired by Agnieszka Palalas who introduces the concept of mindfulness and its potential in the blended learning context. Aga leads participants through a brief mindfulness practice to provide some context around the practice for those who are new to mindfulness. Then, drawing on her research on mindfulness in education, her personal mindfulness practice, and her experience as a contemplative online professor, Aga provides a brief overview of mindful practices in blended learning.

George Brown College Curriculum Specialist, Anne van de Velde, explores how intentional design and the Flipped Classroom blended learning model encourage students to become a conscious participant in how course material relates to their own meaning making. When teachers bring contemplative awareness into the classroom, we place our students at the centre of their learning experience, giving them agency to create meaningful links between external subject matter and their inner lives. Intentional curriculum design affords us a framework to develop this capacity.

PANELS

Geoffrey Soloway, mindfulness teacher, practitioner and researcher, speaks to the relationship of technology and mindfulness across various context. Mindfulness is a core competency needed by individuals, families, teams, co-workers, organizations, cities and countries ASAP. Mobile devices and computers play a significant role in shaping our attentional networks and keeping us more mindless than mindful in our day-to-day. How then can we leverage learning technology to disrupt the very patterns in our brains it is creating? Drawing on his research, Geoff shares key insights learned delivering mindfulness blended learning solutions for organizations, government and education, and specifically share central features of the 30 Day Mindfulness Challenge that teaches Mindfulness-in-Action vs. mindfulness plugged in, with eyes-closed in a quiet room.

Craig Mackie, mindfulness practitioner, teacher, and consultant, addresses some challenges and opportunities related to the usage of technology in mindfulness education and practice. One of the major barriers to success with mindfulness is sustaining engagement with the practices and techniques built during face-to-face instruction. Often participants of 8 week groups are given recordings to download or stream for their daily practices; however, this still remains a chore. Access to mindfulness courses is also a barrier for many rural and remote communities. Using an 8-week chronic pain study at the Ottawa Research Hospital as an example, Craig discusses some adaptations of instructional materials and their delivery required to allow patients with chronic pain to access the course from the comfort of their homes. Key challenges and opportunities are presented pertaining to access, consistency and delivery of mindfulness learning in the mental health field. Craig shares some highlights on the intersection of mindfulness and blended learning instruction.

Mobile game-based learning and MOOCs in blended learning at higher educational settings

Hafiz Zaini, Fairus Hamdan, Helmi Norman and Norazah Nordin

Mobile technologies have impacted the educational scenario by allowing connectivity and seamlessness in teaching and learning. Previous studies have indicated that there is a lack of studies on mobile game-based learning, especially in real time blended learning settings. In addition, previous researches have also indicated that competitive aspect is able to enhance the learning process. As such, to solve the problems and fill the gaps, we investigated mobile game-based learning in in an ethnic relations course at higher education settings. The software used was Kahoot and it allowed assessing students' achievement via a mobile game-based learning approach. The approach applied was single-group experiment using a massive open online course on ethnic relations. We analyzed the achievement of students using mobile game-based learning and assess after pre and post sessions in a period of two months. Findings show that there are three types of learners in mobile game-based learning which are: high achievers, gradually-increasing achievers, and gradually-decreasing achievers. Findings also indicate that mobile-game based learning can potentially be used for promoting engagement in learning.

PANELS

Mobile Context-Aware Learning for Biology in Secondary Education
Helmi Norman

Advanced development in mobile and wireless communications technology enable multiple of new learning that situate students in an environment that combines real-world and digital sources. Such learning environments include context-aware learning, where it allows the real world to be connected by digital information through technology such as context-aware mobile technology. Yet, previous studies have indicated that studies in context-aware learning are still limited in secondary education, particularly in the biology subject. One of the problems is owing to the lack of proper learning strategies or tools for assisting the students to acquire knowledge in such a complex learning. Students are unable to visualize and contextualize abstract concepts in. Furthermore, in line with the Malaysia Education Blueprint 2013-2025, the Ministry of Education emphasizes the 21st century teaching and learning – and context-aware teaching and learning help towards these aspirations As such, to solve the problems and fill the gap, we investigate context-aware mobile learning in Biology at secondary education level and also develop a context-aware mobile learning app and assess its potential in teaching and learning Biology. Findings show that context-aware learning can be potentially used for Biology in secondary education and further research can be done to assess its effectiveness in different science courses and other domains (e.g. social science) as well.

Professor Role in a Blended Learning Environment
Stella Bastone, Evelyn Chan, Margaret Alexander, Allan Esser, M McLean, Elizabeth Speers, James Voulakos and Robin Yap

This panel is comprised of educators at George Brown College in Toronto, Ontario. The particular strength of this panel is in the diversity of its constituents. While each panelist has demonstrated an active interest in early technology adoption, student-centeredness, and integration of policy into practice (e.g., accessibility), each brings a unique perspective stemming from their diverse areas of expertise and advocacy. Please see Appendix A for their biographies.

Research literature suggests that the pedagogical, managerial, social and technological role of the professor changes when a professor moves from a face-to-face to blended format (Skibba, 2007). If it is true that the role of the professor changes in the transition from traditional to blended format, what are the present and future practical implications for educators and administrators in post-secondary environments? In this facilitated panel discussion, conference attendees are invited to interact with panelists on the subject of these possible implications, including those related to professor skill sets, tasks, workload, qualifications, administration, policy, and even budgetary considerations.

The format for the discussion will be interactive, where the audience members (both face-to-face and virtual) are invited to share their questions and considerations with a diverse panel of educators.

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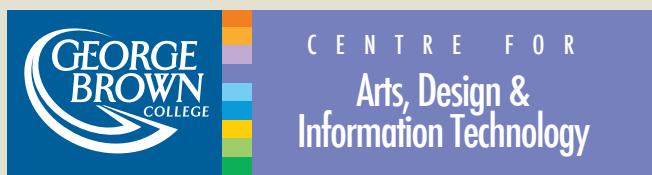
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