Will W.K. Ma · Chi-Keung Chan
Kar-wai Tong · Heidi Fung
Cheuk Wai Rose Fong *Editors*

New Ecology for Education – Communication X Learning

Selected Papers from the HKAECT-AECT 2017 Summer International Research Symposium

Springer

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Preface

The HKAECT-AECT 2017 Summer International Research Symposium on *New Ecology for Education: Communication X Learning* was co-organized by the Hong Kong Association for Educational Communications and Technology (HKAECT) and the Association for Educational Communications and Technology (AECT) on 15–17 June 2017 at the University of Hong Kong. In the wake of the advances in information and communication technology, the Internet and new media enable the emergence of new mechanisms of human networking as well as communication, which are shaped by—yet also share—the development of educational practices. Having witnessed the explosion of information on the web, the HKAECT and the AECT feel the pressing need for colleagues in the fields of education and communication to examine their current and future roles, as they are no longer the ones they used to be and may have to re-define their developments in the process of communication and learning. The Symposium aimed at unpacking the complex interactions between communication and learning, as represented by the symbol "X" in the event title. It provided a platform for knowledge exchanges on education, communications, and technology among educators, researchers, and practitioners who share a common goal to explore better approaches to teaching and learning, along with effective and meaningful media communication through technology advancement.

The Symposium appealed through open calls for paper submissions from a number of areas to address the new ecology for education, including (a) assessment for learning, (b) new media, (c) massive open online courses (MOOCs) and open education, (d) instructional design and design-based research, (e) knowledge diffusion in educational technologies, (f) professional education, teaching, learning and development in the digital era, as well as (g) communication and the media. The encouraging response to the calls reflected the timeliness of the Symposium. In this edited volume of the conference proceedings, selected high-quality manuscripts are broadly categorized around three main themes—the new trends in educational technology (5 chapters), teaching and learning experiences with technology (9 chapters), as well as communication and the media (8 chapters).

It is extremely pleasing that the Symposium successfully invited renowned scholars and learned authors to share their inspirational insights with the audience from a wide range of perspectives about how education and communication have adapted and will further emergent practices in the information age. On behalf of the Symposium Organizing Committee, we take this opportunity to express our gratitude to Prof. Mohan Jyoti Dutta of the National University of Singapore, Prof. Brad Hokanson of the University of Minnesota, Prof. Siu Cheung Kong of the Education University of Hong Kong, and Prof. Robert A. Reiser of the Florida State University for their consent to be our keynote speakers. Our heartfelt appreciation also goes to all chapter contributors and reviewers. Their excellent works and contributions have made this monograph a success in facilitating rich and resourceful exchanges among academicians, practitioners, and professionals.

We cannot thank our partnering institutes and organizations enough for their incessant support and sponsorship, without which the Symposium could not have been realized. They included Centre for Information Technology in Education (CITE) of the University of Hong Kong, Online Communication Research Centre and Department of Journalism and Communication of Hong Kong Shue Yan University, Centre for Learning, Teaching and Technology of the Education University of Hong Kong, Faculty of Education of the University of Macau, Department of Education Studies of Hong Kong Baptist University, and last but not least, the Hong Kong Pei Hua Education Foundation.

Hong Kong
June 2017

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HKAECT

The Hong Kong Association for Educational Communications and Technology (HKAECT; http://www.hkaect.org/) was established in 1989. Its first conference was organized in 1990, addressing "The Role of Educational Communications and Technology in Year 2000", with speakers coming from the United States, China, and Taiwan to discuss the outlook on educational communication and technology. Throughout these years, the HKAECT has held a number of international conferences, symposiums, workshops, and talks with various themes to provide a platform to enable rich exchanges for academicians, practitioners, and professionals in the fields of communication and education to discourse about the shaping and changing issues on education, communications, and technology.

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2004	Media Innovations in Education: Input and Outcome in New Society
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A New Ecology for Education: Refocusing Educational Technology Beyond Content

Brad Hokanson

Abstract In this new century, much of education in general and educational technology in particular have centered on the delivery of information. Instructional design has, since the last century, focused on increasing efficiency and measuring retention. At this point, however, we need to develop a "new ecology" of learning, one which includes other forms of learning into education and one which develops students who are curious, creative, and capable. In our new ecology of education, we should be focusing on the complex and full diversity of learning, not just on a few simple aspects. We must go beyond content to include the development of skills and cognitive traits such as creativity, curiosity, and persistence.

Keywords Non-cognitive skills · Beyond content · Personality traits · Higher level learning

1 Introduction

Much of the current effort in education focuses on "covering the content". This is seen as the singular essential aspect in our teaching and in our work in educational technology. This focus on the informational content affects classroom teaching and is most evident in digital and online learning. It is a focus on the retention of information, which is often seen through the national comparisons of PISA scores or test results, and which is the lowest level of Bloom's Taxonomy (Bloom & Krathwohl, 1956).

Most modern societies have evolved high stakes testing environments, and educational research, discussion, and instructional design have centered on information retention and retrieval. Learners are tested primarily for their remembering of information, methods are evaluated by their ability to ensure information

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retention, and discussion always resorts to the idea of learning as remembering. The new ecology must be different, and must recognize other cognitive traits.

2 Levels of Learning

Both the initial and revised versions of Bloom's Taxonomy describe a hierarchy of learning levels ranging from simple remembering to synthesis and generation, and in the revised version (Anderson et al., 2001), further recognizes the cognitive achievements of analyzing, manipulating, and creating new knowledge.

This limited focus on informational content is not the most important aspect of education; it should not be the central aspect of our "new ecology of learning". Nor should it monopolize the ecology of education, forming a monoculture, a single concentration that is dangerous in the biological world as well as in our metaphorical educational ecology. This solitary focus is not a *valid* pursuit of the work of educational technology, as we must have broader and ecological approach to our work.

2.1 Learning Through Design

Design education may help illustrate a different approach to learning. The field of design is often seen as merely an aesthetic pursuit, but should be better described as a life of problem *seeking* and *solving*. It is not just answering a problem, but rather seeking out and finding problems to solve. It can be described as curiosity applied and formalized.

The education of a designer is focused on solving problems, to be sure, but more of *finding and redefining* problems. This is cognitively more complex, and the learning of knowledge that occurs through the design process happens through the *use* of content instead of simply *knowing* the content. Remembering or retention, low-level learning, is replaced by the capability to synthesize information and to generate new ideas. This is "knowing in action" (Schön, 1983). Design does not start seeking a single answer or destination, but by exploring, discovery, creating a solution …and often understanding.

> By experience, delivery and evaluation based on informational content is considerably simpler than a complex form of learning or skill; memorizing the poem is simpler than writing or analyzing; identifying a historical artist is simpler than creating a drawing; teaching about creativity is easier than developing creativity in the learner. It may also detract from true learning; through a "poverty of attention": What information consumes is rather obvious: it consumes the attention of its recipients (Simon, 1971).

2.2 *Beyond Content*

It is important for learners to go beyond content and develop other skills and capabilities. Content, in reality, is a dead end; it is limited by the extent of the information, and by the single answers provided. It develops the false premise that learning is complete when the information is known, and not when learners continue to seek more. When the content information is retained, learning is not complete, which only it is just beginning, as information is dynamic, constantly changing, and dynamic.

This can be described as being *agnostic* to the informational content, as a looking beyond content to goals that are more essential and meaningful.

However, even within instructional design, the process of learning is seen as separate from the material being learned. The process of instructional design, whether in full curricula or individual courses, often separates content from the learning experience by using subject matter experts.

This categorization is a narrow view of the process and of content, where it focused more on the information transmitted and on declarative knowledge. It does not include skills such as writing or dance, and it also does not include noncognitive skills or character traits. One reason for the focus of instructional design on information-based content may be due to a simplistic understanding of learning, or because of the ease presentation and evaluation. It is also supported by a tendency toward quantitative evaluation and analysis both in the field and to the public.

3 The Evolution of Educational Technology

Much of the work in educational technology over the past 30 years has its roots in the Clark/Kozma debates on the impact of different media on learning. From that base, most evaluation of educational processes has centered on the retention of information by learners. That debate centered on the concept that media mad "no significant difference" in retaining information or content. Clark said, "…media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (1983, p. 445).

That debate and commentary centered instructional design by implicitly setting the criteria for evaluation and success. For instructional design, media became less relevant, and was removed from the learning equation. The field focused on learning as remembering information, the lowest level of Bloom's Taxonomy. And we, the field of educational technology, have spent our efforts figuratively driving that grocery truck, just trying to make deliveries faster and more efficient.

If we continue to work with that analogy, the quality is judged only on the quantity of groceries that are delivered. We test to see the groceries were actually delivered, not if they were nutritious, or if they were consumed, or even if they

rotted at the front door. These are the more valid aspects of the analogy, an understanding that should encourage us to look at learning more broadly. But in many cases today, success in education is defined narrowly, as how much was delivered and how much was briefly remembered. The validity of evaluating learning based principally on information retention is a given, and is not questioned.

As a result of that debate, the field of instructional design ceased looking at differences in the capability of media, that different media affords different actions, or that a different form of learning may occur through the use of different media. Ignoring these other possibilities has focused on information delivery and not on the construction of knowledge through the use of media in many forms.

3.1 Media and Learning

Olson (1974) held that media *converge* as to knowledge conveyed, but they *diverge* as to the skills they assume and develop. In other words, as a means to convey information, there is a focus, whereas, the media themselves can help diversify the development of skills and capabilities. We learn more from the media than just the informational content.

Of course, this should be a concern beyond the field of instructional technology and it would have an effect throughout education. Most educators know of Bloom's Taxonomy and other descriptors of higher level learning, but teaching effort is often focused most on content and lower levels of learning. Seldom addressed are the beyond-content aspects that have been shown to be essential to the long-term success and development of learners. In our new ecology of education, we should be focusing on the complex and full diversity of learning, not just on a few simple aspects. We often omit character traits such as creativity, curiosity, and persistence, among others.

Teachers often recognize this challenge, and feel hindered by a need to cover the content or to "teach for the test". Our new ecology of learning should build deep learners, those who can use and apply knowledge, and who have the drive to finish the work. They should have the curiosity to find out more and the creativity to do something different. True learning is never done, and continues to grow and evolve.

If we examine capabilities to synthesis and generate ideas, we recognize they are not based on any specific content, but often utilize content in new and different ways. Content is still of value, but must be limited as a focus to learning, and must not be the singular direction for the evaluation of learning.

What are the steps we can take to go beyond content in directing our design of instruction? Using a deeper orientation for learning, for example, such as design or problem-based learning, may lead to a new ecology for learning. It will give us better models, and we could also begin to view simplistic content not as the goal, but rather as a medium for learning. It could be something which can be used to support higher forms of learning. If we view content as that which is helpful in developing skills of synthesis, logic, creativity, and curiosity, it does have value. Content could be a medium for education.

We often see ways in which content serves as a medium for deeper learning. For example, practicing the piano provides little new experience with melodies and notes, no new notes or "content", but rather it is an activity that supports the development of expertise and the dedication and persistence needed in many fields. Debussey recognized this in characterizing music as "…the space between the notes."

Similarly, memorizing a poem is not highly valuable for the content of the poem, that is, the specific words, but may be valuable for the considered, deeper examination of what is truly being said, as well as for the discipline of the act of memorization.

Developing an understanding of the use of information or content is where we can develop the higher qualities of education. Education must have more value than is seen by assessing the information retained or remembered. That simplistic understanding that learning can be measuring the information retained is a fallacy; and the system that builds on that direction is ecologically unhealthy. We must seek the diverse learning of a complex ecology. This direction seeks to illustrate a richness that can develop successful learning, and it begins to create both a set of goals for education, and guidelines for instructional technology.

3.2 The Learner

While this can be described as a theoretical direction for the field, it can also be examined through an individual learner. If you could only teach a child one thing, what would you teach them? Would it be one set of facts, or one set of skills, or how to learn? Or would you teach them to be curious, persistent, or creative, to move them forward and to be self-motivated. The positive attributes we must develop in our learners are skills and character traits, and not the content of information. These are traits that will last for lifetime, a sustainable model for learning, and a preparation that needs a new ecology of learning.

4 A New Ecology of Learning

The new ecology requires that we recognize that our larger goals in education, as illustrated by Bloom's Taxonomy and our own hopes are more than just declarative knowledge, information, or facts. We have to begin to evaluate learning and development in ways that are more subjective and inclusive as is being done in design, some schools, and even daycare centers. There are comments about student personalities that are apt measures, that describe leadership, interest, engagement, and teamwork, and through evaluation, learning of social skills and cognitive traits can be achieved. A good goal would be to develop instructional methods for persistence and grit, fairness, and curiosity.

How we design instruction, organize curricula, and how we creative learning experiences is based on the challenges we choose to address, and on our own educational philosophy. Those choices, ways of thinking and learning have developed over years, but still retain much of their orientation from the history and evolution of our field. For innovation to occur, it is important to significantly shift our outlook and re-direct our efforts.

Education builds value not from the details that one knows, and not through a rigid process that is developed to a preordained end result. The value comes through higher order thinking such as synthesis and analysis, and it comes from traits such as creativity. Education and educators must go beyond content to focus on the process, the end results, how everything works, and the thinking and innovative nature of the work.

In the end, the field that is educational technology has the responsibility to improve all education, by the expansion of the use of technology and by the innovative nature of the field. And we know there is value beyond the simple information content. For instructional design, that means we need to reorient our methods. We need to embrace as our role, developing the broader values in education, and separate content from the focus of our work. We need to help education develop as an ecology of learning, one which addresses much more than simple content.

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Brad Hokanson is AECT President 2016. He is also a professor in Graphic Design at the University of Minnesota and serves as Mertie W. Buckman Professor of Design Education for the College of Design. He has taught an ongoing course on Creative Problem Solving at the University of Minnesota since 2000. He has received multiple teaching awards at the University.

Part I
New Trends in Educational Technology

Are Social Media Alternatives to Learning Management Systems When Teaching Online?

Ana-Paula Correia

Abstract This study explores the use of social media in a graduate online course as an alternative to the traditional learning management systems. It uses a qualitative research approach relying on interviews and document analysis as data collection methods. Findings show that students appreciated the flexibility of the mash-up LMS and the opportunity to learn about different learning technologies while using them to support their own learning. Facebook allows students to get to know each other better on a personal level and Edmodo kept the online conversations organized and easy to follow. As far as improving the online learning experience, students suggested an increase in number and frequency of synchronous sessions along with the use of additional content in audio and visual/video formats.

Keywords Social media · Learning management system · Online education · Higher education

1 Introduction

In today's world, the prominence of online learning is unquestionable (Liu, Kalk, Kinney & Orr, 2012). Social media have a wide use inside and outside the education field. The aim of this study was to analyze the use of social media in an online course in the context of higher education. Instead of using a specific learning management system, the course instructor relied on different social media tools to create a "mash-up" learning system that put the student at the center of the learning and teaching process and constituted an alternative to the traditional learning management system.

The concept of "learning management system" (LMS) grew up in the 90s from the development of the Internet and multimedia products. Since then, these systems

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such as, Canvas, Moodle, and Blackboard, have evolved and been adopted by many universities around the world. Also known as "learning platforms", "distributed learning systems", or "learning management systems", these systems combine a variety of teaching and management tools to create highly structured online learning environments. LMSs are scalable systems that can be used to support a wide variety of educational experiences, from courses and programs to virtual universities (Coates, James & Baldwin, 2005). Although there are many differences between LMSs, most of them offer similar features:

- Synchronous and asynchronous communication (e.g., e-mail, chat, synchronous communication, and discussion forums);
- Content development and distribution (e.g., learning resources, learning object repositories, and links to online resources);
- Formative and summative evaluation (e.g., project submission, multiple choice tests, participation records in discussion forums, and teacher feedback);
- Management of the learning and teaching process (e.g., registration, schedules, office hours, and teacher consultations).

Clearly, there is something seductive about LMSs that despite their complexities of installation and use, almost all universities feel compelled to adopt them. Access, cost, and quality are the three main reasons that lead to this adoption. Another important reason is that LMSs offer an unimaginable ability to control and regulate the learning and teaching process in the name of "quality control" (Coates, James & Baldwin, 2005).

The alleged "order" created by LMSs regarding learning and teaching appears to be one of the most compelling reasons for their rapid adoption in North American universities, it is also a target of much criticism. Not only LMSs perpetuate the control of universities, but also support the fact that the teacher is at the center of the learning and teaching process and maintains an almost absolute control in these online environments (Coates, James & Baldwin, 2005). Additionally, many LMSs are exclusively centered around technical and budgetary issues leaving pedagogical issues out or sending them to the background. Following are some of the most common unfavorable views of the use of LMSs in higher education:

- Used mostly in a utilitarian way. It can be said that the LMSs are based on a simplistic understanding of the relationship between teachers, students, knowledge, and learning. In fact, the textual nature of the first LMSs helped to strengthen teaching concepts such as transmission of decontextualized knowledge, limited opportunities for application of knowledge and skill development and a strong emphasis on text-based communication;
- One of the most obvious limitations of LMSs is the easy support of forms of assessment that can be corrected automatically, such as multiple choice questions tests. This poses a serious question concerning the fact that this type of testing and feedback, which is already dominant in higher education becomes

even more prevalent. Consequently, authentic assessment approaches like portfolios, projects, experiments, and demonstrations may be less used;
- In cognitive terms, there is interest in investigating the impact of LMSs on how students: (1) explore and contextualize course content; and (2) summarize, synthesize, and make judgments about their own knowledge. However, not enough research on the degree of involvement of students with teachers, peers, and content through the use of LMSs has been conducted;
- Restrictions on content migration are also seen as a major issue with LMSs. The question that arises here is whether these restrictions limit the diversity of teaching approaches, design elements, and topics selected by teachers. Without control over source code that supports the LMS, pedagogical choices may no longer be made by the teacher;
- The cost associate to LMSs' implementation is substantial since they require to be installed, configured, customized, deployed, and maintained at the vendor's data center or at a client location.

A multi-year survey study conducted at a large US Midwestern university on the uses and perceived benefits of using LMSs to support classroom teaching showed that "instructors and students value tools and activities for efficient communication more than interactive tools for innovating existing practices." (Lonn & Teasley, 2009, p. 686) It looked like that students focused their responses on *how* LMSs were being used rather than if they were being used. If LMSs were being used to support constructivist-based models of learning, then additional tools "to scaffold more interactive forms of instruction and learning may be required for success" (p. 693).

In sum, the LMSs seem to offer an "all-or-nothing" solution for institutions, teachers, and students. For example, LMSs are usually linked to academic calendars and learning experiences bounded in time (e.g., quarters and semesters), as well as students of the institutions they serve. This situation severely limits the continuity of learning beyond a particular class and restricts the exchange with students and teachers from other institutions. Students are not free to choose the best/preferred tools for learning and teachers hamper their teaching approaches to what the LMS can technically accomplish, which undermines the learning and teaching process. Bush and Mott (2009) explain that the monolithic and rigid nature of LMSs mirror the way that content has traditionally been made available for teachers and students (e.g., books and other resources, including online courses) in a policy of "all-or-nothing" or "take-or-leave it." As the online teacher moves away from traditional teaching practices and turns into a "guide on the side," students take on more responsibilities for coordinating and regulating their own learning (Bergel, 2009). It is at this juncture in time that alternatives to traditional LMSs arise in order to overcome some of these limitations and provide a flexible online learning experience and a more student-centered one.

2 Social Media as Alternatives to Traditional LMSs

Despite the fact that social media are being highly used as a form of socialization (Madge, Meek, Wellens & Hooley, 2009), more and more college students are looking for these tools, on its own initiative, to achieve their educational goals (Roblyer, McDaniel, Webb, Herman, & Witty 2010). These tools (e.g., Facebook, Twitter, Instagram, Wikipedia, DropBox, Edmodo, YouTube, Snapchat, and Google+) combine self-created profile pages with other features such as chats, blogs/forums, sound and video sharing, text and image to promote and enhance the interaction between its users/learners. They can not only exchange information and content, but also create content in a collaborative way. Social media is defined broadly as any website or application that allows for any of these activities, meaning communicate, share, and create content. Social media reinforce a sense of belonging in online communities and foster collaboration and knowledge co-construction, which makes them a strong alternative to traditional LMSs.

There are several ways to utilize social media in education. Examples are: the creation of a closed group on Facebook to support or extend a course, a debate on a particular topic on Twitter, a blog on Blogger to promote sharing and discussion of ideas and perspectives. Other advantages of using social media in education are, as follows:

- Students actively participate in their own learning, which means that the teacher is not in total control of the learning and teaching process. Teachers act as "guides" in this process and students are encouraged to take an active role in the regulation of their own learning. Teachers' role in these environments can also include support for dialogue and providing constant feedback on students' performance;
- The collaborative work increases motivation and engagement among students, which generates higher levels of academic performance and more opportunities for feedback and revisions. These activities, in turn, promote critical thinking, and greatly increase the diversity of knowledge and experience between students and teachers. Social media not only allow sharing of knowledge, but also the collaboration during problem solving, and even the development of innovative thinking (Alvarez & Olivera-Smith, 2013).

In this context, the idea of this research study started from a persistent dissatisfaction with traditional LMSs. The course instructor envisioned an online graduate course in instructional design with a continuous flow of interactions between students, teacher, content, and self. In addition, she wanted to implement a project-based pedagogy that required a constant coordination of team projects and intense communication among design team members. Based on the identified requirements, the traditional LMS did not seem to be the best support to provide students with a high-quality learning experience.

The idea of creating an online course that utilizes the potential of social media for learning and teaching emerged, and thus was born the mash-up LMS or modular

LMS (Culatta, 2010). In the case of this study, the mash-up LMS consisted of a combination of Edmodo (edmodo.com), Facebook (facebook.com), Dropbox (dropbox.com), Skype (skype.com), and e-mail. Mash-up, in this context, means the reuse, remixing or combining of various forms of social media (Lessing, 2008) to achieve determined learning objectives.

The learning and teaching process that takes place learning environments supported by social media is the result of multiple exchanges between participants who alternate roles between student (the one who learns) and teacher (the one who teaches). As Alvarez and Olivera-Smith (2013, p. 318) explain, "in these environments, learners actively take responsibility for and regulate their own (collaborative) learning, meaning that the teacher is no longer in full control."

The objective in this particular study was to create an online learning experience according to the needs of students and adapted to the specificities of instructional design as a study area. In this way, it avoided the monolithic approach of using a LMS, just because this was the only system offered at the higher education institution where the course instructor worked.

3 Methods

A qualitative methodology was used in this research study. The 14 students who participated were enrolled in an online course graduate (master's degrees and doctorate) in instructional design offered in a public university in the United States.

The participants group was quite diverse in terms of age, professional experience, study areas (education, design, human–computer interaction), and ethnic origin. They were part of a convenient sample as the author was the instructor for this graduate course at the time of the study. The data collection took place from May to July 2012.

3.1 Data Collection Methods

The methods used for data collection were: online interviews and document analysis of: (1) online interactions, (2) reflections written by the students, and (3) project presentations done by design teams via Skype. Below are some examples of the questions asked to the students:

- What have you learned the most in this course?
- Have the Facebook group added to the learning experience? Yes or No? Please provide an explanation to your answer.
- How was your experience on using a mash-up LMS (Edmodo combined with Facebook, Skype and e-mail)? Do you think this approach should be used again? Yes or No? Please provide an explanation to your answer.

- What existing elements were critical to your successful learning in this course?
- Which parts of the online course do you think were most in need of improvement? Why? How can these be fixed in the future?

As far as the students' reflections, they were asked to discuss their insights about the design project they were involved in as well as the overall online learning experience. They were encouraged to share stories about their experiences in this course in terms of their own learning, understanding of the field of instructional design and growth as practitioners.

3.2 Data Analysis Methods

For data analysis, an iterative and inductive process of analysis was used to formulate a set of qualitative accounts. Through a careful analysis of the data, trends and discrepancies were found and emergent categories were organized by topics.

Using Microsoft Word, data chunks were copied and pasted from the interview transcriptions, students' reflections, and online interactions into a matrix of categories generated during a preliminary analysis. Finally, each data chunk was transformed into a coding system. Through this process codes were refined (merged into broader sections or broken into less inclusive codes) and redundancy was eliminated. If necessary, new categories were created.

4 Findings

Overall, the findings show that students appreciated the flexibility of the media mash-up and the opportunity to learn about different learning technologies while using them to support their own learning. Facebook allows students to get to know each other better on a personal level and Edmodo kept the online conversations organized and easy to follow. As far as improving the online learning experience, students suggested an increase in number and frequency of synchronous sessions along with the use of additional content in audio and visual/video formats. The next paragraphs describe the most important findings.

4.1 Positive Aspects of the Online Learning Experience

Students identified the opportunity to interact with their peers and the teacher, and to learn *about* and *with* different learning technologies as positives aspects of the online learning experience. Other gains of the experience were the opportunity to deepen their knowledge in instructional design and the hands-on activities that

resulted in the creation of educational materials targeted to specific audiences. Students stressed the importance of starting the design process with a good understanding of the educational problem at hand, the target audience, and the learning context. Other students mentioned as additional benefits, the structure of the course, the pace of teaching, the resources available and the ability to move from theory to practice, meaning solving a real-world problem during their instructional design projects and applying the knowledge they were construing as students in the course.

4.2 Facebook Contributions to the Online Learning Experience

Regarding the use of social media in the online course, students shared differing perspectives. Some felt that, particularly Facebook, was not necessary, because it created a bit of confusion and demanded that they spent more time with the course. These students did not recognize the social function of Facebook and thought that their participation on Facebook was just one more course requirement. Another source of confusion was the students' perception that they had to duplicate their investments in effort and time on both systems, Edmodo and Facebook.

Conversely, other students have recognized the use of Facebook as a way of being continuously connected to the class and to get to know each other better on a personal level. One of them shared during his interview the following thought: "I think Facebook did add [to the learning experience]; it was nice to have a forum that was not cluttered up with assignments and was just for sharing resources and ideas."

Another student added: "I enjoyed the introductions and I liked reading the posts from others, but I feel that several of my peers did not contribute. It did add a personal touch in an otherwise distant environment."

Facebook also served as a way to share educational resources, career and professional development opportunities and extend the participation of the learning community even after the course ended.

4.3 Perspectives on the Mash-up LMS

The role of Edmodo in the online course was more didactic than socializing. As a result, projects required by the teacher were posted on Edmodo along with the online thematic discussions that counted towards students' final grade. A few students described Edmodo as "boring" and "sequential" and a mere way to organize and present educational content.

Other students reiterated that Edmodo offered a platform easy to use and navigate. It also allowed to structure the course topics in a logical and uncomplicated way. Students praised the combination of Edmodo with Facebook, Skype, and e-mail. One student in particular, explains that the "use of LMS mash-up was the most effective way to reach a larger number of individuals." She goes on explaining that the course could be part of a larger learning community and be kept active after the class ended. Another student says that "although at the beginning the course was a bit hectic with all of the technologies, I learned which was to be used when and ended up enjoying the mash-up."

One student, during the interview, refers to the course design as interesting as it allowed students "to learn while using all of the [social media] tools and get to know these tools in an educational context." He further explains that "all of the social media tools became part of my instructional design toolbox. It was also great to learn how to use Facebook for educational purposes!" Another student, during her reflection, reiterates that "from our online discussion posts on Edmodo, and from the more 'personal' posts on our Facebook group, I discovered that my peers in this class come from different walks of life, have different goals and aspirations, and are interested in varying fields of study and practice."

4.4 Key Elements for Teaching Instructional Design

The supplemental text readings, the constant incentive to communicate and sharing resources, and the workgroup structure, were some of the elements identified as essential to learn instructional design. Other elements consisted of: (1) thematic online discussions, (2) use Skype for synchronous sessions, (3) samples of exemplary work provided by the teacher, (4) careful course planning, and (5) evaluation criteria that mirrored what is expected from an instructional designer in contexts of practice. During the interview, one of the students shared that "I really enjoyed the textbook and putting pedagogy to practice—I have been working with aspects of instructional design for years now and I feel like I have a foundation of knowledge to back up my decisions as a result of this course. I also enjoyed the online aspect of it—I was able to work at my own pace (although quickly) and interact with my classmates on my own time."

Another student wrote on her reflection, "In fact, I would argue that [this course] has effectively changed the way I approach all instruction I design. Never before would I have thought of myself as an instructional designer."

4.5 Future Improvements of the Learning Experience

In terms of improvements for future iterations of the online course, students suggested using more synchronous communication tools to facilitate interaction among

participants. Adobe Connect and Google Hangouts were some of the tools suggested to increase the educational power of the mash-up LMS. Thus, the increase of synchronous interactions would allow for the establishment of closer professional ties between participants.

One of the students wrote in his reflection: "Maybe another synchronous session or two. One in the beginning to introduce everyone and explain the 'problem' approach. It was nice to see everyone in the end, but I'd also like to meet them in-person in the beginning. And then maybe also toward the middle, so everyone can touch base and see where others are at in their designing process." Another student suggested the use of prerecorded sessions in which the instructor would talk about various topics on instructional design. She explained that she missed the instructor's presence in the course. She used the following words: "I want to hear the instructor's voice, feel the emotion and excitement about the topic discussed in her voice and body language". The fact that the course was based too much on reading online texts was another of the problems encountered. Students proposed the use of more segments of audio and video as ways to express their thoughts.

5 Final Remarks

Similar to the electricity that transformed factories' monolithic systems into modular systems, the Internet is transforming knowledge from static volumes to modular and customizable learning modules. A good example of this transformation is the proliferation of media mash-ups in higher education. Mash-ups are a unique learning experience created by combining several different media, or systems in order to create a new product. For example, a mash-up is to use the photos (from a tool like Flickr) on a map (like Google Earth) to see where the photos were taken (see panoramio.com). The mash-ups differ from products "all-in-one" (e.g., Blackboard and Moddle) because instead of adding new features to existing systems, they take advantage of available systems that already have the desired features. Despite all the systems work independently, they are able to create a unique and personalized experience when used in unison. New products can be created simply by adding different kinds of media or functionality to the mash-up combination (Culatta, 2010).

The research study presented here on the use of a mash-up LMS in higher education relented the interest of students of exploring this approach. Their participation in the online course contributed not only to learn instructional design principles and practices, but also to experiment with different learning technologies in a unique manner. However, students were also critical of the online learning experience and suggested an increase in number and frequency of synchronous sessions and additional use of audio and video content. This seems consistent with Kuo, Walker, Belland, Schroder, and Kuo (2014) study of the use of web-based videoconferencing in online learning and teaching. They showed that learner–instructor interaction and learner–learner interactions were able to predict students'

satisfaction with the online learning experience. One of the reasons related with the use of "features such as emotions icons, talk, or raise hand functions" that supported and elevated these interactions (Kuo, Walker, Belland, Schroder, & Kuo, 2014, p. 161).

As Bush and Mott (2009) argue that student-centered learning technologies that are flexible and address the individual needs of each student are imperative. Social media allows the increase of educational content production as well as the sharing of challenges and victories between students and teachers from around the world. Bush and Mott (2009) explain that perpetuating an educational model focused on the teacher keeps the paradigm that supports the changes in student and teacher roles from natural evolution. However, such evolution is inevitable to the maturation of online learning experiences. The generic nature of the traditional LMS model means that the uniqueness of a particular culture of learning is hindered by a model that is more profitable for developers and software distributors than teachers and students. "Teachers and students are not free to choose the right/best/preferred tool for each teaching or learning activity they undertake, thus creating a technology paradigm that artificially limits possibilities and forecloses optimal teaching and learning choices" (Bush & Mott, 2009, p. 12). This study explored the use of social media in a graduate online course as an alternative to traditional learning management systems.

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MOOCs in China: A Review of Literature, 2012–2016

Xiaoqin Li, Yanyue Chen and Xiaojing Gong

Abstract MOOC has recently been a topic of research. Scholars from home and abroad dedicated their effort to examine the newly emerged matter from various perspectives. The purpose of this paper is to explore the present situation of MOOC study in China. Fifty-two journal articles published in China from 2012 to 2016 were selected as a corpus. By doing systematic literature analysis, the theme discussed and method adopted were studied and classified carefully. The results reveal that the papers focus on participants, course building, and suggestions on MOOC. Chinese scholars tend to carry out qualitative researches than quantitative researches.

Keywords MOOC · Massive online open course · China · Literature review

1 Introduction

The development of massive open online courses (MOOCs) is "an innovation with great potential to widen participation and promote lifelong learning", and "an opportunity to promote higher education opportunities more generally" (QAA, 2014). The concept of MOOC was first proposed in Canada in 2008 (see Kennedy, 2014). Later in 2012, some elite American universities set up a few free online courses to promote MOOC, which gained increasing popularity among the worldwide universities. In 2014, there were approximately 1,000 MOOCs available from universities in the USA, 800 from European institutions, and in several

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languages besides English (Bates, 2012). MOOCs have become excellent learning resources and exert an influence on traditional higher education. China took part in the MOOC activity as well. Some Chinese universities joined foreign mainstream MOOC platforms, while some developed their own platforms. The rise of MOOC attracts much attention of Chinese scholars, especially in the field of education. They carried out both theoretical and empirical researches on the nature and participants of MOOC. Being a heated topic, MOOC brings an explosive increase in quantity of papers related to this topic. However, comprehensive and systematic reviews on MOOC studies are rare and not up-to-date (see Liyanagunawardena, Adams & Williams, 2013; Kennedy, 2014). By the means of literature analysis, this paper attempts to depict a picture of current situation of MOOC in China and present a systematic analysis of the situation and trend of Chinese MOOC studies.

2 Background

In 2012, Stanford, Harvard, and MIT successively established three MOOC platforms independently or by joint efforts, being Coursera, edX, and Udacity, which have attracted worldwide well-known universities to join in and provide high-quality online education services for global learners. Pages of the three platforms on MOOC School by Guokr show that, up to September 2016, Coursera has 1,814 courses and 1,312, 000 subscribers, edX 1,053 courses and 254, 000 subscribers, Udacity 20 courses and 5,000 subscribers respectively. Coursera is obviously the largest MOOC platform in the world.

As to the form of getting involved in MOOC, Chinese universities either join the existing MOOC platforms as course providers or establish platforms themselves. As Ji and Li (2014) mentioned, Peking University, Chinese University of Hong Kong, Fudan University, etc., affiliated with Coursera; Tsinghua University, Hong Kong University of Science and Technology, etc., cooperated with edX. Tsinghua University even set up the first Chinese MOOC platform named XuetangX (http://www.xuetangx.com/). According to MOOC School by Guokr, up to September 2016, XuetangX has 313 courses and 208, 000 subscribers.

Besides universities, some organizations, associations, and enterprises also took part in the education revolution. Guokr founded the largest Chinese MOOC community named MOOC School (Liu & Li, 2014), which provides links and recommendations of influential MOOC platforms. As MOOC practitioners, companies also set up commercial Chinese MOOC platforms, for example, the Guolairen (http://www.guolairen.com/) (Liu and Li 2014).

Due to the inherent characteristics of MOOC, such as computer mediated communication, MOOC has encountered several general problems. Specifically, learners by a large chance can hardly finish the courses, or they feel a loss when learning because they interact with machines rather than people. Furthermore, “language barrier” (Ji & Li, 2014) is another problem for Chinese learners, in that many courses are taught in foreign languages, which causes inconvenience in

learning. Luckily, MOOC School set about to resolve the problem and participated in the Global Translation Cooperation Project of Coursera in September 2013 (http://mooc.guokr.com/post/71/).

Setting "MOOC" as keyword and searching in CNKI.net, it can be found that related studies emerged in 2012 and there were only three articles published in this year. In the following three years, the number of papers is respectively 125, 826, and 1,786. The great increase shows the popularity of the topic. Among the disciplines, education is the most related field. Among 3,000 papers, i.e., around three quarters discuss MOOC in educational perspective. As to research institutes, the top three are National University of Defense Technology, Peking University and Tsinghua University, published 68, 57, and 55 articles, respectively. Many Normal Universities also devote a lot into MOOC research and get noticeable achievements.

3 Method

The purpose of this study is to investigate the situation of the research on MOOC in China, so the study objects are the quality academic journal articles in this area. All the journals must be in the list of CSSCI and/or Core Journal. This is also the selection criteria of the sample. The research must focus on MOOC in open education field to investigate the MOOC research situation in China starting from 2012 when the study of MOOC flourished (e.g., Wei & Xie, 2015). Thus the keywords are established, being "MOOC" + "open education", limited only to titles and keywords to reduce the overload of manual filtering. First, we conducted a search in the quality academic journals about education. These are the selected journals: *Distance Education in China*, *Modern Educational Technology*, *Open Education Research*, *Journal of Distance Education*, etc. All of them belong to CSSCI and/or Core Journals which are the top level journals in China. As of October 2016, the search yielded approximately 42 papers (Table 1).

Table 1 Selected education journals and samples

Title of selected journals	No. of articles
Distance education in China	11
Modern educational technology	8
Open education research	8
Journal of distance education	3
Modern distance education research	3
Educational research	2
Tsinghua journal of education	2
China higher education research	1
China educational technology	1
Comparative education review	1
Journal of higher education	1
Jiangsu higher education	1

The second round of search was extended to two databases using the same keyword—National Social Science Database and Wanfang Data besides education journals. This part of search yielded 10 records in quality journals (we excluded all the articles not published in the CSSCI and/or Core journal. Among this, there were five articles in communication education because of the popularity of communication related majors in China. As a result, 52 papers were identified in the data collection process to form the data base for analysis and classification.

4 Results

First, we counted all the articles by the published year (Chart 1). There were 4 articles in 2012, 9 in 2013, 22 in 2014, 13 in 2015 and 4 in 2016 (till October) respectively. A review of the 52 articles reveals that MOOC has been utilized to facilitate and supplement formal teaching patterns. This section discusses the characteristic of the collected studies, the educational practices of MOOC, the challenges implied and the opportunities provided in the future.

4.1 Characteristic of Studies

4.1.1 Settings

The collected articles cover a wide range of topics, mainly as follows: technology, learning experience, case studies, pedagogies, course building, interaction, challenges, and opportunities. Most of the articles explain the history of MOOC, discuss its characteristics, operating mechanism, current situation of its development, and also provide the lessons or suggestions that the study of MOOC might provide which is also the reason we did not set a category of "Introductory" (See

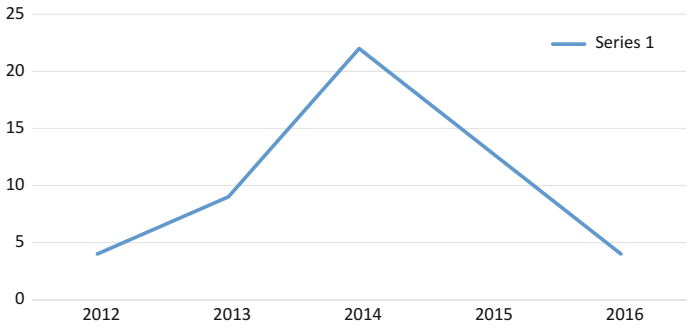

Chart 1 Articles published by year, 2012–16

Table 2 Article Categorization

Themes	No.	Articles
Learning experience	15	Fan (2015), Fan, Wang, Feng, Wang, and Li (2014), Geng and Sang (2014), He (2014), Jiang, Han, and Cheng (2013), Mou and Dong (2014), Li, Xu, and Sun (2015), Liang (2015), Liu, Huang, Zhang, and Li (2013), Liu and Li (2014), Wang (2015), Sang and Liang (2014), Shen, Li, Hickey, and Li (2014), Yang (2016), Zhao, Yang, and Luo (2015)
Case studies	13	Cao (2014), Geng and Sang (2014), Ma (2015), Mou and Dong (2014), Li, Xu, and Sun (2015), Sang and Liang (2014), Shen, Li, Hickey, and Li (2014), Wang, Feng, Wang, and Li (2013), Wu (2015), Xu (2014), Zhang (2016), Zhao, Xie, Liu, and Huang (2014)
Pedagogies	5	Cheng (2015), Fan (2016), Geng and Sang (2014), Xu (2014), Zhang, Liu, and Han (2013)
Course building	10	Guo (2014), Ji and Li (2014), Li (2013), Li and Liu (2016), Liu and Li (2014, 2015), Wang (2015), Wu (2015), Zhao and Yuan (2014)
Interaction	2	Cao and Zhao (2016), Sun and Zhong (2014)
Technology	2	Wang (2013), Wei (2015)
Development and characteristics	5	Chen and Wang (2013), Fan (2012), Li Manli (2013), Li and Wang (2012), Wang et al. (2013)
Challenges and opportunities	7	Fan (2015), Jia and Ma (2014), Li (2013), Wang (2013), Zhai and Yuan (2014), Zou (2012a, b)

Liyanagunawardena et al., 2013). Our research focused on the other characteristics of study, such as the perspectives of the users and/or providers and technology. The Chinese scholar's tend to use "case studies" to do the descriptive analysis (n = 13). At the same time, quite a lot of articles (n = 15) took the perspective of users, i.e., "learning experience", some of them focused on the providers side, i.e., "course building" (n = 10), and only two papers reporting technology, the automatic evaluation of online learning. Some of the articles were assigned to more than one category (Table 2).

4.1.2 Case Studies

Among the 52 articles, 13 have a case element which can be divided into 10 single cases and 3 multiple cases.

Single case

- Coursera—to explore the blended learning mode based on MOOC
- BOOC—to draw lessons from BOOC to improve the Students' Participation and Performance in MOOCs
- Tsinghua University—to study and analyze the behavior of students and teachers from Tsinghua University
- *Radio and Television News Writing*—to study the teaching of this book

- Construction of Evaluation Index System about the Communication Effect of MOOC
- edX—course analysis
- *Dream of Red Mansions*—to investigate the difficulties and support of online learning
- *Principles of Electric Circuits*—behavioristic analysis of MOOC learners
- Santa Fe Institute—study the online courses in Santa Fe Institute
- *Financial Analysis and Decision-making*—the course as a case to study social interactivity in the discussion board.

Multiple case:

- Coursera, Udacity, edX—to provide direction for the evaluating indicators on MOOC
- Coursera, Udacity, edX, futurelearn, uiversity—comparative study
- School Online, Good University Online, China MOOC—Chinese MOOCs for comparative study.

4.1.3 Research and Data Type

Among the 52 articles, half of them are empirical perspective. In them, 20 apply the quantitative method, and 15 the qualitative. Eight of the articles apply both. Those with qualitative analysis focus on themes of characteristics, threats, and strategies while those with quantitative analysis on learning environment, behavior and use of learners and providers. No certain type of research method is specified in the rest of 25 papers which usually are the "introductory" ones. The introductory researches generally try to explore the definition, characteristics, and types of MOOC, and make comparisons among different MOOC platforms. At present, introductory articles are much more than empirical researches in numbers (Table 3).

4.2 Educational Practices

4.2.1 Participants

This part starts from the perspective of learners who are investigated in aspects of types, characteristics, behavior, motivation, learning effects, and models. Analysis reveals that the backgrounds of MOOC learners are diversified but most of the MOOC learners are highly-educated. They participate in the courses out of internal motivation. Compared with lower-educated learners, the former are more motivated and engaged to complete the whole course and more active in the discussion board centering around topics of learning content and teaching management. Their deep engagement with MOOCs are due to the interesting and easy content of courses and

Table 3 Method Analysis

Method		No. of articles	Title
Quantitative	Questionnaire	7	He (2014), He and Chen (2015), Liu, Huang, Zhang, and Li (2013), Ma (2015), Sang and Liang (2014), Yang (2016), Zhao, Yang, and Luo (2015)
	Model/model building	5	Ma (2015), Mou and Dong (2014), Sun and Zhong (2014), Wei (2015), Yang (2016)
	Platform data analysis	4	Cao and Zhao (2016), Li and Wang (2012), Liu and Li (2014), Sang and Liang (2014)
	Case study	3	Li, Xu, and Sun (2015), Sang and Liang (2014), Wang (2015)
	Model analysis	1	Xu (2014)
Qualitative	Document analysis	6	Li and Liu (2016), Liang (2015), Ma (2015), Wang and Zhang (2014), Yang (2015), Yuan and Liu (2014)
	Case study	4	Cao (2014), Li and Liu (2016), Sang (2014), Wang, Zhang, and Zhang (2013)
	Text/content analysis	2	Sang and Liang (2014), Wu (2015)
	Comparative study	2	Wu (2015),
	SWOT analysis	1	Wang (2015)
No specified method applied		25	Chai (2015), Chen and Wang (2013), Cheng (2015), Fan (2012), Fan (2016), Gao (2014), Guo (2014), He (2014), Ji and Li (2014), Jia and Ma (2014), Li Manli (2013), Li Minghua (2013), Liu (2016), Liu and Li (2015), Wang (2013, 2014), Shen, Li, Hickey, and Li (2014), Xu (2015), Zhai and Yuan (2014), Zhao (2014), Zhang (2016), Zhang, Liu, and Han (2013), Zhou (2014), Zou (2012a, b)

the major reason for their dropout in the half way are attributed to the time limitation. There is also a certain number of "active learners" who only audit without submitting any assignments or taking any exams. Evidence also suggests that the mixed learning model based on MOOC has a positive effect on improving the learners' marks. Learners' stickiness to MOOC can be affected by factors including time investment, knowledge and skills gained prior to the courses, the enrollment motivation, and teachers. On MOOC, the number of Chinese learners is small with bachelor and master degree. Apart from that, Chinese learners have difficulty with the language and web access and they also need a new learning system of high autonomy and strict discipline.

This section views from the perspective of teachers and researchers or providers. The development in China is rapid. There are a few teachers with excellent ability

and courage to try new things in China's colleges and universities. These people possess the spirit of idealism and hope to spread the knowledge based on new technology to more people. This community is the major force pushing MOOCs forward. MOOC in China has more room and motivation for development. Compared with the quality of education in American universities, that in China is at a low level not only because of the short history of MOOC in China, but also because of the large-scale enrollment expansion in recent years and the principle of "valuating scientific research and belittling teaching". However, the Education Department in China is very supportive of online education represented by MOOC.

4.2.2 Interaction and Communication

Different from online tutorials, MOOC has broken the limit of "one-way communication". The topics in the discussion board mainly center around learning content as well as those related to teaching management but the interaction among MOOC learners are still at a low level without much emotional communication. Elements related to the use of the MOOC platform further restrain the interactivity between users. The teacher–student interaction is also in lack. Besides, MOOC lacks an effective mechanism to test the learning effects of the participants. Objective questions such as multiple choices and true-or-false questions can be graded by machine but other questions such as open questions and thesis can hardly be graded. Some platforms introduced the evaluation system of peer assessment but some students still prefer the comments made by teachers and question the accuracy and authority of peer assessment.

4.2.3 Course Building

The building of MOOC can be divided into the six stages: prepreparation, course design, resource production, audit test uploading, online operation, and maintenance. The analysis reveals that a successful MOOC platform should incorporate the following elements: a complete course structure, high-caliber teaching providers, timely feedbacks, mature guiding theories, and correct assessment of learning results. Evidence suggests that the development of MOOC by team work helps promote the quality of courses and project management can standardize the building and make the development more efficient. The core learning mechanisms that MOOC possesses include effectiveness of online learning, fine learning, interaction and cooperation between learners, and complex system of self-organization.

4.3 Problems and Challenges of MOOC in China

After all, as a newly sprouted matter, MOOC needs much effort to be done to clarify the concepts and construct theories. Many scholars examined problems concerning MOOC when developing in China and offered suggestions, some of which were involved with Chinese education system, which is totally different from foreign countries. Empirical researches often concentrate on practical application by investigating learners and teachers, aiming at presenting the reality and improving MOOC to be better utilized.

Moreover, the attitude of Chinese scholars toward MOOC is relatively conservative. MOOC took off in 2012 but had its criticism as well, there was even a voice of "Anti-MOOC" in 2013 (Liu & Li, 2014). Chinese scholars deem the effect of MOOC is finite. Zhai (2014) and Jia and Ma (2014) regarded MOOC as an "effective supplement" of Chinese traditional higher education. According to Jia and Ma (2014), it was impossible for MOOC to replace schools run by Chinese government.

5 Discussions and Conclusion

MOOC is characterized by openness, scalable properties (e.g., Kennedy, 2014). It establishes a broader learning platform for learners with flexible styles but is also faced with problems such as high dropout rates, difficulty with learning effect testing, low interactivity, and ineffective use of big data. Traditionally, each course in colleges and universities is charged and graded with a set of strict teaching and register management while on MOOCs, everything is free, free learning, free teachers, and also free certificates. In such a case, the significance of the certificates should be improved by all means to attract more learners to pay for them, which is the way of management for MOOCs to move toward the commercial direction.

A learning community is advised to be constructed which associates with collective and collaborative efforts so as to give full play to the guiding and regulating role of lecturers and teaching assistants. The evaluation and supervision mechanism is required to be improved. Introduction to cross-cultural background and functions such as language selection should be added to the platform. League of MOOC among different colleges and universities can be established.

With MOOC, users can study online and get access to top universities in the world whenever and wherever they can. This has made it ideal for open education without national boundaries and skin color. This study was conducted in 2016, four years after MOOC swept over in China. Reviewing the past researches is critical for us to build our knowledge base and make directions for future research. This volume of research is limited, restricting our understanding of MOOC. Most of the

researches lack systematic and scientific research method to provide solid evidence. Notably, MOOC might lead to cultural tension considering the different cultural backgrounds of learners. Further research might take all these into considerations.

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The Acceptance of Using Social Mobile Application for Learning in Hong Kong's Higher Education

Kwan Keung Ng, Ching Hong Luk and Wai Ming Lam

Abstract This research paper serves as an extended research of our previous research study in another conference ISET 2016 and the paper title is called "The Impact of Social Mobile Application on Students' Learning Interest and Academic Performance in Hong Kong's Higher Education" (Ng, Luk, Luk & Wang, 2016). Using social mobile application for communication is common in this generation and development is driving innovation. Social mobile applications take many social forms depending on a particular application. In addition to Facebook and WhatsApp, WeChat is one of the most popular social mobile applications nowadays especially in China and Hong Kong. WeChat is a mobile text and voice messaging communication service developed by Tencent in China, which was released in 2011. It can exchange contacts with people nearby via Bluetooth, as well as providing various features for contacting people at random if desired, next to integration with social networking services such as those run by Facebook. Photographs may also be embellished with filters and captions, and a machine translation service is available. It is now very common in both China and Hong Kong. This study is to investigate the acceptance of using social mobile application, i.e., WeChat by using the UTAUT model to investigate their behavioral intention and use behavior of WeChat for their learning, as WeChat is the only available social mobile application in China and there are a significant proportion of Chinese students in Hong Kong higher education.

Keywords UTAUT · Social mobile application · WeChat · Academic performance · Sub-degree education · Higher education

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1 Introduction

People worldwide have become increasingly enthusiastic in embracing mobile digital communications equipment (Katz & Aakhus 2002). From a laptop connected to the Internet via wireless fidelity (Wi-Fi) to personal digital assistants to mobile phones, more and more people are communicating with each other from remote distances. Mobile phones in particular have helped to create this new world. More than one out of six people worldwide now have mobile phones (Katz, 2005) and for many people the mobile phone has become essential part of daily life. With the proliferation of mobile communication technologies, communication scholars have begun to question how these technologies are being, and might be, assimilated into people's lives (Ling, 2004). Though there are already well-developed researches of the Internet and its social impacts (Castells, 2001) studies of mobile phone usage and its social consequences are relatively few. The purpose of this study is to investigate the acceptance of using WeChat for their learning, which is one of the most common social communication applications. The result showed that respondents tend to be positive that learning through social media would help their study and enhance their learning interests. In other words, students have positive intention to use WeChat to facilitate their learning.

2 Literature Review

2.1 Mobile Phone Usage

The usage of mobile phones has dramatically increased in recent years, while mobile phones have revolutionized how people manage and operate within their social networks. Mobile phones increase the pace and efficiency of life, and allow for more flexibility in personal interactions. Many European researchers (De Gournay, 2002; Ling & Yttri, 2002; Johnsen, 2003; Licoppe, 2003) have also found that mobile phone use establishes and nurtures connections among close friends and family. Some mobile phones and the Internet are perfectly suited to the ideology of an individualistic society committed to networking (Castells, 2001). The mobile phone allows individuals to be apart from, yet maintain a continuous presence with, family, friends, and colleagues (Gergen, 2002, 2003).

2.2 Mobile Learning in Higher Education

Mobile learning is generally viewed as any form of learning that happens when mediated through a mobile device, and a form of learning that established the legitimacy of nomadic learners (Alexander, 2004). Mobile phones have grown to

such an extent over recent years and are gradually replacing personal computers in modern professional and social context (Attewell & Savill-Smith, 2005). Mobile learning opens students' minds to the possibility of a radically new paradigm and encourages us to abandon the constraints of their habitual ways of thinking, learning, communicating, designing, and reacting. The purpose of higher education and the relatively new ubiquity of mobile devices in our culture have imbued the mobile device with new meanings (Ng et al., 2016). Higher education can now be presented in a more sustained and interactive fashion to empower those who need it. The environments in which the study of mobile learning has been conducted have some similar features with in previous students. These features include enhancing availability and accessibility of information networks; engaging students in learning related activities in diverse physical locations; supporting of project-based group work; improving of communication and collaborative learning in the classroom, and enabling quick content delivery (Huang, Huang, & Hsieh, 2008). Moreover, mobile learning provides the support for learning and training, mobile technologies have also contributed to the potential to support learners studying a variety of subjects (Jalvela et al. 2007).

2.3 Mobility of Technology and Learning

The mobile technology studied in this article is mainly more advance smart telephones and its social mobile application, WeChat. In addition, there are other forms of technology such as digital cameras, flash dishes, and personal digital assistance devices (PDAs). Mobile devices used to deliver higher education content and instruction can also function as audio players, media players, and digital cameras. Advanced mobile devices are furnished with Wireless Application Protocol (WAP) and wireless fidelity (Wi-Fi) capacities so that a user can connect to the Internet by using his or her PDA (Trinder, 2005). The mobile devices mentioned above have the capacity to link to the Internet and deliver content and instruction that can enable learners to learn at anytime and anywhere in a format that is culturally prestigious among people in the same age group. Most of the more advanced models can support a portable, digital, and wireless lifestyle, and mode of teaching and learning. It is precisely the mobility of these devices that makes them highly prestigious and therefore desirable as instruments of learning among learners in the same age group. In fact, they are highly valued by young people in their early 20s because they are visible indicators of wealth, privilege, luxury, and modernity (Ng et al., 2016).

E-learning mediated by personal computers is mostly bound by location and time availability because of the configuration of a personal computer (El-Hussein & Cronje, 2010). The computer has no wireless learning tool linked to the Internet, which means that one must always work in one place at a particular time determined by availability and connectivity. However, mobile learning has made some changes, learning can occur at any place and at any time. The ordinary personal

computer with landline connections to the Internet is constrained by the places in which they are located and their availability. Non-portable personal computers are too heavy to move easily and so learners are compelled to work in the same place and during the timeslots allocated to them by university authorities. By contrast, learning with mobile is a learner-centric activity because it is both mobile and nomadic, and not pedagogically teacher-centric as in the case of traditional lecturers and hardware installed in one particular location under the aegis of the university's authorities (Ng et al., 2016). The overall advantages provided by the mobile learning are more flexible, accessible and personalized learning activities. Such advantages keep the learners engaged in the ongoing learning activities and enhance their productivity and effectiveness. Uden (2007) observes that mobile technologies offer new opportunities for students' educational activities in that they can be used across different locations and times. Students using mobile technologies are not only remote from their instructors; they also fully control the access of information on their mobile devices. In this light, one of the main advantages of mobile learning is that it allows this generation of learners to enjoy a certain amount of freedom and independence.

The advantages of mobile learning are not dependent solely upon the ability to use a portable and wireless communication device successfully. Walker (2007) argues that the kind of learning experienced by mobile owners is unique because it is received and processed within the context in which the learner is situated. The context is utterly individual, which is completely different from the rigid outlay of the traditional classroom or lecture room, and the computer laboratory. Mobile learning is at the intersection of mobile computing and e-learning; it provides accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment (Ally 2005). Furthermore, students' contribution and participation in online discussions have a positive impact on academic performance (Ng et al., 2015). As our engagement with technology changes with time, mobile learning becomes a function not only of time, but also of the momentarily available and dynamically changing technology (Laouris & Eteokleous, 2005). Further studies reflect today's youth becoming increasingly comfortable and accepting of their new digital life-styles, powered by technology such as mobile phones. These phones are enriched by portable entertainment devices. Friendships are made, maintained and lost online often in virtual worlds and on social networking mobile applications, such as WeChat, WhatsApp. Much of what we are seeing today is generally out of the classroom but increasingly in it is technology driven (Banks, 2008).

2.4 Social Media—WeChat

Social media has rapidly changed interpersonal communication. Instant messaging is a social media tool offering real-time text transmission over the Internet. In the past few years, instant messaging has gained popularity as a means of effective and

efficient communication. This function particularly attracts younger generations because it permits users to instantly obtain and share information with a list of their online "buddies" (Correa, Hinsley, & de Zuniga, 2010). WeChat is a mobile instant text and voice messaging communication service developed by Tencent Holdings Ltd. WeChat is a mobile instant text and voice messaging communication service developed by Tencent Holdings Ltd. in China on January 21, 2011. It has similar functions to WhatsApp to generate both text and voice messages. It is free to install, use and download, and supports all smartphone platforms including iPhone, Android, and Windows Phone operating systems. For WeChat users, sending and receiving messaging between different mobile platforms is available. It also provides users an innovative way to communicate and interact with friends through text messaging, hold to talk voice messaging, one to many messaging, photo/video sharing, location sharing, and contact information exchange (Tencent, 2013). Under the rapid development in Internet connection and the popularity of smart phones, WeChat reached 355 million monthly active users at the end of 2013 and is available in over 200 countries and supports 18 different languages (Tencent, 2013). Consumer activities in WeChat range from socializing with friends and entertaining to exchanging information and experiences regarding a product/service. It is the most widely used social networking service in China and has become an important social media platform for computer-mediated communication (Gao & Zhang, 2013). This study is to investigate the acceptance of using WeChat, which is one of the most common social communication applications, and its impacts on academic performance of sub-degree students in Hong Kong.

2.5 *The Unified Theory of Acceptance and Use of Technology (UTAUT)*

Venkatesh, Morris, Davis, and Davis (2003) developed a unified model that brings together alternative views on user and innovation acceptance—The unified theory of acceptance and use of technology (UTAUT). The model suggests that five core constructs, which are performance expectancy, effort expectancy, attitude toward using technology, social influence, and facilitating conditions are direct determinants of behavioral intention and ultimately behavior, and that these constructs are in turn moderated by gender, age, experience, and voluntariness of use (Venkatesh, Morris, Davis & Davis, 2003). In the year since its introduction, UTAUT has been widely employed in technology adoption and diffusion research as a theoretical lens by researchers conducting empirical studies of user intention and behavior. Example can be seen from Liu, Cruz, Rincon, Buttar, Ranson, and Goertzen (2014), which investigates what factors determine therapists' acceptance of new technology for rehabilitation by using UTAUT model. Educational technology is increasingly used in multicultural contexts and across national cultures. Technology acceptance models are based on the view of acceptance as an attitude toward technology. In the

context of technology adoption, the reasoned action and planned behavior approach (Ajzen & Fishbein, 2000) resulted in several theories, of which the most frequently studied in educational settings is the Technology Acceptance Model (Davis 1989), with its various versions. Venkatesh et al. (2003, 2012) formulate their UTAUT as a synthesis of previous TAM versions, and describe technology use under the influence of use intention, further determined by performance expectancy, effort expectancy, and social influence. Additionally, facilitating conditions directly determines technology usage. The influence of the predictors named above on behavioral intention and use behavior is moderated by users' age, sex, experience, and by the voluntariness of use. In another study, Nistor, Wagner, Istvanffy and Dragota (2010) report preliminary findings that are consistent with Venkatesh et al. (2003). Thus, a number of researches show the generalization of UTAUT model in acceptance and usage of technology.

2.6 Social Mobile Application Usage and Academic Performance

This study was concerned with examining the behavioral intention of using social mobile application for learning purpose. Some scholars have suggested that the heavy use of technology for recreational purposes is highly correlated with reduced academic performance (Kubey, Lavin & Barrows, 2001). Respondents who reported social mobile application caused schoolwork problems were found to have spent more than five times as much time online as those who did not report such problems. However, Southwick (2002) found that social mobile application usage did not affect younger students as adversely as it did students. His study's findings suggested that students' mobile application use did not affect their academic performance or their social involvement. Meanwhile, many researchers support the integration of mobile phones in and out of the classroom to enhance students' learning and academic performance. Among the proponents of mobile phones for use in the classroom are from a number of researchers (Cheung, 2008; Ferriter, 2010; Pascopella, 2009; Schachter, 2009; Scomavacca, Huff & Marshall, 2009). These authors are of the opinion that mobile phones could be used for the following educational and or course-related activities: a. access information, record data, and create podcasts, b. to gather data for classroom experiments and demonstrations, and c. enhance interactivity especially in large classroom settings. Other researchers like Roblyer, McDaniel, Webb, Herman and Witty (2010) have also identified that social mobile application has the capability of providing a rich means of interaction between teachers and students. In addition, Heiberger and Harper (2008) found positive correlation between the use of social mobile application and student engagement, a predictor of academic success (Kuh, 2009). Therefore, quite a lot of previous researchers found positive relationship between social mobile application usage and academic performance.

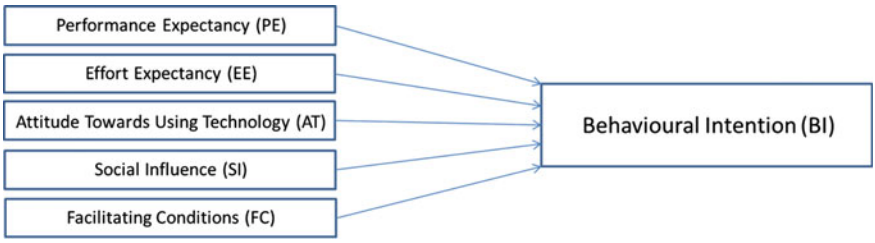
3 Methodology

This study is to investigate the behavioral intention and use behavior of WeChat learning who are studying in tertiary institution. Students' behavioral intention and use behavior were examined by the UTAUT model. Questionnaires were constructed based on UTAUT model as below (Venkatesh, Thong & Xu, 2012). Investigating WeChat results in a higher generalization as Chinese students play an important role in Hong Kong higher education, while WeChat is the only choice for them.

Based on the UTAUT model as below, five factors have been selected for testing if these factors will significantly influence students' behavioral intention (BI) to use social mobile application for learning. These five factors are Performance expectancy (PE), effort expectancy (EE), attitude toward using technology (AT), social influence (SI), and facilitating conditions (FC).

There are five research hypotheses which are listed as follows:

H1: Performance expectancy significantly influence students' behavioral intention to use social application for learning
H2: Effort expectancy significantly influence students' behavioral intention to use social application for learning
H3: Attitude toward using technology significantly influences students' behavioral intention to use social application for learning
H4: Social influence significantly influences students' behavioral intention to use social application for learning
H5: Facilitating conditions significantly influences students' behavioral intention to use social application for learning



Questionnaires were distributed to students who study sub-degree programme or degree programme in Business & Hospitality Management to response at voluntary basis. 173 questionnaires were received from students, and 15 questionnaires were unusable due to incompletion or invalid in the responses; thus, there are total 158 valid questionnaires (91.33%). The data were input and analyzed by partial least squares structural equation modeling (PLS-SEM) software application.

4 Finding and Analysis

Among these 158 respondents, 34% of the respondents are studying sub-degree programmes, and 66% of the respondents are studying degree programmes. The descriptive information of the respondents in term of means and standard deviation (based on 5-point Likert-type scale) is listed as Table 1. Performance expectancy (PE) has the lowest mean score among these five dimensions especially on question PE3—"*I think WeChat learning improves my academic result of my courses*"; however, respondents still tend to positive that learning through social media would help their study and enhance their learning interests. On the other hand, facilitating condition (FC) has the highest mean score especially on question FC2—"*I have knowledge to use the WeChat Apps*" which reflects that students have adequate knowledge and up-to-date equipment to learn through social media.

Regarding the reliability and validity tests are listed as Table 2, the value of Cronbach Alpha and the Average Variance Extracted (AVE) are more than 0.7 and 0.5 respectively in each dimension, thus, the construction of the questionnaires and responses are reliable and acceptable. For the correlation analysis, the latent variable correlations value in Table 3 reflects the correlation among each factor is acceptable since each index is lower than 0.85.

Regarding the partial least squares structural equation modeling (PLS-SEM) path analysis (Diagram 1), the coefficients to all five factors and BI are all over 0.1 which means questions are significantly support to its related dimension.

In order to assess the significance of the path coefficients, i.e., T Statistics, the questionnaires have been performed the boostrapping function in SmartPLS programme with 158 cases to 5000 samples. The β value and t value are listed as Table 4. According to the research result, H1, H3, H4, and H5 are supported, but H2 is not supported; effort expectancy does not significantly influence to behavioral intention since the T Statistics of effort expectancy to behavioral intention is less than 1.96.

The reason why effort expectancy does not significantly influence behavioral intention would be that students are growing up with social media application; they are very familiar in using various types of social media such as WeChat, WhatsApp, Facebook, Instagram, etc. Most of them even are using all these social media daily with their mobile phones and computers. Therefore, the ease of using WeChat (Effort Expectancy) may not influence their behavioral intention to use the WeChat learning in their studies. According to Taiwo & Down research (2013), effort expectancy is not necessarily a significant predictor of behavioral intention if people who already expert in this area, they may be indifferent in the factor of effort expectancy when considering to accept this technology.

Table 1 Summary of the responses in term of mean and standard deviation

	PE	PE1	PE2	PE3	PE4	PE5	**EE**	EE1	EE2	EE3	EE4	**BI**	**BI1**	BI2	BI3
Mean	**3.36**	3.34	3.34	3.24	3.47	3.43	**3.55**	3.73	3.71	3.41	3.34	**3.53**	3.56	3.53	3.50
Standard deviation	**0.98**	0.98	0.98	0.95	0.99	0.99	**0.98**	1.01	0.98	0.99	0.90	**0.99**	0.90	0.97	1.01
	AT	AT1	AT2	AT3	AT4	**SI**	SI1	SI2	SI3	SI4	**FC**	FC1	FC2	FC3	FC4
Mean	**3.55**	3.59	3.66	3.51	3.44	**3.43**	3.58	3.37	3.32	3.46	**3.67**	3.79	3.91	3.32	3.65
Standard deviation	**0.92**	0.78	0.93	1.08	1.04	**0.96**	0.78	0.93	1.08	1.04	**0.97**	0.97	0.92	0.97	0.91

Table 2 Cronbach alpha and the average variance extracted (AVE) analysis

	AVE	Composite reliability	*R* square	Cronbach's α	Commuality	Redundancy
PE	0.74842	0.937		0.915986	0.74842	
EE	0.726068	0.91379		0.874407	0.726069	
AT	0.755516	0.925089		0.891864	0.755516	
SI	0.678753	0.893577		0.840269	0.678753	
FC	0.613855	0.863638		0.79249	0.613855	
BI	0.875723	0.954832	0.793564	0.929065	0.875723	0.201629

Table 3 Latent variable correlations table

	PE	EE	AT	SI	FC	BI
PE	1					
EE	0.840652	1				
AT	0.653237	0.767286	1			
SI	0.74758	0.780362	0.779756	1		
FC	0.693546	0.782351	0.737667	0.803035	1	
BI	0.773582	0.808206	0.770374	0.822491	0.816383	1

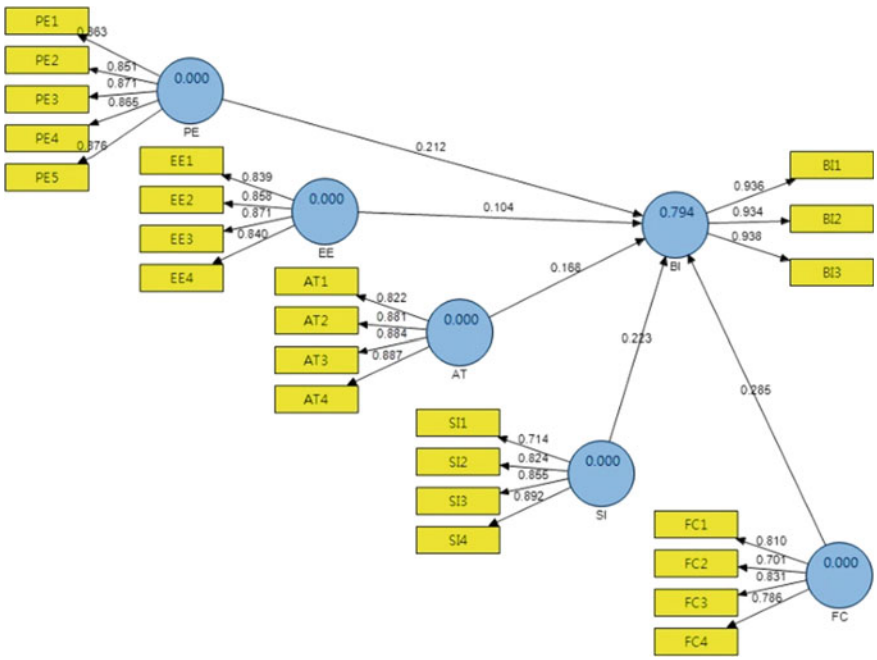


Diagram 1 PLS-SEM path analysis

Table 4 Research test results

Factor → BI (behavioral intention)		β value	*T* statistics
H1: Performance expectancy	→ BI	0.212	3.349914
H2: Effort expectancy	→ BI	0.104	1.318956
H3: Attitude toward using technology	→ BI	0.168	2.591052
H4: Social influence	→ BI	0.223	3.269126
H5: Facilitating conditions	→ BI	0.285	4.464645

5 Limitation and Further Research

Since this is a preliminary research on finding students' behavioral intention if they would accept to using WeChat Learning for their studies, the sample size is limited, besides, the respondents are all studying in business and hospitality management and come from two institutes. It is recommended that further research would be conducted in a wider based, and respondents should be invited from other schools/departments, and other higher education institutes as well. Moreover, researchers also recommend that other online teaching modes should also be surveyed besides social media applications in order to find out which application would mostly influence students' learning behavioral intention.

In addition, academic performance can be measured and comparison of academic performance between users and nonusers of WeChat can be conducted in future research to investigate if WeChat can enhance academic performance or not. Furthermore, various kinds of social media applications besides WeChat can also be investigated for comparison of the learning effectiveness.

6 Conclusion

This research investigates the acceptance of using social mobile application, i.e., WeChat by using the UTAUT model to investigate their behavioral intention and use behavior of WeChat for their learning. The result shows that all five constructs, namely performance expectancy, effort expectancy, attitude toward using technology, social influence, and facilitating conditions have above average mean scores, in which facilitating conditions has the highest mean score, meaning that students have adequate knowledge and up-to-date equipment to learn through social media. In addition, the mean scores show that students positively believe that learning through social media would help their study and enhance their learning interests. On the other hand, according to the correlation analysis, all four constructs, except effort expectancy do not significantly influence to behavioral intention because of students' familiarity in using various types of social media. Therefore, the ease of using WeChat (Effort Expectancy) may not influence their behavioral intention to use the WeChat learning in their studies. As a result, institutions can consider

facilitating students' learning by implementing social media applications to enhance classroom teaching.

However, in order to improve the generalization of the study, future study should be extended to students in other disciplines and various types of social media applications can be examined. In addition, academic performance can be measured in future study so that the impact of social media application on academic performance can be further examined.

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Theoretical Frameworks and Research Methods in the Study of MOOC/e-Learning Behaviors: A Theoretical and Empirical Review

Zhao Xun Song, Mei Fung Cheung and Stephane Prud'Homme

Abstract The field of research on Massive Open Online Courses (MOOCs) and other online Learning Management Systems (LMS) is very comprehensive. Dozens of theories or intention-based models are used by scholars as theoretical frameworks or basis to deal with the user attitudes, intentions, acceptance, and adoption. Among these frameworks, the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), and The Unified Theory of Acceptance and Use of Technology (UTAUT) are the most widely used models. However, studies on these competing frameworks and models are sparse. In response to the rapid rise of MOOCs and the lack of research examining users' intention to adopt this revolutionary initiative, this study provides a theoretical and empirical review of the three major theoretical models in an attempt to shed lights on future research about the mechanism influencing users' intention or behaviors of adopting MOOCs for long-distance learning. Research methods adopted by scholars using these frameworks are also summarized.

Keywords MOOCs · Theoretical frameworks · Intention-based models · Research methods

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1 Introduction to MOOCs/e-Learning Studies

As a new form of learning initiative, Massive Open Online Courses (MOOCs) revolutionize the delivery of distance education and facilitate the offer of open educational resources (OER) to students (Friedman, 2012). MOOCs have become a prominent issue of conversation due to the large number of students enrolling all over the world. This latest education initiative has attracted over 400 universities offering thousands of MOOCs to millions of students across the globe registered for the courses (Evans et al., 2016; Zhou, 2016).

The factors influencing the adoption of an educational innovation are always a topic of interest to researchers and education practitioners. A number of researchers have examined different dimensions of this new innovation. Some studies addressed demographic characteristics of MOOC users (Christensen et al., 2013; Ho et al., 2014) and patterns of student behavior in MOOCs (Evans et al., 2016; Kizilcec & Halawa, 2015; Kizilcec et al. 2013; Liyanagunawardena, Adams, & Williams, 2013; Perna et al., 2014). Some researchers explored the applications of MOOCs in different academic disciplines (Evans & McIntyre, 2014; McFerran, 2016; Robinson et al., 2015). A few studies inspected the assessment issues of MOOCs (Chauhan, 2014; Chiou & Shih, 2015; Suen, 2014). Learning theories and pedagogical designs for MOOCs have also attracted the attention of scholars (Anders, 2015; Beaven, Hauck, Comas-Quinn, Lewis, & de los Arcos, 2014; Mackness, Mak, & Williams, 2010). Yet, little research has been done on the mechanism that determines the adoption of MOOCs (Barclay & Logan, 2013; Gao & Yang, 2015; Norazah et al., 2015; Zhou, 2016). Indeed, many scholars have contributed to the theoretical understanding in behavioral intention to adopt educational innovations in the digital era. Various theoretical frameworks addressing the antecedents and determinants of users' intention have been used in research. These studies can provide insights for researchers and educators to further explore the determinants of adopting MOOCs.

2 Purpose and Significance of the Study

This paper intends to serve as a theoretical and empirical review on the factors affecting the adoption of educational innovations in e-learning, mobile learning, or distance education. Specifically, it reviews the studies adopting three most widely used theoretical frameworks: the Theory of Planned Behavior (TPB), the technology acceptance model (TAM), and The Unified Theory of Acceptance and Use of Technology (UTAUT).

The paper contributes to the research on behavioral intention of adopting MOOCs in several ways. First, it focuses on the factors affecting the adoption intention, which is indeed one of the very important elements that determine the scale of adopting MOOCs. Second, it provides a systematic review of relevant research using the three major models and identifies the major constructs examined by different scholars. Third, it serves as a stock taking of dominant and possible

research methods adopted by related studies. The review may assist or encourage stakeholders such as educational institutions, educators, and scholars to further explore the determinants of using MOOCS in the future.

3 Research Methods of This Study

To achieve the objective of this study, we used Google Scholar, ProQuest, Ebsco, and Web of Science as the major databases and searched journal papers, conference proceedings, Master or Ph.D. dissertations or theses for the literature on the MOOCs and e-learning behavior from the users' perspectives, mainly focusing on the acceptance, adoption, intention, motivation, attitude, and behavior of students as well as teaching faculties. Therefore, studies on the MOOCs design and curriculum, MOOCs platform or providers, e-learning technology improvement, and online learning communities, etc., are excluded in this study.

MOOCs are viewed as a massive e-learning and have also become a popular trend since 2008. There are times that some scholars studied the user acceptance of OER or e-learning with the most recent trend of MOOCs as an example. Therefore, literature on the user acceptance and adoption of e-learning platforms such as Learning Management System (LMS), Mobile Learning (M-learning or m-learning), and OER where MOOCs are used as examples are also our targets for analysis.

There are dozens of theories or models used in the study of MOOCs or e-learning behavior, for example, the Expectation–Confirmation Model (ECM), the ADDIE (analysis, design, development, implementation, and assessment) Model, the Carroll's Model of School Learning, the Theory of Reasoned Action (TRA), the TAM, the Motivational Model (MM), the Decomposed Theory of Planned Behavior (DTPB), a combined TBP/TAM, the Model of PC Utilization, the Innovation Diffusion Theory (IDT), the Social Cognitive Theory (SCT), etc.

Studies relevant to the behavioral intention and acceptance of MOOCs were sought based on a combination of keywords related to the above-listed acceptance theories (TRA, TAM, IDT, UTAUT, etc.) and MOOCs in different databases (ProQuest, Ebsco, Web of Science, and publicly available search engines such as Google Scholar, Yahoo, Bing, etc.). 78 full academic papers including peer-reviewed journal articles, conference papers, Ph.D. and Master dissertations were identified. 42 (54%) of the papers use TAM as a framework, 12 (15%) of them use UTAUT, 8 (10%) of them use TPB, while the rest 16 (21%) papers adopt other acceptance theories as theoretical frameworks.

This study, due to the paper length limitation, focuses only on the research papers that adopt the three most widely used theoretical frameworks or models: the TPB, the TAM, and The UTAUT for a theoretical and empirical review. The chosen papers that adopt TPB, TAM, UTAUT as frameworks or models in the

study of MOOCs behavior are then undergone a qualitative analysis. The major constructs and the relationship between different variables are represented and illustrated with examples in the following section.

4 Frameworks and Models in the Study of MOOC/e-Learning User Behaviors

This study focuses on and exemplifies the three widely used theoretical frameworks and models: TPB, TAM, and UTAUT, and their variances.

4.1 Theory of Planned Behavior (TPB)

Ajzen (1985) developed the TPB from his TRA. There are three major concepts in the TPB. Attitude toward behavior refers to how an individual evaluates a behavior while the subjective norm is an individual's evaluation on the social pressure to perform or not perform a behavior (Ajzen, 1991, p. 188). Perceived behavioral control is how an individual perceives the ease or difficulty of performing a behavior (Ajzen, 1991, p. 188). In addition, these three possible predictors of behavioral intention may be affected by indirect determinants which are sets of beliefs (Ajzen, 1985; Lee et al., 2010) as shown in Fig. 1.

A number of studies about e-learning and mobile learning have adopted TPB as theoretical frameworks with some adjustments and new elements in order to enhance the theory to explain the intention of adopting educational innovations. Lee et al. (2010) argue that the inconsistent results in the significance of the three predicting dimensions in TPB may be due to a broad definition of the action comprising the behavior. To fix this possible shortcoming, they investigate the influences of the indirect determinants and the three direct determinants of the TPB on teachers' intentions to utilize a specific technology in a specific way. The results

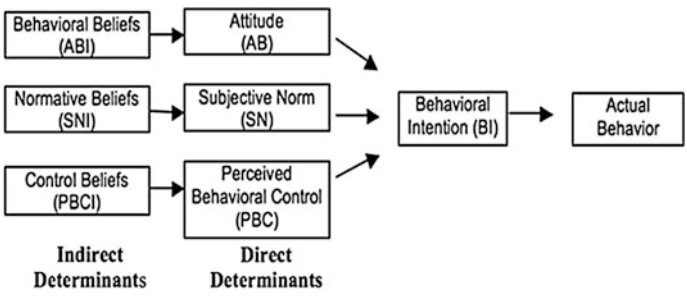


Fig. 1 TPB model of Lee et al. (2010) (adapted from Ajzen 1985)

of their study show that all three direct determinants are significant antecedents to teachers' intention and attitude has the stronger influence than other two determinants. Their research finding not only suggests that teachers must have positive attitudes about using computers to create and deliver lessons but also reminds TPB researchers of the importance of using specific definitions of the target behavior.

Cheon et al. (2012) employed TPB as a framework for identifying college students' perceptions and needs for mobile learning by decomposing the three indirect determinants (attitudinal, normative, and control beliefs) into six specific constructs as the antecedents of the three direct determinants (Fig. 2). The results confirm the theory that their attitude, behavioral control, and subjective norm positively influence their acceptance of m-learning. All antecedents were significantly related to the direct determinants except students' readiness.

Clutterbuck et al. (2015) contributes to the investigation of students' intention to adopt educational innovation by integrating a qualitative study with a quantitative survey based on the TPB. The interpretative methodology provides insights on the subcategories of the TPB major constructs and the quantitative study examines students' responses on the major constructs. Their findings show that all three direct determinants are significant and this indicated that TPB is an efficient model to examine students' intention of participating in online assessment which was identified as one of the three unresolved major challenges in relation to MOOCs (Fig. 3).

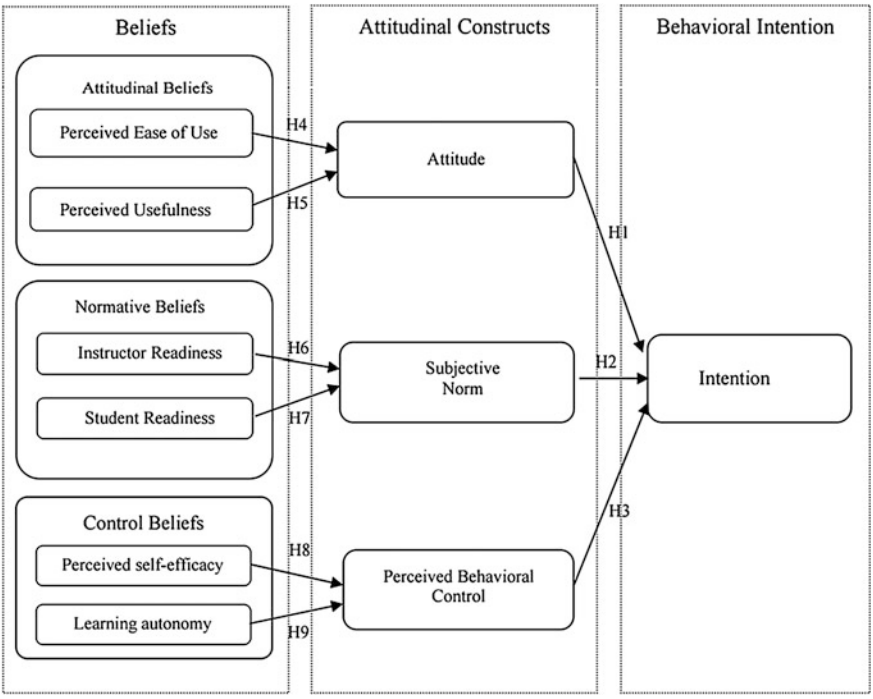


Fig. 2 Research model of Cheon et al. (2012)

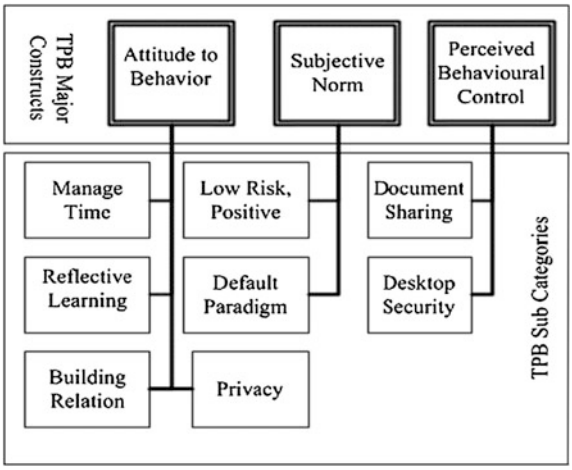


Fig. 3 Clutterbuck et al. (2015)

Zhou (2016) investigates the factors that influence students' intentions to use MOOCs by integrating the TPB and the self-determination theory (SDT) in her research framework to overcome the limitation of TPB on examining the origins of the belief-based antecedents (Hagger & Chatzisarantis, 2009; Hagger et al., 2002) and the unique MOOC environment which facilitate the exercise of students' autonomy. The two motivation constructs were considered as the primary factors affecting the adoption of education innovations. An online survey of 475 university students in China provides quantitative data to test how well the five constructs based on the TPB and SDT can explain students' intention to use MOOCs for learning. Her study results show that attitude toward MOOCs and perceived behavioral control have significant effect on students' intention to use MOOCs but subjective norm is not a significant determinant. Autonomous motivation is an antecedent on attitude and perceived behavioral control while controlled motivation has a positive influence on subjective norms (Fig. 4).

4.2 The Technology Acceptance Model (TAM)

One of the most frequently used frameworks in the study of MOOCs user behavior is the TAM developed by Fred Davis in 1986 (Fig. 5). This model has been widely used to explore technology adoption in a variety of contexts since its development. TAM, adapted from TRA, postulates that an individual's perceptions of how easy to use and how useful a new technology is determining the person's attitude toward the use of the technology as well as his or her behavioral intention to use it. Such attitudes and behavioral intentions of the technology in turn determine the person's actual usage: whether to accept or reject it.

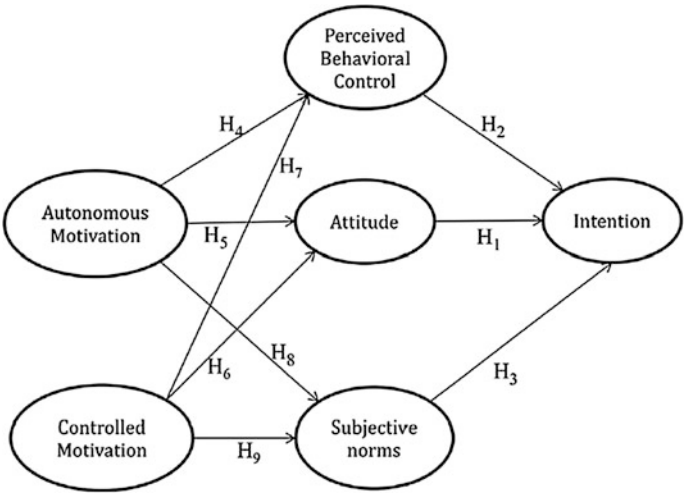
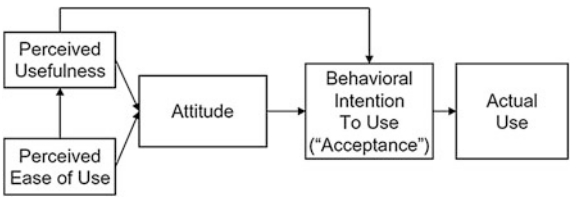


Fig. 4 Zhou (2016)

Fig. 5 Technology acceptance model



TAM is used as the basis for generating hypotheses and conceptual frameworks in her study of by scholars in the study of MOOCs. For example, Juhary (2013) adopts TAM to examine the perceptions of students on the use of the LMS at the Defense University, Malaysia, and to determine the acceptance level of the LMS and to identify the factors that may hinder or influence the use of the LMS. The study serves as an example as higher learning institutions actively participate in MOOCs in the country.

Other scholars use TAM as a basic framework but add more variables to strengthen the explanatory power of the model (Kelly, 2014; Aharony & Bar-Ilan, 2016; Lvovskaya & Lamprou, 2015). For example, Kelly (2014) uses TAM and makes a path analysis of the OER to understand adoption of these resources, with a particular emphasis on self-efficacy as a determining factor in TAM (Fig. 6).

Lvovskaya and Lamprou (2015) study the acceptance of MOOCs in two Swedish universities by expanding the basic TAM to include five variables: prior experience, personal innovativeness, managerial support, training, and incentives (Fig. 7).

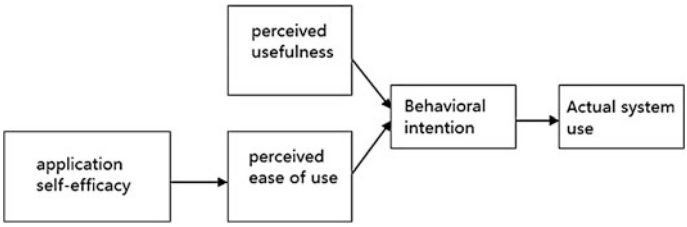


Fig. 6 TAM by Kelly (2014)

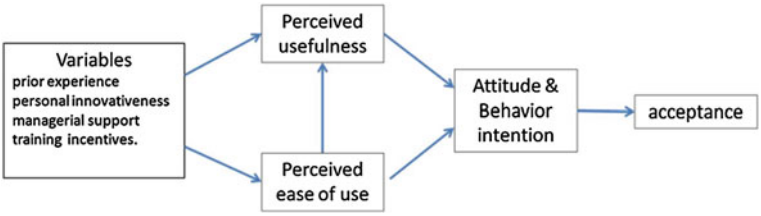


Fig. 7 Model by Lvovskaya and Lamprou (2015)

The technology acceptance model 2 (TAM2) and the technology acceptance model 3 (TAM3) are also used in the study of MOOCs. TAM2 (Fig. 8) proposed by Venkatesh and Davis in 2000 is a revision and an improvement of TAM. It extends the original model to explain perceived usefulness and usage intentions by including social influence factors (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience.

Park (2009) bases his integrated theoretical framework on TAM2 to study university students' e-learning acceptance and intention to use e-learning with selected constructs such as attitude, perceived usefulness, perceived ease of use, self-efficacy of e-learning, subjective norm, and system accessibility (Fig. 9).

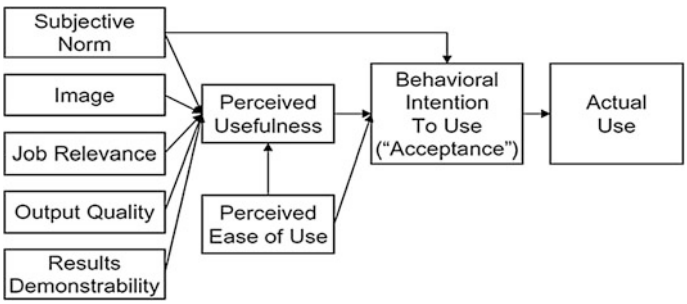


Fig. 8 Technology acceptance model 2 (TAM2)

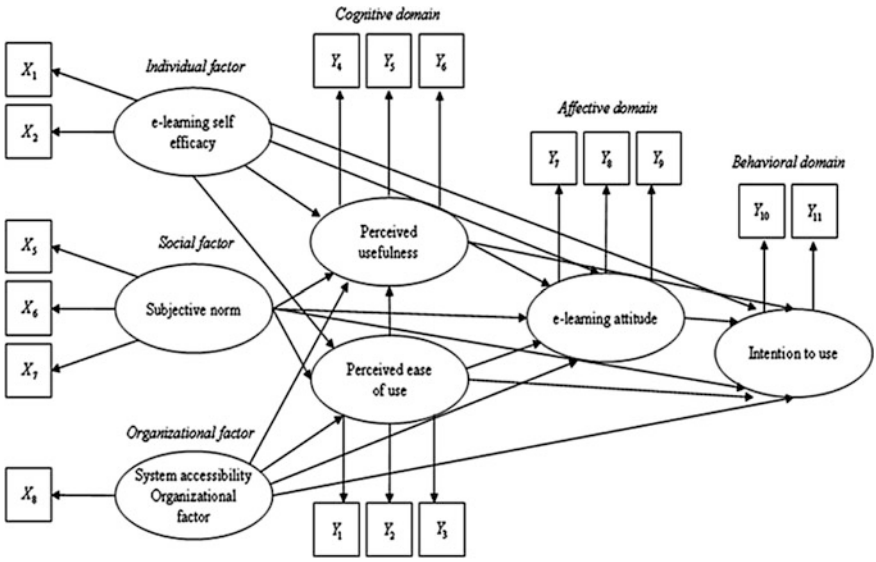


Fig. 9 Theoretic interesting model by Park (2009)

Venkatesh and Bala (2008) refined the TAM2 into the development of TAM3, which again extends the model for more social influences, environmental influences, user experience, and personal preference (Fig. 10). Jeffery (2015) studied the dynamic of factors that predict usage of Learning Management Systems (LMS) with a questionnaire based on the TAM3 variables plus Change Fatigue, Overload, and demographics. Correlations, regressions, and path analysis were employed to test critical links between key variables in the model.

Another kind of research adopting TAM to study MOOCs is to incorporate other theories. For example, TAM is integrated with the Task Fit Technology Model (TTF) which claims that performance will be increased when a technology provides features fitting the requirements of the task (Goodhue & Thompson, 1995). Wu and Chen (2015) integrate TTF with TAM to explore factors influencing online participation among the MOOCs users and to explain perceived effects of participation (Fig. 11).

4.3 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The TAM is considered the most prominent model in the study of technology acceptance and has been applied in several hundreds of studies in a wide range of settings (Pynoo et al., 2011). However, no more than 40% of the variance in the dependent variable is explained, leaving room for additional antecedents of

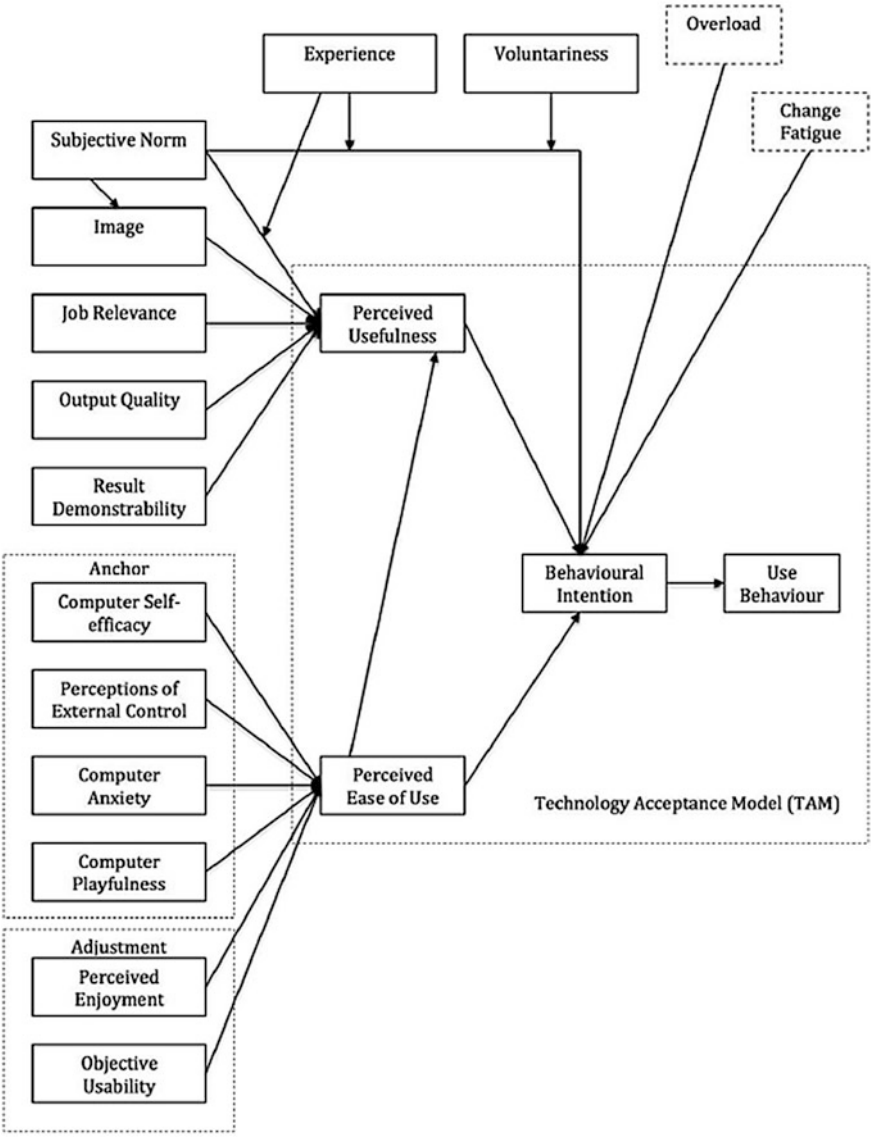


Fig. 10 TAM3 by Venkatesh and Bala (2008)

acceptance (Legris et al. 2003). This leads to the development of the UTAUT proposed by Venkatesh, Morris, Davis, and Davis (2003). They include four recurrent constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) in the UTAUT and four variables (gender, age, experience with the technology, and voluntariness of use) that moderate the relationships

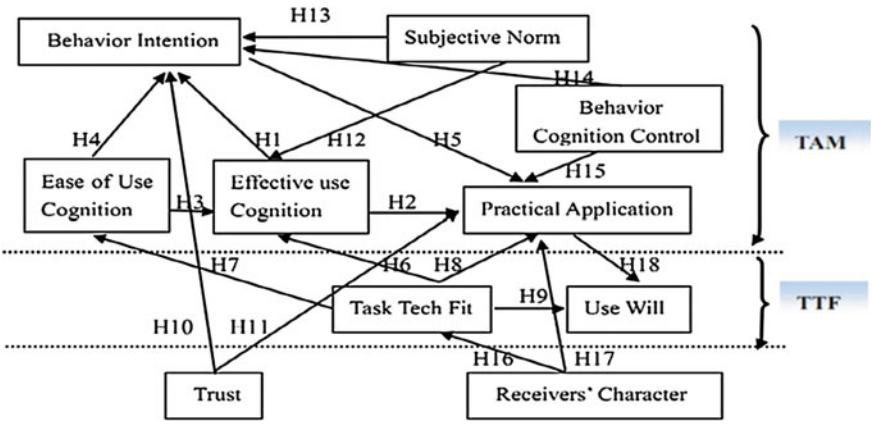


Fig. 11 TAM and TTF by Wu and Chen (2015)

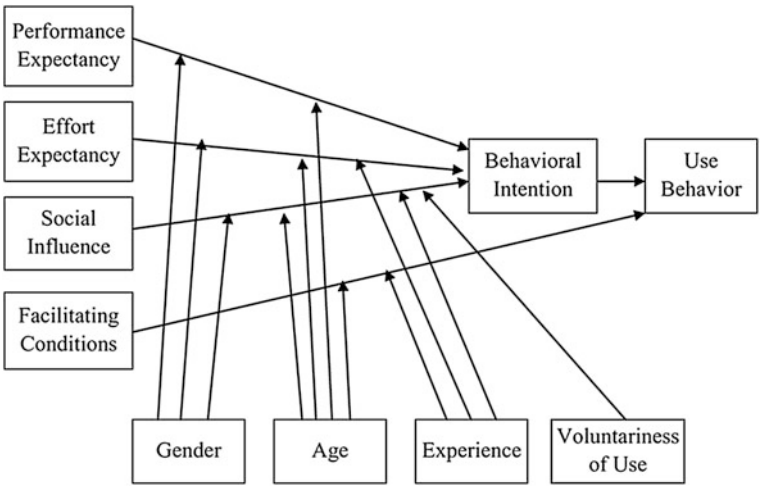


Fig. 12 UTAUT

between the predictors and intention or use (Fig. 12). UTAUT was found to explain up to 70% of the variance in behavioral intention, thereby outperforming its originating models (Venkatesh et al., 2003).

Some scholars use a simplified version of UTAUT to study students' e-learning. For example, Tan (2013) applied UTAUT to study acceptance and use of English e-learning websites by Taiwanese college students (Fig. 13). He studied the four factors that influence use of English e-learning websites: performance expectancy, effort expectancy, social influence, and facilitating conditions but the moderating effect of gender, age, experience, and voluntariness are not considered because the participants were all college students, and the gender, age, experience, and

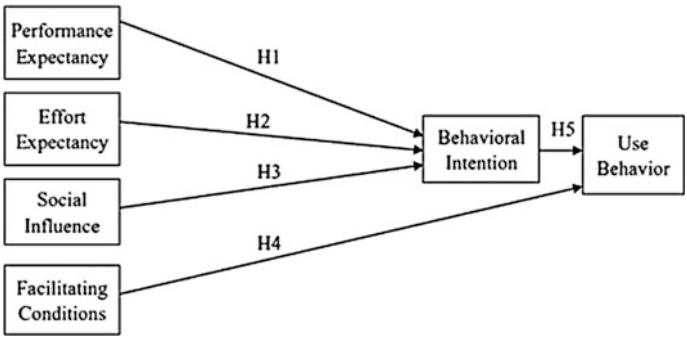


Fig. 13 UTAUT model by Tan (2013)

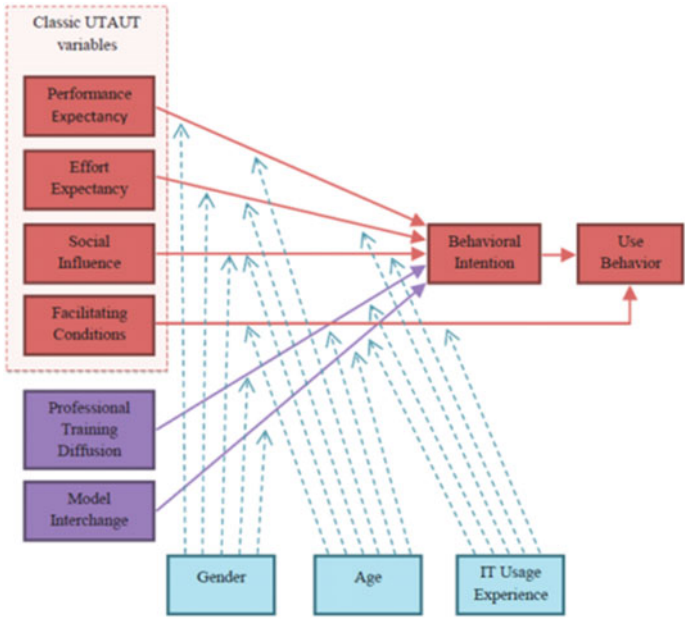


Fig. 14 UTAUT model by Marcinkowski and Wrycza (2015)

voluntariness are similar. Other scholars add more variables into the UTAUT model to tailor for their special needs in their study. Marcinkowski and Wrycza (2015) modified the classic UTAUT model by supplementing it with two additional variables: Professional Training Diffusion as well as Model Interchange (Fig. 14).

The following table, due to the limitation of paper length, lists just a few of the researches adopting TPB, TAM, and UTAUT in the study of MOOCs/E-leaning behavior:

Frameworks or models	Constructs	Research methods	Author(s)
TPB	Behavioral beliefs; normative beliefs; control beliefs; attitude; subjective norms; perceived behavioral control; intention to use computer in e-teaching and learning	Preliminary study asking open-ended questions, survey	Lee et al. (2010)
TPB	Attitudes to usage; subjective norms; perceived behavioral control; behavioral intention to use	Qualitative study with open-ended questions survey	Clutterbuck et al. (2015)
TAM	Perceived usefulness; perceived ease of use; attitude towards usage; behavioral intentions	Surveys	Juhary (2014)
TAM	Perceived usefulness; perceived ease of use; attitude toward usage; behavioral intentions; application self-efficacy	Web-based survey	Kelly (2014)
TAM	Perceived usefulness; perceived ease of use; attitude toward usage; behavioral intentions; learning strategies; cognitive appraisal	Both quantitative and qualitative analysis	Aharony and Bar-Ilan (2016)
TAM	Perceived usefulness; perceived ease of use; attitude toward usage; behavioral intentions; prior experience; personal innovativeness; managerial support; training; and incentives	Case study	Lvovskaya and Lamprou (2015)
TAM2	E-learning self-efficacy; subjective norm; system accessibility; perceived usefulness; perceived ease of use; attitude; behavioral intention to use; e-learning	Questionnaire cluster sampling method	Park (2009)
TAM3	Behavioral intention; computer anxiety: computer playfulness: computer self-efficacy: image; job relevance; objective usability; output quality; perceived ease of use; perceived usefulness; perceptions of external control; demonstrability; subjective norm: voluntariness: change fatigue; change overload	Survey correlational and cross-sectional design	Jeffrey (2015)
UTAUT	E-learning; educational success; higher education; mandatory environment; social influence; performance expectancy; gender and students' previous education	Survey factor analysis	Decman (2015)

(continued)

(continued)

Frameworks or models	Constructs	Research methods	Author(s)
UTAUT	Performance expectancy; effort expectancy; social influence; facilitating conditions; behavioral intention; use behavior	Survey reliability analysis, correlation and regression analysis	Tan (2013)
UTAUT	Professional training diffusion; model interchange; CASE tools; higher education; technology acceptance model modifications; systems analysis and design	Survey Cronbach's Alpha coefficients	Marcinkowski and Wrycza (2015)

5 Comparison of the Frameworks in the Study of MOOCs and Implications of This Study

The field of research on MOOCs and other online LMS is very comprehensive. Dozens of theories or models have been used by scholars as theoretical frameworks or basis to deal with the user attitudes, intentions, acceptance and adoption. Among these frameworks, TPB, TAM, and UTAUT are the most widely used models. These three models are originated from the TRA, which explains human behavior from social psychological viewpoints.

Each of the three models has its own advantages. It is necessary to compare and contrast them and identify the most appropriate model to deal with the right combination of factors that affect individual behavior toward acceptance and usage of MOOCs.

TPB highlights the predictive power of the three determinants which are all attitudinal constructs on behavioral intention. It also investigates the influences of various beliefs as prior factors affecting the three determinants (Fig. 15). If researchers' main concern is how the attitudinal constructs influence the behavioral intention and usage of MOOCs, TPB would be the suitable model.

The TAM model is most widely used and has been validated. Researchers have extended the model to TAM2 and TAM3 to encompass the impact of dozens of variables. Compared with TPB, attitude which is a major determinant in TPB is treated as a dependent variable in TAM. Perceived ease of use and perceived usefulness which are the beliefs on the cost and effectiveness of the technology are not considered as prior factors but independent variables in this theory. Some prior factors such as perception on MOOCs, individual, social, and organizational factors are incorporated by different researchers in their models (Fig. 16). TAM compared favorably with TPB in parsimonious capability and is easier to use than TPB (Venkatesh & Davis, 2000). It provides a quick, relatively easy, and inexpensive way of conducting research on users' post-adoption behavior (Hong, Thong, & Tam, 2006).

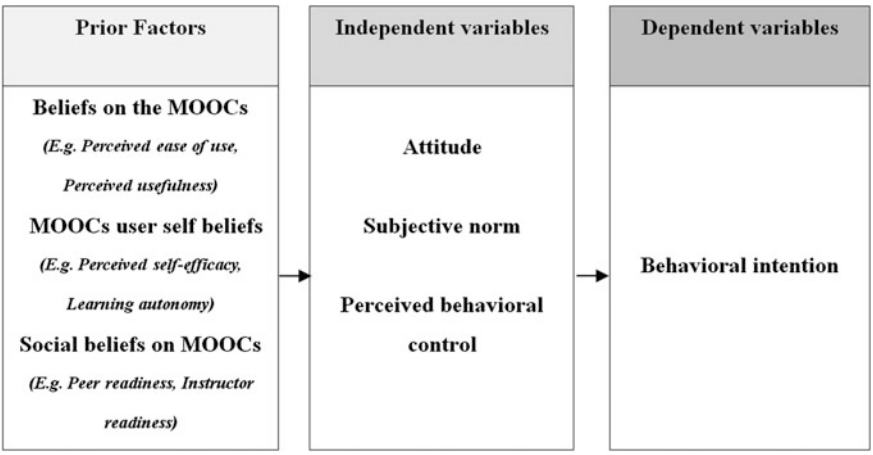


Fig. 15 A summary of TPB factors

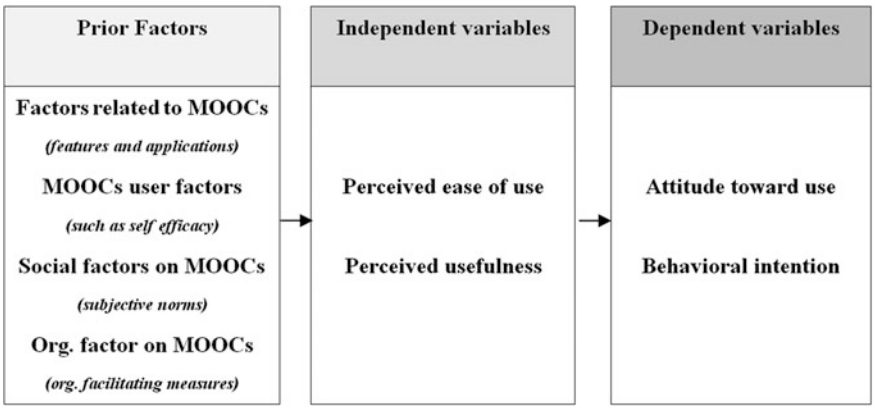


Fig. 16 A summary of TAM factors

The UTAUT is known for the comprehensiveness of the model because it incorporates the elements of eight of the most relevant technology acceptance models. Compared with TPB, performance expectancy and effort expectancy which are user's perception on the cost and effectiveness of the technology, together with social influence and situational factors are the independent variables in the UTAUT Theory. The roles of some moderating variables such as age, gender, user's experience, and voluntariness are highlighted in the model (Fig. 17). In addition, the UTAUT does not only consider the intention to use the technology as the dependent variable, but also measure the actual use because facilitating conditions will have a significant influence on usage behavior when moderated by experience and age (Venkatesh et al., 2003). The UTAUT captures more of the social and

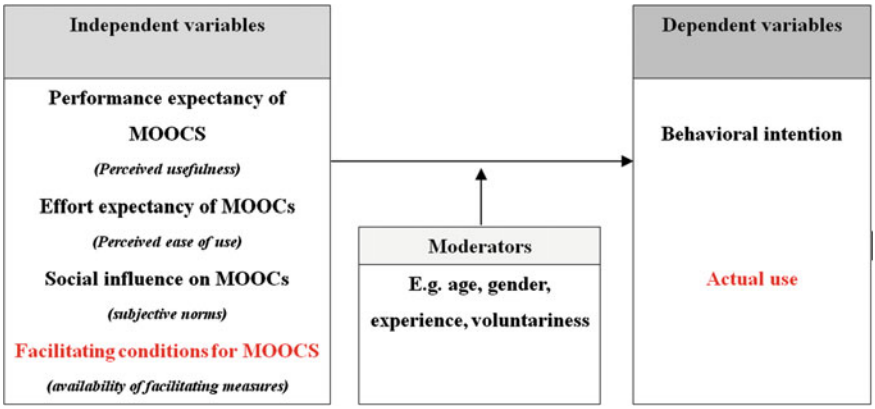


Fig. 17 A summary of UTAUT factors

organizational context than TAM through the core constructs of social influence and facilitating conditions. The UTAUT model is the best fit for studying the MOOCs adoption if various contextual and objective factors are to be emphasized and tested.

The three models each have their own advantages and applicability through the above comparative analysis across the three frameworks. The key features of each model with their connection to the investigations with MOOCs are tabulated, which we believe will facilitate future researchers in their study of MOOCs user intention and behavior.

Though TPB, TAM, and UTAUT are the most popular models in the study of MOOCs user behavior, few scholars simply adopt these models in their original forms. The trend toward integrating and/or incorporating associated variables and constructs with TPB, TAM, and UTAUT has a better fit in related areas of applications. For example, Tan (2013) use a simplified version of UTAUT to study students' e-learning with the exclusion of variables like gender, age, experience, and voluntariness while Marcinkowski and Wrycza (2015) modify the classic UTAUT model by supplementing it with two additional variables. Although research considers UTAUT to have reached its practical limit of explaining individual technology acceptance and use decisions (Venkatesh et al., 2003), research has modified it or even integrated it with other theories to tailor their study for specific needs under different contexts. However, the additional number of variables can strength the explanatory power than the original models but at the same time raises the question of parsimony. Researchers should think about how to maintain a balance between the added explanatory power and the complexity introduced by the additional variables.

Some researchers have tested several competing models to explain and predict user technology acceptance and adoption. For example, Ndubisi (2006) compares the three dimensions of TPB (attitude, subjective norms, and perceived behavioral control) with the three dimensions of TAM (attitude, perceived usefulness, and

perceived ease of use) and concludes that the impact of the TAM is stronger than the TPB. Hsiao and Tang (2014) empirically assess five theoretical models of technology acceptance, TPB, TAM, DTPB, C-TAM-TPB, and UTAUT. The explanatory power, goodness-of-fit indices, and model parsimony were taken into consideration in the model comparisons throughout the study. The results indicate that UTAUT appears to be the best model in terms of the metrics of parsimonious fit and explanatory power. Theoretical comparison of different theoretical intention-based models is important to fellow researchers in their choice and process of academic explorations of MOOCs and e-learning user behavior.

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New Technologies and Old Professional Development: A Reflection on Emerging Approaches

Jin Mao

Abstract Applying old rationale, content, and processes from traditional professional development in today's technology-enhanced teaching and learning environments can be problematic. This paper reviews new forms of professional development that emerge from the digitally connected environments with the intention to inspire reflective thoughts about effective, quality teacher professional development by the key indicators, and characteristics discussed in the literature. The reflection on emerging approaches to professional learning may also inspire a conversation about future pedagogical changes and innovations.

Keywords Teacher professional development and learning · Change and innovation · New technologies

1 Introduction

Wiley and Hilton (2009) defined six categories of critical change faced by higher education: analog to digital, tethered to mobile, isolated to connected, generic to personal, consumers to creators, and closed to open. These six categories of change brought by technological advances are impacting almost all parts or subsystems of our society, from social life to business to education of all levels. In K-12 education, schools strive to provide computers, smart boards, tablets and other resources to adapt to new challenges through various initiatives such as virtual schools, one-to-one computing, BYOD (bring your own devices), or blended learning. With the increasing demands from these initiatives and the changed teaching and learning environment, teacher professional development is considered as key to integrating technology in teaching and learning, improving quality of teaching and classroom practices, and managing educational change (Colbert, Brown, Choi, & Thomas, 2008; Loughran, 2014; Tondeur, Forkosh-Baruch, Prestridge, Albion, & Edirisinghe, 2016). Public

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schools in the United States have begun to provide more support for new teachers and almost all teachers have participated in professional development in the form of short-term conferences or workshops (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). However, although many successful teacher professional development cases have been frequently reported, schools are faced with challenges such as the concerns about the effectiveness of professional development or a lack of evidence for improved learning outcomes regardless of various efforts in teacher professional development. Considering the vast amount of expenses and resources provided, many researchers and educators have also been questioning why teachers are not well prepared to integrate technology effectively into classroom practices, or to implement student-centered teaching and learning (Morsink et al., 2011; Polly & Hannafin, 2010). More questions regarding the effectiveness of technology in improving learning and the professional development following each new technology initiative are raised especially as technology integration has now evolved from a resource-focused phase, in which the number of computers or whiteboards is the solution, to a pedagogy-focused one in which effective instructional strategy is the key. Based on a discussion of the criteria for quality professional development, this paper presents a review of emerging professional development approaches and an analysis of the problems with traditional professional development used in today's technology-enhanced teaching and learning environment. The reflection on emerging approaches to professional learning may hopefully inspire an extended conversation about future pedagogical changes and innovations.

2 Quality Professional Development and Challenges Indicated by Research Findings

Researchers (Lawless & Pellegrino, 2007; Thomas et al., 2012) summarized key indicators for high-quality professional development based on the findings from published research. They include duration, access to new technologies, meaningful and active learning, peer collaboration, community building, personalized assistance, practical interventions and measurable impact on student learning. Colbert et al. (2008) reviewed the characteristics of effective professional development and noted that compared with the focus on a deep understanding of the academic content and the ways students learn, building professional learning communities, collaboration, and a culture of inquiry are crucial in developing good teachers. Tondeur et al. (2016) developed a model for effective teacher professional development based on an analysis of four successful cases from different contexts and the model emphasizes an important indicator of engaging teachers in an ongoing inquiry for effective and meaningful professional learning.

However, professional development practices have yet to be explored and researched more for the purpose of achieving the effects of these indicators for high quality and effective professional development. Research findings indicate a lack of

empirical evidence for either teacher or student learning stemmed from professional development, as well as documented changes in teacher practices and sustained adoption of innovative approaches disseminated through professional learning (Lawless & Pellegrino, 2007; Hirsh & Killion, 2009; Brownell, Adams, Sindelar, Waldron, & Vanhover, 2006). Considering the essential role of professional development and the resources and time already invested for this purpose, many educators and researchers have questioned the problems with traditional professional development. In her 2004 presidential address at the annual meeting of the American Educational Research Association, Hilda Borko pointed out that many professional development programs are "fragmented, intellectually superficial, and do not take into account what we know about how teachers learn" (Borko, 2004, p. 4). The frequent short-term, top-down professional development in the form of workshops or one-day seminars can hardly generate effective professional learning or successful professional experiences that improve teacher quality or impact school culture (McConnell, Parker, Eberhardt, Koehler, & Lundeberg, 2013; Peckover, Perterson, Christiansen, & Covert, 2006).

In response to the problems of traditional professional development, new forms of professional learning have emerged in recent years and a few examples are listed below: online teacher professional development (Dede, Ketelhut, Whitehouse, Breit, & McClosekey, 2009), learner-centered professional development (Polly & Hannafin, 2010), university-school professional development collaboration (Thomas et al., 2012), teacher-led community of practice (Kopcha, 2010), research-based professional development (Duran, Brunvand, Ellsworth, & Sendag, 2012), and teacher design teams (Becuwe, Tondeur, Roblin, Thys, & Castelein, 2016). The content of professional development has evolved over the years following the changing policies and the increasingly greater influence created by new communication and learning technologies. However, pedagogical approaches, how students learn, and policies and mandates for teachers continue to be the focal areas in teacher professional development, and they continue to change as a result of the digitally connected world and the technology-enhanced teaching and learning environment. Even though technology utilization is still being considered as "islands of innovation" instead of the driving force for systemic change (Tondeur et al., 2016), the focus on technology is now expanded to (1) effective adoption of learning technologies in teaching and learning; (2) effective use of social media tools for personal learning networks, community building, and professional participation. Correspondingly, new approaches to professional learning are emerging, although traditional formats of professional development, such as workshops, seminars, and the use of coaching, are still common in schools. This paper will then review a number of emerging approaches to teacher professional development, with the intention to inspire reflective dialogues and discussions about effective, quality teacher professional development by the key indicators and characteristics discussed in the literature. As Colbert et al., (2008) suggested, successful professional development may take many forms, but one goal should remain the same and that is: Developing good teachers, which is crucial for successful student learning. In addition, the other goal for professional development should be that the

professional development needs to generate the intended outcomes, i.e., as Yoon et al. (2007) suggested, having a direct impact on teacher learning and indirect effect on student learning.

3 Review of Emerging Approaches

In accordance with the recommended success indicators, as well as the problems with traditional professional development from the literature, the following is a list of emerging approaches to teacher professional development that take advantage of current technology advances and meet the common goal of integrating technology into teaching and learning. These approaches include developing online professional development resources, creating professional learning communities (PLCs), fostering social-media-based personal professional learning, authoring open educational resources (OER), and promoting collaboration-focused professional development. These categories are not exclusive of each other; instead, they may exist independently as individual categories of professional development or they may overlap with one or a few other categories.

3.1 Online Professional Development Resources

Online resources for professional learning purposes, either created or found as a result of an Internet search, can exist as a general concept that refers to all types of online professional development, but they differ from online professional development activities or initiatives based on certain philosophies or principles, for example, professional learning communities. Online professional development resources may be considered the earliest form of professional development that differs from traditional face-to-face, one-shot type of workshops. They have been used extensively to supplement traditional short workshops in regards to "duration" by extending professional development outside of school walls and training hours. They have been used mostly as a knowledge repository, and for management and sharing purposes. Ravitz and Hoadley (2005) suggested more systematic review of digital resources and examined the challenges related to the professional development needed for using online resources and for disseminating knowledge management practices.

Knowledge management, as a field with its origin from technology-based data and information management, focuses on processes of "creating, acquiring, capturing, aggregating, sharing and using knowledge to enhance organizational learning and performance" (Frank & Liebowitz, 2011, p. xi). Although knowledge management has its roots in informational technology and has many different definitions and philosophical underpinnings, Hülsmann and Bernath (2011) differentiates knowledge management from information management by emphasizing

professional development, and by their definition, KM is an organization's ability to capture "the knowledge distributed within the organization, eliciting/generating new knowledge, and leveraging it for improving the organization's performance" (p. 253). Rasmussen and Hall (2015) studied knowledge management as an innovation. The definition of knowledge management as either professional development or an innovation best summarizes the importance of and the need for managing online resources as a type of knowledge management and professional development in school settings. Compared with the other types of professional development formats discussed below, this category is probably the most general and the one that may have been used extensively for various purposes, and that will continue to be meaningful in the next few decades as information technology evolves rapidly.

3.2 Professional Learning Community (PLC)

The concept of a professional learning community (PLC) develops rapidly with the focus shifted from traditional professional development to online environments. In recent years, professional learning community (PLC) seems to be an overused term that may have lost its original meaning defined in literature. DuFour (2004) warned that the universal use of the term in referring to any groups with an interest in education may produce ineffective PLCs as the other unsuccessful school reform efforts and he emphasized the big ideas that characterize the core principles of PLCs. The first big idea DuFour discussed is that a shifted focus of the PLC model is to ensure that students learn, rather than students are only taught. This corresponds to the connection between professional development and student achievement reviewed by Yoon et al. (2007). A culture of collaboration and a focus on student achievement are two other big ideas discussed by DuFour. Inquiry, reflection and conversation about the reflection are also important factors that affect the success of PLCs (Hord & Sommers, 2008). Challenges for PLCs include building the social and support structures that promote deep inquiry into practice, transitioning to systemic change, and obtaining support and guidance from principals and teacher leaders (Ruebel, 2011). Cochran-Smith and Lytle (2009) differentiated PLCs from other types of inquiry groups by emphasizing top-down directives and a focus on increasing student achievement in PLC activities.

The PLC is not a new concept. However, the use of technology to support PLCs is now making them more popular than ever before and the nature of PLCs may have expanded from its original focus on student learning to other professional missions. For example, in 2011, the Pennsylvania Department of Education Bureau of Career and Technical Education (BCTE) and Meeder Consulting Group initiated five virtual Professional Learning Communities (PLCs) to help learn the best Career and Technical Education (CTE) practices and sustain the implementation of new strategies. Many states and school districts have mandatory PLCs. Johnson (2011) found that the PLC model had no significant effect on New Jersey State certified

teachers' perceptions of the content, process, and context of the PLC implementation. However, Leavitt et al. (2013) found that teachers were motivated and felt empowered to improve their math teaching through participating in teacher-created-PLCs. To benefit from PLCs, it is critical for schools to consider the core principles from the original definition of PLCs when choosing between mandatory or voluntary teacher-created PLCs. Mandating PLCs by school or district administration without considering the nature of PLCs and teacher motivation in professional learning may add to confusion over online professional development and will produce ineffective change efforts.

3.3 Social-Media-Based Personal Professional Learning

Social media tools have been changing how people communicate, socialize, and learn through powerful informal systems. Personal learning networks are one of these informal systems and have gradually become a regular approach to professional learning. Richardson and Mancabelli (2011) proposed the concept of personal learning network (PLN) and defined learning networks as "rich set of connections each of us can make to people in both our online and offline worlds who can help us with our learning pursuits" (p. 21). Teachers can easily learn topics related to their profession through their own PLNs using social media, such as Twitter, Facebook, or Scoop.it. Comments, opinions and different views shared in online networking sites provide teachers with vast amount of information, and help them evaluate online resources and fully understand their potential usefulness for teaching practices. Various apps on smart phones can help teachers easily access online resources and manage their networking accounts.

Along with PLNs, the concept of Personal Learning Environments (PLEs) is defined as an emerging trend that refers to systems for enabling learner-centered, self-directed, or group-based learning innovations in education (Johnson, Adams, & Haywood, 2011). A PLE is considered a promising pedagogical approach that uses social media to support formal and informal learning as well as learner self-regulation (Dabbagh & Kitsantas, 2012). Beginning with a discussion of various definitions of PLEs, Martindale and Dowdy (2016) analyze and explore the origin, history, design, examples of PLEs, as well as barriers and future directions for future PLEs. Regardless of the terminology used, one common notion is the use of social media and social networking technologies in personalizing learning experiences by individual needs and correspondingly, increasing learner engagement in various educational contexts. Differences between social-media-based personal professional learning and PLCs reside in teachers' motivation for professional learning, relevance to individual professional needs, and access to experts in the field. The focus on personalization and connectivity may have become the hallmark that makes social-media-based professional learning as an innovation in its own right, compared with traditional professional development that are normally isolated and driven by top-down decision-making.

3.4 Open Educational Resources (OER)

Besides the potential for changing the face of future education completely, open educational resources (OER) and massive open online courses (MOOCs) are revolutionizing professional learning for people from all walks of life. Many organizations such as WikiEducator or OER Commons have been established for the purpose of enhancing teachers' professional learning. Created by Institute for the Study of Knowledge Management in Education (ISKME) in 2007, OER Commons currently owns 46,861 OER, free teaching and learning materials from all over the world, and training services such as Teachers as Makers Academies. The OER Handbook for Educators 1.0 (http://wikieducator.org/OER_Handbook/educator_version_one), created by WikiEducator, was developed to help educators understand, locate, use, develop, and share OER for the purpose of enhancing teaching and learning. Wiley (2014) published the 5R Open Course Design Framework, which is a set of guidelines for developing OER courses and the five openness permissions are retain, reuse, revise, remix, and redistribute. Compared with traditional professional learning that is provided by schools or districts, OER enable teachers to access, learn, create, and share in an open and flexible way. Adopting OER at the school or district level for professional development may involve a close evaluation of specific policies related to the OER movement. To achieve this goal, it is important for educational leaders and policy makers to accept openness as a common notion and recognize it as a catalyst for education reform as described by Wiley (2010).

3.5 Networked Professional Learning (NPL)

Networking includes both human networking and computer networking, so networked professional learning (NPL) refers to professional development supported by human networking with or without computer networking technologies. NPL can be research-based, collaboration-focused, networked professional learning. For decades, university-school partnerships for research and development purposes have provided good opportunities for providing professional learning that is tailored to local needs and an informed research agenda, as well as common goals set by the collaborating parties. Corporate-education partnerships also provide unlimited professional learning as well as business opportunities. Besides many university-school partnerships based on state level educational or technology initiatives, funded projects are other common opportunities for university-school collaborations. The Discovery Channel Global Education Partnership, now A World at School, which started in 1997 as a corporate initiative of Discovery Communications, has now developed learning centers around the world to provide education and enrichment for both students and teachers. The biggest advantage and feature of NPL is the local or global collaboration between educators and

people from any sector of society. Today, the connected world makes it almost effortless to collaborate with anyone from anywhere. Thus, when planned well, NPL could serve as a newly revitalized force to create situated, sustained, collaborative, and participatory learning that can engage teachers, involve them as active learners, and motivate them to participate in a larger professional community.

4 Issues

With fast-emerging new technologies that are transforming how people communicate, socialize, and learn, approaches to professional development should be adjusted to adapt to the changing teacher population, educational priorities, and culture. However, a number of issues emerged from current professional development practices: teachers' perceptions of teaching and learning, a disconnect between professional development and actual classroom practices, and the design of professional development, support, and communication. These issues should make us contemplate whether current technology-supported professional development is really innovative, or it is rather simply the old professional development, considering its content, process and participants' perceptions.

The perceptions of teaching and professional development as services rather than as aspects of the profession and lifelong learning are influencing the culture of professional development. When teachers are motivated to attend workshops only to get the required hours for work, and when the goal of professional development is not relevant, any workshop or initiative intended for professional learning could be futile in improving student achievement. Mundy, Kupczynski, and Kee (2012) suggested that the marginalization of professionalism in the United States has degraded teachers to the role of a service provider under the accountability mandate, while professionalism in Italy centers around trust.

Current professional development practices indicate a trend in having programs crammed with popular technological and educational topics such as inquiry-based learning, while dismissing the relevant goals and objectives as well as actual classroom practices. Boyle and Charles (2009) found that teachers' articulated philosophy of teaching and learning is not consistent with what was observed in actual classroom teaching. Polly and Hannafin (2010) also suggest that despite professional development highlighting reform-based pedagogies, observed teaching practices do not align with teachers' beliefs. It is pressing for professional developers or designers to become aware of this inconsistency and avoid developing programs that only follow fads in emerging technologies or trendy topics. Additionally, resistance is a natural product of any change process, so support, such as incentives or guidance from teacher leaders, is important for motivating teachers in professional learning and sustaining instructional innovations. Communication between different stakeholders, including teachers, students and administrators, in professional learning is another critical factor to consider. Traditionally, students' perspectives are not considered when changes take place by a top-down approach

but this structure may have to change as social media and participatory culture are changing how people communicate and learn.

5 Conclusion

The reflection on emerging approaches to professional learning supported by new technologies may lead to a number of concluding thoughts. First, when designing any professional development program, it is important to consider all the variables involved in the learning and change processes, for example, the changing learner or teacher population, communication styles, changing ways of learning, the affordances of emerging tools and software, and any resistance to change and innovation. Otherwise, professional development supported by new technologies but with old rationale, content, and process may still fall into the category of well-intentioned but ineffective or even failed educational efforts. Second, in reality, as Boyle and Charles (2009) stated, because of the existing outcome-based teaching and learning culture, "the rhetoric of rich teaching and learning is simply that, rhetoric" (p. 40). Therefore, professional learning will be effective in improving student learning and achievement only when teachers themselves are self-regulated and are able to align what they believe philosophically and what they practice in classroom teaching. Finally, the emerging approaches to professional learning may have clearly indicated the importance of recognizing every individual as both a learner and a contributor in any learning environment. Only with this changed mindset, the culture of teaching as a profession can be changed in order to enhance the effectiveness of professional learning and to avoid making those criteria for quality professional development merely as laudable aims.

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Part II
Teaching and Learning Experiences with Technology

Assessment of Student Learning Achievement in Regression Tasks

Ken Li

Abstract Many students are under the illusion that the use of IT can accomplish statistical calculations without the need for statistical thinking but the regression models they built are infeasible for making prediction. It is therefore in the present study to assess the operational level of students' statistical thinking in regression modelling. A sample of students was selected to attempt the seven questions on an individual basis. A qualitative analysis of students' responses to each of the questions was performed within the assessment framework of Putt et al. as checking which of the four levels of statistical thinking the students had: idiosyncratic thinking, transitional thinking, quantitative thinking and analytical thinking. The analysis results show that most students attained either quantitative thinking or analytical thinking when handling more technical tasks, but not the tasks of reasoning about data; reasoning about results; and reasoning about conclusions. These reasoning tasks demand statistical communication that should be emphasized and monitored throughout Statistics lessons and written works should be assigned to students so that teachers can provide feedback on their writings, as helping them conceptualize material, make links among concepts and internalize thinking.

Keywords Scatterplots · Regression modelling · Statistical thinking · Vocational education

1 Introduction

Although statistics education should keep pace with the development of Information Technology (IT) to strengthen students' capacity to understand statistical processes and conduct statistical investigations, many students are under the illusion that the use of IT can accomplish statistical calculations without the need

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for statistical thinking. That is why they cannot accomplish regression tasks leading to the construction of a regression model feasible for making prediction. But, in fact, Wells (1903) prophesied that "Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write." Apparently, the prophecy is fulfilled as one of the educational objectives in any statistics curriculum is to teach students how to think statistically (American Statistical Association, 2014). Statistical thinking may simply be employed for rectifying flaws and fallacies (Campbell, 2004).

Nevertheless, the definition of statistical thinking can be as broad as the thought processes involved in statistical activities or works. Statistical thinking can also be defined as narrowly as focusing on the study of variation. Therefore, this paper attempts to review various definitions and models of statistical thinking from which we select the one most conforming to the context of regression modelling; and to assess student's ability of using IT tools and beyond. The aim of the assessment is to provide feedback information to teachers about students' proficiency in using IT tools; and which parts of statistical thinking they cannot fully develop so as to improve pedagogy to support learning.

2 Literature Review

There are different statistical thinking perspectives within different disciplines, for example, business, health care, quality control, biology and so forth. Statistical thinking can improve business performance as well as process (Hoerl & Snee, 2012). Similarly, statistical thinking should be able to improve healthcare management (Wainer, 2013).

The definition of statistical thinking (American Society for Quality, 2016) concentrates on studying the variation in interconnected processes and emphasizes the need for thinking about variation reduction. Obviously, this definition does not show the full scope of statistical thinking because the definition is formulated for processes associated with quality control but not for other statistical processes.

On the other hand, statistical thinking can be employed in scientific investigation. Bishop and Talbot (2001) defined statistical thinking as the thought processes involved in reasoning about data; reasoning about results; and reasoning about conclusions. Reasoning about data involves studying the background, content and context of data, and justifying reasonableness of data measurement, appropriateness of measurement units of data, and meaningfulness of the data range. Reasoning about results evaluates whether outputs resulting from statistical processes are consistent with statistical logic and have any interconnection among or discrepancy between them. When reasoning about conclusions, one draws valid conclusions based on the statistical evidence. The conclusions may or may not match real-life phenomena or their underlying rationale. If there is such a match, insights, and discoveries will be generated; otherwise implications should be deduced from the discovered contradiction so as to give direction to further exploration or investigation.

In statistics education, the statistical thinking framework proposed by Jones, Thornton, Langrall, Mooney, Perry, and Putt (1998) was about reading data displays; organizing and reducing data; displaying data; analyzing and interpreting data. The tasks of reading data displays and displaying data are similar to graph characterization and graph construction in Cook and Weisberg (1999). Organizing and reducing data refer to deriving summary statistics. Analyzing and interpreting data are not restricted to the tasks of reading graphical data in Curcio (1997), but also synthesize statistical ideas from numerical data or descriptive statistics like making statistical inferences, interpreting statistical results and building forecasting models.

Apart from using the models to develop students' statistical thinking, it would be necessary for assessing how well their statistical thinking is developed. Thus, the assessment checks how well students to reason about data; reason about results; and reason about conclusions. The reasoning ability is associated with the model of statistical thinking developed by Bishop and Talbot (2001). Such assessment provides information to teachers about how well students understand beyond the use of statistical procedures and computations they have used (Gal, 1998); and also about which parts of statistical thinking they cannot fully develop so as to improve pedagogy to support learning. In fact, assessing students' statistical understanding is a difficult and daunting task (Lajoie & Romberg, 1998). The following paragraphs attempted to conduct further literature review from which an assessment instrument in the context of regression modelling was derived.

Chance (2002) assessed student's ability of statistical thinking but did not provide a clear assessment framework. In contrast, Biggs and Collis (1982), Bude (2006), and Putt, Perry, Jones, Thornton, Langrall, and Mooney (2000) provided assessment frameworks that are more exhaustive. Biggs and Collis provided a general framework for assessing how well students accomplish learning tasks; and classifying students' learning outcomes in five levels: prestructural, unistructural, multistructural, relational and extended abstract. Prestructural responses are displayed by students who can attempt simple tasks but they cannot accomplish them. Those students who use one relevant aspect have achieved a unistructural level of achievement. Students who use several aspects but treat them unrelated or unconnected, attain a multistructural level of achievement. Relational level of achievement refers to integrating the relationship between different aspects. In attaining the extended abstract level of achievement, students should be able to deduce relationships.

The assessment frameworks of Bude (2006) and Putt et al. (2000) are relevant to the field of statistics. Putt et al. assessed four achievement levels of statistical thinking: idiosyncratic thinking, transitional thinking, quantitative thinking as well as analytical thinking. Idiosyncratic thinking is about making personal judgement or using personal experience to formulate a problem statement. Transitional thinking is to be aware of the importance of quantitative reasoning and making sense of the data. Quantitative thinking refers to reasoning about results of statistical analysis of data. Analytical thinking is more or less like reasoning about conclusions. The last three levels of statistical thinking can be found in Bishop and Talbot (2001).

Bude (2006) assessed students' statistical understanding in three levels: elementary, intermediate and highest achievement. Elementary level evaluates general understanding of statistical definitions and procedures. Intermediate level refers to a deeper understanding of statistical data as well as statistical methods. Highest level refers to the skills of justifying and interpreting statistical results. Bude's second level achievement, which is equivalent to the second and the third levels of achievement in Putt et al. (2000), does not give clear indications of which parts of statistical methods and understanding of statistical data students do not do well. In addition, Bude pointed out that assessment framework of students' statistical ability should be developed according to a specific statistical topic, because the skills of reasoning used in different statistical approaches have variation in thought processes. For these reasons, an instrument to assess students' thinking in regression modelling was modified in accordance with Bishop and Talbot (2001), Jones et al. (1998) as well as Putt et al. (2000) in this paper.

3 Assessment Instrument and Research Participants

A test was designed to evaluate key aspects of students' statistical thinking and graphing in regression modelling, in addition to assessing their proficiency in using Excel graphing and calculation tools as well as their knowledge of Excel syntax and programming skills. In the test, a set of real-life data [i.e. electricity consumption (y), air temperature (x_1), relative humidity (x_2), the index of industrial production (x_3), the number of telephone lines (x_4), composite consumer price index (x_5) and gas consumption (x_6)] with local context was given. Seven specific questions were set in accordance with the models of Bishop and Talbot (2001) as well as Jones et al. (1998) to evaluate students' responses to each particular task in a preliminary examination of data process. The quantity and scope of data were judged to be within the reach of the students' ability.

Question 1 asked to discuss whether there is a relationship in each of the six pairs of variables, i.e. (a) y and x_1, (b) y and x_2, (c) y and x_3, (d) y and x_4, (e) y and x_5 as well as (f) y and x_6, based on the context of the given data. Question 2 asked to discuss whether the values of y, x_1, x_3 and x_5 cover a reasonable and meaningful range based on the measurement of the given data. Question 3 asked to construct scatterplots for each of the three pairs of variables, viz (a) y and x_2, (b) y and x_4 as well as (c) y and x_6. Question 4 asked to determine the strength and the direction of the relationship between each of the three pairs of variables: (a) y and x_2, (b) y and x_4 as well as (c) y and x_6. Question 5 asked to use Excel to compute each of the six pairs of variables. Question 6 asked to use Excel to test whether the linear relationship in each of the six pairs of variables exists at the level of significance of 5%. Question 7 asked to explain what the correlation coefficient tells us about the relationship in each of following the four pairs of variables, i.e. (a) y and x_1, (b) y and x_2, (c) y and x_3 as well as (d) y and x_6. According to Bishop and Talbot (2001), the first two questions are equivalent to the task of reasoning about data, the

fourth and the sixth questions are similar to the task of reasoning about results, and the last question is consistent with the task of reasoning about conclusions. The third and the fifth questions are about the tasks of representing data; organizing and reducing data, respectively as in Jones et al. (1998). According to Taylor's (1980) framework of technology, the work they did for Questions 3 and 5 is simply to employ Excel as tutor; Excel was conceived as playing the role of tutee when dealing with programming tasks in Question 6.

A random sample of 23 full-time students enrolling in Year 2 of the Higher Diploma in Applied Statistics and Computing (HDASC) course in the Hong Kong Institute of Vocational Education was drawn to attempt the test. This cohort of HDASC students was selected because Regression Modelling is a statistical module taught in their Year 2 study. An analysis of students' test responses were conducted so as to identify which level of statistical thinking they could not achieve.

4 Research Findings

Question 1 was to evaluate students' ability of thinking associated with connecting among facts or evidence, and deducing the relationship between electricity consumption and the other five variables if any. Among 23 students, only one (4.3%) provided correct answer with grounds based on data context. Twenty students (87.0%) gave correct relationship but provided incorrect wording sequence; used statistical graphing or calculation tools; did not provide adequate grounds; or did not justify relationship based on data context. Two students (8.7%) could not assess the relationship between two variables. Of course, the responses with justification were relatively better in quality than those which had no justification. Apparently, only 4.3% of students achieved analytical level of statistical thinking whereas 95.7% of students could activate quantitative or lower levels of thinking.

Question 2 assessed how well students justified whether the values of given data covered a reasonable and meaningful range with respect to its context, measurement, and measurement units. Five students (21.7%) could justify the reasonableness and meaningfulness of data measurement with correct and thorough answers. Fifteen (65.2%) gave correct answer with partial reasons for meaningful range; justification but not specific/irrelevant/not explicit/invalid; or without giving any reasons. One student (4.3%) could not answer the question directly but gave some relevant information. Two students (8.7%) did not attempt the question. Most of the students employed transitional thinking, which means that they took the opportunity to cross check whether an underlying phenomenon matched/mismatched with the situation derived from empirical data, but only some were successful.

Question 3 was to assess students' knowledge of scatterplot construction and proficiency in using Excel graphing tools. Among 22 students, 50.0% demonstrated their good knowledge of correlation graphing and proficiency in using Excel graphing tools. The remaining 50.0% made at least one of the following technical mistakes: omission of axis labels and measurement units, improper graph

orientation and inappropriate graph scales. All these flaws depicted the students as being less capable of analytical thinking.

Question 4 focused on an appraisal of students' thinking associated with determining the strength and direction of the relationship of two variables. Among 23 students, four (17.4%) could comprehend correlation patterns in scatterplots with valid reasons. Ten students (43.5%) gave incorrect or imprecise answers to this question. Their incorrect answers were due to inappropriate graph scales; or wrong or conflicting reasons. They had given imprecise answers as they provided inexplicit explanations or reasons irrelevant to data scattering. One student (4.3%) could not estimate the correlation coefficient, and eight students (34.8%) did not attempt this question. To summarize, only 17.4% of students could demonstrate the ability of analytical thinking but 82.6% could not. Their inability was probably allied with treating graphic features as isolated entities and/or unrelated to scattering of data.

Question 5 appraised students' performance of statistical calculations using Excel. Excel proficiency of seven students (30.4%) could not be assessed because their computer files were corrupted or unavailable. Out of sixteen students, 14 used Excel tools to accomplish correlation calculation tasks including proper selection and use of correlation function or correlation analysis tool and correct input of data and output of correlation results. The remaining two students used correct tool and syntax to compute correlation coefficient but did not give any implication of correlation results. Most of the students displayed analytical thinking.

Students' responses to Question 6 were evaluated based on two criteria. The first criterion dealt with students' knowledge of Excel syntax and programming skills and the second with their performance of statistical hypothesis testing. Among 23 students, 12 (52.2%) programmed Excel properly for statistical hypothesis testing, and only one student (4.3%) had used incorrect Excel syntax or programmed Excel incorrectly. However, it was not possible to assess for 10 students (43.5%) on Excel programming because computer files were corrupted or unavailable.

Students' responses to Question 6 were then evaluated to compare how well they performed statistical hypothesis testing. Nine (39.1%) out of 23 students, who accomplished statistical hypothesis testing tasks, they provided proper formulation of null and alternative hypotheses; correct statistical evidence and decision; sound reasoning with statistical evidence as well as statistical implications from Excel output, and attained analytical level of statistical thinking. The remaining fourteen students (60.9%) failed to complete statistical hypothesis testing tasks. Their failures were due to no/incorrect implications for correlation test results; no/incorrect rejection region; no statistical decisions made; or wrong statistical tools or tests used. Obviously, students did not give the correct rejection region owing to using an incorrect probability distribution; misreading the standard normal deviate from the Excel statistical function; mixing up the rationales of one-sided and two-sided tests, particularly without stating null and alternative hypotheses; or wrong Excel programming. Inappropriate statistical tests or wrong statistical decisions resulted from these technical mistakes and eventually led to drawing an inconsistent conclusion or a wrong implication. Intuitively, not all the students could activate analytical level of statistical thinking.

Question 7 aimed at assessing students' ability to reason with correlation results and deduce its practical implications. Among 23 students, sixteen (69.6%) responded to correlation deduction and synthesis vaguely and their arguments were not linked to the data context. None of students could deduce the data relationship in a practical context. They might not fully integrate the relationship between the measurement, measurement units, content and context of data and all the graphic features. To interpret correlation beyond the superficial level, students needed to peruse the data and understand them contextually, being regarded as a means of judging the potentiality of variables for proposing a regression model. In dealing with synthesis and deduction, a translation of statistical terms was made in the use of lay language in connection with correlation results but 17.4% of their deduction tasks could fulfil this general translation requirement. Three students (13.0%) did not attempt the question.

The quality of students' responses to Questions 1–7 was summarized in Table 1 using the assessment framework of Putt et al. (2000). Analytical level of statistical thinking was not well achieved by the students except doing the task of organizing and reducing data specifically, constructing scatterplots and doing statistical

Table 1 Achievement levels of statistical thinking

	Unclassified	Level 1	Level 2	Level 3	Level 4
Q1.	2	9	3	8	1
Q2.	2	1	15	0	5
Q3.	1	0	0	11	11
Q4.	8	1	10	0	4
Q5.	7	0	0	2	14
Q6.	0	8	4	2	9
Q7.	3	1	3	16	0

Notes

Qs 1–7 were set in accordance with the models of Bishop and Talbot (2001) as well as Jones et al. (1998) to evaluate students' responses to each particular task in a preliminary examination of data process. Specifically

Q1: Bishop and Talbot's (2001) Model of Statistical Thinking—reasoning about data
Q2: Bishop and Talbot's (2001) Model of Statistical Thinking—reasoning about data
Q3: Jones et al.'s (1998) Statistical Thinking Framework—representing data
Q4: Bishop and Talbot's (2001) Model of Statistical Thinking—reasoning about results
Q5: Jones et al.'s (1998) Statistical Thinking Framework—organizing and reducing data
Q6: Bishop and Talbot's (2001) Model of Statistical Thinking—reasoning about results
Q7: Bishop and Talbot's (2001) Model of Statistical Thinking—reasoning about conclusion

A qualitative analysis of students' responses to each of the questions was performed within the assessment framework of Putt et al. (2000) as checking which of the following four levels of statistical thinking the students could achieve

Level 1: Idiosyncratic thinking
Level 2: Transitional thinking
Level 3: Quantitative thinking
Level 4: Analytical thinking

Unclassified: Students' responses could not be classified because these groups of students did not attempt the questions or their computer files were corrupted

calculations using Excel. When students were not sure what to do, quantitative thinking was most likely employed. Besides, idiosyncratic thinking or transitional thinking was displayed by a few students when attempting to present their ideas though loose, vague or fragmented.

5 Implications for Classroom Teaching

Most of the students could not display idiosyncratic thinking, transitional thinking or quantitative thinking when dealing with the tasks of reasoning about data; reasoning about results; and reasoning about conclusions. Thus, this is of great importance in helping students learn how to construct arguments on the basis of evaluation. Evaluation here refers to justifying whether or not the correlation coefficient and scatterplots make sense or deals with how well the statistical results can be turned into evidence in connection with the context of data and problem setting. Prior to evaluation, students must find some reference materials about how electricity is consumed in Hong Kong as ground. They may find electricity consumption is influenced by the domestic use, industrial use and commercial use and so forth. The domestic use is mostly related to climate, environment and lifestyle. The electricity consumed for industrial and commercial activities is under the influence of local or global economic. Students must then be taught correlation and causation in that way to fully aware and differentiate four types of causes: necessary cause, sufficient cause, necessary and sufficient cause a well as contributory cause (Campbell, 2004). Students should evaluate whether the statistical results they obtain match or mismatch the ground in general. In addition, written works should be more often assigned to students so that teachers may provide feedback on their writing, such as helping them conceptualize material, make links among correlation concepts, and internalize thinking.

6 Conclusion

The quality of students' responses was not evaluated by checking the final numerical answer, but studying how statistical thinking was developed; identifying the strengths and weaknesses of students' statistical thinking. It appears that students attained higher levels of statistical thinking when handling tasks involving representing data; and organizing/reducing data. These are more technical than tasks involving reasoning about data; reasoning about results; and reasoning about conclusions in which they could activate idiosyncratic thinking, transitional thinking or quantitative thinking as showing incoherent or incomplete arguments. These tasks demand statistical communication in oral or written form associated with the use of English language which is a vital part of statistics. The students who were less able to achieve analytical level of statistical thinking might be due to poor

English proficiency as English being their second language (see Putt et al., 2000). As such, use of statistical communication should be emphasized and monitored throughout Statistics lessons (Horton & Hardin, 2015) in which teachers may intervene learning activities so as to enhance linguistics ability in the context of statistics (Li & Goos, 2015).

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Research-Based Design: Case of an Academic E-reader Design

Shuling Li

Abstract The rapid growth of e-reader use has received increasing attention in e-commerce and academia. To study the academic use of e-reader plays an important role in research area, especially for masters, doctors and professors. With the purpose to explore the academic potential of e-reader, this paper used research-based design to explore the way of supporting users' reading comprehension and improving their reading competence. Based on Facer and Williamson's user-centred design approach (2004), this paper carried out the design research via three iterative testing and trial processes. The results demonstrated that the test and trial process of Leinonen's research-based design is essential for the assessment, reconstruction and quality of designed concept.

Keywords Multimodality representation · Gamification · Collaborative learning

1 Introduction and Design Concept

In recent years, the rapid growth of e-reader use has received increasing attention in e-commerce and academia. The study of academic use of e-reader, as Thayer, Lee, Hwang, Sales, Sen and Dalal (2011) put it, has remained underway, students in university and college have become popular consumers of e-reader. According to Hamou, Anwar and Benhadria (2012), increasing availability of e-reader has reshaped ways in which people conceive and gain knowledge in digital age. E-readers (Kindle, iPad, Sony Reader, Nook, etc.) are, therefore, treated as new digital technologies with great potential to enhance reading and learning (Aaltonen, Mannonen, Nieminen, & Nieminen, 2011; Hamou et al., 2012; Thayer et al., 2011). With the purpose to improve academic potential of e-reader, I intend to design an e-reader that could be broadly used in academic learning.

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In this project, the designed e-reader is a mobile app with a virtual learning environment, aiming to support users' academic reading and learning. Design challenges are recognized as the lack of motivation affordances for academic reading, interaction design challenges and the limited application of e-reader in collaborative learning. The object of design is to help users enhance reading comprehension and improve reading competence. Considering design challenges, major features of e-reader are multimodal presentation of texts, exercises with rewarded points and incentives, and collaborative learning platform. Two prototypes with different fidelity (Low-Fidelity, Hi-Fidelity) will be developed and offered to stakeholders for testing and evaluating the actual use in two different workshops. Activities and feedback from users will be analyzed by designer, educational experts and technology developers during iterative development and refinement process of the concept. Finally, the prototype will be tested and examined for the sake of a feature-rich concept for target users.

2 Literature Review

In terms of the academic reading and learning with e-reader, Thayer et al. (2011) reviewed previous research on e-reader and figured out three problematic features. These features include limited motivation supports for active reading and reading practices, less satisfied navigational design and limited construction of collaborative learning environment.

Referring to motivation supports for active reading, Wright, Fugett and Caputa (2013) indicate that positive feelings of reading stemmed from the interaction with digital texts could increase overall motivation and engagement. That is, measures aiming to support active interaction between user and text are potential to enhance reading comprehension and competence. Since Kalantzis and Cope (2012) argue that multimodality could powerfully express the meaning of text and develop the interaction between reader and text, as a result, multimodal presentation of digital texts could be treated as a kind of motivation affordances to engage users in personal meaning-making of the text and promote positive emotions. In addition, graphic design of navigation and annotation, also as representation of multimodal texts (Kress, 2010), has potential to reduce users' intrinsic cognitive load (Sorden, 2005). It is because that multimodal stimulations enhance memorizing by deducing meaningful relationships (Andreano, Arjomandi, & Cahill, 2008). From the perspective of extrinsic motivation, Deterding, Sicart, Nacke, O'Hara, & Dixon (2011) propose the term gamification, that is, using game design elements in non-game contexts, has great potential to support the learning by providing extrinsic encouragement (Lee & Hammer, 2011). In line with the principle of gamification, incentives and rewarded points of the reading exercises are potential for the construction of a playful and enjoyable learning environment. The environment is able to 'improve the user experience and user engagement' (Deterding et al. 2011, p. 2425).

With respect to the construction of collaborative learning environment, although it is a defective research area in e-reader design at present (Hamou et al., 2012), it is meaningful and productive for e-reading (Murphy, 2010). Through collaboration, quality interaction between peers is generated (Murphy, 2010), which facilitates the achievement of shared understanding and shared goals (Timmis, 2012). As Dillenbourg et al. (2009) put it, the purpose of collaborative learning is not simply in enabling the collaboration across distance, but in creating situations in which effective interactions could happen. Through the co-construction of shared understanding, interaction supports users' motivation and self-regulation (Dillenbourg et al., 2009). It is essential for uses to develop personal learning strategies.

3 Learning Brief

Learning objects are to:

1. Improve target users' engagement and motivation towards academic read
2. Enhance target users' comprehension.

The main aim of the designed e-reader is to improve readers' motivation and engagement in academic reading. Target users are students in university and college. They can use the e-reader at any place in their convenient time. During reading process, students will use multimodal reading texts (video, diagram and written text) to enhance their comprehension. After text reading, students will have an opportunity to enjoy reflective exercises with rewarded points and incentives. The purpose of such design is to support students' motivation and engagement, simultaneously, enhance their understanding of texts. The forum is the place for students to evaluate their understanding and co-construct knowledge with their reading peers. Furthermore, the graphic design of navigation will support the whole reading process. One principle I will stick to is that both cognition and social construction will be involved in the reading with e-reader, which can offer users a real reading experience (Dillenbourg, 1999).

4 Possible Example of Architecture and Screen Design

4.1 Diagram of E-reader Architecture

Since main features of designed e-reader are multimodal presentation of reading text, reflective exercises with rewarded points and forum for collaborative learning, design process will highlight these features. Figure 1 illustrates the structural diagram of e-reader. The upper half shows main menus of home page on the left side and functional structure of personal page on the right side. Then, the bottom half

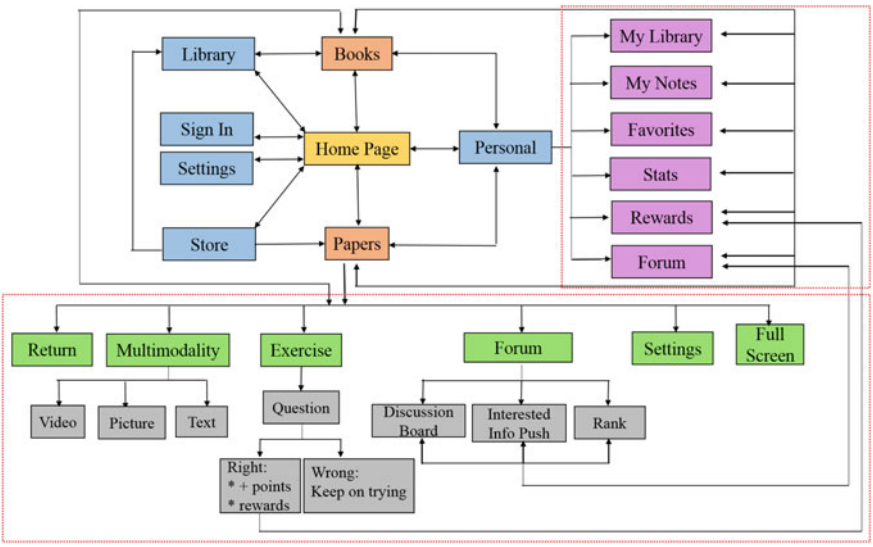


Fig. 1 Diagram of the e-reader architecture

demonstrates main functions in supporting academic reading. These functions are available for both paper reading and book reading. In a nutshell, the following diagram shows the architectural framework of e-reader.

4.2 Screen Shots

To indicate the content of the e-reader, the home page will appear automatically when show the title and main menus (see Fig. 2). The bottom left corner shows six

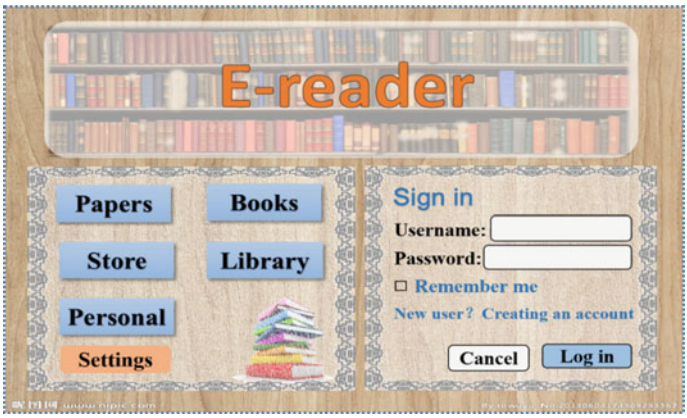


Fig. 2 The home page of the e-reader

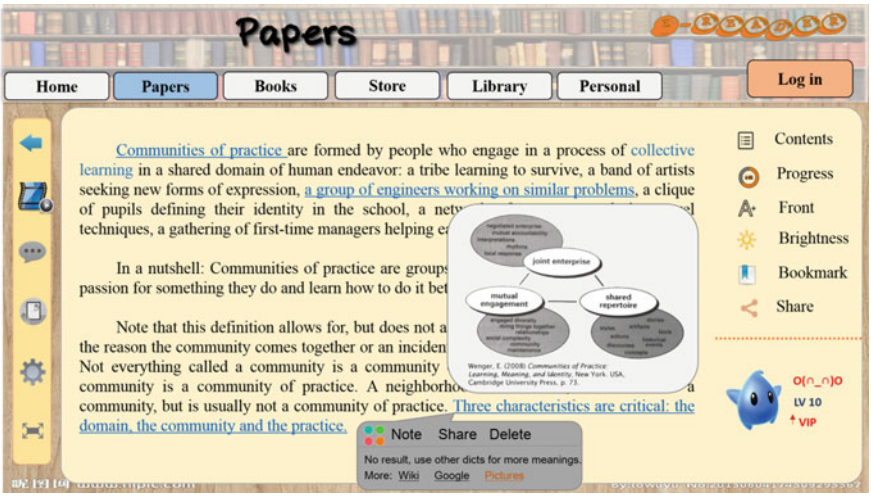


Fig. 3 Multimodal presentation of the reading texts

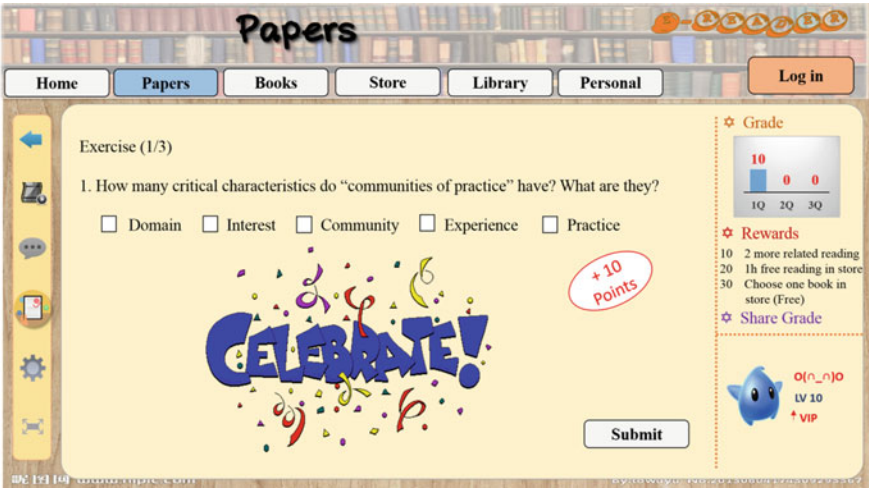


Fig. 4 "Gamified" exercises

functional buttons of the system, the "settings" button at the bottom aims to change the background and colour of the screen. The bottom right corner is the place for sign in, which offers users access to the personalized reading and learning place.

With the purpose to present three main features, following Figs. 3, 4 and 5 will illustrate how different features support users to learn from the reading process. Figure 3 illustrates the multimodal presentation of reading texts.

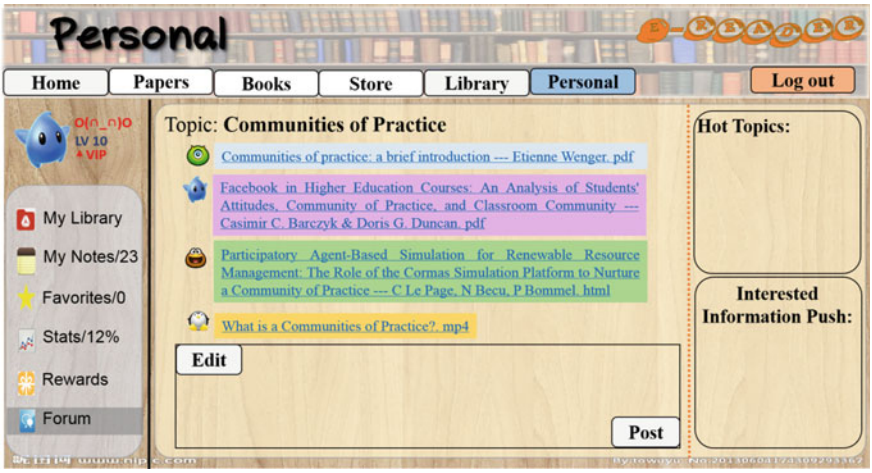


Fig. 5 The personal forum of e-reader

Besides reading text, the system presents corresponding video (linked by the hyperlink in the text) and pictorial annotations to enable users to understand the material from different dimensions. Meanwhile, with pictorial icons and specific colour, graphic navigations on both left and right sides make presented illustrations easy to read. Figure 4 demonstrates playful exercises. These exercises come from reading texts, being designed for users to synthesis and reflect what they have read. With the purpose to inspire users' motivation and enthusiasm on reading, the extra points will be rewarded when the answer is right. In turn, if the answer is not correct, the system will encourage the user to keep on thinking with automatic texts "Please think again" and a hopeful emotion.

Finally, collaborative learning environment will be illustrated by the Fig. 5. It is the forum in "personal" section. After choosing their favourite topic, users could express their understandings and confusions, or share supported reading materials at edit area, then post it to user who is also interested in this topic. In addition, the place also supports discussion among online users, they can negotiate and make-meaning of the reading text together to co-construct the knowledge. Through the forum, users could mutually engage with joint activities and shared practices. On the right side, the "Hot Topics" area aims to display critical issues related to topic with academic answers, while "Interested Information Push" area targets to show recent related research. All compensatory information contributes to in-depth reading comprehension as well as both intrinsic and extrinsic reading motivation. In general, the forum could be an ideal option for the adoption of e-reader in collaborative learning. Based on reviewed literature and exampled screen design, the final poster will be illustrated by Appendix.

5 Design Process

With the purpose to spark the motivation and support both academic reading and collaborative learning of university and college students, following flowchart (Fig. 6) will present the design and development process of e-reader.

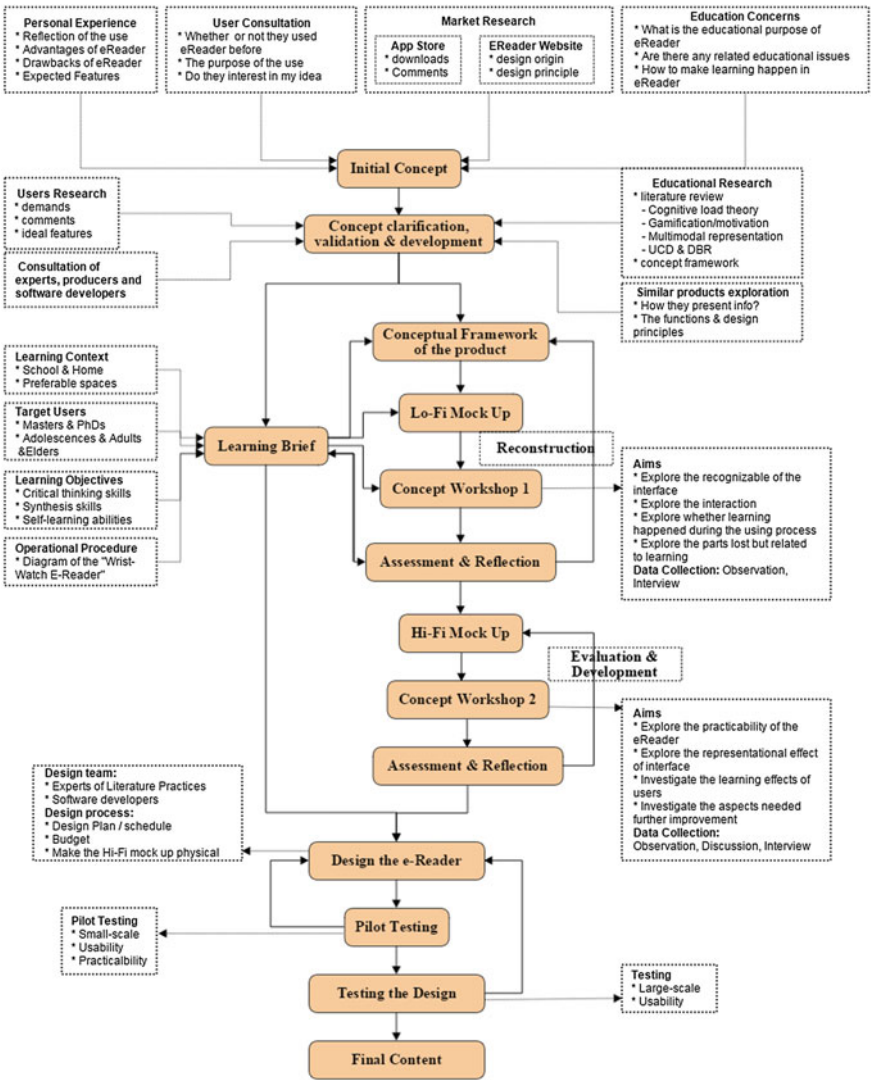


Fig. 6 Design process of the e-reader

5.1 Theoretical Framework of Design Process

From the perspective of technology push and demand pull (Van den Ende & Dolfsma, 2005), the design based on the research explores what the new technology can do by computer scientists, and the role of technology in motivating target users. Instead of using specific technology, Leinonen, Toikkanen and Silfvast (2008) emphasizes the importance of serving users in research-based design process. As Facer and Williamson (2004) put it, working with users is the better way to collect first-hand experience of end users' demands, interests and requirements. In addition, the problems supporting for the design process stem from people's authentic lives, and are recognized and articulated in collaboration with stakeholders (Leinonen et al., 2008). With the purpose to effectively adopt the designed e-reader into university students' academic reading, feedbacks from stakeholders are essential for product design. That is, the purpose of technology design is to serve users, instead of the using of a specific technology (Norman 1988). Accordingly, design and development process will comply with principles of user-centred design (UCD) approach based on the research-based design. The following Fig. 6 is the illustration of the e-reader design process.

In line with Facer and Williamson (2004), working with users not only offers first-hand experiences of end users' needs and interests, but also enable designer and software developers to 'free-up' their formulaic ideas for creative design and identify challenges and difficulties at an early stage for the achievement of their educational aims. As a result, users and stakeholders should be involved in every stage of design process. In terms of design process, Leinonen et al. (2008) has already divided the process into four iterative but partly overlapping phases, contextual inquiry, participatory design, product design and production of software as hypothesis (Fig. 7).

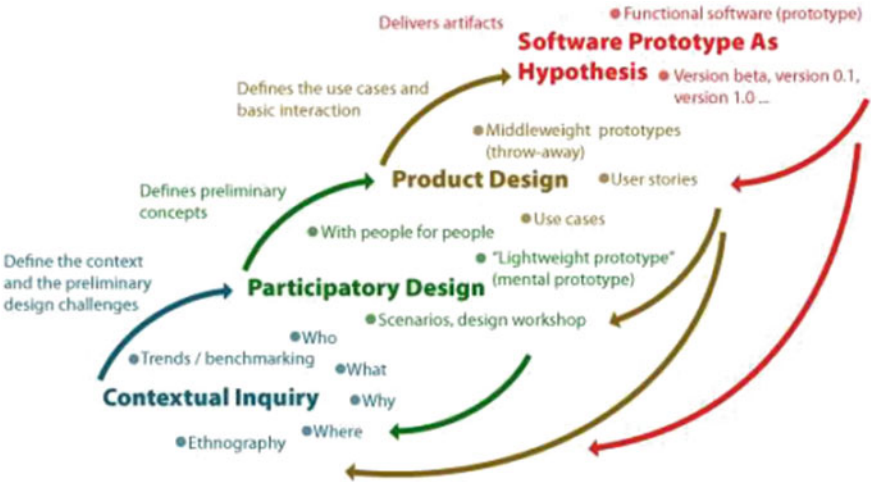


Fig. 7 Research-based design process. Adapt from Leinonen et al. (2008)

Complying with principles of each phase, e-reader design process will be categorized the phrases as concept clarification, concept development, concept refinement and concept realization. Within each iterative process, different identities will be shaped by users. Initially, participated users will be learners to understand the process of invention, then, being critics to evaluate what is good and what is bad when compared with similar inventions. After that, users will be inventors to offer creative design suggestions, and even being co-designers to identify requirements of users and proceed on to the next stage of participatory design.

5.2 Concept Clarification and Validation

Initially, as a master student, I have some personal experiences of using e-reader in my academic reading and learning. Since some features of present e-reader are not satisfied enough, such as the limited notes taking and annotations, I intend to design a new version e-reader to support the academic reading. With the initial idea in my mind, I will turn to master students to identify whether they have same demands informally. Their answers and intentions for the academic use of e-reader will not only help me validate the design object—e-reader, but also support the further design of specific features and functions. That is what Facer and Williamson (2004) suggested, working with users could offer innovative and creative resources. With confirmed design subject and useful resources, I will go to app store and e-reader websites to investigate the context of e-reader use from a large scale. The comments of users posted in app store and websites will offer me an opportunity to broadly investigate users' demands and preferences, and prospectively, to explore the preliminary design challenges. As Leinonen et al. (2008) put it, identification of context and challenges refer to the clarification of target users, co-designers, related difficulties and reasons for the solution, which will closely connect practical design with users' requirements. In addition, since it is the design of a technology-based educational tool, I will take following educational concerns into account, such as how learning happens in e-reading process, how to design e-reader to make users more involved in active reading and how to design learning environment within e-reader and so on. Then, I will discuss these questions with my tutors and some educational experts to figure out design focuses.

So far, the vague idea will become more clear and concrete. The designed object will be an e-reader that will enable target users to be effectively involved in academic reading and learning. However, the specific functions of the designed e-reader will be still vague, which will be clarified in the process of concept development.

5.3 Concept Development

Since the object of design is to explore academic potentials of e-reader, this phrase will aim to identify problematic features of present e-readers in academic reading. What I will do in this phrase is conducting educational research, simultaneously, finding out target users' expected features and challenges of e-reader design based on the consultation with users, experts and software developers.

In terms of educational research, two aspects of efforts will be undertaken. The one is to go back to previous studies regarding academic exploration of electronic reading devices. The reason is that previous studies could provide valuable information for new exploration. As what discussed in Sect. 2 Literature Review, researchers' arguments and statements in previous studies can support the identification of three problematic features of e-reader, and facilitate me to gain a general idea of users' preferences, which are that sounded functions for notes taking and multimodal representation are demanded. The other is to interact the problematic features with expects. According to Leinonen et al. (2008), users can bring their tacit knowledge and original requirements into design to free-up designer's formulaic and fantastic ideas. As a result, target users will be experts in this stage to support the clarification of specific features. For this end, a group of university students, including undergraduates, postgraduates and PhD students, will be involved in a focus group for me to consult their comments on previous using experiences and expected features for academic reading and learning. Since target users are seen as 'native informants' (Facer & Williamson, 2004, p. 5), they are able to figure out problems from and within their learning experiences. As the part of end users, problems suggested by these students will be the essential evidence for further development. After educational research, problematic features will be illustrated, which will facilitate the refinement of expected features.

Referring to the identification of design challenges and specific design features, the consultation with target users, educational experts and software developers will be involved separately. As Facer and Williamson (2004) point out, different kinds of participants have different potential functions for product design. Three groups of people will be involved in three different focus groups with the purpose to clarify different issues. Target users, as the 'native informants', will not merely support identification of problematic features, but also could be co-designers to support the articulation of design features. They will provide first-hand experiences for designers to design end users' expected functions (Facer & Williamson, 2004). Accordingly, focus group of target users will also be potential to formulate concrete features of e-reader design. Educational experts in this stage will be the people who are familiar with learning theories and good at the instructional system design. They will be deal choice for the evaluation of design features and the recognition of potential challenges in constructing identified virtual learning environment within a mobile e-reader. Finally, software developers and producers, as the main force for

physical construction of e-reader, will be able to recognize difficulties of e-reader construction by considering technological issues, like technological feasibility. As a result, technological challenges will be potential to be identified in this consultation. In general, different focus groups will provide various resources for me to identify specific design features and design challenges. Whilst, both video and audio recording will be involved in the consultation process to ensure explicit and formal transcripts.

In line with educational research and consultations in three focus groups, identified design features will be the multimodal representation of written text, gameful design of exercises and forum design for collaborative learning within e-reader. Since the lack of motivation affordances for academic reading, unsatisfied navigation design and limited collaborative learning environment design of e-reader will have been identified as design challenges, aforementioned features will be examined in the next section to explore whether they will inspire users' motivation and afford a meaningful and satisfied reading experience for users. In addition, the diagram of the e-reader architecture will be illustrated by Fig. 1 in Sect. 4.

5.4 Concept Refinement

With architectural diagram of designed e-reader, it will be easy for the production of a low-fidelity (Lo-Fi) prototype. As a tangible architect, low-fidelity prototype will facilitate the examination of the identified features. As Leinonen et al. (2008) put it, significance, meaning and opportunities of designed product will be realized only in real contexts through practical use. Accordingly, a workshop with target users will be needed to generate real contexts and explore implications and signification of identified features of e-reader. In line with Leinonen et al's (2008) diagram of research-based design process, iterative processes for the refinement of concept will be required to gradually refine lo-fi prototype to high-fidelity (Hi-Fi) prototype. From this sense, two concept workshops with lo-fi prototype and hi-fi prototype separately will be involved for the examination and evaluation of design.

The first workshop with lo-fi prototype

Since structural diagram of e-reader system will provide scenarios and sketches for constructions of physical prototypes (Leinonen et al., 2008), the first workshop with lo-fi prototype will stimulate prospective learning environment for users. The lo-fi prototype will be made by PowerPoint, which facilitates the interaction between users and prototype. With tangible artefact, users will be potential to be actively involved in interaction. The workshop will be divided in two stages. At first, I will observe user's using process to find out whether multimodal representation and gamified exercises could motivate users to engage in academic

reading and enhance their comprehension of reading texts. For instance, I will observe how they use multimodal scaffolds and how they use forum to enhance their comprehension and reading. After that, the interview with users will further enable me to work out above explorations. Users' comments and discussions will provide valuable resources for me to re-examine developed concept and reconstruct lo-fi prototype. In order to ensure elicit transcripts, the process will be video and audio recorded throughout. For data analysis, all collected information from workshop will be analyzed and evaluated by designer, educational experts and software developers as well. As Leinonen et al. (2008) remark, iterative reflection and experts' feedback of collected data will support the refinement of lo-fi prototype for achieving learning objectives, while software developers' suggestions based on the data will attach great importance for the production of users' prospected products.

The second workshop with hi-fi prototype

After iterative reconstruction process, prototype will become a more feature-rich application, named hi-fi prototype (Leinonen et al., 2008). Although it is still a prototype, hi-fi prototype will be looked and felt as final product, which can present complete functionality, define navigational scheme and allow fully interactive communications (Rogers, Sharp, & Preece, 2011). Despite it is argued that hi-fi prototype is time-consuming and expensive to develop, Rogers et al. (2011) address the meaning and significance of hi-fi prototype. That is, it will be useful for testing out technical issues and for selling ideas to people (Rogers et al., 2011).

In the second workshop, hi-fi prototype will be applied as artefact to facilitate the exploration of interface design and the practicability of e-reader. The purpose will be to examine the feasibility of e-reader., that is, to investigate how effective will e-reader be for target user's academic reading and learning. In this workshop, users' practical using experiences will be observed by designer, educational experts and software developers. They will take down appeared problems and technological issues during users' practical using process. After that, they will ask users questions based on notes taking to figure out the effectiveness of e-reader for the motivation of target users in academic reading and learning. Whilst, tailored interview questions will also help the investigation of the recognizable of the interface and the practicability of e-reader. Through this workshop, group of educational experts will aim to examine the refinement of learning environment and avoid pitfalls of designing resources (Facer & Williamson, 2004). Group of software developers will focus on the identification of technical issues (Rogers et al., 2011). As well, in order to keep the data for further investigation, workshop will be recorded by video and audio recordings.

6 Concept as Hypothesis

Both workshops described above will support the production of functional prototype, which has been tested with a number of stakeholders in different contexts with different methods. Feedbacks gathered from workshops and pervious research that prototypes have been tested will increase our understanding of context and lead to the modification of it. What is more, such information will also have implications on design process and the production of final product.

From time being, prototype will become the hypothetical version for technology developers to produce final product. As potential solutions for aforementioned design challenges, both pedagogic design and technological concerns will have been considerately evaluated and assessed. At the final stage, the usability regarding the reading effectiveness, reading time, perceptions of front legibility, front attractiveness and general preference (Bernard et al., 2002) will be tested among a large scale of participants. This test will benefit the reduction of development costs and the increasing of user efficiency and satisfaction (Wiklund, 2012). After usability testing, the concept will be the functional prototype software.

7 Critiques

Referring to the design of a technology-based educational tool, cost and time should be one of practical concerns for the production of efficient and productive products. For example, initial hypothesis of e-reader is a wristwatch e-reader, that is, an e-reader application affiliated on the watch with a separate virtual screen. But soon I changed my idea because of concerns regarding supported technologies and costs. On the one hand, the combination of wearable technology and virtual reality requires expensive and professional supported costs and span for long time, which are challengeable at present. On the other hand, what users need is not a professional technology tool, but an accessible educational scaffold. In a nutshell, cost and time are the important concerns when evaluating the usability of a design process.

From this sense, three iterative testing and trial processes, which are processes revolved around the workshop 1, workshop 2 and concept testing, also involve cost and time concerns. Every testing and trial circle requires professional supports from people and technology, which is indeed costly. Moreover, after each testing circle, collected data should be analysed and evaluated for the assessment and reconstruction of the concept, which is quite time-consuming. Accordingly, it seems that these processes are arduous. However, functional-rich concepts are generated from iterative processes and further constructional suggestions. Considering the quality of product, iterative processes are significant for the collection of meaningful data and the development and refinement of concept. Since the major aim of design process is to design a practical and efficient e-reader, these three iterative testing processes are essential for the production of final product.

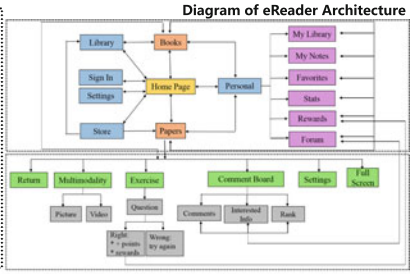
Appendix

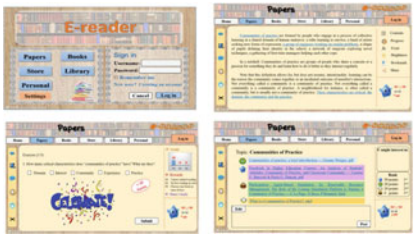
An eReader for academic reading and learning

Learning Brief

The main aim of designed e-reader is to scaffold the motivation and engagement in academic reading through electronic reading devices. Target users of design are students in university and college. They can use e-reader at any place in their convenient time. During reading process, students will use multimodal reading texts (video, picture and written text) to enhance their comprehension from different dimensions. After text reading, students will have an opportunity to enjoy reflective exercises with rewarded points and incentives. The reason for such design is to support their motivation and engagement. Forum is the place for students to evaluate their understanding and co-construct knowledge with their reading peers. Finally, by using graphic design of navigation, students will familiarize their reading techniques and improve their reading competence in the whole reading process. One principle I will stick to is that both cognition and social construction will be involved in academic reading process, the purpose of which is to offer users a real learning experience (Dillenbourg et al. 1999).

Diagram of eReader Architecture





Design

Design process:

- Concept clarification and validation→Concept development→Concept refinement(with 2 workshops)→Test and trial→Concept as hypothesis→Final Concept

Main menu of home page:

- Papers, Books, Library, Store, Personal

Features:

- Multimodal presentation of reading text
- Graphic navigation
- Gamified exercises
- Personal reading platform

- Accumulation of reading
- Management of materials
- Rewards
- Comments boards
- Notes taking and recording

13

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Identifying the Needs of Flexible and Technology Enhanced Learning in Vocational and Professional Education and Training's (VPET) Workplaces

Ricky Yuk-Kwan Ng, Rechell Yee-Shun Lam, Kwan Keung Ng and Ivan Ka Wai Lai

Abstract The appropriate technology enhanced pedagogical approaches ultilising mobile and flexible technologies would generate better learning and teaching experiences in workplaces. However, there is a lack of in-depth study of Vocational and Professional Education and Training's (VPET) students, teachers and workplace mentors' teaching needs. With an aim to identify suitable pedagogical practices to devise suitable e-learning means for more effective learning and teaching in VPET's workplaces, 26 interviews with students, teachers and workplace mentors were conducted to identify the support and training needs that may be required by students and teachers for the identification of specific instructional strategies to derive innovative pedagogical practices. Findings of this study revealed that due to the advances in technology, blending face-to-face teaching with e-learning or mobile learning is the current trend in VPET's learning and teaching to accommodate flexible learning, enhance motivation and interaction. It is also suggested that Technology Enhanced Learning (TEL) together with guidance, collaboration and training would able to accommodate VPET students, teachers and workplace mentors' learning and teaching needs. Implications are on the resources, timely technical support and updating of innovative pedagogies, training for teacher and mentor and the acceptances of the 'new' by the students, teachers and workplace mentors.

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1 Flexible and Technology Enhanced Learning (TEL) for Workplaces Learning

The Vocational and Professional Education and Training (VPET) stresses professional knowledge and values authentic practical experiences in workplaces (Avis, 2014; Bank, 2013; Harris & Simons, 2006). Prolong engagement in workplaces and guidance from workplace mentors on authentic tasks is the most common learning and teaching practices. A number of studies suggested that workplace practices would be able to deepen the levels of learners' engagement and collaboration so as to promote a coherent wholesome learning experience in workplaces (Hillier, 2009; Lee, Lam, Lui, & Pang, 2014; Mohamad, Heong, Kiong, & Rajuddin, 2012; Smith, 2003, 2006); it also provides "a fertile opportunity for learners to appropriate knowledge that connects theory to practice in a realistic and efficient way" (Brooker & Butler, 1997, p. 487). A mentoring approach has become an important part of VPET's curriculum. Nearly all of the trade-specific disciplines have integrated industry attachment (IA) into their programmes to enable students to apply their knowledge into real-life practices. The length of IA varies and resulted from a range of issues, such as the availability of workplaces for practices, the workload of workplace mentors, the design of module contents to complement the IA arrangements, the balance of the materials to be taught in schools and workplaces and the preparation of the students and mentors. To address the above issues, Ng and Lam (2015) and Ng and Leung (2014) proposed using mobile and flexible technologies to enable learning and teaching resources in the forms of video (Lecture Capture, Live Broadcasting, Wearable Technologies, Massive Open Online Courses (MOOC), Augmented Reality/Virtual Reality (AR/VR) and Instant Messaging (Social Media, Group Chat)) as complements and supplements learning and teaching strategies to facilitate self-paced learning and the enhancement of learning and teaching in workplaces. It is generally assuming that appropriate technology enhanced pedagogical approaches utilising mobile and flexible technologies would generate better learning and teaching experiences in workplaces (Errington 2001, 2004; John 2002, 2005; Lee et al., 2014; Liu, Han, & Li, 2010; Mullin 2013; Sangster, Maclaran, & Marshall, 2000; Smith 2003, 2006; Tsang, Yuen, & Cheung, 2014). In view of the above, this study aims to identify students, teachers and workplace mentors' needs and suitable e-learning means for more effective learning and teaching in VPET's workplaces. It is also expecting the findings would generate insight shed light on suitable pedagogical practices in workplaces.

2 Design and Methodology of This Study

Eight semi-structured focus group interviews with 53 students from four Vocational Education and Training (VET) institutions, one focus group with 20 teachers from one of the participating institutions, eight individual interviews with teachers from three of the participating institutions, and ten individual interviews with workplace mentors from four different industry sectors were conducted to diagnose the learning and teaching needs of students, teachers and workplace mentors. Open-ended questions were used for the above interviews and the answers were transcribed and analysed to identify learning and teaching needs and specific instructional strategies to derive innovative pedagogical practices.

3 Findings and Discussions

3.1 Semi-structured Focus Group Interviews with 53 Students

The focus groups comprised 53 students studying in Hotel, Hospitality, Tourism, Pharmaceutical Science, Nursery Education, Property Management and Design programmes. The interview questions covered the areas of learning practices and learning with technology, When asking their learning practices (for example, 'Do you like to study alone? Why?'), most of the students responded that they liked to study alone at home rather than in school. Nonetheless, they would like to study in groups with peers for idea exchange and information sharing. It indicated that students would like to study at their preferred places and not like to be bounded by locations, while being connected and interacted with friends and peers were important. In general, most of the students used personal computers and/or mobile phones for online information searching and communication with peers. Most of them regarded lecture notes as one of their most preferred learning tools because they could jot down important points during the lectures. A majority of the students liked visual images, videos, demonstrations, group discussions, interactive activities and tutorials in their lessons. On the contrary, students disliked long lectures without interactions, rigid teachers, fast teaching pace, unclear explanations and heavily loaded timetables. Their most frequently encountered difficulties in class were teachers' fast teaching pace, English vocabulary and jargons, classes involving theories, not being able to see and remember demonstrations as well as the understanding of lecture notes. They would seek help from peers face-to-face or via social media and going online for subject information (dictionaries and demonstration videos). They used computers and mobile phones to access Google, Wikipedia and other online resources to solve learning problems. Some of the students also considered that online information may not be accurate and they would use them as supplementary materials. Students generally liked teachers to

prepare notes, share real-life experiences, demonstrate procedures in a moderate pace and reinforce lessons with videos after classes.

Concerning students' views on learning with technology, the interview questions included: What kinds of support would you wish to have in your classroom lessons and industrial attachment? How can the different technologies be used effectively to help you learn in your classroom or in your revision? A majority of them believed that technology could enhance their learning. They would like to have videos, lecture capture system for timely review of lessons, augmented reality (AR) for simulation practices, online platforms for materials sharing and retrieval, mobile apps, massive open online course (MOOC) for flexible learning and social media for communication with peers. For accessibility, most of the students preferred using personal computers, mobile phones, tablets for online information but they also preferred printed copies for note taking and study.

3.2 Focus Group with 20 Teachers

The focus group comprised 20 teachers teaching Engineering, Design, Information Technology, Building Services, Language, Whole Personal Development, Culinary Arts and Automotive Technology programmes. Nine of them had received teacher training and held in-house training certificates, Postgraduate Diploma in Education or Bachelor of Education. Reflected from responses to the questions of teaching practices and the problems such as 'What problems do teachers generally encounter in teaching the modules or in the discussion of issues with students?', almost all the teachers stressed on classroom management problems, e.g. students are not attentive, unmotivated as well as passive. Teachers mentioned that they would use a range of student-centred approaches to conduct different learning and teaching activities, such as real-life examples, learning games, group discussions, questionings and different assessments to draw students' attentions. In addressing the issues of resources and supports for teachers to teach their modules, half of them said the resources were enough and sufficient while the other half mentioned that there was room to enhance the learning programmes (TLPs), online supplementary materials and subject-related information. Half of the teachers would also like to have training on special educational needs (SEN), pedagogical practices, presentation skills, instructional design, classroom management and technology enhanced learning. When asking if they made use of the Learning Management Platform (LMP) provided by their institutes, 15 teachers said they had been using the LMP for delivering course materials online. In addition to the Moodle platform, the most used technologies in their teaching were videos, PowerPoints and YouTube. They preferred using computers and mobile phones to access internet and online resources. Some of the teachers responded that they did not have time to prepare for the use of technology in teaching. Other teachers also commented that technology was unnecessary because of the specific nature of their courses. Some also said that they did not know which technology was available to be used. When asking the

pros and cons of using technology in teaching, most of them believed that technology would motivate students to learn more effectively, as it enabled easy information sharing and material updates, broadened students' visions with abundant resources, provided flexible learning, catered for diverse learning styles, offered better interactions and communication outside school and created multi-sensory attractions. Nevertheless, a few teachers worried about the copyright issues, and their views on using technology in teaching to enhance students' learning effectiveness were still in question.

In response to the questions on teaching with technology (for example, what kinds of support would you expect for industrial attachment for students?), teachers generally agreed that during students' IAs, technology enhanced learning such as interactive course content, lecture capture system, videos, online learning and teaching resources, assessments and discussion forums would help. Half of the teachers considered that social media, AR, virtual reality (VR), video capture system and MOOC would enable teaching effectiveness, while a majority of the teachers asserted that mobile apps would not improve teaching effectiveness. Similar to the views of students, when asking teachers' most preferable learning aids and technology, almost all the teachers chose printed copies as the first choice followed by personal computers and mobile phones. Teachers also suggested to the provision of related hardware (computers in every classroom, cameras, video capture system, projectors) and software (online platforms, learning and teaching resources, mobile apps) by the institutions to facilitate the use of technology and online resources in daily teaching.

3.3 Individual Interviews with Eight Teachers

The eight teachers participated in the individual interviews were from Building Services, Engineering, Culinary Arts, Hospitality and Pharmaceutical disciplines of three different intuitions. Seven of them had received learning and teaching training. In response to the problems and issues in teaching practices, most teachers commented that the students were inattentive, unmotivated and in lack of work experience. These teachers also mentioned that the English standard of some students was poor especially for those who graduated from Chinese secondary school and the student–teacher ratio was high. Because of the above, they adopted different means to motivate the students to learn more effectively, including questioning, group discussions, peer collaborations, role-plays, case studies, demonstrations, visuals, videos, real-life examples, guest speakers and visits. For the question: 'Are the teaching resources/support related to your industry/trade sufficient?' All teachers agreed that the teaching resources provided by their institutions were sufficient but there was room for further enhancement (e.g. TLPs, online references). For training, teachers preferred multimedia production, hardware and software and pedagogy. All teachers except an Engineering teacher used Moodle provided by institutions, but most of them only used the platform to upload and

download notes and teaching materials, and collect assignments. One of the teachers said that the Moodle platform was too slow and students did not like to log into it. They preferred using other online resources or apps for communication. The most commonly used technologies by the teachers were video clips, online resources, Internet, YouTube, Facebook, WhatsApp and other mobile apps. Teachers generally agreed that technology for learning would benefit students and enhance learning effectiveness because online resources provided not just subject materials, but also other related resources, as well as learning flexibility. They also agreed that using technology saved time on updating teaching materials, lessened administrative work, was good for data collection and thus released teachers' workloads. And they continued to express that technology for learning was good for timely review and communication especially when the students were in IAs. A few teachers concerned about the workload of students once imposed technology in learning. When asking what and how technologies could be used effectively to help out teaching, teachers replied that AR/VR would promote interactivities; video capture system could be for lecture reviews; social media could foster connections with students; and MOOC enhanced flexible learning. But one teacher said video capture system may indirectly encourage students to skip classes and teachers and students might not want to be caught on camera. Answers to the question about teachers' most preferred teaching aids revealed that printed copies, personal computers and mobile phones were most commonly used. On the suggestions of using technology and online resources, most of the teachers recommended online platforms and materials, videos, AR/VR and games. They also expressed that a good promotion on the use of technology in teaching was important for teachers and students as potential users.

3.4 Individual Interviews with Ten Workplace Mentors

The ten workplace mentors participated in the individual interviews were from medical, retail, hospitality and entertainment industries. Only two of the workplace mentors did not have formal learning and teaching training. The workplace mentors' work experiences ranged from 1 to 20 years and their roles were clinical supervisor, mentor, demonstrator, tutor, trainer and learning and development director. Responses to the questions on workplace mentoring practices showed that the most common problems the workplace mentors encountered in teaching trade-specific skills and workplace etiquette were the shortage of time for coaching, the readiness, the diverse backgrounds and proficiencies, and the lack of work experiences of the students. Most of the workplace mentors used guidance, coaching, observations, case studies, real-life examples, experience sharing, learning and teaching activities, self-evaluation, target setting and feedback as teaching methods to help students learn more effectively. Videos, case reviews, self-assessments and reflections, hands-on practices, demonstration of procedures and real-life projects were also used to facilitate students' learning in the

workplaces. Most of the workplace mentors had designed or used online resources, guidelines and notes, assessment and feedback forms and reflective logs. Over half of them agreed that the current resources were sufficient but they would like to have train the trainer, coaching skills and mentoring skills courses. Regarding the questions on using technology in mentoring, the workplace mentors in the hospital said they had been using e-learning materials for learning, assessments and evaluations. The workplace mentors in the retail sector did not use any technology in mentoring because of the job nature, while mentor in entertainment industry used internet to retrieve online resources for students for reference in mentoring. The workplace mentors in general asserted that technology was convenient for timely update of teaching materials, provided flexible learning without being bounded by locations, fostered communications via social media and was attractive to young generations. However, they commented that the drawbacks lied on the resources input for development, the unsuitability for hands-on practices and lack of personal care. Half of the workplace mentors believed that technology would benefit students and enhance the effectiveness of mentorship. When asking the questions on teaching with technology and students' supports in IAs, the workplace mentors expressed that interactive course, video capture, online viewing of lectures, instant messages for communications, online assessment and feedback sharing platforms between school instructors, workplace mentors and students were most needed. The workplace mentors in general contended that social media provided better communication and sharing of information; AR/VR served as a supplement to students' hands-on practices which enhanced their learning; video capture system allowed timely and clear review of lectures and demonstrations; MOOC enabled flexible and self-paced learning; and mobile apps were for convenience. The workplace mentors also agreed that the above when used appropriately would enhance mentoring effectiveness. When asking workplace mentors' most preferable learning aids and technology, it may be due to their industrial culture that they mostly chose printed copies as the first choice followed by personal computers and mobile phones. On the suggestions for the use of technology and online resources, most of the workplace mentors suggested that online platforms learning and teaching materials were most needed. Some workplace mentors also suggested the above should be sponsored and developed by the government bodies or recognised organisations, e.g. WHO, CINAHL, MEDLINE.

3.5 Summary of the Responses from the Interviews

A summary of the most salient responses from all the focus groups and individual interviews is mentioned in Table 1.

Table 1 Summary of the responses from the Interviews

Participants	Reponses to interview questions
Students	Like: • Students preferred flexible learning while at the same time maintaining peers communication • Students used personal computers and/or mobile phones for online information searching and communication with peers • Visual images, videos, demonstrations, group discussions, interactive activities, real-life experiences sharing and tutorials were preferred in lessons • Long lectures without interactions, rigid teachers, fast teaching pace, unclear explanations and heavily loaded timetables were unfavourable • Help sought from peers face-to-face or via social media, online searching for subject information, dictionaries and demonstration videos were popular • Students believed that technology could enhance their learning • They would like to have videos, lecture capture system for timely review of lessons, AR for simulation practices, online platforms for materials sharing and retrieval, mobile apps, MOOC for flexible learning and social media for communication with peers Unlike: • Their most frequently encountered difficulties in class were teachers' fast teaching pace, English vocabulary and jargons, classes involving theories, not being able to see and remember demonstrations as well as the understanding of lecture notes
Teachers	Like: • Teachers preferred using computers and mobile phones to access internet and online resources • Most teachers believed that technology would motivate students to learn more effectively, as it enabled easy information sharing and material updates, broadened students' visions with abundant resources, provided flexible learning, catered for diverse learning styles, offered better interactions and communication outside schools and created multi-sensory attractions • Using technology saved time on updating teaching materials, lessened administrative work, was good for data collection and thus released teachers' workloads • The most commonly used technology for the teachers were PowerPoints, video clips, online resources, internet, YouTube, Facebook, WhatsApp and other mobile apps • Teachers agreed that during students' IAs, technology enhanced learning, such as interactive course contents, lecture capture system, videos, online learning and teaching resources and assessments, and discussion forums would help • Teachers considered that social media, AR/VR, video capture system and MOOC would enable teaching effectiveness • Student-centred approaches were used to conduct different learning and teaching activities such as real-life examples, learning games, group discussions, questionings and different assessments to draw students' attentions

(continued)

Table 1 (continued)

Participants	Reponses to interview questions
	Unlike: • Some said the current resources were enough and sufficient while the other mentioned that there was room to enhance the TLPs, online supplementary materials and subjects related information • Teachers would like to have training on instructional design, classroom management and TEL
Workplace mentors	Like: • Guidance, coaching, observations, case studies, real-life examples, experience sharing, learning and teaching activities, self-evaluation, target setting and feedback were used to help students learn more effectively • Videos, case reviews, self-assessments and reflections, hands-on practices, demonstration of procedures and real-life projects were also being used to facilitate students' learning in the workplaces • Half of the workplace mentors agreed that the current resources were sufficient • The workplace mentors in general asserted that technology was convenient for timely update of teaching materials, provided flexible learning without being bounded by locations, fostered communications via social media and was attractive to young generations • Half of the workplace mentors believed that technology would benefit students and enhance the effectiveness of mentorship • Interactive course, video capture, online viewing of lectures, instant messages for communications, online assessment and feedback sharing platforms between school instructors, workplace mentors and students were most needed • Online platform learning and teaching materials were most needed and the workplace mentors suggested the above should be sponsored and developed by the government bodies or recognised organisations • They would like to have train the trainer, coaching skills and mentoring skills courses Unlike: • The most common problems the workplace mentors encountered in teaching trade-specific skills and workplace etiquette were the shortage of time for coaching, the readiness, the diverse backgrounds and proficiencies and the lack of work experiences of the students • The drawbacks lied on the resources input for development, the unsuitability for hands-on practices and the lack of personal care

4 Implications and Conclusion

With an aim to identify suitable pedagogical practices and e-learning means by studying VPET's students, teachers and workplace mentors' teaching needs in VPET's workplaces for more effective learning and teaching in VPET, this study used individual interviews and focus groups interviews with a range of VPET stakeholders to collect views for comparison and analysis. With the advancement in technology, it is identified that the current trend in learning and teaching is blending face-to-face teaching with e-learning or mobile learning (Lecture Capture, Live

Broadcasting, Wearable Technologies, MOOC), AR/VR and Instant Messaging (Social Media, Group Chat). Workplace mentors generally regarded that technology would benefit students and enhance the effectiveness of mentorship. Findings also suggested that mobile and flexible TEL would be the appropriate innovative pedagogical practices that would benefit workplace learning and teaching. The result of this study also revealed that flexibility, guidance, collaboration and training would able to accommodate VPET students, teachers and workplace mentors' learning and teaching needs. Implications of this study suggest further examination on instructional design of specific trade-specific learning and teaching materials so as to utilise the suggested mobile and flexible technologies. The well preparation of students, teachers and workplace mentors for the blended mode of learning and teaching using technologies is another hurdle to be solved. Other noteworthy points are the resources and support from training institutions and professional organisations, the feasibility of using mobile and flexible technologies to complement and supplement hands-on practices in authentic workplaces. In sum, this study concludes that TEL would be the most appropriate pedagogical approaches to enhance learning and teaching experiences in workplaces.

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Understanding Factors Influencing English Teachers in Chinese Universities to Teach with Technology: A Case Study

Fang Huang, Timothy Teo and Mingming Zhou

Abstract This article explores factors that influence university English teachers' technology use in China by conducting semi-structured in-depth interviews. The findings revealed that English teachers generally hold positive attitudes toward technology use in teaching. Facilitating conditions, technology usefulness, and social influences are major factors influencing their technology uptake. This research deepens people's understanding of technology use in education through analyzing contextual and cultural phenomenon in China. Suggestions are provided for educational administrators to improve the quality of continued professional development and effectively promote technology integration among teachers.

Keywords Technology acceptance · English teachers · China

1 Introduction

Information communications technology (ICT) has brought dramatic changes to education, affected paradigm shift (Wong, Teo, & Russo, 2012), and made learning meaningful (Baydas & Goktas, 2016). The teaching effectiveness brought by technology use was reported in diverse subjects, including science education (McFarlane and Sakellariou 2002) and reading (Carrasco & Torrecilla, 2012). Teo (2011) summarized technology integration in teaching not only increased students' learning motivation, but also motivated teachers to develop new teaching strategies

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and enrich teaching materials. In English teaching, ICT provided an authentic language teaching environment (Wang & Coleman, 2009) and promoted communicative language teaching and learning activities (Golonka, Bowles, Frank, Richardson, & Freynik, 2014; Zou, 2013). The use of ICT also helped increase students' learning autonomy (Wang & Coleman, 2009) and problem-solving skills (Tsai 2013).

In China, the use of ICT as a teaching and learning tool has been acclaimed as a catalyst for educational transformation (Yang, 2012). Although there are top-down policies promoting technology integration in English teaching (e.g., CECR, 2007), teachers had lackluster responses toward using ICT or used them at a low level (Li & Walsh, 2011); technologies were not employed in an innovative way (Li, 2014). Such phenomenon was observed at all levels of education (Gao, 2012; Li & Walsh, 2011). Existing technology acceptance studies with Chinese English teacher samples mostly focused on teachers at k-12 or secondary school level (Li 2014), and very few studies reported teachers' technology use at university level (see Hu & McGrath, 2011 as an exception). Considering the visible mismatch between policy requirements and English teachers' reluctance to use ICT and the high-access–low-use paradox (Li & Ni, 2011), this study aimed to unpack factors that influence university EFL teachers' technology acceptance. In Chinese universities, English teacher–student ratio is nearly 1:200, which makes interaction between students and teacher difficult and insufficient, and in the long run, students' English learning is characterized as 'deaf and dumb English' in China (Liu & Dai, 2003, p. 8). In globalized society, the effective communication using English is important, and importance of improving students' intercultural competence are widely recognized (Wang & Coleman, 2009) and specified as teaching objectives in the College English Curriculum Requirement (CECR, 2007). The policy also specified the necessity of technology use and promoted technology integrated teaching mode. While policy requirement does not guarantee successful technology integration, instead, it is the teacher who decides whether to use technology in the teaching practice, and besides, there is a lack of internationally published research informing Chinese university teachers' understanding of technology integration (Sang, Valcke, van Braak, Tondeur, & Zhu, 2011); there is a need to conduct a holistic and in-depth investigation to encompass personal, pedagogical, and organizational factors that influence the integration of technology (Tondeur, Van Keer, van Braak, & Valcke, 2008), and the further inquiry in the context of Chinese EFL teaching.

In this study, we aimed to explore English teachers' understandings of using ICT in China. Research questions are as follows: what are English teachers' attitudes toward technology use in China? What factors influenced their technology uptake? The findings contributed to technology acceptance theories by unpacking factors that influenced English teachers' technology use in Asian cultures. It also contributed to practice by providing enlightening evidences and suggestions for policy-makers and administrators to improve continued professional development.

2 Literature Review

2.1 Technology Acceptance Model (TAM)

Rooted on the theory of reasoned action (Fishbein & Ajzen, 1975), the technology acceptance model (Davis, Bagozzi, & Warshaw, 1989) is among the first models to include psychological factors to predict users' technology acceptance, and is widely used in educational field. Its capability in explaining user behavior has been empirically witnessed across a broad range of end user computing technologies and user populations in education (Teo, 2009a, b). The theoretical framework for this research draws from TAM with the goal of detecting factors that influence EFL teachers' acceptance of technology. According to TAM, the perceived usefulness and perceived ease of use are the most important determinants for end users' computer usage behavior. Perceived usefulness refers to the degree to which a person believes technology will help him or her to perform a certain task in an efficient and productive manner. In contrast, perceived ease of use has to do with the extent to which a person perceives that the use of technology will be relatively free of effort. People's technology use is determined by behavioral intention, which is influenced by users' attitude toward technology usage, as well as the direct and indirect effects of perceived usefulness and perceived ease of use. Perceived usefulness and perceived ease of use jointly affect attitude.

Although TAM has been recognized as useful in predicting teachers' technology usage intention in education (Yuen & Ma, 2008), teachers' decision-making of technology use is influenced by specific usage-context feature (Dishaw and Strong 1999) and culture (Dong, 2009). Chinese culture is significantly different from the west (Hofstede, 1980) where TAM was originated and widely researched, it is natural to believe contextual and cultural difference might impact teachers' technology acceptance. Although ample quantitative studies indicate factors that influence users' successful technology integration, puzzling aspects still remain (Tondeur, Kershaw, Vanderlinde, & van Braak, 2013). Chinese EFL teachers' decision-making in technology adoption is even more complicated than TAM suggested (Li, 2014). For example, in qualitative studies among EFL teachers in China, Li (2014) reported besides technical supports and access to technology resources. EFL teachers also concerned about the availability of time for teachers to prepare for teaching courseware with technology, and this was not suggested in previous quantitative studies. In addition, Chinese EFL teachers' beliefs in computer self-efficacy and social norms are not internationally reported yet in quantitative studies (Li, 2014). It is insufficient to understand technology integration solely based on quantitative studies which often focus on factors and effect sizes (Tondeur et al., 2013).

3 Method

3.1 Participants

In this study, fourteen teachers were selected for several considerations. First, half of participating teachers came from developed areas (e.g., Shandong, Anhui, Fujian, and Yunnan) and the other half were from developing areas in China (e.g., Heilongjiang and Xinjiang). Second, the participating teachers vary in gender, age, professional rank, and technology use experience. Finally, half of the teachers are currently working in key universities (universities of "211 project" and "985 project") in China and the other half working in non-key universities. With government support, key universities have priorities in funding support and technology equipment installation, and these may influence teachers understanding of technology-related pedagogy (Zhu, 2015). Table 1 illustrated detailed information of the participants and pseudonyms are used to ensure their confidentiality.

3.2 Data Collection and Analysis

A case study approach was adopted in this study to explore EFL teachers' technology acceptance in Chinese universities. Semi-structured in-depth interviews

Table 1 Demographic characteristics of participates

Teacher	Gender	Age	Professional title	CALL experience (year)	University type	Province
Ding	Female	20–30	Assistant Lecturer	1	Key	Anhui
Chang	Female	50–60	Professor	10	Key	Shandong
Cui	Male	50–60	Professor	10	Key	Shandong
Shi	Male	40–50	Professor	13	Key	Heilongjiang
Bu	Male	30–40	Associate professor	13	Key	Heilongjiang
Sun	Female	20–30	Lecturer	5	Key	Fujian
Liu	Male	30–40	Associate professor	10	Key	Shandong
Wang	Female	20–30	Lecturer	8	Non-key	Yunnan
Wang	Female	50–60	Professor	14	Non-key	Shandong
Xu	Female	30–40	Lecturer	14	Non-key	Shandong
Xia	Female	30–40	Lecturer	12	Non-key	Shandong
Lu	Male	40–50	Associate professor	5	Non-key	Shandong
Dong	Female	30–40	Lecturer	12	Non-key	Shandong
Zhang	Female	20–30	Lecturer	10	Non-key	Xinjiang

were conducted individually to gain further understanding of factors that influence EFL teachers' technology acceptance. Each participant was interviewed following a protocol. The specific questions were thought about well in advance and prepared with several revisions through discussing with scholarly experts both in technology acceptance research field and qualitative research methodology. The interview focused on the following questions: (a) university type; (b) teaching experience using technology; (c) views on the roles technology play in teaching English; (d) factors influence their use of technology and specific examples; (e) perceived barriers or concerns of using technology in teaching; (f) perceived the importance of related English language teaching policy and university-based policies; and (g) understanding of the constructivist teaching theory and practice. Each interview varied in length from 30 to 40 min and was conducted in Chinese to avoid language difficulty and misunderstanding. Often additional questions were asked to clarify or to explore unique experiences of the interviewees. Informed consents were obtained from participants to record the interview for content analysis. Face-to-face and online interviews using WeChat were conducted because interviewees are different provinces in China. All interviews were finished in 3 months. Explanations of the research purposes and procedures were fully distributed. It is worth noting that the researcher's prior working experience as an English teacher in a university had helped to gain the trust and cooperation of the participants, and importantly, their empathy and shared understanding in the pursuit of the research goals.

In analyzing interview recordings, the data were processed carefully through transcription, coding, data clustering, theme generation, and conclusions. First, the data were fully transcribed in Chinese and were sent back to teachers to check for accuracy against the original recordings. Then the authors read the transcriptions for many times to establish appropriate codes. Initial themes were then refined by grouping into sub-themes (e.g., technology usefulness in attracting students' attention, compliance to policy, resources) and removing overlapping ones, until a saturated list of main themes that represented the common ideas of participants' responses were captured. Finally, the analysis and interpretations were compared with interview guidelines and research questions to draw conclusions.

4 Findings

4.1 Modernization in Facilitating Condition: Sufficiency in Equipment Access Versus Difference in Availability of Technical Support

With the pervasiveness of technology equipment in Chinese universities, equipment access is sufficient for teachers and it is an important driving factor that influences teachers' attitudes toward using technology. Creating electronic work using computers such as PowerPoints, Flash links, and webpage links is reported as frequent teaching activities in their classes (e.g., from Ding, Dong, Zhang, Sun, and Lu).

> The classroom equipment in my university is very good. I can see many funding were used to install new equipment. University leaders are very proud if the hardware and software facilities arrive at a certain high level (from Lu).
>
> Our university is a non-key university, nearly every classroom is equipped with computers and projectors, not to say key universities (from Wang).

Modernization is stepping into Chinese universities and brings about innovations in pedagogy and teachers' beliefs. Due to the recognized benefits technologies bring to education, schools at all levels have been committed to improving technological infrastructure, especially computers and the Internet installations. Pervasive technology equipment in campuses provides a precondition for both teachers and students to adopt technologies in teaching and learning. However, Taylor and Todd (1995) suggested facilitating condition does not only elaborate the hardware equipment but also include availability of technical support in the environment that encourages and facilitates technology adoption. In school setting, physically installed equipment, available materials and resources, along with technical and administrative supports from schools make joint efforts in enhancing users' technology behavioral intention (Groves & Zemel, 2000). The interview data did not suggest a consensus in terms of technical support availability, but teachers suggested key universities are better in technical supports than non-key universities. For teachers from non-key universities, specialized technical supports are rarely available when they are needed, and this influences teachers' decision-making in technology adoption. Comparatively, informants from key universities reached a consensus that there are specialized technical staffs that they can resort to. They can get timely help when they are needed (e.g., from Sun, Cui, and Chang).

> Each time I met with technical problems I am actually very nervous, and I fell embarrassed. I wish I could ask for help from someone who helps deal with technical problems (from Dong, a teacher in a non-key university).
>
> There is a technician in each teaching building in my university. I can call him if I cannot start the computer or projector, and he will come to the classroom very quickly to solve technical problems (from Chang, a teacher from a key university).

The interview data suggested facilitating conditions including technology equipment and technical supports influence teachers' attitudes toward computer use, which are consistent with previous research findings (Ngai, Poon, & Chan, 2007; Teo, 2008, 2009a, b).

4.2 Technology Usefulness

In accordance with TAM suggested, the fourteen informants consented about the primary importance of perceived technology usefulness in their decision-making process. Teachers' understandings of technology usefulness are summarized and analyzed combing with contextual and Chinese culture.

4.2.1 Usefulness in Attracting Students' Attention for Communication

The most striking effectiveness that drives teachers' technology use is that technology is especially useful to help attract students' attention, motivate their engagement, and enhance listening and speaking practices.

> University students are usually not attentive in class. Audio and video clips are very helpful to attract their attention and at least make them lift their heavy heads to look at you (from Ding).
>
> My students do not like to answer questions in class. I inserted a small race-to-be-the first program in my PPT slides. Whenever I want them to answer questions, I used it. Students are motivated to answer questions because they think it is interesting (from Sun).

The perceived usefulness of technology integration is very much reflected in its ability to attract students' attention and make them be attentive in class. Unexpectedly, teaching effectiveness and pedagogical innovation are far beyond teachers' concerns. "Lifting their heads" is a preliminary step for communicative teaching.

4.2.2 Usefulness in Providing Authentic English Language Input and Enriching Materials in Chinese EFL Class

In China, mandarin is the only mother tongue for both teachers and students; therefore, the lack of authentic English teaching and learning environment is a severe weakness. All my interviewees consented that technologies are very advantageous in providing authentic input and rich teaching materials.

> Technology provides authentic English language and cultural materials, they greatly broadens students' vision and knowledge (from Wang).
>
> I need to confirm the appropriateness of some English expression or phrases when I give answers to students. In many cases, I need a computer to search for meaning (from Dong).

Technology adoption is especially meaningful in countries or regions where English is not people's mother tongue. Although university EFL teachers in China usually had good English training, they are still not as proficient as native English speakers in terms of language use.

4.2.3 Usefulness Reflected in Time Perception: From Time-Consuming to Time-Saving

The third sub-theme about usefulness is indicated in time perception. China is known for its big population, and the class size in Chinese university is also big, specifically each class usually has 60 students (Hu, 2002). University teachers spend a great number of times in grading students' assignments and correcting errors, and preparation before class is usually time-consuming. Therefore, when

they make teaching-related decisions time is one of the major concerns (Li and Ni 2011).

> I usually search online, copy and paste important contents into my PowerPoint slides. In the first round of teaching, it takes time to select materials from massive resources, but after that, I can use the slides I prepared repeatedly for future teaching and it saves a lot of time (from Ding).

The time perception shows a dynamic feature in the continuum. Although teachers feel preparation using technologies is very laborious but fruitful because of massive recourses they can resort to, technology also offers them long-term benefits. In this sense, technology is useful and such perceptions flow from time-consuming to time-saving.

4.3 Social Influence

A person's thoughts, views, and behaviors are inevitably influenced by group members, especially those who are important to him or her. Fishbein and Ajzen (1975) defied this as subjective norm, it means "a person's perception that most people who are important to him think he or she should or should not perform the behavior in question" (p: 302). All my informants responded positively about influence form others and provided details about how they influenced teachers' decision-making.

> I was informed a lot about technology use in the regular faculty meeting … Also, faculty leaders asks teachers to use teaching platform and even checks teachers' platform use. But the good thing is if your page got the highest click rate, he appraises you in the meeting and set you as a good model (from Zhang).

Besides influence from leaders, teachers' technology uses make them be regarded as fashionable, instead of being "out of date" by students, according to Ding. Positive comments can spread among students, peers or leaders, and the teachers' names can be well recognized. In addition, according to the interview data, leaders encourage a teacher who uses technology in a good way to take part in teaching competition, and this often bring him or her a title of "jiaoxue mingshi" (distinguished teacher) and sometimes money as a reward. The title is valuable to university teachers for future professional promotion. Therefore, external pressure is reasonably changed to teachers' internal initiatives.

> In my university, if you get the title of "jiaoxue mingshi", you have higher chances to be promoted. One university level award equals to one research paper published in the Chinese core journal (From Ding).

According to the interview data, technology use is considered as a necessity to be competitive in teaching competition, and the success of teaching competition is a bonus for teachers' professional promotion. Therefore, it is interesting that the external pressure resulted from leaders' emphasizing technology use gradually enables teachers to take initiatives to use technology in teaching.

5 Discussion and Limitation

This study examined Chinese university EFL teachers' understanding of technology integration in English teaching and factors influence their technology use. The interview data generated three themes regarding EFL teachers' perceptions of factors influence their technology adoption. They are facilitating condition, perceived usefulness, and social influence. The increasing funding support from Chinese government and the promotion of educational reform (Hu & McGrath, 2011) enables the possibilities of massive equipment in Chinese universities, and the influence of it is in line with technology acceptance theories that specify facilitating condition as one of important variables influencing teachers' attitudes toward technology use (Teo, 2009a, b). However, the lack of technical support is reported in non-key universities and this concern leads to teachers' conservativeness of accepting technology. Perceived usefulness is the major driven factor for EFL teachers' technology adoption. Usefulness in attracting students' attention, which suggested by Schmid (2007) is regarded as a precondition for communication between teachers and students, and usefulness in providing authentic input, which is in accordance with results from a meta-analysis (Golonka et al., 2014), are especially meaningful in English teaching in China; another typical usefulness is suggested in teachers' perception of time. In literature, time was previously reported as a restriction for university teachers to practice innovative teaching (Zhu et al., 2010). Courseware preparation using technologies is very time-consuming, but once they finished the first round of teaching, the time-consuming process will be changed into the time-saving activity, constituting a time continuum, because they can use the courseware for years with minor revision, based on the condition that textbook remains the same for a long period of time. Another factor is social influence, which plays an important role in teachers' decision-making in technology adoption. This is also in line with previous research findings (Venkatesh & Bala, 2008), and reflected sociocultural contexts are important in affecting teachers' use of technology (Li, 2014). It is interesting that gradually perceived external pressure is changed from to internal initiatives.

This study is limited in scale considering the geographical diversity in China. The themes generated may only include common influential factors and some specific contextual factors may not be mentioned by informants in this study. Further researches are needed to gain deeper insights into English teachers' technology use and factors influencing their intentions by involving not only teachers from different universities, but also administrative staff and leaders given that they may have different perceptions of technology-related policies and the need for technology implementation.

6 Conclusion

Technology integration in English teaching helps develop students' communicative competence when it is applied in student-centered, communicative competence enhancement teaching atmosphere (Yang & Chen, 2007; Wang & Coleman, 2009). Although Chinese government issues funding and policies to promote technology use, teachers' technology integration is still a problem. Origin from IS field in western countries, technology acceptance theories are not necessarily holding across cultures (Srite, 2006), and when they are applied in non-western and developing countries, the accountability may be questioned. Given that the way educational users respond to technology for teaching and learning purpose differ from general technology users, and teachers' decision-making is more complicated than what the TAM suggested (Li, 2014), this study enriches understanding of technology acceptance theories by identifying and interpreting factors influence university EFL teachers' technology use in the Chinese context. The findings are interpreted by combining with Chinese culture. English teachers view technology integration in teaching is a trend of modernization and fits their teaching task. The findings are mostly in accordance with technology acceptance theories, although uniqueness is founded based on understanding of Chinese context. For example, sub-themes of the perceived usefulness together explain why perceived usefulness is a major driving factor among Chinese English teachers. Besides contribution to the technology acceptance theory, this study provides suggestions for policy-makers and administrators by unpacking the urgent need to provide opportunities for teachers to improve their technology skills and pedagogical understandings using technologies. Universities are suggested to pay more attention to provide technical support for teachers, and in so doing, worries reported by EFL teachers will largely be eliminated. Continuing professional development (CPD) for the purpose of equipping teachers with pedagogical knowledge is urgently needed to facilitate teachers' understanding of pedagogical and content knowledge, and how to implement it in teaching practice.

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Emotional Multimedia Design for Developing Mathematical Problem-Solving Skills

Ka Ho Ng and Thomas K.F. Chiu

Abstract This experimental study aims to investigate the effects of incorporating an emotional design into multimedia materials on problem-solving skills, and attention and motivation levels in primary mathematics. We divided 60 primary school students into control and experimental groups. In the experimental group, the face-like shape and "happy" color were used in the emotional design. We used pre- and postests to measure score gains, a post-questionnaire measure attention and motivation levels. The results of this study showed that the experimental group performed significantly better than the control group on problem-solving skill. The results also showed that students learning with the emotional design had higher attention and motivation levels. Further discussion suggests that, if positive emotional designs were applied, students felt happier and more hopeful during multimedia learning. We suggest teachers should use face-like shape approach to teach geometry to make the content knowledge more interesting and positive. We also suggest teacher could present happy images in the beginning of mathematics classroom for attracting student attention.

Keywords Multimedia learning · Emotional design · Mathematics · Problem-solving skill

1 Introduction

Problem solving is one of essential skills in our daily life (Jonassen, 2000). Students with good problem-solving skills are also easier to develop their metacognition in learning since they have to apply their knowledge to solve complex problems

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(Lambdin, 2003). Multimedia learning is one of the effective learning environments (Mayer, 2009) in mathematics education (Chiu, 2014, 2016b; Chiu & Churchill, 2015b, c). Students in the environments better develop their remembering and understanding skills. Literature showed that incorporating positive emotional design into multimedia learning better facilitates student learning (Mayer & Estrella, 2014; Plass, Heidig, Hayward, Homer, & Um, 2014; Um, Plass, Hayward, & Homer 2012). It is necessary to understand how the positive design affect learning (Mayer & Estrella, 2014; Plass et al., 2014; Um et al., 2012). Very little experimental studies examined the effects of emotional multimedia design on development of mathematical higher order thinking skill. Accordingly, this study aims to investigate whether an additional emotional design can facilitate problem-solving skills, and increase attention and motivation levels in primary mathematics.

2 Literature Review

2.1 Multimedia Learning and Emotional Design

Students learn better from multimedia—images and words—materials (Mayer, 2009). Words also can draw students' attention with language; images contain more information (Mayer, 2005). Therefore, students can get more information from both images and words, which is supported by the cognitive theory of multimedia learning. The theory advocates that our brain has two channels—audio and visual. It also suggests that there are three types of cognitive processing—extraneous, essential, and generative. They better remember and understand the knowledge and concept presented by the materials (Mayer, 2005, 2009). However, incorporating emotional designs in multimedia learning may be more effective. More studies needed to be done to further understand the role of emotional designs in multimedia learning (Mayer & Estrella, 2014).

Besides of the above, personalization is also essential for learning and teaching in multimedia materials (Moreno & Mayer, 2000; Kartal, 2010). The personalization is related to student emotion. Customizing the learning materials for individuals is more beneficial; one does not fit all (Moreno & Mayer, 2000). Kartal (2010) found that students learned with personalized multimedia materials for language, such as Turkish and Kurdish, were more effective than students learned with the same material. He also suggested that the students in the personalized group had higher level of motivation. Many studies have been conducted to see how to use emotional design to personalized the materials (Moreno & Mayer, 2000; Kartal 2010).

In multimedia learning environments, students who hold positive emotion learned better (Um et al., 2012). There are two factors that related to the emotion of students: external mood induction and emotional design induction (Um et al.,

2012). External mood induction is more in the field of psychology which is not the focus of this study. Emotional design induction concerns the intervention of teachers. Visual elements in emotional design in the intervention of teachers include color, shape, and emotional pictures that affect students' learning performance (Plass et al., 2014). Furthermore, Shavelson and Towne (2002) conducted experiments on using various instructional materials in various academic levels, such as college students and university students. Um et al. (2012) also integrated emotional design into multimedia teaching comprehension materials in college. The studies both suggested the treatment group—including emotional design performed better than without in multimedia learning. According to the cognitive theory of multimedia, the short-term memory can be enhanced by drawing students' attention (Mayer, 2009). Emotional pictures that are more likely to draw students' attention would help student remember the concept and knowledge longer (Mayer, 2009).

Core affect model is also a theoretical study supporting emotional design (Russell, 2003). In the model, the appearance of graph affects student learning. Plass et al. (2014) suggested that color and "face-like shapes" were the important components of emotional design. In their study, they found that the tone of color, such as warm colors and neutral colors, with integration of "face-like shapes" appearing in the design of image in teaching and learning materials can affect the nature of emotion. The studies of Pekrun and Jerusalem (1996) and Pekrun (2006) also showed similar results. Pekrun (2006) study showed that students were encouraged by positive emotional design while they became angry and anxious from negative design. Therefore, emotional designs can affect student learning in multimedia environments.

2.2 Mathematics and Multimedia Learning

In mathematics, there are two types of skills: the skill to follow or repeat solutions and steps with understanding (know-how); and the skill to connect mathematical concepts and their relationship with each other (Chiu & Churchill, 2015a, b; Tessmer, Wilson, & Driscoll, 1990). The first skill that concerns condition-action rules typically requires less conceptual understanding and deep thinking and is often procedural in nature while the other that concerns cognitive learning—connections and relations (Anderson, 1983; Tessmer et al., 1990). The learning from the second skill is relational, dynamic, and transferable in nature (Anderson, 1983; Tessmer et al., 1990). Different order thinking skills require different types of cognitive processes. A higher order thinking skill requires a more complete and complicated understanding (Berger & Törner, 2002; Chiu & Churchill, 2015a, b).

The revised Bloom's Taxonomy suggests six orders of thinking skill—remembering, understanding, applying, analyzing, evaluating, and creating (Anderson et al., 2001). Remembering is a skill to remember and recall relevant knowledge from long-term memory. Understanding is a skill to develop their knowledge by way of classifying, summarizing, and comparing; applying is a skill to implement

procedures; analyzing is a skill to determine how parts relate to each another and to an overall domain; evaluating is a skill to make comments and to reason their decisions; and creating is a skill to develop or understand a new pattern.

The studies of Chiu and Churchill (2015a, b) investigated how different multimedia designs affect student mathematics learning. In their studies, the multimedia materials were designed using principals of multimedia learning suggested by Mayer. They suggested incorporating subject-specific designs into multimedia materials can result in better learning. The students in their studies learned better in remembering, understanding, and analyzing when the multimedia materials comprising a subject-specific instructional design. The studies also suggest exploring some other design aspects for the multimedia learning, such as emotional design.

3 The Present Study

This present study aims to examine the effects of an additional emotional design on enhancing problem-solving skills, and intention and motivation levels in multimedia learning at primary mathematics. We have two research questions as follows.

1. Do primary school students have gained in developing problem-solving skills using multimedia material with emotional design?
2. Does the emotional design increase attention and motivation levels during student learning?

The studies of Mayer and Estrella (2014), Plass et al. (2014), Schneider et al. (2016) suggested that positive emotional designs can increase motivation level and facilitate learning. We expected that the emotional design group will significantly (H1) better develop problem-solving skills, and (H2) have higher attention and motivation levels. In this paper, we also used the findings to suggest effective classroom teaching and learning for mathematics.

3.1 Research Design and Participants

The study adopted an experimental design. The intervention was an emotional design. We used pre- and posttest and post-questionnaire to collect data to answer our research questions.

Seventy primary 1 students, aged from 5 to 8, in a Hong Kong government subsidy school agreed to be the participants of this study. Ten of them were absent on the day of experiment. Only 60 of the students completed the experiment. We also invited 2 teachers to participate this study. We divided them in two groups—29 in the control group and 31 in the experimental group. The control group learned a multimedia material, while the experimental group learned with material comprising an emotional design.

3.2 Materials

This study included two multimedia learning materials, pre- and posttests and post-questionnaire.

The multimedia learning materials were videos. Figures 1 and 2 show the screenshots of the videos in the control and experiential groups, respectively. The additional emotional design is color of the elements and face-like shapes (Plass et al., 2014). In the control group, the videos were colored in gray scales. The shape used was either circle or rectangle, see Fig. 1. In the experimental group, we redesigned the graphics in the videos, face-like shapes were used, and colors were "happier" and warmer, see Fig. 2.

In the pre- and posttest, the questions assessed problem-solving skills. The questions had three levels—fundamental level (Level 1), normal level (Level 2), and challenging question (Level 3), see Appendix. The full mark was 8.

In the experiment, the post-questionnaire used a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). There were four questions. The first two questions concerned emotional design were "*The color using in the clip draws your attention.*" and "*The cartoon using in the clip draws your attention.*" Another two questions assessing motivational level were "*I like to have more lessons like this*." and "*I enjoyed learning in this lesson.*"

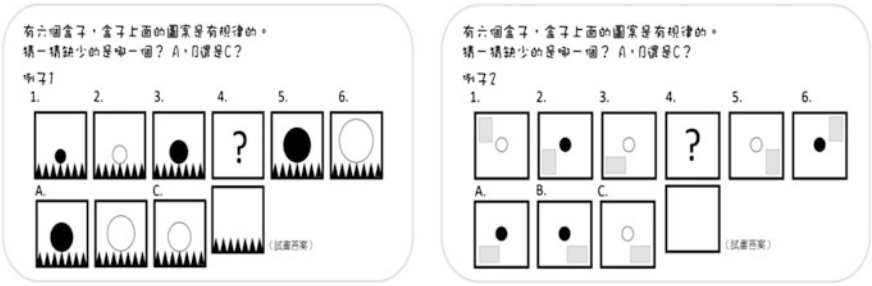


Fig. 1 The screenshots of the videos in the control group

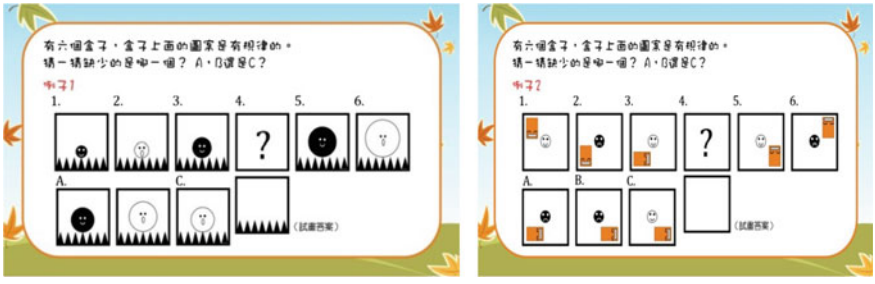


Fig. 2 The screenshots of the videos in the experimental group

3.3 Procedure

We conducted this study in the schools where the students studied. We got the consent from principal, parents, teachers, and students. We randomly divide the participants into two groups. The students finished the 10-min pretest before the experiment in their classrooms. We conducted the experiments in the computer rooms followed by the 10-min posttest and 5-min questionnaire.

In the experiment, the students sat in the assigned seats. We first talked about the purpose of the study and described the instructions of the experiments. Students followed instructions to learn by watching the videos and doing exercises. There were three pieces of videos. In the experiment, before watching the video, the students were asked to predict answer and draw the possible pictures followed by watching a video. There were 2 min break in between the videos. The learning period is approximately 45 min. After learning, the participants finished the posttest and questionnaire.

4 Results

The data collected from the pre- and posttests reflect the changes in problem-solving skill after learning the multimedia materials. We used ANOVAs to measure the score differences between before and after the experiment. The data collected from the questionnaire measure student attention and motivation levels.

The analyses showed that the additional emotional design significantly improved the two groups' problem solving. The analyses also showed only the emotional design group significantly had higher attention and motivational levels than the control group during learning. Table 1 shows descriptive statistics of the two groups.

To examine hypothesis 1, one-way ANOVAs on score gain was used. In the emotional design group, the analyses showed that experimental group significantly improved more than the control group for problem-solving skill, $F(1, 59) = 84.20$, $p < 0.001$.

To examine hypothesis 2, one-way ANOVAs on the post-questionnaire score were used. The analyses showed that there was a significant difference in attention

Table 1 Descriptive statistics of the two teacher groups

		Experimental group (n = 31)		Control group (n = 29)	
		Mean	S.D.	Mean	S.D.
Problem-solving skill	Pretest	2.24	1.48	1.94	.09
	Posttest	3.17	1.10	3.03	0.75
Attention level					
	Posttest	8.51	2.57	6.86	2.22
Motivational level					
	Posttest	8.53	2.61	6.89	1.84

level between the control group (M = 6.86, SD = 2.22) and experimental group (M = 8.51, SD = 2.57), $F(1, 59) = 7.09$, $p < 0.01$, suggesting that the emotional design group had stronger attention during learning. There was a significant difference in motivation level scores between the control (M = 6.89, SD = 1.84) and experimental group (M = 8.53, SD = 2.61), $F(1, 59) = 6.17$, $p = 0.01$, indicating that the emotional design group had higher motivational level.

Overall, these results show that incorporating the additional emotional design into multimedia learning developed better problem-solving skill, drew more attention, and increased motivation level.

5 Discussion and Conclusions

The main goal of this study was to investigate the effects of emotional design on mathematical problem-solving skills, attention and motivational levels in primary school level. In this paper, we have two main findings. The first finding is that the emotional design better developed mathematical problem-solving skill, which is in line with the studies of Mayer and Estrella (2014), and Plass et al. (2014). The use of face-like shapes and happy color in our design facilitated student learning, which agrees with the study of Plass et al. (2014). The second finding suggests that the emotional design drew attention and increased motivational level. The positive emotional design is more likely to provide a more encouraging environment for mathematics learning.

Positive emotional designs enhance learner motivation level during learning (Mayer & Estrella, 2014). The designs affect learner performance by attraction and activation (Pekrun, 1992; Russell, 2003). When learner learns new topics with new media (multimedia), the learners might felt anxious (Chiu, 2016a; Chiu & Churchill, 2016a). The designs could switch from negative emption into positive emotion—happier and feel more hopeful. In other words, this positive motional design removes emotional barriers (anxiety) and encourages learners to acquire learning information from multimedia materials for their thinking. From the view of Mayer's Cognitive Theory of Multimedia Learning, this positive motion can facilitate cognitive processing during mathematics learning.

This paper offers three implications for teaching mathematical problem-solving skill. First, the designs of digital learning materials, particularly in innovative teaching, should take student emotion into account. The designs make students feel happy, satisfied, and clam. Second, face shapes and smile face are suggested to be included in teaching primary geometry. Third, teachers should present positive emotional images in the beginning of the lesson to enlighten student for attracting them. This attraction can lead to higher motivation for further learning.

There are three limitations in this study as in any study. First, student mathematics learning ability was not taken into account in the experiment. Second, the emotional design we used focused on shapes and color. Third, the number of questions was small and the questions only assessed transfer skill.

Finally, while this study appears to support the emotional design we proposed, more studies are needed to validate them and confirm the effectiveness of the design. We are engaged in further research of other mathematics topics and other subjects to refine the emotional design for mathematics problem-solving skills. The future research should explore how to positive emotional design and assess more different skills.

Appendix: Sample Questions in Pre- and Posttests

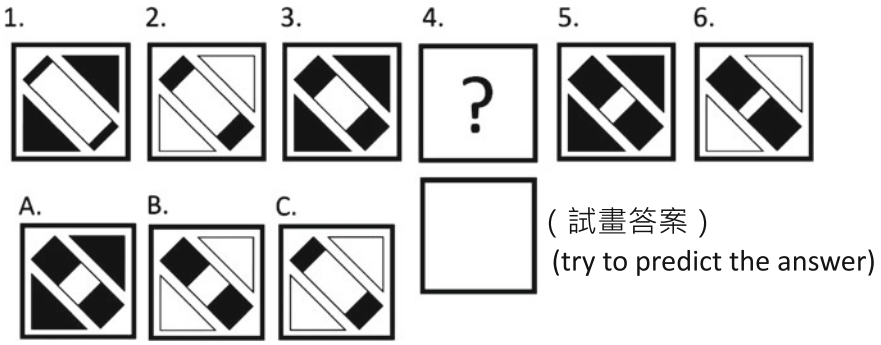
下列各題有六個盒子,盒子上面的圖案是有規律的。

(In the following, there are six boxes and they are queue up by some rules.)

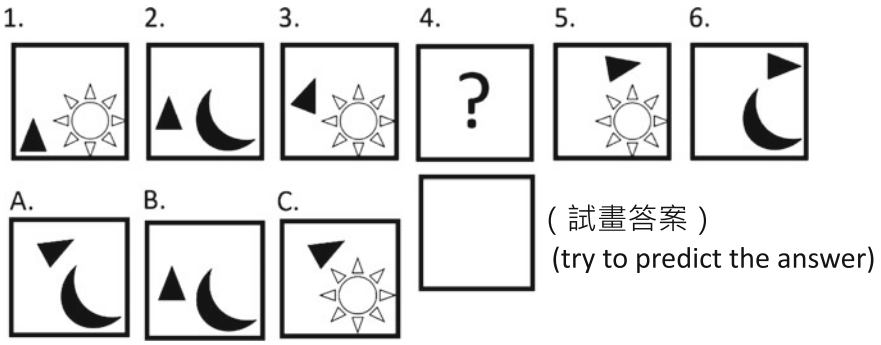
猜一猜缺少的是哪一個?A,B 還是 C? (將適當的英文字母圈出來。)

(Please guess the missing picture in the box with "?" A, B or C? Please circle the right one.)

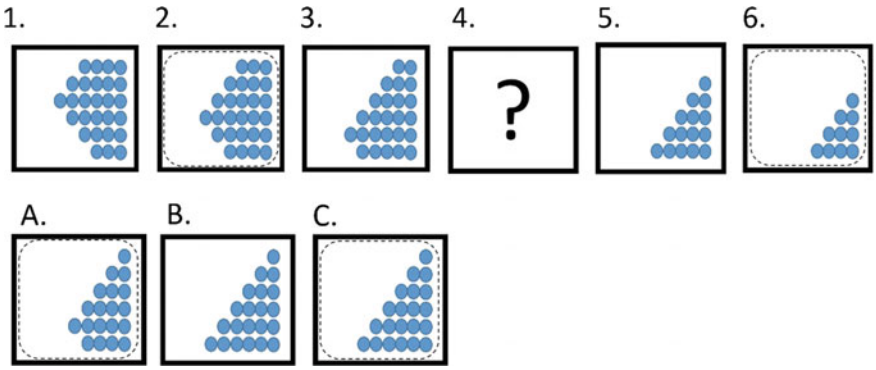
Question 1



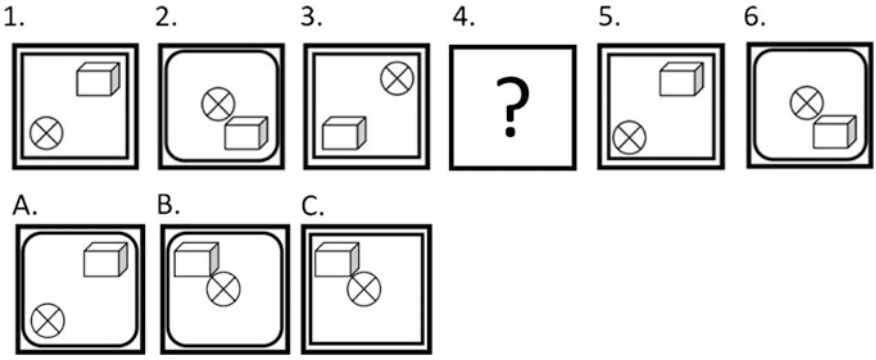
Question 2



Question 3



Question 4



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Implementing Digital Game Mechanics and Various Video Lecture Formats in a Flipped Research Method Course: What Postgraduate Learners Say?

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Abstract The purpose of this study is to examine postgraduate learners' perceptions of a gamified flipped learning approach incorporated with video-recorded lectures in a postgraduate Research Method course. Both methods of quantitative and qualitative data collection methods such as questionnaire and interview were conducted to obtain students' feedback. The findings showed that most of the students had a positive attitude toward the flipped classroom. They were willing to recommend the flipped classroom to their friends and they liked watching the lessons on video. A majority of the students agreed that flipped learning is more engaging than the traditional classroom. Most participants reported they enjoyed taking the tests and quizzes online, and agreed that the flipped learning approach had improved their learning. Almost all participants agreed that digital game mechanics such as badges and leaderboard helped promote the success of flipped learning. Five different video-recorded lecture formats were also examined. Results revealed that participants most preferred the digital tablet writing + instructor talking head, as well as the PowerPoint slides + instructor talking head lecture formats. Suggestions to improve the flipped learning course were provided.

Keywords Online lecture · Video format · Flipped classroom · Gamification

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1 Introduction

With the technological advances made over the last two decades, students are no longer limited to learning in traditional classrooms. Blended learning, an active learning approach which combines web-based learning with face-to-face classroom, is believed by many researchers to have the potential to radically change higher education (Garrison & Vaughan, 2008). Today, many educators are paying more attention to the blended learning approach and a variety of blended learning formats are being implemented around the world. Of the many different models of blended learning in practice, the use of flipped classroom has become increasingly widespread (O'Flaherty & Phillips, 2015). The flipped learning approach basically replaces the traditional instruction with online videos in order to give students more opportunities to interact with their teachers and with their peers in the face-to-face class activities. Teachers thus become a facilitator who is able to pay more attention to the teacher–student interaction in the class. Online video lectures enable instructors to assign more in-class time for learner-centered activities, such as integrating the curriculum concepts with authentic examples, applying the knowledge into practice or inviting guest speakers to share their experience.

The flipped learning model has been applied in various subjects. See and Conry (2014), for example, designed a distinctive flipped classroom model for a faculty of clinical pharmacy and it worked out successfully. Roach (2014) implemented the flipped learning model to study students' perceptions of this approach and has found that students had a positive attitude toward the flipped classroom. Butt (2014) employed the flipped learning model in an actuarial course by reversing the provision of in-class course materials with after-class course materials. The study found out that students' perceptions of the flipped classroom were positive. Love, Hodge, Grandgenett, and Swift (2014) adopted a flipped learning model in an applied linear algebra course and for another section of the course utilized the traditional teaching method. Students who had taken part in the flipped class achieved better results in examinations than those students who had participated in traditional classrooms. Gilboy, Heinerichs, and Pazzaglia (2015) experimented with the flipped learning model in two undergraduate nutrition courses. The researchers found out that of all the 142 students, most of them claimed to like the flipped learning approaches rather than the traditional ones. Simpson and Richards (2015) redesigned a population health curriculum of a nursing program by applying a flipped classroom method and found that students gained a better understanding of the course content.

Although the previous studies have helped us understand flipped learning better, several research gaps still exist. First, a majority of studies have hitherto focused on undergraduate students in the Western world such as the USA (Bishop & Verleger, 2013). Relatively few studies have been conducted on postgraduate learners in an Asian country. Second, despite the increasing popularity of video-recorded lectures in flipped learning, we still understand little about how different video formats may affect students' preference of the lectures. Studying student preference of various

video formats is important because it can help us use the right format to develop video lectures that can engage students.

2 The Present Study

The present study aims to extend our collective understanding of flipped learning in two ways. First, we extended our study to a Hong Kong university context, more specifically to the teaching and learning of a postgraduate Research Method course. Second, we examined five different video-recorded lecture formats; these include the (a) traditional lecture format, (b) interview + PowerPoint slides, (c) instructor talking head + digital tablet writing, (d) instructor talking head + PowerPoint slides, and (e) instructor image + audio + PowerPoint slides. We have two research questions as follows:

1. How do postgraduate students perceive the use of flipped learning?
2. Which video lecture format is most preferred by postgraduate students?

3 Method

A case study methodology was employed to investigate a contemporary phenomenon in-depth and within its real-life context (Yin, 2013). A postgraduate course entitled "Research Methods" was flipped. The face-to-face class was scheduled once a week. The course ran for 10 weeks. The Moodle learning management system was used to host all the online activities such as the pre-class videos, discussion forums, online group work collaboration, and interaction among students and the instructor. In the face-to-face class, the instructor conducted activities such as problem-based learning in group, tutorials for questions and answers, hands-on experience of statistics software (i.e., SPSS), student presentation, and feedback sharing. A student-center learning environment was established. Optional post-class activities were also developed to extend students' learning. The weekly activities are summarized in Table 1.

Digital game mechanics were also used in the flipped Research Methods course to motivate the student participation in the course. Students were rewarded with early bird and well-done badges when they completed a given task early or produced good quality work. Each badge was worth a certain number of points (e.g., one point for an early bird badge). These points did not count toward the final course grades. A leaderboard was also created to rank students based on the number of points students had accumulated. It could improve the student engagement in their learning process.

The videos were created in five main different formats (see Fig. 1a–e). The duration of videos varied between 5 and 18 min. Each video required 3–5 h for

Table 1 Weekly activities of the flipped research method course

Week	Topic	Pre-class	In-class	Post-class
1	Overview of the research process	Video, quiz	Q&A of the research process, group activity to identify the research topic, and problem statement of sample articles	Brainstorm own research topic, formulate own problem statement, upload onto Moodle, comment on peer's work
2	Literature review	Video, quiz	Review of Week 1 and literature review, analyzed previous published literature reviews, hands-on workshop on online database search	Summarize relevant papers in a table, identify limitations of previous studies, comment peer's work
3	Experimental design	Video, quiz	Review of Week 1, 2 and experimental design, analyzed previous articles	Give brief introduction to own research method, research questions, and procedure
4	Correlation and qualitative case study	Video, quiz	Brief review of Week 1, 2, and 3. Discussion of correlation and case study articles	Provide more information about own research method, including desired data collection methods
5	Survey	Search for existing survey	Discussion on characteristics of a good survey	Design an actual survey (group work), comment and vote peer's survey
6	SPSS	Video, SPSS practice	Review of video lecture, instructor demonstration of inferential statistics (e.g., *t* test) on SPSS, group activity on SPSS	Enter additional data, analyze additional data using SPSS, report results using APA, extend own learning to other tests (e.g., non-parametric tests)
7	Interview	Video, forum discussion	Review of video lecture content, critique an interview by analyzing mistakes and giving suggestions for improvement	Develop own interview protocol; make comments on peers' interview protocol
8	Observation	Observe use of mobile device in daily life	Discussion on key features of observational research, ethical issues, observer bias, observer effect	Make comments on peers' observational data
9	Content analysis	Video	Hands-on practice of content analysis	Evaluate peers' work
10	Wrap-up		Problem-solving activity to design a research study (group work)	

Fig. 1 Types of video lecture formats

shooting and editing. The videos were uploaded to YouTube platform for easy student accessible with digital or mobile devices. The quality of the video was in high definition 1080p format. It was designed for full screen clear viewing. Online quizzes were prepared for students to complete after watching the videos. It assisted the student in understanding the content and reinforcing their memory for the upcoming face-to-face class each week.

3.1 Participants

A total of 36 students (11 males and 25 females) gave their consent to participate in the research study. The students came from countries such as Hong Kong, Mainland China, Mexico, and India with different backgrounds, such as teacher, publisher, school support staff, online educator, and fresh university graduates.

3.2 Data Collection and Analysis

Students' perceptions of the flipped learning course were collected using a questionnaire survey. The questionnaire was a 5-point Likert scale with eight items (see the Results section). The students' opinions were further gathered by six open-ended questions: "what are the advantages of flipped learning?"; "what are the disadvantages of flipped learning?"; "would flipped learning be useful for other subjects?"; what improvements would you recommend to improve the flipped learning course?"; "what improvements would you suggest to improve the video lecture format?"; and "please state any other comments you wish to make about flipped learning." Students were also asked to rate the five different video lecture formats on a five-point scale, ranging from "not at all interested" to "very interested." Individual interviews (about 30 min each) were also conducted with 10 students. The interviews provided a more in-depth understanding of the participants' opinions toward flipped learning.

4 Results

4.1 Quantitative Results

From Table 2, it can be seen that most of the questions regarding learner' learning experience of the flipped learning approach implemented in the class received affirmative answers. About 80% of the participants indicated (agreed and strongly agreed) that a flipped learning course was more engaging than a traditional classroom. Close to 89% of participants indicated that they would recommend flipped learning to their friends. About 78% of participants reported that they liked to watch the lessons on video. Three-quarters of the participants agreed or strongly agreed that they liked taking tests and quizzes online. About 83% of participants indicated they liked to self-pace themselves through the flipped course. Seventy-two percent of the participants said they were more motivated to learn in a flipped learning course. Three-quarters of the participants reported that flipped learning had improved their learning. Finally, about 86% of the participants indicated that the use of digital game mechanics was helpful in promoting the success of flipped learning.

We can see from Table 3 that the participants most preferred the "instructor talking head + digital tablet writing" format, followed by the "instructor talking head + PowerPoint slides" format. Seventy-five percent of the participants reported they were very interested and somewhat interested in these two formats.

However, more participants (n = 14) reported they were very interested in the "instructor talking head + digital tablet writing" format, as compared to the "instructor talking head + PowerPoint slides" format (n = 8). The third most preferred video format was "Interview + PowerPoint slides" with 72% of participants

Table 2 Results of the survey on participants' perceptions toward flipped learning (n = 36)

Question	SD	D	N	A	SA
The Flipped Classroom is more engaging than traditional classroom instruction	2	1	4	15	14
I will recommend the Flipped Classroom to my friends	1	2	1	18	14
I like watching the lessons on video	1	2	5	17	11
I like taking my tests and quizzes online using Moodle	2	3	4	19	8
I like to self-pace myself through the course	2	2	2	18	12
I am more motivated to learn in the Flipped Classroom	2	4	4	15	11
The Flipped Classroom has improved my learning	2	1	6	21	6
Gamification is helpful to the success of Flipped Classroom	1	1	3	17	14

Note SD strongly disagree; *D* disagree; *N* neutral; *A* agree; *SA* strongly agree

Table 3 Participants' preference of the video lecture formats (n = 36)

Question	VI	SI	N	NVI	NAI
Traditional lecture format	6	15	11	3	1
Interview + PowerPoint slides	9	17	9	1	0
Instructor image + audio + PowerPoint slides	3	17	11	3	2
Instructor talking head + PowerPoint slides	8	19	5	3	1
Instructor talking head + digital tablet writing	14	13	7	2	0

Note NAI not at all interested; *NVI* not very interested; *N* neutral; *SI* somewhat interested; *VI* very interested

reporting somewhat interested and very interested. The "traditional lecture" format was the fourth preferred style (58%), while the least preferred format was "Instructor image + audio + PowerPoint slides" (56%).

4.2 Qualitative Results

The qualitative results collected via the six open-ended questions in the questionnaire, as well as from the individual interviews. Participants' opinions will be presented under each heading below.

4.2.1 Advantages of the Flipped Learning Course

Many of the participants worked full-time in the day; or took several courses concurrently in the semester. Students found the pre-class video lessons provided them flexibility to learn at their own pace, such as viewing the video and answering the quizzes in their own spare time. Flipped learning eliminated the problem caused by different learning paces between strong and weak students in the classroom.

Self-pacing was therefore an advantage to the participants under the flipped learning setting. The use of Moodle also helped create a convenient online environment for the pre-class activities, discussion, sharing, and interactions among students. Students welcomed the use of YouTube in hosting the video lectures. Most students reported that YouTube is a convenient channel because it allows the videos to be played on all kinds of devices whether on a desktop or a mobile device (e.g., smartphone). Many students felt that the flipped learning course turned out to be more interesting than other classes they attended. Students stated that in the flipped learning course, they became more active participants instead of being a passive one in the class. Students also enjoyed the use of digital game mechanics (e.g., badges and leaderboard). Most students felt that these game mechanics motivated them to participate in the class activities.

4.2.2 Disadvantages of the Flipped Learning Course

Probably, the least favorite aspect of flipped learning was the increase in student workload in completing the pre-course activities, and some students needed time to adjust to this new approach. Not every student was willing to invest the time to watch the videos, answer the quiz, or complete other pre-class activities such as searching for a questionnaire survey and comment on it. Consequently, students who did not do the pre-class work would get less out of the in-class discussion.

4.2.3 Would Flipped Learning Be Useful for Other Subjects?

Most of the participants believed that flipped learning is applicable and practical for other subjects. Participants suggested that flipped learning might be particularly appropriate for science-related subjects because the complex molecule structure and mouth movement could be easily expressed via video. Students could replay the video for revision whenever they wished in a flipped learning setting. This is not possible in a traditional lecture setting because it would be unreasonable to ask the instructor to repeat the lecture many times. Students who had already understood the lesson would feel bored and irritated.

4.2.4 What Improvements Should Be Made to the Flipped Learning Course?

Several students suggested that subtitles be provided for all the video lectures. This would help non-native English learners to follow the video content more easily. One student recommended that the pre-class video be made available at least 72 h before the next face-to-face class in order to give students sufficient time to watch the video and complete other pre-class activities. Students also suggested that the duration of each video be not more than 10 min long. Other suggestions include

(a) providing a summary of key points at the end of each video, (b) incorporating other media such as animations in addition to video, and (c) showing the questions before the start of the videos so that students would be more motivated to watch the videos to find the answers.

5 Conclusions

To the best of our knowledge, this study is the first in Hong Kong to examine the use of digital game mechanics and various video lecture formats in a postgraduate Research Methods class. From the participants' perspectives, the flipped classroom was stimulating and engaging, which enhanced students' learning motivation. It also had the "flexibility" of supporting self-paced learning outside class and saved time for both instructors and learners in the class. Students could preview and review the video lectures and learn materials at anytime and anywhere. This provided an opportunity for students to prepare for the face- to-face lessons and get a better understanding of the content. We found that students most preferred the digital tablet writing + instructor talking head video format. This lends support to the findings of Guo, Kim, and Rubin (2014) who reported that "Khan-style tablet writing" tutorials tend to be more engaging.

The findings of this study should, however, be viewed with some caution due to the small participant sample size. Future research examining a larger sample size would be useful to help us generalize the results. In this study, we did not measure the actual duration of each student's video views. In future studies, we plan to use YouTube statistics to provide us an indication of the total viewing time of each video. Finally, although it is useful to understand students' perception and preference of using flipped learning, it is more important to examine whether the postgraduate students can acquire and use the knowledge comparable to traditional classroom setting. Therefore, in subsequent studies, we plan to carry out experimental studies that will interrogate this very issue. We also plan to examine the two video formats most preferred by students, namely the "instructor talking head + digital tablet writing" and the "instructor talking head + PowerPoint slides" formats. Future studies can be conducted to examine which of these video formats can significantly affect student attention and learning.

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Multitasking with ICT Among University Students: An Exploratory Study

Liping Deng

Abstract The paper reports an exploratory study on Hong Kong university students' multitasking practice with ICT. It seeks to provide a descriptive account of students' multitasking behaviors during self-study time, and discern the relationship between multitasking with learning. Based on the questionnaire data, the study shows that university students were avid users of technology and multitasking with ICT was the "new normal". It has been revealed that the engagement with social media such as Facebook, Instagram, and SMS were related to multitasking with these tools. On the other hand, there were also evidence the students employed these tools for learning purposes as well. As to the impact of multitasking with ICT on learning, the study shows only multitasking with SMS was negatively correlated with students' GPA.

Keywords Multitasking · Social media · Higher education

1 Introduction

With the growing ubiquity, pervasiveness, and mobility of digital technologies, multitasking with technologies has become a widespread phenomenon (Hembrooke & Gay, 2003). The research work on students' multitasking has shown different perspectives. On one hand, research evidence has pointed to the negative impact of multitasking with digital technologies on learning (Junco, 2012; Junco & Cotten, 2012; Rosen, Carrier, & Cheever, 2013; Wood et al., 2012). On the flipped side, some researchers viewed multitasking in more positive light. There has been growing evidence for the self-initiated and self-directed use of the technologies to enhance learning (Biddix, Chung, & Park, 2015). The most recent study conducted by ECAR (2016) involving over 70,000 undergraduate students across 25 countries showed that 96% of students owned smartphone and 78% have used phone for learning.

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The main purpose of the present study, as a preliminary study of a large-scale study, is to explore multitasking behaviors of Hong Kong university students with ICT tools outside classroom. It seeks to provide a descriptive account of the main ICT tools involved in multitasking while working on their schoolwork, and discern the impact of multitasking on students' learning performance. Three research questions were posed to guide the investigation: (1) How do university students multitask with ICT during their self-study time? (2) How does multitasking with ICT affect learning performance? (3) What are the factors that influence students' multitasking behaviors? The study will provide practical guidance for students to pay heed of the disruptive and negative influence of multitasking with technologies, and make more conscious decisions on using technological tools for learning. It will also allow educational practitioners to have a better understanding of the reality and motivation of students multitasking behaviors.

2 Literature Review

A number of recent studies have shown that multitasking with technologies while attending lectures or doing schoolwork led to off-task behavior, thus had negative impact on student learning performance. Since the present study focuses on multitasking during self-study time, the line of research on multitasking outside classroom will be zoomed in here.

2.1 Multitasking Outside Classroom

On the whole, the research work shows that multitasking with technologies might tax students' ability for concentration and cognitive processing. Yet, it seems that different types of digital technologies might pose different influence on student learning. Junco and Cotten (2012) examined how college students multitasked with ICTs and sought to determine the impacts of this multitasking on their college grade point average (GPA). In particular, they focused on how students engaged in a number of popular ICT activities (searching for content using Facebook, email, IM, talking, and texting) while doing their schoolwork. The students reported spending a large amount of time using ICTs and in particular, texting, Facebook, and email, frequently while doing schoolwork. Using Facebook and texting while doing schoolwork were negatively associated with overall GPA.

Rosen et al. (2013) examined task switching by students at home and sought to determine how often students switched task, why they switched, and how this impacted their ability to learn. They observed that the participants averaged less than six minutes on task prior to switching most often due to technological distractions such as social media, texting. Those who used Facebook had lower GPAs than those who avoided it. In another study on the theme, Judd (2014) analyzed the

usage log data captured during university students' self-directed learning in a computer lab in order to determine the relationship between Facebook use and multitasking behavior. It was denoted that Facebook use was associated with increased multitasking behavior, hence detrimental to attentiveness to learning tasks at hand. Similarly, David, Kim, Brickman, Ran, and Curtis (2015) examined the effects of multitasking when studying or doing homework and found that the frequency and attention to texting and social media were positively associated with deficient control over multitasking with mobile phone.

2.2 Social Media for Learning

The proliferating growth of social media brings forth a rising interest in using these tools for educational purposes. Smith and Caruso (2010) reported that undergraduate students were progressively integrating SNS and other web-based tools into their learning experiences. Students' preference of SNS and interest in using it for learning have been reported by several studies. Schroeder and Greenbowe (2009) reported that undergraduate students had a stronger preference for using Facebook for online discussions as a supplement to face-to-face teaching. In resonance, Gray, Annabell, and Kennedy (2010) found medical students were drawn to Facebook to support group study on account of its ease of use and convenience. Likewise, the students in Vivian's (2011) study also looked on Facebook as a familiar, useful, and easy-to-access platform that could support peer networking, sharing, and discussion.

Some studies on the use of Facebook in academic settings have shown optimistic results. For example, English and Duncan-Howell (2008) sought to enhance peer support among Business Education students via Facebook and reported that Facebook facilitated students' interaction and strengthened group cohesiveness through exchanging encouragement and support. The study carried out by Yu, Tian, Vogel, and Kwok (2010) revealed that online social networking helped strengthen social relationships among students, heighten their self-esteem and boost their learning performance. Vaughan, Nickle, Silovs, and Zimmer (2011) reported that Facebook, texting, and instant messaging were the predominant communication tools in support of students' group work.

On the other hand, students' use of Facebook is argued to be primarily socially oriented. In a study conducted by Fewkes and McCabe (2012), the use of Facebook for educational purposes was ranked as the lowest among other usages. Likewise, in another study conducted by Gray et al. (2010), although the students generally thought of Facebook as convenient and appealing, only a quarter of students reported the use of the social networking website for support their learning. Madge, Meek, Wellens, and Hooley (2009) denoted that university students were not keen on using Facebook for discussion related to formal learning. This implies that students' engagement with social networking websites for informal learning outside the school context is still quite limited.

3 Methods

The study included convenience samples who were mostly third-year students who took a required course on educational research. The students were actively involved in developing the questionnaire as the main instrument for data collection. They had an assignment on designing the questionnaire that aimed to investigate the multitasking behaviors with ICT during self-study time. They were advised to take their own experience into account when designing the questions and choices. The students' work, to a great extent, informed the design of the questionnaire used in the study.

The questionnaire consisted of four sections. The first section focused on participants' ICT usage and skills including questions concerning the frequency and length of using phone, computers, etc., for various purposes such as study, social networking, etc. Section 2 covered learning-related questions such as time spent on study, and technological tools for learning. Since one of the research questions looked into the effects of multitasking on learning, we asked students to report their cumulated GPA. The third section focused on multitasking behaviors while doing schoolwork. Detailed and specific questions were designed in relation to multitasking behaviors and students' perceptions. For example, one question read: Suppose you work on schoolwork for 1 h. How much time you might spend in the following ICT tools for activities NOT related to learning? Then popular ICT tools students are engaged with were listed out (e.g., Facebook, WhatsApp, Instagram, YouTube). These items were based on the questionnaire items designed by students themselves, thus the list should cover the most popular technologies involved in multitasking. At last, the open-ended questions were designed to elicit the reasons behind multitasking.

The questionnaire was set up using an online survey service called Qualtrics. The students were invited to fill out the questionnaire online anonymously and encouraged to forward the questionnaire to their friends and peers who were also university students. Eventually a total number of 61 questionnaire responses were gathered through the online questionnaire and resulted in 53 valid ones. The respondents were mostly year 4 students (66%) and female students (76%).

4 Results

4.1 ICT Usage

The students were asked to estimate how long they used mobile phone, computer, and tablet on daily basis on a 5-point scale with 0 for no use, 1 for less than 1 h, 2 for 1–2 h, 3 for 3–4 h, and 4 for over 4 h. The results show that mobile phone was the most used device (M = 3.28, SD = 1.007), followed by computer (M = 2.96, SD = 0.999). Sixty percent of the respondents acknowledged that they used mobile

Table 1 Daily usage of popular digital technologies

	Min	Max	AVE	SD
SMS (e.g., WhatsApp, WeChat)	1	4	2.15	0.97
Web surfing	1	4	1.92	0.83
YouTube	0	4	1.81	0.88
Facebook	0	4	1.58	0.99
Instagram	0	4	1.43	0.97

phones 3–4 h a day; 17% used phones less than 2 h. 40% indicated that they used computers 3–4 h a day; 30% used less than 2 h. On the same 5-point scale of frequency, the respondents were asked to rate how long they used ICT tools for study, social networking, entertainment, and games on daily basis. The results showed that the students employed ICT tools slightly more frequently for study (M = 2.53, SD = 0.89), followed by entertainment (M = 2.25, SD = 0.939), and social networking (M = 2.13, SD = 1.01). The majority of students (74%) spent 1–4 h on study with the support of various ICT tools. A similar percentage (69.8%) of students spent 1–4 h on entertainment with technologies, while 62.2% on social networking websites.

On the same 5-point scale, specific questions were asked about the amount of time spent on specific tools or platforms on daily basis. As shown in Table 1, SMS was ranked the top activity as the respondents dwelled on it for an average of 2.15 h every day. Web surfing (1.92 h) and YouTube (1.81 h) took the second and third places. Every respondent also used SMS and browsed the Internet every day. Additionally, the students also spent considerable amount of time on Facebook (1.58 h) and Instagram (1.43 h)—two popular social networking websites in Hong Kong.

4.2 Learning Behaviors

Since one of the major agenda of the study is to explore the effects of multitasking on learning, a series of questions were asked in relation to students' learning behaviors and habits. On average, the students spent 2.72 h on schoolwork (excluding class time) per day (SD = 0.794). Another important area is to what extent students used technologies for learning purposes. In the questionnaire, the respondents were asked to rate on a 7-point scale (0 for no use, 1 for less than 10 min, 2 for 10–20 min, 3 for 21–30 min, 4 for 31–40 min, 5 for 41–50 min, 6 for 51–60) how much time they spent on various tools/platforms for learning-related activities during one hour of typical study time. As indicated in Table 2, document processing tools such as Microsoft Word was rated the most commonly used tool for learning which occupied an average of 35 min of a typical study hour. Websites were the second most used platform for learning with an average of 30 min spent on them. Additionally, SMS was involved in learning-related activities for an

Table 2 Students' use of ICT tools for learning and non-learning activities

	ICT for learning				ICT for multitasking			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Document processing tools (e.g., MS Word)	1	5	3.58	1.351				
Websites	0	5	3.04	1.467	0	5	1.44	1.312
SMS	0	5	1.42	0.908	0	5	1.62	1.028
YouTube	0	3	1.30	1.011	0	5	1.60	1.414
Facebook	0	5	1.04	1.091	0	5	1.24	0.981
Instagram	0	3	0.85	0.841	0	5	1.14	1.041

average of around 15 min. Other social media such as Facebook, YouTube, and Instagram was employed less often with an average of 13 min on YouTube, 10 on Facebook, and 8 on Instagram.

4.3 Multitasking with ICT

When working on their schoolwork, 93% of students had computer in front of them and 72% also kept the phone within reach. With a simple yes and no question as to whether they multitasked with ICT while working on schoolwork, 93% of students admitted that they did while only three students chose "no". Another aspect of multitasking behavior pertained to whether the students would be interrupted when the notification popped up. The majority of respondents (81%) acknowledged that they would check their phone when new SMS messages came in. The notification on Facebook and Instagram prompted much less students to check their phone with 28% for Facebook and 26% for Instagram.

For those multitaskers with ICT tools, they were asked to estimate how much time they spent on activities not related to learning during one hour of typical study time on a 7-point scale (0 for no use, 1 for less than 10 min, 2 for 10–20 min, 3 for 21–30 min, 4 for 31–40 min, 5 for 41–50 min, 6 for 51–60). It was shown that SMS and Facebook were the top two ICT tools for multitasking each with an average of around 16 min within one hour of study time. When taking a close look, close to half of respondents (48%) acknowledged that they spent only 10 min of less on Facebook. Close to quarter (24%) stayed on Facebook between 10 and 20 min when working on schoolwork for an hour. The results with SMS were similar with half of respondents admitted that they were involved in non-study activities for less than 10 min and 26% between 10 and 20 min.

Efforts were also made to tap into the students' perceptions concerning multitasking while working on schoolwork through 5-point Likert scale with 1 for strongly disagree, 3 for neutral, and 5 for strongly agree. As shown in Table 3, 81% of respondents either agreed or strongly agreed that multitasking helped them relax

Table 3 Students' perceptions concerning multitasking

	1	2	3	4	5	M	SD
Multitasking helps relax	1 (1.9%)	1 (1.9%)	8 (15%)	35 (66%)	8 (15%)	3.91	0.741
Multitasking makes me spend more time on schoolwork	1 (1.9%)	7 (13%)	14 (26%)	25 (47%)	6 (11%)	3.53	0.932
Multitasking makes me more difficult to focus on schoolwork	1 (1.9%)	10 (1.9%)	10 (1.9%)	25 (1.9%)	7 (1.9%)	3.51	1.012

during study time. As to the statement that multitasking resulted in more time spent on schoolwork, the majority of the respondents also chose either agree (47%) or strongly agree (11%). As to whether multitasking with ICT made it harder to focus, a similar percentage of students chose either agree (47%) or strongly agree (13%).

4.4 Factors and Effects of Multitasking

Pearson's correlation was run to explore the possible association between multitasking practice and various factors such as time spent on phone, time spent on SNSs, etc. First, it was revealed that time spent on mobile phone everyday was highly correlated with time spent on SNSs ($r = 0.506$, $p < 0.001$), and on SMS ($r = 0.369$, $p < 0.01$). Time spent on using computers on daily basis was marginally correlated with length of time for study ($r = 0.347$, $p < 0.05$), time spent on web surfing ($r = 0.345$, $p < 0.05$), and YouTube ($r = 0.298$, $p < 0.05$). It seems that those students who were avid phone users tended to spend more time on SNSs and SMS. On the other hand, the computers were more for study, web surfing and watching videos on YouTube. When looking into the usage purpose of ICT tools with multitasking practice, it turned out that those who were more involved with SNSs on the whole were less likely to concentrate on task when working on their schoolwork ($r = -0.402$, $p < 0.01$).

Efforts were made to scrutinize the relationships between daily usage of specific ICT tools such as Facebook, Instagram, YouTube and the use of these tools for learning and multitasking. First of all, the data shows that the engagement with various popular SNSs and websites were highly correlated with each other. Those who spent a lot of time on Facebook also tend to be high users of Instagram ($r = 0.770$, $p < 0.001$), and SMS ($r = 0.408$, $p < 0.01$). An interesting observation is that the daily engagement with Facebook was highly correlated with the use of Facebook for learning ($r = 0.496$, $p < 0.001$) and even Instagram for learning ($r = 0.362$, $p < 0.01$). Meanwhile, those high users of Facebook were also more likely to multitask by visiting Facebook ($r = 0.490$, $p < 0.001$) and Instagram ($r = 0.354$, $p < 0.05$) and tended to switch to tasks not related to learning in their

self-study sessions ($r = -0.423$, $p < 0.01$). The same pattern was detected for high users of Instagram too. Those heavy users of Instagram also tended to employ Facebook ($r = 0.347$, $p < 0.05$) and Instagram ($r = 0.506$, $p < 0.001$) for learning purposes more. On the other hand, they were also more likely to multitask by visiting Facebook ($r = 0.471$, $p < 0.01$) and Instagram ($r = 0.542$, $p < 0.001$) and less likely to focus on study ($r = -0.458$, $p < 0.01$). When it comes to YouTube and SMS, a similar observation was made regarding the relationship with the multitasking with these tools. The high users of YouTube also spent more time on YouTube while working on schoolwork ($r = 0.364$, $p < 0.01$). Those students who used SMS frequently in their daily life also tended to engage in multitasking with SMS during self-study time ($r = 0.529$, $p < 0.001$).

In an effort to reveal the effects of multitasking practice on learning, the students were also asked to report their cumulative GPA on the 8-point scale with 1 for under 2, 8 for 3.76–4.0. No correlation has been found between time spent on specific tools such as Facebook, Instagram, YouTube on daily basis and during self-study time. The only significant correlation was found between daily engagement with SMS and students' GPA. Those high users of SMS tended to have lower GPA ($r = -0.376$, $p < 0.01$).

5 Discussion and Conclusion

This study set out to reveal the multitasking practice of Hong Kong university students during their self-study time and explore the relationship between the multitasking practice with their learning. To begin with, the questionnaire data indicated that the students used mobile phones and computers frequently in their daily life for study, social networking, and entertainment purposes. Meanwhile, the data also indicated that multitasking with ICT is a "new normal" among the university students. The vast majority of students had the habit of multitasking with ICT. On the other hand, the data also shows that the students also employed various ICT tools for the service of learning. The most prominent technological tools used for learning was the document processing tools (e.g., Microsoft Word) followed by websites. The popular social media such as Facebook, Instagram, YouTube, and SMS were also employed for learning purposes, yet on a less frequent scale.

One clear message emerged from the data is that the technological tools, especially the SNSs, are truly double-edge sword. On one hand, the more the students are engaged with ICT tools such as Facebook, Instagram, the more likely they employ the tools for learning purposes. In this respect, the findings of this study are in line with the earlier studies (e.g. Smith & Caruso, 2010; Vivian, 2011) that showed the increasing tendency of integrating SNSs for learning purposes. On the other hand, the increasing involvement with social media such as Facebook, Instagram, YouTube, and SMS was found to be associated with shortened focused time during self-study sessions. Those spent more time on Facebook, Instagram, YouTube, and SMS also tended to multitasking with these tools.

In terms of the effects of multitasking with ICT on learning, the current study yielded mixing results as compared to related literature. Departing from the previous work that showed the negative association of the time spent on Facebook and grade (e.g., Junco, 2012), our study did not find the same result. The only multitasking behavior that showed negative correlation with GPA was the use of SMS. There are two plausible explanations. First, the questionnaire data also revealed that the vast majority of students could not resist to check the notification of new SMS messages. In contrast, much less students (around only a quarter) succumbed to the temptation to check Facebook or Instagram with notification of new content pops up. Second, it can be that SMS compelled users to respond, which might be more taxing to their cognitive bandwidth.

This study points to a pitfall we should watch out when examining multitasking with ICT. The ICT tools nowadays are versatile with a multitude of features fulfilling different purposes. The same tool can be a source of distraction as well as an instrument for learning. As such, we should move beyond looking at a specific tool as a whole, but discern different types of activities students were involved when multitasking, and the resulting effects on their learning. This resonates what Lin (2013) maintained that research on multitasking should specify the tasks, activities, and situations involved. In this respect, we have been seeing burgeoning research efforts. For instance, Junco (2012) maintained that different activities on Facebook had different impact on students' academic outcome. Chatting and posting status were negatively associated with GPA, while checking friends' status was positively associated with GPA.

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Examining the Information Literacy Life Cycle Among Macau University Students: Psychometric Evidence of the UNESCO-ILL

Cathy Ka Weng Hoi and Timothy Teo

Abstract The current research aims to provide psychometric evidence for the UNESCO Information Literacy Lifecycle (UNESCO-ILL), which can be used to evaluate individuals' stages of acknowledge information literacy. A 20-item UNESCO-ILL was examined with a four-factor structure (i.e., "accessing and utilizing information," "storing information," "handling information," and "disposing information") reported by previous research. Data was collected from 360 undergraduate and graduate students of the University of Macau in Macau Special Administrative Region (SAR), China. Results showed good fit of the four-factor structure based on the sample data. Additionally, results supported the UNESCO-ILL with a four-factor structure compared with a single-factor structure. Suggestions for future research were provided.

Keywords Information literacy · UNESCO eleven stages life cycle · Macau · Undergraduate and graduate students

1 Introduction

Throughout the recent decades, researchers and educators are advocating the appropriate use of information and communication technology (ICT) in various education contexts. Although researchers have provided fruitful support to the benefits of embedding ICT into the classroom settings, questions have been raised

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about the proper methods to adopt ICT without causing problems on students' learning (Chang, Liu, Lee, Chen, Hu, and Lin, 2011). Specifically, students may obtain false information or adopt improper values if they are not already taught with the criteria to evaluate information from ICT. In this vein, it is crucial for teachers to facilitate and enhance students' ability to actively receiving the correct information, while filtering incorrect ones simultaneously (Horton, 2008).

1.1 Defining Information Literacy

Addressing this, the United Nations Educational, Scientific and Cultural Organization (UNESCO) posed information literacy as a necessary guideline for people to live a daily life in the information-rich society (Horton, 2008). Aharony and Bronstein (2014) defined information literacy as the capability of distinguishing, locating, assessing, arranging, generating, utilizing, and transferring information in an efficient manner to serve the purpose of clarifying an issue from a concern. Horton (2008) claimed information literacy as the skill to enable lifelong learning of an individual.

Based upon the importance of information literacy, UNESCO specifically identified a set of criteria for an individual to be evaluative on information literacy. Horton (2008) proposed the UNESCO 11 stages of the information literacy life cycle, while Rafique (2014) developed a self-report instrument for information literacy based on these 11 stages. Nonetheless, no factor structure analysis was provided to support the validity of the UNESCO Information Literacy Lifecycle (UNESCO-ILL). This could cause arguments on the process of exploring the relationship between different factors of information literacy and other associated variables.

1.2 Purpose of This Study

The current research aims to provide evidence for the reliability and validity of this instrument based on its factorial structure. Regarding this, Hoi, Teo, and Zhou, (2014) have provided preliminary evidence for factorial structure of the UNESCO-ILL. In their study, an exploratory factor analysis was conducted and Hoi et al. (2014) concluded a four-factor structure of the UNESCO-ILL. The four factors accounted for 51.10, 6.50, 4.98, and 3.57%, respectively, all together 66.15% of the total variance. Hoi et al. (2014) labeled the four factors as "accessing and utilizing information," "storing information," "handling information," and "disposing information." In order to provide more solid support for the future use of the UNESCO-ILL, this study will analyze the factorial structure reported by Hoi et al. (2014).

2 Method

2.1 Participants and Procedure

Data was collected from the University of Macau in Macau Special Administrative Region (SAR), China. Participants were 360 students with 187 undergraduate (51.8%) and 170 graduate (47.2%) students; three participants (0.9%) chose "others" or did not report their study levels. Among these participants, 262 (72.8%) of them were female participants. Mean age of participants was 22.50 (SD = 2.91). Participants were from 26 different majors including Education, Psychology Chinese Medicine, Physical Education, etc.

The data collection process was conducted using paper-based and web-based surveys of the UNESCO-ILL. This study employed a mixed method data collection in order to maximize the number of responses (Greenlaw and Brown-Welty, 2009). Particularly, the same format including number of pages and questions in each page was designed to be identical for both paper-based and web-based questionnaire, which aimed at creating similar appearance for both questionnaires. Based on this condition, the mode differences could be limited (Denscombe, 2006). The nature and purpose of the study were explained and participants were invited to participate in the study with no reward or incentive. Also, participants were well informed that the data would be kept anonymous and confidential.

2.2 Measure

Participants' level of information literacy was assessed using the 20-item UNESCO-ILL on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The UNESCO-ILL was developed by Rafique (2014) based on the 11 stages of information literacy life cycle, which was proposed by Horton (2008). This scale was later revised by Hoi et al. (2014) in order to enhance readability and accuracy of the items. According to the results reported by Hoi et al. (2014), four factors were suggested of the UNESCO-ILL, namely accessing and utilizing information (Access, 10 items, "I am able to determine the existence of needed information or not"); storing information (Store, 4 items, "I am able to preserve information"); handling information (Handle, 4 items, "I am able to organize information"), and finally disposing information (Dispose, 2 items, "I am able to dispose of information no longer needed").

2.3 Data Analysis

A number of analyses were conducted to provide psychometric evidence of the UNESCO-ILL. All analysis was performed using *R* statistical software (R Development Core Team, 2011). Confirmatory factor analysis (CFA) was conducted using the "cfa" function in the "lavaan" package (Version 0.5-20; Rosseel, 2012) of R.

3 Results

Descriptive statistics for each of the items in UNESCO-ILL is shown in Table 1. Means of all items were within the range from 4.29 to 5.56, while *SD* ranged from 0.95 to 1.38. Skewness and kurtosis indices showed that the data is a left-skewed and leptokurtic distribution. Nonetheless, all the indices were well within the acceptable ranges according to the recommendation of the range between −3 and +3 for skewness and between −8 and +8 for kurtosis (Kline, 2010).

Table 1 Descriptive statistics of the UNESCO-ILL

Subscale	Items	Mean	*SD*	Skewness	Kurtosis
Handle	UNE1	5.39	1.08	−0.70	3.71
	UNE2	5.23	1.06	−0.53	3.33
	UNE3	5.24	1.03	−0.57	3.39
	UNE4	5.00	1.11	−0.41	2.94
Access	UNE5	5.42	1.04	−0.59	3.07
	UNE6	4.92	1.05	−0.23	3.05
	UNE7	4.98	0.97	−0.33	3.21
	UNE8	5.22	1.03	−0.59	3.81
	UNE9	5.15	0.99	−0.43	3.18
	UNE10	4.83	1.13	−0.43	3.26
	UNE11	5.38	0.95	−0.40	2.80
	UNE12	5.34	0.99	−0.50	3.40
	UNE19	5.25	1.13	−0.66	3.59
	UNE20	4.54	1.28	−0.36	2.90
Dispose	UNE13	4.46	1.33	−0.09	2.50
	UNE14	4.29	1.38	−0.08	2.50
Store	UNE15	5.45	1.06	−0.61	3.30
	UNE16	5.57	1.03	−0.68	3.41
	UNE17	5.51	1.07	−0.80	3.98
	UNE18	5.49	1.18	−1.03	4.46

Note Handle handling information; *Access* accessing and utilizing information; *Dispose* disposing information; *Store* storing information
SD standard deviation

3.1 Factorial Structure of the UNESCO-ILL

A confirmatory factor analysis (CFA) was conducted to examine the factorial structure of the UNESCO-ILL reported by Hoi et al. (2014). Robust Maximum Likelihood (MLR) estimation was used to analyze the structure of the congeneric model with uncorrelated errors. MLR was used as the estimation method as it was discussed earlier that the data was a left-skewed and leptokurtic distribution.

To evaluate the fit of the model with comparison to the sample data, a number of indices were used as the criteria. The minimum fit function χ^2, the ratio of χ^2 to its degree of freedom χ^2/df was examined, with the χ^2/df value to be lower than 3.0 to indicate an acceptable fit of the model (Carmines and Mclver, 1981). Other fit indices included the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). SRMR and RMSEA are recommended to be less than 0.08, while CFI and TLI are recommended to reach 0.90 and above to indicate acceptable fit between the proposed structure and the sample data (Hair et al., 2010).

Results of the CFA showed an acceptable fit of the hypothesized structure (χ^2 = 410.144, χ^2/df = 2.501, SRMR = 0.050, RMSEA = 0.065 [0.058, 0.071], TLI = 0.92, CFI = 0.93) of the UNESCO-ILL. However, item UNE20 had poor standardized estimate of 0.48, indicating insufficient communalities toward its corresponding factor (Hair et al., 2010). As a result, this item was removed from the model. Upon removal of the item UNE20, re-analysis of the model showed a better fit (χ^2 = 330.961, χ^2/df = 2.267, SRMR = 0.046, RMSEA = 0.059 [0.052, 0.066], TLI = 0.94, CFI = 0.95).

A single-factor model structure was also examined in order to compare the two different model structure of the scale. Results showed bad fit of the single-factor structure (χ^2 = 1184.709, χ^2/df = 6.969, SRMR = 0.083, RMSEA = 0.129 [0.123, 0.135], TLI = 0.69, CFI = 0.72). Additionally, the relative fit of the four-factor model ($AIC_{four\text{-}factor}$ = 15,691.39) was lower than the single-factor model ($AIC_{one\text{-}factor}$ = 17,901.58), with the difference of AIC of 1095.32, thus indicating the four-factor model was a better structure of the UNESCO-ILL (Burnham and Anderson, 2002). Cronbach's α of the four subscales ranged from 0.87 to 0.93, indicating good internal reliability of the four subscales. Cronbach's α, unstandardized, and standardized estimates of the four-factor UNESCO-ILL were shown in Table 2. All items in the UNESCO-ILL were listed in the Appendix.

4 Discussions

Information literacy has received conspicuous attentions from educators and researchers during the recent years, with respect to the rapid growth of information communication and technology (ICT) in education process. Horton (2008) have identified the importance of individuals to recognize the need of information

Table 2 Parameter estimates and reliability indices of the UNESCO-ILL

Factor	Item	UE[a]	SE[b]	α
Handle	UNE1	1.00	0.83	0.93
	UNE2	1.08	0.91	
	UNE3	1.04	0.90	
	UNE4	1.06	0.86	
Access	UNE5	1.00	0.76	0.91
	UNE6	1.04	0.78	
	UNE7	1.01	0.81	
	UNE8	0.95	0.72	
	UNE9	0.98	0.78	
	UNE10	0.95	0.66	
	UNE11	0.86	0.71	
	UNE12	0.94	0.75	
	UNE19	0.96	0.67	
Dispose	UNE13	1.00	0.91	0.87
	UNE14	0.96	0.84	
Store	UNE15	1.00	0.87	0.92
	UNE16	1.03	0.92	
	UNE17	0.97	0.84	
	UNE18	1.02	0.80	

Note Handle handling information; *Access* accessing and utilizing information; *Dispose* disposing information; *Store* storing information

[a]*UE* unstandardized estimates

[b]*SE* standardized estimates

All items are significant at the $p < 0.001$ level

literacy and, in turn, handle information in an appropriate manner. With the UNESCO 11 stages of information literacy life cycle (Horton, 2008), individual can monitor one's information needs according to different stages. This could be especially beneficial to students, who is one of the biggest consumer of information from different ICT sources. Moreover, students are group of individuals with greater opportunity to develop into a lifelong learning given the ability of information literacy. Still, teachers would have to assess and evaluate students' information literacy based on the stages they are at the information literacy life cycle, which could provide better and more targeted training programs during daily teaching activities.

The current study provided psychometric evidence to support the use of the UNESCO-ILL, which was developed by Rafique (2014) and later revised by Hoi et al. (2014). This scale would enable teachers to understand the current situation of students' information literacy and therefore provide appropriate training to enhance

students' ability to distinguish between true or false information, analyze the value of the information, access and handle information properly, and so on.

School principals and teacher educators may also need to be aware of the information literacy life cycle of teachers, provided the fact that they play the major role of transferring the appropriate values of information literacy. Teacher educators may consider embedded the elements of the UNESCO information literacy life cycle into teacher training and development course to ensure continuous and sustainable growth of teachers' information literacy.

5 Limitations and Suggestions

One limitation of the current study is the use of self-reported survey that it is possible to include socially desirable responses. Under the influence of social desirability, people tend not to report their true behaviors, habits, thoughts, and feelings (Adams et al., 2005). Researchers may consider assessing participants' level of social desirability simultaneously when examining their information literacy in the future.

Future research may examine the association between the four factors of the UNESCO-ILL and related constructs, such as media literacy (Chang et al., 2011). Construct validity could also be provided by assessing the association between the UNESCO-ILL and the other information literacy measures. It could also be useful to provide empirical evidence for the psychological traits and information literacy.

6 Conclusions and Future Directions

The current study provided further psychometric evidence for the UNESCO-ILL, for the use of measuring information literacy of individuals. Teachers may apply the instrument to evaluate students need formation information literacy as well as their information literacy life cycle. School principals may also consider to take a closer understanding of the current stages of teachers in terms of their information literacy.

Educational researchers have suggested consideration benefits for the potential achievement that can be obtained from appropriate utilization of ICT during the education process. Future use of ICT in education could be unforeseeable, researchers and educators may need to carefully observe students' behavior during the process of embedding ICT into education.

Appendix

Item	English	Chinese
UNE1	I am able to organize information	我能夠整理信息
UNE2	I am able to analyze information	我能夠分析信息
UNE3	I am able to interpret information	我能夠解譯信息
UNE4	I am able to evaluate information	我能夠評估信息
UNE5	I am able to determine the existence of needed information or not	我能夠判定現有的信息是否是我所需要的
UNE6	I am able to fully understand found information	我能夠完全地理解我所找到的信息
UNE7	I am able to accurately identify and define the information	我能夠準確地辨別並解釋信息
UNE8	I am able to find the needed information	我能夠找到所需的信息
UNE9	I am able to communicate and present the information	我能夠就信息進行溝通展示
UNE10	I am able to evaluate reliability of information and its resources	我能夠判斷信息及其來源的可信程度
UNE11	I am able to utilize the information to resolve the problem	我能夠運用信息去解決問題
UNE12	I am able to go for help to understand needed information	我能夠尋求幫助以理解所需的信息
UNE13	I am able to dispose information no longer needed	我懂得如何處置失效信息
UNE14	I am able to safeguard information no longer needed	我懂得如何安全保護已失效的信息
UNE15	I am able to preserve information	我能夠保存信息
UNE16	I am able to store information	我能夠儲存信息
UNE17	I am able to reuse information	我能夠重復使用信息
UNE18	I am able to record and archive information	我能夠將信息紀錄並存檔
UNE19	I am able to realize that a need or problem exists that requires information	我能意識到哪些需求或問題需要信息
UNE20	I am able to create or cause to be created unavailable information that I need	當我需要某種不存在的資訊時,我能夠創造,或促使該資訊產生

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ICT Use at Home of Hong Kong Students: Understanding New Arrival Children from Mainland China

Miaoting Cheng and Allan H.K. Yuen

Abstract With the effort of Hong Kong government to enrich e-learning resources, along with the increasing availability of ICT, students in Hong Kong are now living with a sophisticated range of Information and Communication Technology (ICT) in every aspect of their daily life. Studies show that new arrival children (NAC) from Mainland China constitute the largest cultural group of students only second to their Hong Kong local peers, yet they are at a less advantaged position in learning and future development than their Hong Kong local peers. Despite the considerable benefits of ICT in promoting students' learning and development, there is a surprising dearth of research on the daily ICT use among NAC in Hong Kong. Studies show that students' ICT use is a complex process influenced by their social environment. Theories from cross-cultural studies show that people with immigrant background tend to have different behavioural development. This paper aims to provide understanding of the daily ICT use of NAC and local students in Hong Kong secondary schools, and examine whether NAC and local students are different in their daily ICT use. A quantitative study with cross-sectional age groups involve both Secondary 1 and Secondary 2 students was conducted. An online survey was administered as a mean to collect information about NAC and local students' demographic background and daily ICT use. The study on students from 27 secondary schools revealed four types of daily ICT use at home: information search and learning (ISL), creative use (CU), social life and entertainment (SLE), and online surfing and shopping (OSS). Significant differences between the two groups of students in ICT use were also found. Implications of findings are discussed.

Keywords ICT use at home · Mainland immigrant students · Hong Kong

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1 Introduction

In Hong Kong, Mainland immigrant students have been viewed as particular group of students with regard to the large population basis, increasing expansion trend, and distinct cultural background. Since 2010, more than 150,000 children aged 15 or below have entered Hong Kong for family reunion and they generally live in families from lower socio-economic status (SES) in Hong Kong (Home Affairs Department and Immigration Department, 2013, 2014, 2015). The children who migrate from Mainland to Hong Kong are described as "new arrival children" (NAC), who reside in Hong Kong within 7 years (Chan, 2002; Cheung & Hui, 2003). Along with the polarization of SES, NAC also face challenges in adapting to the new education and curriculum system, new living and school environment, and exclusion and prejudice in and out of school, which may not be anticipated (Chan, 2002; Chong, 2004; Gu, 2011; Phillion, 2008).

Given the proliferation, increasing importance, and changing nature of digital technologies, students' ICT use has been a concern and practices of research studies. A number of such studies consistently show that one's family environment and background could significantly influence students' experience of ICT use. Moreover, substantial cross-cultural studies have documented the influence of one's cultural background on a particular behaviour such as technology use (e.g. Bandura, 1986; Berry, 1997). Though many studies in Hong Kong have clearly revealed the impact of social and cultural environment on students' ICT use (e.g. Yu et al. 2012; Yuen et al. 2015), limited studies have made attempts to understand NAC's ICT use. Moreover, with the launch of four ICT in education policies (EMB, 1998, 2004, 2008, 2014), the issues on NAC's ICT use are minimally addressed. Without policy adjustment and critical awareness of researchers, digital inequality could perpetuate and deepen existing social inequalities in Hong Kong.

Therefore, the aim of this study is to investigate the present demographic characteristics of NAC in Hong Kong, explore the daily ICT use of Hong Kong students with a focus on that of Mainland immigrant students, and compare the daily ICT use between Mainland immigrant students and local students in Hong Kong. Accordingly, the research questions are as follows. What are the demographic characteristics of NAC in Hong Kong? How do NAC use ICT at home? Do NAC and local students differ in their ICT use?

2 Literature Review

With profound advantages in geographic location, politic and economic conditions, and living environment, the surge of immigrants from Mainland China to Hong Kong after the reunification is prominent. From 1998 to the first quarter of 2016, a total of 868,621 new arrivals from Mainland China to Hong Kong were recorded in

their first entry to Hong Kong via Lo Wu control point, with a daily average of around 130 (Home Affairs Department and Immigration Department, 2002, 2007, 2012, 2016). Since the main purpose of the One-way Permit Scheme is to facilitate family reunion among Mainlanders and new Mainland immigrants, most of the new OWPHs who had not worked in the Mainland were homemakers and students, which constituted an average of 33.2% (286,821) and 7.2% (62,154) of the whole Mainland new arrivals population from 1998 to 2016.

As a result of unprecedented migration level, Hong Kong schools have enrolled students with different cultural backgrounds. Findings from substantial large-scale studies consistently showed that students with Mainland immigrant background constituted the largest group only second to local students in Hong Kong secondary schools. For example, the HKPISA 2003 study on a total of 4478 students from 145 secondary schools revealed that about 23% of the 15-year-old students identified themselves as Mainland China born, which constituted 92.6% of the non-local born students (Pong, 2009). Based on the self-reported data of PISA 2009, the percentage of immigrant students in Hong Kong secondary schools increased to 39.1% still with a majority of them were from Mainland China (OECD, 2012). In extant official documents released by the Hong Kong government, the children who were born in the Mainland and had entered to reside in Hong Kong are described as "new arrival children" from the Mainland. However, what accounts for "new arrival" and how Mainland immigrant children become "old arrival" are not clearly defined. It is suggested that the term "new arrival" is not appropriate for those who had resided in Hong Kong for over 6 years (Chan, 2002; Cheung & Hui, 2003). In general, NAC refers to children who migrate from the Mainland to Hong Kong and have resided in Hong Kong within 7 years (e.g. Chan, 2002; Cheung & Hui, 2003).

Along with the polarization of SES, substantial studies revealed that they faced unanticipated challenges in adapting to the new education and curriculum system, new living and school environment, and exclusion and prejudice in and out of school (Chan, 2002; Chong, 2004; Gu, 2011; Phillion, 2008). Though NAC from the Mainland share the same ethnicity with Hong Kong local students, these newcomers moving to Hong Kong are similar to immigrants entering a new country (Chan, 2002; Chong, 2004; Gu, 2011; Phillion, 2008). Particularly, Chong's (2004, pp. 101–109) elaborate study on Mainland immigrant students in Hong Kong summarized six challenges include: linguistic barriers, discrimination and ethnic stereotyping, appalling living conditions, school admission problem, pressures from parents, and homesickness.

Many studies in Hong Kong have clearly revealed the impact of students' family and cultural background on students' ICT use (e.g. Cheng, Park, & Yuen, 2015a; Yu et al., 2012; Yuen & Cheng, 2015; Yuen, Lau, Park, Lau, & Chan, 2016a). Yu et al. (2012) revealed that family socio-economic factors such as parents' educational background, home ICT facilities, and parents' ICT skill play a significant role in influencing students' use of computer. More precisely, students with parents who possess higher socio-economic status tended to use computer more for learning activities rather than entertainment. The in-depth case study by Yuen et al. (2016a) also revealed that although ICT use was penetrated in Hong Kong secondary

students' life, students in families with better SES background generally had more opportunities to access ICT at home and had more creative and effective ICT use to promote their academic performance.

Despite ICT use of Hong Kong students has been discussed in many studies, limited studies have made attempts to understand NAC's ICT use. Coincidentally, Phillion (2008)'s study into NAC's educational experience showed that male NAC generally played video games and watched online videos in spare time due to parental inhibition on socializing outside. They may seek to establish and maintain groups that share similar cultural norms through the use of technology (Gu, 2011). These studies provide critical insights into the role of ICT use in NAC's cultural adaption. While ICT use could help NAC adapt to Hong Kong society, it could also isolate them from mainstream group and create digital inequalities. However, with the launch of four ICT in education policies (EMB, 1998, 2004, 2008, 2014), the issues on NAC's ICT use are minimally addressed.

Without policy adjustment and critical awareness of researchers, digital inequality could perpetuate and deepen existing social inequalities in Hong Kong. This study seeks to understand NAC's ICT usages in Hong Kong focusing on how Hong Kong students use ICT at home, and how NAC use ICT compared to that of Hong Kong local students.

3 Research Design

To address the research questions, a quantitative survey with cross-sectional age groups was conducted. A survey instrument was developed from a review of related literatures (Lau & Yuen, 2010; Slate, Manuel, & Brinson, 2002; Venkatesh, Morris, Davis, & Davis, 2003), which has been widely tested and validated in the Hong Kong context (e.g. Lau and Yuen 2013; Yuen et al. 2016a). The survey collects information of the four dimensions: students' demographic characteristics, migration background, socio-economic status, and daily experience in using ICT.

The target population is secondary students in Hong Kong schools implementing the local curriculum. Generally, local primary and secondary schools in Hong Kong are operated under four main categories include Government, Aided, Direct, and Private (Education and Manpower Bureau [EMB], 2016). Of these schools, they are generally categorized into three levels according to the mean academic ability of the students they admit (high, middle, and low), with some schools admit the highest achieving one-third of students, some schools admit the middle achieving one-third of students, and the others admit the bottom one-third (Gu, 2011; Zhu & Leung, 2011). The sampling frame contains the school identity number assigned by the Hong Kong Education Bureau, which include students with overall academic ability in high, middle, and low level. Based on a sample size analysis (Henry, 1998), an estimated sample size is 21 schools.

In view of the sample size, stratified sampling was conducted at school level based on the broad categorizations of students' mean academic ability in high,

middle, and low level. Since the class size in Hong Kong public schools is similar, random sampling was applied at class level to select one intact class of both Secondary 1 and Secondary 2 students for each school. 30 schools were invited and 27 schools gave consent to participate in the study.

4 Results

A total of 1285 students were recruited after data cleaning. The age range of the respondents is from 10 to 18 years old, with 589 of them are female and 705 of them are male, 634 of them are Secondary 1 students and 651 are Secondary 2 students. Students' birthplace and the length of students' residence in Hong Kong were used as the cut-off line in categorizing NAC and local students. Amongst these 1285 students, 139 students are NAC from the Mainland who were born in Mainland and have lived in Hong Kong for 7 years or less, 1146 students are local students who were born in Hong Kong and have lived in Hong Kong for more than 7 years.

In line with previous studies on Mainland immigrant students in Hong Kong, it was found that NAC from the Mainland (mean = 13.75, range 11–18, SD = 1.3) are generally older than their local peers (mean = 12.59, range 10–15, SD = 0.7). Another salient characteristic of NAC is that 79 (56%) of NAC's father and 128 (92%) of their mother were born in Mainland China. In comparison, the majority of local students' parents were born in Hong Kong. The demographic background of sample students is shown as Table 1.

Given the remarkable differences in students' family background, linear regression was run to examine the predictable effect of father, mother, and student's birthplace on student's years of education in Hong Kong. For birthplace variables, Mainland China and Hong Kong were coded as 1 and 0 respectively. Results indicated two significant predictors including father's birthplace ($\beta = -0.150$) and student's birthplace ($\beta = -0.531$) with adjusted R-Square 0.35. The findings suggested that a student whose birthplace was Mainland China and whose father was also a Mainland immigrant had much shorter years of education in Hong Kong.

Students' daily ICT use was assessed with the scale adapted from Slate et al. (2002). The scale consists of 18 items in Chinese has been widely tested and validated in many previous empirical studies in Hong Kong (e.g. Cheng, Park, & Yuen, 2015b; Yuen & Park, 2012; Yuen et al. 2016b). All the items were measured using a 5-point Likert scale with response categories recoded as "never" (=1), "rarely" (=2), "sometimes" (=3), "frequently" (=4), and "always" (=5). Exploratory Factor Analysis under the principal components and varimax rotation procedure was performed on students' self-reported ICT use at home.

Table 1 Demographic information of participants

		NAC (n = 139)	Local (n = 1146)
Age	10–14	109	1128
	15–18	30	17
	Maximum	18	16
School level	High	17	565
	Middle	59	372
	Low	63	209
Grade level	Secondary 1	70	564
	Secondary 2	69	582
Gender	Female	66	523
	Male	73	623
Father's birthplace	Hong Kong	47	761
	Mainland China	79	246
	Others	1	33
	I am not sure	12	106
Mother's birthplace	Hong Kong	5	621
	Mainland China	128	381
	Others	0	52
	I am not sure	6	92
Father's educational level	Secondary education or below	66	562
	Tertiary education or above	24	328
	I am not sure	53	256
Mother's educational level	Secondary education or below	76	596
	Tertiary education or above	21	306
	I am not sure	42	244

The four factors explained 57% of the total variance was identified. The Cronbach's alpha of each factor ranges from 0.68 to 0.82. All the factor loadings are more than 0.45. The results were shown as Table 2.

Given the characteristics of each factors, the four factors were sequentially labelled as: information search and learning (ISL) (7 items, e.g. "Search for learning material"); creative use (CU) (4 items, e.g. "Create or use video or picture"); social life and entertainment (SLE) (4 items, e.g. "Chat with net friends"); and online surfing and shopping (OSS) (3 items, e.g. "Browse Internet without any purposes"). The mean of ISL, CU, SLE, and OSS is 2.53, 1.87, 3.42, and 1.92 respectively.

In order to adjust the under-representation of NAC in the sample, "weight cases" was used in the independent samples t-test. Results of the t-test (ref. Table 3) showed that NAC and local students have no significant difference in using ICT for SLE and CU, but NAC and local students have significantly more frequent use of ICT for ISL and OSS.

Table 2 Rotated factor loading for the 18 items of students' ICT usage at home

Items	Factor 1 (ISL)	Factor 2 (CU)	Factor 3 (SLE)	Factor 4 (OSS)
Item 1	0.47			
Item 2	0.67			
Item 3	0.75			
Item 4	0.71			
Item 5		0.5		
Item 6	0.51			
Item 7	0.80			
Item 8			0.66	
Item 9	0.59			
Item 10			0.57	
Item 11			0.79	
Item 12				0.65
Item 13				0.75
Item 14				0.75
Item 15			0.75	
Item 16		0.75		
Item 17		0.76		
Item 18		0.72		
% of variance explained				57%
Cronbach's alpha	0.82	0.75	0.70	0.68

Table 3 Compared mean between NAC and local students in four ICT use types

	NAC		Local		Sig.
	Mean	SD	Mean	SD	
ISL	17.33	4.84	15.76	5.01	0.000
SLE	14.12	3.42	13.72	4.00	0.265
OSS	6.42	2.87	5.66	2.69	0.002
CU	7.65	3.04	3.28	3.28	0.407

A paired samples *t*-test was conducted to compare the mean scores on the six conditions including ISL-CU, ISL-SLE, ISL-OSS, CU-SLE, CU-OSS, and SLE-OSS within NAC. Significant differences were found in all conditions. The same test was also run within local students. Results showed that local students share very similar patterns of ICT usage except CU-OSS (ref. Table 4). More specifically, it revealed that local students have no significant difference between CU and OSS use, while NAC have much frequent OSS use than CU ($t = -3.45$, $p = 0.001$).

Table 4 A paired samples *t*-test

	NAC			Local		
	Mean	SD	Sig.	Mean	SD	Sig.
ISL–CU	0.84	12.25	0.000	0.658	29.02	0.000
ISL–SLE	−0.76	−9.13	0.000	−0.917	−27.87	0.000
ISL–OSS	0.62	6.69	0.000	0.625	20.91	0.000
CU–SLE	−1.61	−18.09	0.000	−1.58	−48.08	0.000
CU–OSS	−0.22	−3.45	0.001	−0.034	−1.25	0.224
SLE–OSS	1.38	14.269	0.000	1.546	49.594	0.000

5 Discussion and Conclusion

Using data from the empirical study on secondary students, this study has provided understanding of NAC's ICT-related experiences, who constitute the largest population only second to local students in Hong Kong. As revealed by the demographic data, NAC were generally older than local students and were placed in age-inappropriate grade. Moreover, since this study has drawn from samples across districts, it was also found that NAC generally attended schools with students in lower academic achieving student in lower SES districts. In comparing NAC and local students' family background, significant differences were also found in terms of their parents' migration background. Consistent with previous studies on Mainland immigrants in Hong Kong, the results suggested that cross-border marriage was widely existed in NAC's family with the majority of their mother were from Mainland China and most of their father were from Hong Kong.

Interestingly, the results of linear regression turned out that only father's birthplace and student's birthplace were significant predictors of students' years of education in Hong Kong. Such findings suggested that NAC tended to have much shorter years of education compared with local students in Hong Kong secondary schools. The findings of linear regression offer potential explanation to NAC's overrepresented in age-inappropriate grade level and low SES school districts. Previous studies on Mainland immigrants in Hong Kong consistently showed that most of the Mainland immigrants were homemakers and students, and the family SES of Mainland immigrants were generally lower than their local counterparts (Home Affairs Department and Immigration Department, 2002, 2007, 2012, 2016).

Thus, it is possible that NAC in Hong Kong are generally distributed in low SES districts and have lower academic ability to enroll in schools with students of higher academic achieving. Moreover, due to the restriction of immigration policies, Mainland wives who marry to Hong Kong men need to wait for a long time before they could also move to reside in Hong Kong, which have resulted in many "pseudo single parent families" (Chan, 2002; Ho, 2006; Law & Lee, 2006; Lo, 2005). This helps to explain the significant effect of father's birthplace on students' years of education in Hong Kong. Since students are more suitable for eligibility

criteria to obtain right of residence in Hong Kong much quicker than their mother, thus they could migrate to receive education in Hong Kong even if only their father is Hong Kong citizen.

In terms of NAC's ICT usage experience at home, the results showed that ICT had been penetrated in every aspects of Hong Kong students' daily life. Typically, the results revealed four categories of daily ICT use, namely information search and learning (ISL), creative use (CU), social life and entertainment (SLE), and online surfing and shopping (OSS). When the comparison between NAC and local students in terms of the four ICT usage type was made, no significant differences were detected in using ICT for SLE and CU, but NAC have significantly more frequent use of ICT for OSS and ISL. While controlling for students' migration background, the result of paired samples *t*-test showed that NAC have significantly more frequent use for OSS than CU. The findings continue to support the preference of NAC in using ICT for OSS in their daily life.

With a careful look on the four types of ICT use, the activities reported in OSS such as "browse Internet without any purposes" and "browse entertainment news" require the least digital skills and knowledge. As opposed to OSS, performing activities reported in CU such as "create or use chart, graph, or tables" and "create or use video or picture" requires and is more likely to develop a broad range of ICT knowledge and skills. Such findings may also reflect a lack of digital literacy among NAC or less opportunity of NAC to develop their literacy skills from daily ICT use, which appear to a potentially worrying sign. Further research into the relationship of NAC's ICT usage and digital literacy is merited. Overall, this study does not only ascertain the differences of ICT usage between NAC and local students in Hong Kong, but also widens the research on technology studies on cultural aspects.

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Part III
Communication and the Media

Conflictual Journalistic Creativity: When Journalists Got Caught in Inconsistent Media Professionalism and Inconsistent Political Ideology

Wendy Wing Lam Chan

Abstract Creativity has been a thriving term ever since we have knowledge. Journalism industry is facing the challenge brought about by the digital world, the long time span on one printed newspaper has become a rare scene. Media pundits try every means to earn the survival of the industry, and creativity becomes the way out. Every breakthrough of knowledge requires creativity. To date, people offer a wide range of definitions on creativity in various fields. To be exact, creativity, in general, is a way that has not yet been adopted by other before. In the domain of journalism, it takes a prominent role for the pundits' survival in the competitive media environment. As such, the thrust of narratives about journalistic creativity begin to take its shape. The article examines the debates about whether journalism has creativity in its competitive industry, and in the conflictual environment, what are the drive factors that catalyst creativity. We carried out 15 in-depth interviews with the experienced reporters and editors working in the frontline media environment, findings showed that all of them agree creativity has taken place in the industry. Closely aligned to journalistic creativity, inconsistent political ideology and inconsistent media professionalism have played inevitable role to the formation of journalistic creativity.

Keywords Creativity · Journalism · New media · News writing · Traditional media

1 Introduction

In the twenty-first century, the survival of journalism has been a pressing issue for the journalism industry in the whole world. Every news organization opts for a marketplace, and keeps the capital flow in order to make sure the operation of their publications. It is said that the competitiveness of media companies depends on an

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exceptionally high degree of day-to-day management of creative professionals, because the design and production of media content and products is an ongoing process of creation (Malmelin & Virta, 2015). Globally, it is a trend that media have taken many forms in presenting news that is closely aligned to creativity. Often, we can see that the news organizations adopt different approaches to present the news, for instance, they use creative headlines, draw comics and even employ comics, etc., to catch the eyeballs of the readers and audiences. Established news organizations, for example, BBC also emphasizes on journalistic creativity and run training courses on creativity; on the other hand, South China Morning Post also emphasizes that they need some energetic and creative young reporters to write the news articles. Undoubtedly, news presentation style evolves so as to survive in the increasingly competitive news markets. Previous studies state the relationship between creativity and journalism (Fulton, 2011; Malmelin & Virta, 2015; Gardner, 2011); and the definitions of creativity are well explored in various fields, for example, social psychology, looking at the flow theory of one's mind (Csikszentmihalyi, 1996; Runco, 1997), but seldom research sheds light on conflictual environment in the media organizations, in which uses its lens to view journalistic creativity. As to keep abreast with the nowadays trend, we see the journalistic style changes, thus creativity takes place, and creativity exploration is a timely matter to be discussed.

Hence, the present empirical study aims to explore underlying factors that contribute to the creativity in journalism among individuals in journalistic environment. It breaks a fresh ground in explaining the journalistic creativity formation of individuals in journalistic environment.

2 Concept Explication of Journalistic Conflictual Environment

Conforming environment and conflictual environment becomes two dichotomies in the newsroom environment. Conflictual environment refers to the incompatible environment that created by inconsistent media professionalism and inconsistent political ideology that reporters often have to face. This phenomenon is a complete opposite to the conforming environment. Through anticipatory socialization, one may easily find media organization that has relatively more or less the same kind of values with what they learnt from their peers, parents, and school. However, this does not necessarily mean that conflictual moments could not be found as such. They often found themselves go through a process of learning, relearning, and unlearning. During the conflictual environment, they need to relearn skills and techniques so as to fit the environment. Somehow, they even need to unlearn so as to please the boss for climbing up the ladder in the hierarchies of the newsroom. There are seemingly a lot of reasons for contributing to the conflictual environment.

However, as an individual reporter, when it comes to maintain their judgments and values, they have to get around the ban, and relies on other ways to play the edge ball, this is what Scott (2008) calls it "the weapons of the weak."

Conflict, in general, is defined as "behavior expectation related to one social position they occupy conflict with expectations related to another. The conflict is most intense when contradictory expectations are experienced in the same social setting" (Zurcher, 1983, p. 77). By applying this definition in the newsroom, conflicts found in the newsroom are related to all sorts of reasons, including political pressure from the parties or government, or office politics, etc.

Journalists consider themselves responsible to their audience but not their corresponding news organization or agency. Journalists refuse to argue with the positions taken by news companies that may go against the public interests. According to Breed (1955), conflicts in the newsroom are in various ways, such as featuring a pro-policy item and burying anti-policy story. More than that, Bantz (1985) says, in terms of the development of organizational cultures in news work, there are five major factors leading to the conflicts, for example, news worker distrust and dispute; set of professional and business norms; entertainment and professional norms; controlled competitions arise from pressures both toward competition and toward cooperation in news work; and the nature of news products.

However, researchers note that competition, contest, and possible conflicts would help fight for excellence (Shields & Bredemeier, 2010). It is highlighted by prior studies that there are potential advantages of conflict in the interaction between problem-solving groups. Under such an environment, idea quantity is not only enhanced, but useful and unique insights into group brainstorming could also be provided (Goldenberg & Wiley, 2011).

Therefore, we put forward the research questions as follows:

RQ1. What is meant by journalistic creativity?
RQ2. What are the driven factors in the conflictual environment give rise to journalistic creativity?

3 Methods

Fifteen news professionals working and staying in Hong Kong were interviewed to collect information and gather the gist of creativity in various media organizations, including newspaper, magazines, TV production and news platforms online, and it is not within the local context, also from the US, Sweden, Taiwan, and China for the study, they all have 10 years or above experience, as shown in Table 1.

Interview transcripts were typed and read in full, and the coding scheme was employed to analyze the data as DeCuir-Gunby, Marshall, and McCulloch (2011) said "analyzing interview data is a multiple "sensemaking" endeavor […] and to

Table 1 Profile of the interviewees

ID	Gender	Interview date	Interview time
M1	Male	07/04/2015	1 h and 14 min
F1	Female	11/04/2015	32 min
M2	Male	20/04/2015	34 min
F2	Female	21/04/2015	24 min
M3	Male	22/04/2015	1 h and 2 min
F3	Female	23/04/2015	47 min
M4	Male	24/04/2015	43 min
F4	Female	28/04/2015	41 min
M5	Male	30/04/2015	32 min
M6	Male	12/05/2015	32 min
M7	Male	14/06/2015	1 h and 12 min
M8	Male	07/07/2015	1 h and 15 min
M9	Male	03/08/2015	45 min
M10	Male	05/08/2015	1 h
M11	Male	12/08/2015	1 h and 10 min

use a codebook as a means of analyzing interview data" (p. 137). Therefore, open coding, axial coding, and selective coding were used to analyze the data. At the first stage of data analysis, open coding was adopted so as to analyze the interview line by line to give label some keywords and categorize phenomenon, so as to find the pattern base on the grounded theory (Glaser & Strauss, 1967; Corbin & Strauss, 2008). In the end, the result of qualitative interviewed were interpreted and further discussed in order to fetch a meaningful and insightful understanding of journalistic creativity in the context of journalism.

4 Findings: Factors in Relation to Journalistic Creativity

4.1 Influence Brought by Inconsistent Media Professionalism to Journalistic Creativity

When people touch upon the thrust of media professionalism, there seems to be a lot of debates concerning on how to define this term. Media practitioners learn this through their experience and their passion toward this industry have laid a strong foundation to their pursuit of consistent media professionalism. However, the media environment could never be as perfect as it is in our imagination, where conflicts are often found that potentially threaten the media professionalism that cadet journalists and experienced journalists upheld, as what F1 puts it, "good journalism is not just about the inverse pyramid, you have to go beyond that model." (F1). In light of this, inconsistent media professionalism could achieve journalistic creativity when the below scenarios happen in the workplace:

(1) Journalists' roles clash with organization's interests

M8 has asked for the boss's approval to buy the shots (the documentary has been kept by mainland investors) only takes around 40 s; however, the boss thought this (only a few second shots) is too expensive, yet he (M8) still wanted to buy the shots, in his point of view, "if I did not have the shots in my video, the video loses its soul" […] an excellent story should pay close attention to (small) area like this. In his narration, media professionalism is about setting the bottom line for the things that he could accept.

Another interviewee came across whether she should report the pure facts or protect the company's interests:

The correspondent that I was working for was trying to get me to interview Winnie Mandela, as a Swedish freelancer, pretending that I had nothing to do with the Sunday Times. It was a bit sneaky and it did not work. She probably noticed the name Sunday Times on the fax message that I sent her to request an interview. That was a funny example of how you have to come up with ideas for how you can solve a problem. It is quite embarrassing for a journalist if the person that you interviewed complained about how the article was written. It happens. I once interviewed a CEO with a big Swedish company, and that caused some trouble for the editor because the company needed to check the article before it was published in case there were something not quite right with it. They found that the CEO in the interview did not sound very smart and the person expressed herself badly in the interview. The wordings, the phrases, I just took the phrases word for word, and very precisely, but she sounded very dumb actually, a little bit uneducated or something, so this had to be corrected. The article was changed quite a lot. You do not want to be too creative and you just want to try to give a fair reflection of what this person said. (F2)

(2) Journalist's media professionalism does not equate to only conforming to policy blindly, but also enhancing the quality of the work:

We have limitations of the numbers of words for every headline, and the format of the front page is conformed to a standard format, as it requires you to conform to that, even though if you want to use more words to describe the situation, sometimes you have to use 6 (fewer) words to round it up […] The Internet's titles are also aiming at this standard, if your news title is not good (attractive) enough, basically, no one would spend time on this, and I consider it as a waste. (M11) Similar to the above-mentioned situation, media professionalism is also contradictory to some real-life situation when rules forbid you to get hold of some crucial information, one interviewee made a highlight on this:

M11 offers a numbers of examples concerning the issue of journalistic creativity. Creativity in journalism is a sophisticated concept. One of the examples he mentioned is about Princess Diana.

M11 said, "she visited Hong Kong, one reporter of our newspaper has carried out a lot of research, and he knew that Diana had a habit which is to go swimming every day. Thereby, he took a lot of pictures when Princess Diana was swimming

[…] The reporter is able to capture "the creativity", of course, he has carried out research work […] and this "skills" cannot be taught in the class. (M11)

Following the same logic, by adding some entertaining features into the radio news programme may be contradictory at times:

When carrying out the news reporting, one should not add personal opinions to it, but adding the music is something different. It involves emotions (the radio porgramme), a questions poses to us whether the news report should stick to objectivity? I would argue this is entirely a pure journalistic report, when it comes to current affairs progarmme, then the introduction comes with music will be absolutely not problematic. (F3)

(3) Failure of creativity due to the inconsistent media professionalism

They need me to follow strict formats. It is like cooking a dish, every dish is like this. Sometimes I want to add a little bit more color, more descriptions. One publication I work for told me that I cannot use adjectives. I was very disappointed. (F1)

For example, Ming Pao (a Hong Kong prominent and moderate newspaper), the term "Wolf-Ying" (a term to insinuate the cunning character of Hong Kong Chief Executive) should not be placed in the titles […] If newspaper has to walk a more moderate path or more elitist path, then they should not write the news title in this way. We have some considerations when using these news titles, one is market's forces, whether they accept headlines like this, more often, the media practitioners will only say, "I cannot accept this with my professional standard." (M7)

Another powerful "policy" in the world is the legal terms, and one interviewee put forward her point of view:

I believe the only limitation to media professionalism should be laws. If the news report is not against law, then what you can freely write what is in your mind, this is what we consider freedom of press. Charlie Hebdo is a bad example, they attacked people. As an individual, you can consider what to write and what should not appear in your piece; however, as a media, you cannot set a limitation or boundary to the reporters. (F3)

4.2 Influence Brought by Inconsistent Political Ideology on Journalistic Creativity

Deuze (2005) and Eide (2007) mentioned about the relationship between popular journalism and professional ideology, and Deuze also said, "media culture and popular culture are increasingly difficult to classify" (p. 861). Media culture and popular culture can be closely linked to inconsistent political ideology as creativity is also found on politics side of news information. The way the media practitioners present their ideas could be fully reflected on their day-to-day journalism. In light of

this scope of discussion, we can see there are three major points that they tried to bring about: (1) change the narrative structure; (2) adopt sarcasm to play the edge ball.

(1) Change the narrative structure

Changing the narrative structure is a must for bringing about "journalistic creativity." In the case of corruption in the government, the reporter or the news organization may risk themselves in many political accusations, here is how the reporter deals with this:

First, the big story is the corruption. And from that corruption story, I would find the story from the big story, like the big story was the corruption. The next story would be who the participants of the corruptions are. How was it carried out? The method of how the corruption took place? The money inflow, what laws were violated, what are the punishment? The major players were stories from the big stories. You frame it in such a manner, there are small stories from the big story. Not only different angles, in the big story, you can get the details, like how the money was got the cash that they stole, so they need to keep their money in a secretive manner. In this way, the story would be more believable and would interest the public, definitely would impress the people by presenting what is really happening. The little clues would offer the audiences a big picture. (F6)

Similar narrative structure can be found in M3's case:

There is a case that I came over when I was doing the reporting. The main character of the story is about an elderly woman who takes care of the discharged prisoners. As those discharged prisoners have long been in prison, some of them were abandoned by their family members, when they are out of the prison, they find themselves hard to live and work in the society. This elderly woman would like to include them in her house. This story was reported by other media, and when I read through the whole story, I found something very intriguing. I discovered that this elderly lives in Shanxi, and those come to her are from different parts of the world. The number is growing so much, and there is even referral from the government. I found this story not making sense, later I found that government takes advantage of this elderly woman, and without giving her any subsidies for her to help with these discharged prisoners. From this small story, there is a bigger story, government did not effectively follow up with the life after they are discharged from prison. (M3)

M7 made use of arranging the fact by highlighting the misdeeds of the "characters" in the news articles:

The actual operation of newsroom is not about routine work, but also includes aesthetic side of it. When you write the article for people to read, and neglect their feeling and response, then it is considered as a failure. For example, news seldom employs creativity to wrap the story, it is through arranging facts, what do you want to put it under the lens. For instance, Chief Executive Leung Chun-ying's home was found to have unauthorized building works. By presenting the basic fact, it has been very impactful […] but you will not write a story about the illegal building work of a common family's house. It depends much on our perspective, who should we

supervise, we are not here to supervise general public, our responsibility is to supervise those who are in power and rich. Because by unfolding these stories, we can make sure the society will not be that extreme and unfair. You may ask why we are that demanding toward them […] the standard is, when you get hold of the power, you have to accept that we will use magnifying camera and optical microscope to look at you. (M7)

Creativity sometimes also lies on the reporter's instinct on the issue:

I wish to talk about the Control of Obscene and Indecent Articles Ordinance, as when I tried to discuss with others about this ordinance, I spotted out some fundamental problems of this. I believe those materials that are considered obscene could not be reviewed before it is out on the market. How can one define the term "indecent"? The government did not clearly state which material should be under control […] Government does not have the courage to answer whether they will also place this control on the published work, and the published work mainly includes newspapers and magazines. Thereby, I mentioned this concern in one of my editorials, highlighting that if this law is passed, government has the right to control over publication. The, freedom of press in Hong Kong will completely lose form that day onwards. After this editorial is published, other media forward this piece, after 3 months, then government backed off. (M2)

(2) Adopt sarcasm to play the edge ball

One thing is very clear, for the past 20 years, if we (media) discuss the theme "June fourth," the mainland China will need to suppress, or the magazine cannot survive […] During 1980s, the third plenary session mentioned about revolution. The media in the mainland China have to play the edge balls, when there is green light on, people keep running; when the red light is on, then they have get around the ban, the way we put it would be running detour. (M2)

5 Discussion

5.1 Conflictual Creativity Resulted from Inconsistent Media Professionalism and Inconsistent Political Ideology

Conflictual creativity cannot be explained with simple words as it requires a context. From the interviews this study had carried out, they sort out some "ways" to play the edge ball. It can be divided into three parts. First, posing a challenging question, second, rearranging the fact in the news stories; and thirdly, adopting innovative news presentations to avoid being banned.

By posing a challenging question, it is a trick to obtain an answer (Ryan, 2005; Cohen, 1989). A lot of people avoid camera; it is rare for the reporters to get a chance to actually throw questions to the interviewees. If they get the chance, they are advised to ask challenging questions that require the interviewees face the

issues. Their answers are considered precious to the general audiences. This is especially pertinent to the situation that the politicians are getting away from the complex situation with a prepared script. However, if the reporters ask a right question, even they do not necessarily offer an answer, a facial expression reacted to the question would explain his thoughts. More than that, asking a good question would always bring an excellent answer, it is reporters' responsibility to do research beforehand, and grasp the chance to obtain answer whenever they are situated in the press conference, carry out reporting or interview the key figures.

Rearranging the fact in the news stories is also a key that could be categorized as journalistic creativity. This is closely aligned to changing the narrative structure of the stories. When media practitioners talk about rearranging facts, they are trying to play tricks on organizing the timeline for the stories. By rearranging the facts, they are able to point out the misdeeds of the characters in the news stories. For example, political figures like Hilary Clinton, currently running for presidential election, her mishandling of emails have been dug out for investigations. This incident, again, implies that the arrangement in the narrative structure is not limited at the writing, but go beyond that, reporters could pay special attention to the happening time of the incidents.

Adopting innovative news presentation to avoid the stories being banned or get the audiences' attentions (Machill, Köhler, & Waldhauser, 2007; Iyengar & Kinder, 2010). A lot of news stories, for example, stories related to political figures. Corruption cases are very hard to be dealt with. According to the interviews shown above, there are potential loss from the news organizations because the drop of existing advertisements and potential advertisers. Innovative news presentation would be a way out that may break the tradition of journalism. In the old days, people will not very likely to accept the presentation of Question and Answer, but now, financial stories would adopt approach like this. For sensitive political stories, reporters bring small stories into a bigger context so as to arouse the public attention, taking a less risky approach, more about "let the evidence speak for themselves."

6 Conclusion

6.1 Inconsistent Media Professionalism Will Not Be Considered a Factor to Journalistic Creativity

Inconsistent media professionalism, however, as pointed out by interviewees contributed to the failure and also the success of creativity. Reporters are forbidden if they want to make the work "a little bit more creative." But every coin has two sides. Though sometimes reporters encountered restrictions on publishing their work, still, some of them believe by conforming to media professionalism is not the only way to achieve excellent work in journalism. Reporters want to hold the readers' attention, and mere media professionalism cannot help them achieve this.

They need to adopt quick-wit and skills to package the story well. The media environment, or the society, however, not always offer you to facilitate a proper reporting. Thereby, these groups of reporters attain "creativity" with their years of experience. They break the boundary, and able to obtain "first-hand information" that protect the society's interests and unfold the dark side of the society.

6.2 Political Pressure Inside Out Contributed to Journalistic Creativity

In short, in the form of traditional and social media, reporters always find themselves trapped into the dilemma of political pressure from the news organizations and also from the outer forces, for instance, commercial pressure and also political interventions from the government or related political parties. Playing edge ball is a safer approach for reporters to "get things done." By getting the things done means that they can safeguard the role of being a reporter, but at the same time, minimize the possible lost that the news organization has to bear. In applying the skills to get around the ban, reporters think about a number of ways to achieve this, for example, adopting sarcasm in their writing, and more commonly, change the narrative structure to bring the focal point under the spotlight. Creativity is reflected from their ways to solve the problems aroused by the political hurdles during their day-to-day journalism.

7 Limitations and Further Studies

This study has a numbers of limitations. This study mainly focuses on journalistic creativity instead of media creativity. Most of the respondents form the interview pool is coming from the level of experienced journalists working in news reporting majorly. Majority of them are reporting hard news instead of soft news. Besides, most of the interviewees are working in Asian context, only a few of them come from overseas news companies or agency. Therefore, it may fail to generalize the overall global scenario, which considers a failure in generalization of the media trend in this day and age. All the face-to-face interviews were done between me and the reporters. These reporters have to uphold the principles of media professionalism in front of the recorder, and carry the risk of giving a desirable answer as such. Future study would be encouraged to conduct this with young reporters when they are more green to the environment. Further studies could be carried out by including survey study so as to generalize the environment better, while looking at journalistic creativity as this issue.

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Emoticons and Emotions: Exploring the Roles of Emoticons in Emotional Representativeness, Awareness and Management

Wing-Yan Lau and Chi-Keung Chan

Abstract This study examines the relationship between emoticons and emotions, specifically, exploring the roles of emoticons on emotional representativeness, awareness and management. This study hypothesizes that the combination of text and emoticons has the greatest effect on emotion representativeness, awareness and management. Also, the effect of emoticons is moderated by the users' emotions. A 3 (emotions: joy/fear/sadness) × 3 (message patterns: using emoticons only/using text only/emoticons plus text) factorial experimental design was adopted in this study. 154 participants were recruited from a private college in Hong Kong and they were randomly assigned to one of the nine conditions. The results showed that there was no significant main effect of message patterns on emotional representativeness, awareness and management. The main effect of emotions was only significant for emotional management. The interaction effects between emotions and message patterns were also insignificant. This study provides some new insights to understand the roles of emoticons in expressing emotions in Instant Messenger.

Keywords Emoticons · Emotions · Message patterns

1 Introduction

Instant Messenger (IM) is an important tool in computer-mediated communication (CMC). The total worldwide number of IM accounts is over 3.3 billion (The Radicati Group, 2013). Unlike face-to-face (F2F) communication, IM is quite different from a live communication, for instance, emotion expressions and non-verbal behaviors. The debate between the interaction style of CMC and F2F

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has been ongoing. Some researchers argued that CMC is impersonal and affects the quality of communication (Jenson, 2005; Rice & Love, 1987). However, more recent studies have provided a different view on CMC. They found that people are easier to express their emotions in CMC and this produces positive changes in emotion states (Derks, Bos, & von Grumbkow, 2008b; Huang, Yen, & Zhang, 2008). For expressing emotions in CMC, emoticons/graphic emotions are commonly used. These emoticons help one to add emotion expressions to the text-based communication (Derks et al., 2008a). In order to better understand the emotional expressions in CMC, it is important to examine the linkage between the emoticons and users' real emotions. Thus, this study aims at investigating the role of emoticons through emotion-focused model.

Emoticons are created by punctuation characters :-) or graphical symbols ☺ that are similar to facial expressions (Huffaker & Calvert, 2005; Walther & D'Addario, 2001). Many studies found that emoticons are used for entertainment, information and social interaction (Derks et al., 2008a; Walther & D'Addario, 2001). Emoticons also emphasize a tone or meaning during message creation and interpretation (Luor, Lu, Wu, & Tao, 2010; Walther & D'Addario, 2001). However, the effect of emoticons depends on the specificity of the message. When the text message is presented unclearly, emoticons are the supplementary cues to interpret the message (Wang, Zhau, Qiu, & Zhu, 2014). Consequently, emoticons are important for message users to express themselves and to make the messages more understandable. In fact, emoticons are used across various situations. With emoticons, people are more willing to express their positive emotions as well as negative emotions in CMC (Derks et al., 2008a). In addition, emoticons can be used to show empathy on the online psychotherapy. Emoticons are also used to facilitate a welcoming environment for the client in the Internet mental health practices.

Due to the potential roles of using emoticons in enhancing the non-verbal message in CMC, it is interesting to further explore the emotion expression through emoticons. Previous studies provided the foundation of studying emoticons. However, they rarely discussed about the representativeness of emoticons and their psychological impacts on the users. If emoticons are influential, are they presenting the users' authentic emotions? In other words, do these emoticons represent the true emotions of the users? Also, is the usage of emoticons possibly help us to recognize and to manage our emotions?

Thus, this study examines the roles of emoticons through the framework of emotion-focused therapy (EFT). EFT is a self-organization process to make sense of our emotions (Greenberg, 2004). This study integrates the concepts of EFT to the usage of emoticons in CMC. Three principles of emotional processing are required in EFT: (1) increasing emotional awareness, (2) enhancing emotion regulation and (3) transforming emotion. In this study, the authors only focuses on the first two principles. The purpose is to understand the relationship between emoticons and emotions as well as to understand the emotional representativeness of emoticons. Furthermore, this study aims to investigate the emotional awareness and management of using emoticons. The study can possibly provide a new direction of studying emoticons with a psychological framework.

1.1 Emoticons and Emotions

The main function of emotion is to communicate one's feelings, motives, and needs to both oneself and others (Bowlby, 1991). Emoticons might have similar ability to act these functions in CMC. Emoticons are found to strengthen the intensity of the message in IM. They can not only serve some of the functions as actual non-verbal behavior, but also complement and enhance verbal messages (Derks, 2008a; Tossell, Kortum, Shepard, Barg, Rahmati, & Zhong, 2012). A previous study examined the relationship of emoticon use, enjoyment and information richness (Huang et al., 2008). The results showed that emoticons eliminated some difficulty in expressing personal feelings in words. Indeed, people believe that emoticons can express their feelings in a more concrete way.

1.2 Different Message Patterns in Expressing Emotions

Message pattern is an important component to study the influence of emoticons. It can be basically divided to pure text, emoticons and the combination of text and emoticons (Derks et al., 2007). For pure text, self-report can help users' to express his/her emotions explicitly (Tetteroo, 2008). Despite texting, emoticons can enhance written communication in the same way as visual or language supports verbal communication (Derks et al., 2008a). Also, emoticons can strengthen the intensity of the message, such as a positive message with a smile emoticon is more positive than a pure positive text message (Derks et al., 2007). In addition, the meaning of emoticons can be deduced if the message does not include text (Salló, 2011). From these previous findings, it is argued that the combination of text and emoticons may be a better way to express emotions in CMC.

1.3 Representativeness of the Emoticons

People use emoticons to express their emotions in the message. Derks et al. (2007) stated that people use more negative emoticons in negative contexts and more positive emoticons in positive contexts. Thus, there is a consistency between emotions and emoticon usage in a message. However, some studies found that emoticon usage may obfuscate the meaning of the message and receivers may misunderstand the emotions of the senders (O'Dowd & Ritter, 2006). The reason is that people may not have an accurate interpretation of the meaning of the emoticons used in a message. Therefore, the emotional representativeness of emoticons is an interesting and important issue on studying the emotion expression in CMC.

1.4 Emotion-Focused Therapy (EFT)

The goal of Emotion-focused Therapy (EFT) is to help people to become aware of, accept and make sense of their emotional experiences (Greenberg, 2004). They help people to regulate their emotions and not become stuck in strategies which may lead to disorientation and incongruence (Greenberg & Paivio, 1997).

Emotional awareness is the first and important process of recognizing the primary emotions. According to Greenberg (2004), people should be aware of their feelings in order to be well understanding of their emotions. It encourages people to explore and make sense of their emotional experiences. The goal is to lead to the acceptance of their experiences after the awareness (Greenberg, 2004).

The second level of processing is emotional regulation. It tends to deal with secondary emotions and maladaptive emotions (Greenberg, 2004). Emotional regulation addresses different causes of developing the maladaptive emotions, such as cognitive factors (beliefs about threat and security), emotional factors (avoidance and management of emotional experience) and contextual factors (patterns of relating to others and the environment) (Mennin, 2005). This study focuses on the emotional aspect, therefore emotional management can be examined specifically under emotional regulation.

1.5 Emoticons, Emotion Awareness and Emotion Management

There is not much research about the relationship between emoticons and emotional awareness and management. Emoticons are created based on human facial expressions (Walther & D'Addario, 2001). Facial expression can produce corresponding to feelings, emotional experience and emotional intensity (Silvia, 2002). People can understand and interpret others' and their own emotions through facial expression. Facial expression is also a cue to manage emotional experiences (Burgoon & Hoobler, 2002). Studies supported that facial expression is the channel to manage and regulate emotion expression. Reading the facial expressions is a vital component of emotion appraisal and expression (Ekman, 1965; Izard, 1990). It is argued that emoticons can be assumed to serve the similar functions as facial expression. People may be aware of their emotions and manage their emotions through viewing and typing the related emoticons.

According to the previous literature, this study examines the emotional representativeness, awareness and management of emoticons under different message patterns and emotions. Studying emotional representativeness of emoticons is an important first step before incorporating emoticons into EFT perspective. The possible effect of using emoticons on emotion awareness and management would also be investigated. This study also examined the effect of emoticons under

different emotions and message patterns that can influence the outcome of the emotional representativeness, awareness and management.

1.6 Conceptual Framework and Hypotheses

Figure 1 shows the conceptual framework for this study. The emotional representativeness, awareness and management are the dependent variables in this study. Three message patterns (text only/emoticons only/emoticons plus text) are selected in this study. Two research questions were developed: (1) Does a message have greater emotional representativeness when using the combination of text and emoticons in the message? (2) Does a message including text and emoticons facilitate greater effect on (a) emotional awareness and (b) emotional management?

Besides, this study examines the emoticons under several emotions. Three primary emotions (joy/sadness/fear) were studied. As people need more explanation to express emotions in negative situations, studies indicated that people would use fewer emoticons under negative contexts in the messages (Derks et al., 2007). In addition, the use of emoticons decreases when people are under emotionally intense situations, such as extreme emotions of anger or guilt (Kato, Kato, & Scott, 2009). Therefore, it is assumed that emoticons would have lower effect under negative emotions. Therefore, the third research question is: (3) Do emoticons have stronger effect on emotional representativeness, awareness and management in expressing positive emotions?

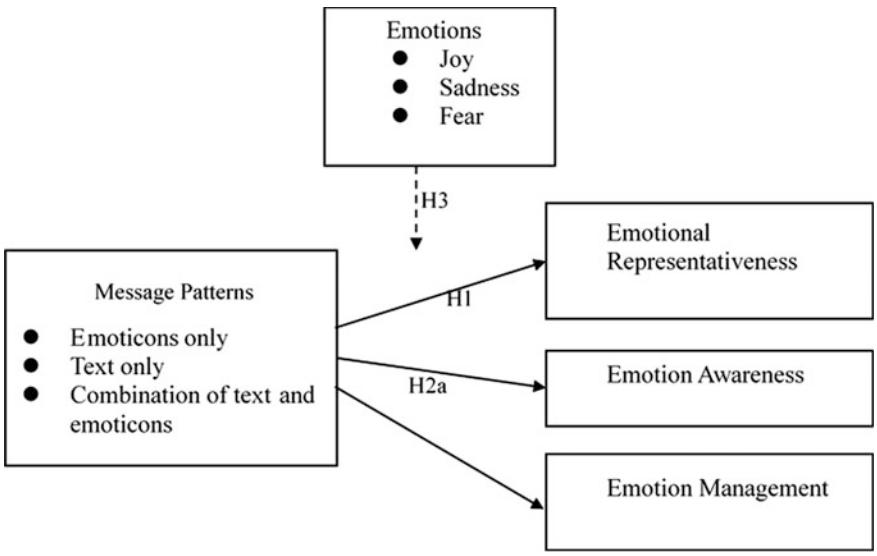

Fig. 1 Conceptual framework for this study

There are three hypotheses in this study. First, it is hypothesized that the emotional representativeness is stronger when the message includes text and emoticons. Second, it is hypothesized that the message including text and emoticons can facilitate better emotional awareness and management. Third, it is hypothesized that emoticons have significant stronger effect on emotional representativeness, awareness and management in a positive emotion state (e.g. joy).

2 Method

2.1 Participants

Initially, 154 university students at a private college in Hong Kong participated in this study (with informed consent) and they were randomly assigned to one of the nine experimental groups. Each condition included a combination of one of the three emotion states (joy/sadness/fear) and one of the three message patterns (emoticons only/text only/emoticons plus text). Thus, this experimental study adopted a 3 × 3 factorial design.

This study examined the emotional representativeness, awareness and management under different combinations of condition (emotion states × message patterns). Emotion state and message pattern are the two independent variables in this study. For the emotion state, this experiment induced three emotion states using three corresponding video clips. The purpose of this emotion induction was to imitate the situations which people use instant messengers to express emotions under different emotions. For the message pattern, three conditions were included, that is, emoticons only, text only, and emoticons plus text. In short, this study examined whether different combinations of message patterns and emotional states have significant differences the emotional representativeness, awareness and management.

2.2 Measures

Emotional representativeness. It was measured by a self-developed item. This item was 'What level does the message represent your real emotions?' The participants rated this item with a 7-point Likert scale (1—strongly disagree to 7—stronly agree).

Emotional awareness. Emotional Self-Awareness Scale (Reid et al., 2011) was used to measure the emotion awareness of the participants. The Cronbach's alpha of this scale is 0.83. Two subscales were adopted from the original scale: recognition and identification. These two subscales were chosen because they had similar function as the emotional awareness in EFT. There were a total of 10 items for

emotional awareness. The participants anchored each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). These items measured the participants' emotional awareness after typing the messages. A higher score represents higher emotional self-awareness.

Emotional management. It was measured by a self-developed items based on the Cognitive Emotion Regulation Questionnaire (Garnefski & Kraaij 2006). The reliability of the subscales ranged from 0.75 to 0.86. Five subscales (Acceptance, Rumination, Positive reappraisal, Refocus on planning) were adopted in this part. There were a total of 8 items and participants rated each item on a 6-point Likert Scale ranging from 1 (strongly disagree) to 6 (strongly agree). A higher score represents higher emotional management.

2.3 Procedures

To prevent the confounding effect of one's personal emotion, a screening pretest was first administered to select the participants who were at the stable emotional state. The Emotional Rating Scale (ERS) was adopted as the screening test. The Cronbach's alpha of this scale is 0.93. ERS is consisted of 36 items. The participants rated each item on a 4-point Likert scale. There were 150 participants with an average score in between 2 and 3 on ERS were considered to have stable emotional state and they were randomly assigned to one of the nine groups. There were 97 (64.7%) female and 53 (35.3%) male students in this study.

Based on the experiments from Fredrickson (2013), three self-produced video clips with similar length were used to induce three primary emotions: joy, sadness and anger. The video clip of joy showed that a family prepared a self-made ball pit at home and played with excitement. For the sad video clip, a scene of a little girl lived under a war situation. The fear video clip showed a scary story in the bedroom. To ensure the validity of emotion induction, the three video clips had been viewed and rated by 30 raters prior to the experiment. To reflect on the feeling through emoticons, participants must key a message (emoticons only/text only/emoticons plus text) on a provided mobile device with Whatsapp application. For the emoticons, participants could only type the emoticons with face expressions. A preliminary study was conducted to develop a coding scheme for categorizing the emoticons/words into related emotions. Table 1 shows some samples of the coding scheme.

In addition, a manipulation check was performed to assess the effect of emotion induction. Researcher analyzed emotion induction through the message from the participants. There was a coding scheme to test the consistency between the message and the induced emotions. For the emoticon group, their messages were examined with the emoticon coding scheme. For the text group, their messages were checked by the coding scheme of emotion words. Both coding schemes were developed from the preliminary study by a team of few raters.

Table 1 Samples of coding scheme for emoticons and emotion words

	Emoticons	Emotion Words
Joy		開心(joy)、輕鬆(relax)
Sadness		傷心(sad)、悲哀(sorrow)
Fear		驚嚇(scary)、害怕(fear)

Then, participants were randomly assigned to one of the conditions and were arranged to sit in front of a computer (with headphones) to watch one of the video clips in a laboratory. The rationale is to induce emotions to the participants. After watching a video clip, participants were given instruction to reflect on their feelings through a message pattern. A mobile device with Whatsapp application is provided in this part. They were requested to send the message to the researcher. Then, participants completed a questionnaire on emotional representativeness, awareness and management. A debriefing session was provided after the participants completing the questionnaire.

3 Results

The two-way ANOVA analyses were conducted to analyze the data to test the main effect and interaction effect of the message patterns and emotions. In other words, it examines the main effects and interaction effect of two independent variables on the emotion representativeness, awareness and management.

3.1 Screening and Manipulation Check

From the screening test, there were 150 participants (97.4%) had an average score between 2 and 3. It represented that most of the participants in this study were in stable emotional state. Only four participants (2.6%) who scored 1 or 4 and their data were excluded from this study.

For the manipulation check of emotion induction, there were 136 participants' messages (90.7%) which matched over 85% with the coding scheme. The results of this manipulation check indicated that the video clips successfully induced the emotions to most of the participants. There were 14 participants' messages (9.3%) which matched less than 85% with the coding scheme. It showed there were differences in presenting the emotions through instant message.

3.2 Emotions and Message Patterns

In this study, we hypothesize that emoticons have the lower effect on emotional representativeness, awareness and management. Two-way ANOVA was employed to test the interaction effect of emotions and message patterns on emotional representativeness, awareness and management. The emotion × message pattern interaction effect on emotional representativeness was not significant, $F(4, 141) = 0.297$, $p = 0.879$, $\eta^2 = 0.008$. The emotions × patterns interaction effect on emotional awareness was also not significant, $F(4, 141) = 0.316$, $p = 0.867$, $\eta^2 = 0.009$. Finally, the emotions × patterns interaction effect on emotional management was not significant, $F(4, 141) = 1.714$, $p = 0.150$, $\eta^2 = 0.046$. The two-way ANOVA results that the effects of message patterns on emotional representativeness, awareness and management were similar across different emotions.

3.3 Main Effect of Message Patterns

The results showed that there was no significant difference on emotional representativeness between three message patterns, $F(2, 141) = 0.758$, $p = 0.470$, $\eta^2 = 0.011$. Also, there was no significant difference on emotional awareness between three message patterns, $F(2, 141) = 0.018$, $p = 0.982$, $\eta^2 = 0.001$. Finally, there was no significant difference on emotion management between three message patterns, $F(2, 141) = 1.874$, $p = 0.157$, $\eta^2 = 0.026$.

3.4 Main Effect of Emotions

No significant difference on emotional representativeness between three emotion states was found, $F(2, 141) = 1.671$, $p = 0.192$, $\eta^2 = 0.023$. There were also no significant difference on emotion awareness between three emotion states, $F(2, 141) = 1.911$, $p = 0.152$, $\eta^2 = 0.026$. There were significant differences on emotion management between three emotion states, $F(2, 141) = 6.639$, $p = 0.002$, $\eta^2 = 0.086$. These results indicated that different emotions affected the emotion management. Further analyses revealed that joy emotions ($M = 4.38$, SD = 0.59) had significant better emotion management than sad ($M = 4.11$, SD = 0.45) and fear emotions ($M = 4.01$, SD = 0.56).

4 Discussion

Communication through Instant Message becomes part of our lives. Effective communications include words, symbols, facial expressions and body languages (Hasson, 2012). Several previous studies supported that emoticons become a supplementary of interpreting the emotions in Instant Message (Derks et al., 2008a; Luor et al., 2010; Wang et al., 2014). This study investigates the role of emoticons in expressing our emotions with an emotion-focused therapy model. Specifically, this study examines the emotional representativeness, awareness and management of using emoticons only versus text only as well as combination of emoticons and text (different message patterns). Furthermore, the present study examines the effect of emoticons under different emotional states (joy, sad and fear).

First, it is hypothesized that mixed message has the greater effect on emotional representativeness, awareness and management. However, the results showed that there was no significant difference on emotional representativeness, awareness and management between the message patterns. This indicated that the effect is similar in using different patterns to deliver the message. Walther and D'Addario (2001) stated that the message pattern did not generate different interpretations of emotions when the messages contained or without emoticons. The emoticons may only be the cue of complementing verbal messages but not enhancing or contradicting the content of the messages. This explanation suggested that the message containing emoticons is similar to the message in pure text in terms of emotion expression.

In addition, a study stated that emoticons have been considered to be used in a way similar to the text message in expressing emotions (Thelwall, Buckley, Paltoglou, Cai, & Kappas, 2010). Also, emoticon is a cue to convey the emotion in text messages (Hogenboom, Bal, Frasincar, Bal, De Jong, & Kaymak, 2015). In present study, we found that individuals do not develop better emotional awareness and management through mixed messages. These results imply that messages with emoticons have similar effect of recognizing and managing our emotions as text messages or in a combined form.

As the study from Derks et al. (2008b), emoticons are used habitually and unconsciously over time. Therefore, individuals may not necessarily use emoticons to express their emotions but only have the intentions and motives to use them. This study showed that the usage of emoticons did not represent users' emotions better than other message patterns. Thus, it can explain that the messages with emoticons may not enhance the better effect of emotion awareness and management than other message patterns.

Although no difference was found between the message patterns in this study, the descriptive results showed that all three message patterns were possible to represent part of the users' emotions (4.83–5.15 on a 7-point rating scale) and it can enhance the individual's emotional awareness (4.08–4.09 on a 6-point scale) and emotional management (4.09–4.26 on a 6-point scale). In other words, they were able to recognize and manage their own emotions through expressing in the instant messages with different message patterns.

Derks et al. (2008a) found that people used the least emoticons in negative context. The reason is that people have to explain the situation accurately through text. However, the present study showed that there were no significant interaction effect between the emotions and message patterns on representativeness, awareness and management. It represented that emoticons have the similar effect from other message patterns under negative emotions. It can be explained that the emoticons had the similar level of explaining the negative emotions as the function of text.

In addition, previous research showed that people express more emotions under positive contexts than in negative contexts (Lee & Wagner, 2002). In general, expression of positive emotions is more acceptable than negative emotions in instant messages. In this study, the results showed that there was a significant main effect of emotions on emotion management. The joy emotions had significant stronger effect on emotional management than the negatives (sad and fear). This implies that positive emotions support people to be easier to facilitate emotional management.

There were several limitations in this experimental study. The representativeness of the sample was a major limitation. Each condition only included 15–19 participants from a private college in Hong Kong and it may not represent the population. Besides, the video clips were selected from the online broadcast channel; therefore, some participants might watch the video clips before. This may cause bias due to their past perceptions to the video clips.

According to Greenberg (2004), the process of emotion-focused therapy is a long-term process. Individual has to experience different levels of recognizing, accepting and understanding to achieve emotional awareness and management. So, another limitation is the design of this study, watching video clips may not completely induce the actual emotions to evoke the emotional awareness and management. Consequently, the results might not be completely presented by only watching the video clips.

Furthermore, instant message communication requires interaction with others. In this study, the participants only presented their emotions with a message. This might not represent the interaction situation in the instant message communication. Interaction with others may have the better effect of recognizing and managing the emotions of the users. Future research can emphasize on the influence of emotion awareness and management through designing an actual interactive communication in instant message.

Future research can further study on other possible effects of people's emotion expression using different message patterns in Instant Messages. To support healthy communication in CMC, it is necessary to further explore the effective methods to express and manage our emotions. For more, future research can also emphasize on different forms of emotional expression in Instant Messages, such as photos, videos, voice message or combinations of emoticons with these different forms. It can provide a better understanding of emotional representativeness, awareness and management using different forms in instant messages.

To conclude, there was little research in viewing the possibility of emoticons as a coping strategy. This study provided a new direction of understanding the influence

of using emoticons in instant messages through an EFT model. Although the results did not indicate that any specific message patterns (emoticons only, text only and combinations of text and emoticons) have better effect of expressing and manage emotions, this study gave a new idea of examining a possible emotion-focused model from instant messages. The application of emotion-focused therapy also provided a useful framework to analyze the influence of different patterns of instant messages.

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Exploring Cultural Differences on Presentation Style of Newspaper Organizations' Facebook Pages

Eiswein Tsz Kin Wong

Abstract Social media has been widely used by newspaper organizations while few researches focus on the role of culture in the presentations of newspaper organizations' Facebook pages. We explore how cultural differences affect newspaper organizations' social media presentation. This research analyzes the content of newspaper organizations' Facebook pages' posts in the USA and Hong Kong to compare how Facebook posts are presented and results show significant differences between news reporting and writing, use of photo and communication process from the USA and Hong Kong newspaper organizations. Although the use of heading does not show significant difference between two districts, the use of lead and simple photo only in USA newspaper organizations are significantly more than Hong Kong newspaper organizations. The use of full article, attracting sentence, hashtag, photo with words, infographics, adding logo on photos or videos and replying comment in Hong Kong newspaper organizations are significantly more than USA newspaper organizations.

Keywords Social media · Newspaper organization · Facebook page · News reporting and writing · Use of photo · Communication process

1 Introduction

Social media like Facebook has changed the way of communication and provided platform for users to receive and spread information. People are free to register accounts on Facebook and edit their profiles. Users can add personal information and photos in their profile, use different tone of words, style of photos, or even

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length of post to build their online image. Recently, newspaper organizations also open their own Facebook page to connect with the large number of users.

Social networking sites have their specific features which make them different from traditional medium. One of the most obvious difference is the writing style among newspaper organizations. As social media has a limit on displaying word at the wall post, users will either ignore the post's content or click 'read more' to read the whole passage if the passage is too long. Most of the newspaper organizations have given up using the traditional format of news article on their wall posts and tried to create a content that fit the reading habit of users.

Some may believe that Facebook is speeding up globalization and culture will no longer influence the online behaviors. However, there are studies which show that cultural effect is appearing on Facebook behaviors (Caers, De Feyter, De Couck, Stough, Vigna, & Du Bois, 2013).

Traditionally, cultural difference affects media presentations (Aday, Livingston, & Hebert, 2005), because newspaper organizations have to be localized and get attention from audiences. Although social media is offering a platform for newspaper organizations to link with the world, the behavior especially presentation differences between different places' newspaper organization and Facebook page is not well defined.

Therefore, this research tries to fill the research gap regarding whether culture influences newspaper organization's presentation on social media.

Thus, the objective of this research is to explore how newspaper organizations' Facebook pages present their idea under different culture. We set the following research questions:

(1) Are there any differences between news reporting and writing between newspaper organizations' Facebook pages' post in USA and Hong Kong?
(2) Does the use of photo different between USA and Hong Kong newspaper organizations' Facebook pages?
(3) Is the communication process different between USA and Hong Kong newspaper organizations' Facebook pages?

2 Literature Review and Hypotheses Development

2.1 Newspaper Organization Revolution

Newspaper organizations no longer want to obtain a one-way communication only and have found ways to interact with their audiences since the development of Internet. They change their platform from traditional one to online platform and increase the interactions with their audiences. The new platform offers four kind of interactions: medium, medium/human, human/medium, and human interactivity (Chung, 2008). As the technology has grown fast in the past two decades, newspaper organizations are not satisfied with their own online platform and turn their

interest to social networking sites. Rogers (1986) stated that technology can influence the performances of communication including both process and product as a reinforcement or constraint.

Bardoel and Deuze (2001) classified the impact of Internet to media organizations into four characteristics: Interactivity, Customization of content, Hypertextuality, and Multimediality.

Social networking sites, especially Facebook, offer platforms for newspaper organizations to release information and interact with their audiences. Because of the huge number of users in Facebook, 1.09 billion daily active Facebook users on average for March 2016 (Facebook, 2016), newspaper organizations try to set up their own Facebook page on Facebook. Messner, Linke and Eford (2011) found that the adoption rate of Facebook by Newspapers and TV stations increased from 86.9 to 94.9% and 81 to 100% in 2009 and 2010.

Facebook allows users to present their information on their wall freely in text, photo, photo and text, video, video and text form as they want. It means newspaper organizations have unlimited space, airtime on Facebook page. Despite presenting their information, newspaper organizations can receive instant response from the audiences. Audiences can give a like to the page they like and receive the page's updates in their News Feed. There are three main actions audiences can take as a feedback, which are Like, Comment, and Share and they are what Facebook calls engagement. Engagement is a measuring scale created by Facebook to evaluate every post. Newspaper organizations not only have to create attractive contents to gain higher engagement, but also have to catch audiences' eyes to make them spend more time to read the posts. Whether a post is catchy or not is higher related to the presentation of the post. Bell (1991) stated that the presentations of news media consist of two parts which are written and visual. The presentations can reflect the society and culture and affect attitudes and opinions of audiences. When it comes to Facebook, newspaper organizations can input text, photo, and video in their posts as the written and visual part of news.

The way newspaper organizations present news on Facebook will affect the willingness of audiences to read the post and audiences engagement to the post.

2.2 Cultural Difference

Social media is designed to connect individuals together and the tremendous growth of it seems to reflect the result of globalization. Although users from different places are gathered on same platform, it is naïve to think people would behave the same on the platform. Wilson, Gosling and Graham (2012) stated that the behavioral data collected from Facebook is very fit to study cultural differences and previous studies focus on topics like cultural differences on social media use (Jackson & Wang, 2013) and motivation of using social media (Kim, Sohn, & Choi, 2011). While few studies focus on cross-cultural newspaper organizations' Facebook pages' presentation style. There are six categories of dimensions in Hofstede's model of nation cultural, namely

Power Distance (PDI), Individualism versus Collectivism (IDV), Masculinity versus Femininity (MAS), Uncertainty Avoidance (UAI), Long-Term Orientation (LTO), and Indulgence versus Restraint (IND) (Hofstede, 2001; Hofstede, Hofstede, & Minkov, 2010). Dimension like Power Distance may affect the presentations of newspaper organization Facebook page, as it means whether the less powerful members of a society accept and expect that power is distributed unequally.

It means the power of newspaper organizations are well accepted by the audiences and the newspaper organizations have not intention to change their presentations to fit the new platform.

We also believe that Uncertainty Avoidance (UAI) affects the presentations. It is about how a society reacts to an unknown event, will they avoid the changes, or adapt the changes? The newspaper organizations in weaker UAI society should accept and adapt a new form of presentation on the new platform.

It is no doubt that culture influences individual's behaviors and style of local media, we believe that newspaper organizations' Facebook pages' presentations would be influenced by culture in four aspects they are controlled by local newspaper organizations.

Heading, lead, and full article are the fundamental elements of traditional newspaper presentation style. While newspaper organizations can change the use of them when they are using their Facebook pages to present their news stories. Also, they can use attracting sentence to attract the audiences to read their news stories. We argue that the use of heading, lead, full article and attracting sentence would be influenced by culture. Therefore, we test the following hypotheses.

H1: The preference of using heading between USA and Hong Kong newspaper organizations' Facebook pages is different.
H2: The preference of using lead between USA and Hong Kong newspaper organizations' Facebook pages is different.
H3: The preference of using full article between USA and Hong Kong newspaper organizations' Facebook pages is different.
H4: The preference of using attracting sentence between USA and Hong Kong newspaper organizations' Facebook pages is different.

Hashtag is a topical marker that indicates the context of the post and core idea (Tsur & Rappoport, 2012). It is a new form of expression from social networking sites' microblogging function and newspaper organizations' Facebook pages can decide to use it or not. We argue the use of hashtag would be influenced by culture. Therefore, we test the following hypothesis.

H5: The preference of using hashtag between USA and Hong Kong newspaper organizations' Facebook pages is different.

Every picture tells a story, while everyone interprets the picture differently. Newspaper organizations can decide to leave room for audiences' imagination, adding words on it to guide the audiences to think or use infographics to directly tell what they want the audiences to know. Also, they can add their logo on the picture

to claim their ownership of the photo. We argue the picture style of newspaper organizations' Facebook pages would be influenced by culture. Therefore, we test the following hypotheses.

H6: The preference of using simple photo only between USA and Hong Kong newspaper organizations' Facebook pages is different.
H7: The preference of using photo with words between USA and Hong Kong newspaper organizations' Facebook pages is different.
H8: The preference of using infographics between USA and Hong Kong newspaper organizations' Facebook pages is different.
H9: The preference of using logo on photos or videos between USA and Hong Kong newspaper organizations' Facebook pages is different.

Newspaper organizations can reply for the comment from the audiences and hence build relationship with them. More communication between newspaper organizations and audiences will make newspaper organizations look more like human beings but not organizations. We argue the reactions of newspaper organizations' Facebook pages would be influenced by culture. Therefore, we test the following hypothesis.

H10: The preference of replying comment between USA newspaper organizations' Facebook pages and Hong Kong newspaper organizations' Facebook pages is different.

3 Method

3.1 Background

We conducted a content analysis on newspaper organizations' Facebook pages to investigate presentation style of USA and Hong Kong newspaper organization. USA newspaper organizations were represented by USA Today, The New York Times, The Wall Street Journal, Los Angeles Times, and New York Post; while Hong Kong newspaper organizations were represented by Apple Daily, Oriental Daily, Ming Pao Daily News, HKEJ, and HKET.

3.2 Subjects

We analyzed the past 20 posts of each newspaper organization started from afternoon 1 p.m. on 11st August 2016 with a sample size of 200. This research analyzed the Facebook pages performance by the presentation of post was analyzed by the structure of post such as whether it consisted of a heading, lead, full article or a not

directly related to news attracting sentence, hashtag and would they reply for comments. Also, the style of photos was also explored, such as whether they got a logo on photos or videos, words on photos, infographics, or they were just pure photos.

3.3 Measures

To measure the district, we used 1 to represent America and 2 to represent Hong Kong. For the availability of heading, lead, full article and attracting sentence and would they for reply comments, we used 0 (*No*) and 1 (*Yes*) to represent their availability and for photo style, we used 0 (*No*) and 1 (*Yes*) to represent whether it is photo only, photo with words, or infographics and also the availability of logo on photo or video.

4 Findings

4.1 Descriptive Statistics

There were 200 data sets. The details were summarized in Table 1.

4.2 Descriptive Analysis of Variables

4.2.1 Chi-Square Test to Test Variables' Relationships Between USA and Hong Kong

A chi-square test was performed and no relationship was found between district and the heading ($\chi^2 = 0.695$, d$f = 1$, $p = 0.404 > 0.05$). Significant relationships were found between district and lead ($\chi^2 = 38.86$, d$f = 1$, $p = 0.000 < 0.05$), district and full article ($\chi^2 = 6.19$, d$f = 1$, $p = 0.013 < 0.05$), district and attracting sentence ($\chi^2 = 55.64$, d$f = 1$, $p = 0.000 < 0.05$), district and reply comment ($\chi^2 = 7.25$, d$f = 1$, $p = 0.007 < 0.05$), district and simple photo only ($\chi^2 = 65.3$, d$f = 1$, $p = 0.000 < 0.05$), district and photo with words ($\chi^2 = 73.97$, d$f = 1$, $p = 0.000 < 0.05$), district and infographics ($\chi^2 = 10.53$, d$f = 1$, $p = 0.001 < 0.05$), district and logo on photos or video ($\chi^2 = 39.31$, d$f = 1$, $p = 0.000 < 0.05$) and district and hashtag $\chi^2 = 126.75$, d$f = 1$, $p = 0.000 < 0.05$) (see Table 2).

Table 1 Descriptive statistics

Subject	Descriptions	Percentage
District	USA	5 (50%)
	Hong Kong	5 (50%)
Heading	Yes	153 (76.5%)
	No	47 (23.5%)
Lead	Yes	106 (53%)
	No	94 (47%)
Full article	Yes	6 (3%)
	No	194 (97%)
Attracting sentence	Yes	63 (31.5%)
	No	137 (68.5)
Reply comment	Yes	7 (3.5%)
	No	193 (96.5%)
Simple photo only	Yes	93 (46.5%)
	No	107 (53.5%)
Photo with words	Yes	54 (27%)
	No	146 (73%)
Infographics	Yes	10 (5%)
	No	190 (95%)
Logo on photos or videos	Yes	68 (34%)
	No	132 (66%)
Hashtag	Yes	80 (40%)
	No	120 (60%)

Table 2 Chi-square test between Hong Kong and USA

Category	Subject	USA (N = 100)		Hong Kong (N = 100)		Total N	χ^2	df	p-value
		Yes	No	Yes	No				
News reporting and writing	Heading	79	21	74	26	200	0.695	1	0.404
	Lead	75	25	31	69	200	38.86	1	0.000
	Full article	0	100	6	94	200	6.19	1	0.013
	Attracting sentence	7	93	56	44	200	55.64	1	0.000
	Hashtag	1	99	79	21	200	126.75	1	0.000
Use of photo	Simple photo only	75	25	18	82	200	65.3	1	0.000
	Photo with words	0	100	54	46	200	73.97	1	0.000
	Infographics	0	100	10	90	200	10.53	1	0.001
	Logo on photos or videos	13	87	55	45	200	39.31	1	0.000
Communication process	Reply comment	0	100	7	93	200	7.25	1	0.007

4.2.2 Independent Two-Samples *t*-Test to Test USA and Hong Kong Differences

An independent-sample *t*-test was conducted to compare the Hong Kong and USA media Facebook post (Table 3). There was no significant difference between heading in USA ($M = 0.79$, $SD = 0.41$) and Hong Kong ($M = 0.74$, $SD = 0.44$) media Facebook post ($t(198) = 0.83$, $p = 0.407 > 0.05$). Significant differences were found between lead in USA ($M = 0.75$, $SD = 0.44$) and Hong Kong ($M = 0.31$, $SD = 0.46$) media Facebook post ($t(198) = 6.91$, $p = 0.000 < 0.05$); full article in USA ($M = 0$, $SD = 0$) and Hong Kong ($M = 0.06$, $SD = 0.24$) media Facebook post ($t(198) = -2.51$, $p = 0.013 < 0.05$); attracting sentence in USA ($M = 0.07$, $SD = 0.26$) and Hong Kong ($M = 0.56$, $SD = 0.5$) media Facebook post ($t(198) = -8.74$, $p = 0.000 < 0.05$); reply comment in USA ($M = 0$, $SD = 0$) and Hong Kong ($M = 0.07$, $SD = 0.26$) media Facebook post ($t(198) = -2.73$, $p = 0.007 < 0.05$); simple photo only in USA ($M = 0.75$, $SD = 0.44$) and Hong Kong ($M = 0.18$, $SD = 0.39$) media Facebook post ($t(198) = 9.80$, $p = 0.000 < 0.05$); photo with words in USA ($M = 0$, $SD = 0$) and Hong Kong ($M = 0.54$, $SD = 0.5$) media Facebook post ($t(198) = -10.78$, $p = 0.000 < 0.05$); infographics in USA ($M = 0$, $SD = 0$) and Hong Kong ($M = 0.1$, $SD = 0.3$) media Facebook post ($t(198) = -3.32$, $p = 0.001 < 0.05$); logo on photos or videos in USA ($M = 0.13$, $SD = 0.34$) and Hong Kong ($M = 0.55$, $SD = 0.5$) media Facebook post ($t(198) = -6.96$, $p = 0.000 < 0.05$); and hashtag in USA ($M = 0.01$, $SD = 0.1$) and Hong Kong ($M = 0.79$, $SD = 0.41$) media Facebook post ($t(198) = -18.51$, $p = 0.000 < 0.05$). Therefore, H2–H10 were supported.

Table 3 Independent sample *t*-test between USA and Hong Kong Newspaper organizations' Facebook pages

Category	Subject	USA		Hong Kong		*t*	d*f*	*p*-value
		M	*SD*	*M*	*SD*			
News reporting and writing	Heading	0.79	0.41	0.74	0.44	0.83	198	0.407
	Lead	0.75	0.44	0.31	0.46	6.91	198	0.000
	Full article	0.00	0.00	0.06	0.24	−2.51	198	0.013
	Attracting sentence	0.07	0.26	0.56	0.50	−8.74	198	0.000
	Hashtag	0.01	0.10	0.79	0.41	−18.51	198	0.000
Use of photo	Simple photo only	0.75	0.44	0.18	0.39	9.80	198	0.000
	Photo with words	0.00	0.00	0.54	0.50	−10.78	198	0.000
	Infographics	0.00	0.00	0.10	0.30	−3.32	198	0.001
	Logo on photos or videos	0.13	0.34	0.55	0.50	−6.96	198	0.000
Communication process	Reply comment	0.00	0.00	0.07	0.26	−2.73	198	0.007

5 Discussion

One of the main ideas of social media is connecting the world together and it is easy for people to think the behavior of users will be the same. While different people live in different places would be influenced by the culture differently. When they use the social media, their online action would also be influenced by the culture and it should be the same when it comes to newspaper organizations' Facebook pages. However, few evidences prove that there are differences between USA and Hong Kong newspaper organizations' Facebook pages.

The aim of this study is to explore cultural difference between USA and Hong Kong newspaper organizations' Facebook pages. We analyze the posts structure of USA and Hong Kong newspaper organizations' Facebook pages.

5.1 Heading Is Still Dominating

We find that the difference between expected and actual data of using heading is likely just due to chance and there is no significant mean difference between two district. It may due to the use of heading is common among two districts and there is no cultural difference in this aspect, the consistence of using heading means this fundamental structure of news are not given up by the newspaper organizations on social media.

5.2 Hong Kong Newspaper Organization Tends to Use Untraditional Presentation

Significant differences are found in using lead, full article, and attracting sentence between USA newspaper organizations' Facebook pages and Hong Kong newspaper organizations' Facebook pages. The use of lead in USA newspaper organizations' Facebook pages is more than Hong Kong while the use of full article and attracting sentence in Hong Kong was more than USA.

A lead is a highlight of a new article which catches your attention at first sight with the most attractive part of the news which is a traditional form of presenting a news article. It is still common to use lead in USA newspaper organizations' Facebook pages while Hong Kong newspaper organizations' Facebook pages are more likely to use full article to show the whole story or even introduce a new form of presentation method such as attracting sentence. Attracting sentence is not directly related to the news story, most of them are feelings from the reporter or humorous sentences. Instead of using traditional way, Hong Kong media tends to give the whole passage for audiences to interpret themselves or use unexpected way to attract audiences.

Interestingly, the use of hashtag in Hong Kong newspaper organizations' Facebook pages is significantly higher than USA newspaper organizations' Facebook pages. Hong Kong newspaper organizations' Facebook pages use hashtag as a trendy and fun action but not to identify specific topic.

Hong Kong newspaper organizations adapt more changes on social networking sites and they are willing to break the traditional rules of presentation. On the other hand, USA newspaper organizations avoid to make as many changes as Hong Kong newspaper organizations. From a cultural perspective, the Uncertainty Avoidance (UAI) of USA newspaper organizations is higher than Hong Kong newspaper organizations.

5.3 *USA Newspaper Organization Tends to Purely Let Photo Tell the Story*

Regarding the usage style of photo, there are significant differences in using simple photo only, photo with words, and infographics. USA newspaper organizations' Facebook pages use a simple photo only more frequently than Hong Kong. While Hong Kong newspaper organizations' Facebook pages tend to use more photos with graphics than USA newspaper organizations' Facebook pages. Photos can tell the story. Placing a simple photo only means there is not additional opinion from the newspaper organizations on the photos while adding words and using infographics are leading the audiences to think of your opinions. It relates to whether the newspaper organizations allow free imaginations from the audiences to their photo and also whether they adopt indulgence culture or restraint culture.

Result shows that Hong Kong newspaper organizations' Facebook pages is significantly more than USA newspaper organizations' Facebook pages to add logo on photos or videos. The reason behind it may be Hong Kong newspaper organizations' Facebook pages want their logo appearing on the Facebook more as the photo may be shared by other users.

5.4 *Hong Kong Newspaper Organization Communicates More with Audiences*

Replying for a comment or not is significantly different between two districts. It means Hong Kong newspaper organizations' Facebook pages are not only receiving the response from the audiences but also take a further step to communicate with the audiences directly. It can improve the closeness between media and the audiences and enhance the loyalty of audiences. From a cultural point of view, the power distance between the Hong Kong newspaper organizations and audiences is shorter than USA newspaper organizations.

5.5 Limitations and Further Studies

Despite the significant results, there were some limitations in the research. First, the research covered only five most popular newspaper organizations in both districts which constrained the generalizability. Further studies might conduct to more newspaper organizations to generalize the result. Moreover, the types of presentation in this research only consisted of three types which are the context, photo, and communication. We could include other type of presentations like the nature of video and the frequency of posting news article.

6 Conclusion

We must admit that social media has changed the way that newspaper organizations present their news articles. However, contrast to general belief, social media like Facebook has not made all newspaper organizations to present at same way. Newspaper organizations from different districts with different cultures do present in different ways. Although the use of heading is still common in newspaper organization Facebook page from both districts. The use of lead, full article, attracting sentence, and hashtag varies from place to place which means cultural difference is affecting the news reporting and writing. Both use of photo and communication process are also different between two districts. The result of this research confirms the relationship of cultural difference and presentation on Facebook by newspaper organizations.

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Facebook Use and Well-Being in Chinese College Students

Raymond Chi Fai Chui

Abstract Facebook is one of the most popular social network sites used by college students. Although some Western studies have started to explore the effect of Facebook use on individuals' well-being, few empirical research has focused on these processes in Chinese college students. The primary aim of the study was to examine the association between Facebook use, loneliness, self-esteem, social support, and psychological well-being in a sample of Chinese college students. Participants were 680 Chinese college students aged 17–25 years across universities in Hong Kong. Path analyses indicated that Facebook use was associated with the well-being of Chinese college students in various ways. Using Facebook to connect to existing relationships was positively associated with social support. Results also indicated that social support and loneliness were mediators of the relationship between Facebook use and psychological well-being. The intensity of Facebook use was positively associated with loneliness, while using Facebook to connect to existing relationships had a positive association with individual well-being directly and indirectly. Implications of the results and further study directions are discussed.

Keywords Facebook · Psychological well-being · Loneliness · Self-esteem · Social support · Chinese college student

1 Introduction

Facebook is one of the most popular social network sites (SNSs) and is used by a large number of college students to maintain existing social ties and create new relationships (Chou & Edge, 2012; Ellison, Steinfield, & Lampe, 2007; Johnston, Mei-Miao, & Hauman, 2013; Pettijohn, LaPiene, & Horting, 2012). It has also been used by college students for entertainment and emotional expression (Hew & Cheung, 2012).

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Thus, Western researchers have started to explore the influence of Facebook use on well-being (Hew & Cheung, 2012). However, few empirical research has addressed the influence of Facebook use on the well-being of Chinese college students. Therefore, the aim of this study was to examine the association between Facebook use and Chinese students' psychological well-being.

The use of SNSs is positively associated with life satisfaction, happiness, and school adjustment (Kim & Lee, 2011; Valenzuela, Park, & Kee, 2009; Valkenburg, Peter, & Schouten, 2006). For instance, an individual's happiness is enhanced when they present themselves positively on Facebook (Kim & Lee, 2011). Furthermore, the use of Facebook to maintain existing relationships has been associated with higher levels of social adjustment in college (Kalpidou, Costin, & Morris, 2011). Thus, Facebook use is positively related to well-being, especially when it is used to maintain existing relationships. However, using more Facebook to pursue new relationships is related to lower levels of social adjustment (Yang & Brown, 2013). Communication with weak ties is unable to provide psychological benefits (Kraut & Burke, 2015). Other studies also suggest that frequent Facebook interaction is negatively associated with psychological well-being (Chen & Lee, 2013).

The above-noted studies have examined happiness, life satisfaction, and school adaption to reflect the well-being of college students, but no studies have adopted a measure of general psychological well-being. Herein, I anticipated that Facebook use would be indirectly related to general well-being via social support, self-esteem, and loneliness. I examined loneliness as previous research has linked loneliness to Facebook use. Specifically, when individuals use Facebook to pursue new relationships, they report higher levels of loneliness than those who use Facebook to maintain existing relationships (Yang & Brown, 2013). Importantly, loneliness is negatively related with individual well-being (Kong & You, 2013; Swami et al., 2007). Moreover, lonely students tend to have problems making friends and are unsatisfied with their social relationships, which affect overall life satisfaction (Ozben, 2013).

Self-esteem is another important predictor of psychological well-being (Chen, Cheung, Bond, & Jin-Pang, 2006) and was examined herein. Low self-esteem has been associated with high levels of psychological distress, poor life satisfaction, and poor positive affect in college students (Ayyash-Abdo & Alamuddin, 2007; Kong & You, 2013; Topham & Moller, 2011). Moreover, high self-esteem is associated with high levels of life satisfaction (Chen et al., 2006). However, time spent on Facebook has been negatively associated with self-esteem for college students (Kalpidou et al., 2011; Mehdizadeh, 2010). Making social comparison in Facebook can negatively impact users' self-esteem (Zuo, 2014). When students are not able to gain positive recognition but feel worse about themselves from Facebook, such feelings of inadequacy will lead to the development of low self-esteem.

In addition, social support is essential for enhancing the well-being of college students, and thus was included in the current study. Specifically, social support has been shown to buffer the effects of stress and enhance one's coping ability (Cohen & Wills, 1985). It has also been positively related with life satisfaction and negatively related with depression (Cheng, 1997; Rossi & Mebert, 2011). Facebook use

can strengthen social networks and enable college students to maintain and accumulate social capital (Ellison et al., 2007). Importantly, Internet social connections have not been shown to reduce the social circle of participants, but rather, encourage individuals to meet people outside their local areas (McKenna & Bargh, 1999). Spending more time on SNSs has been associated with high levels of face-to-face interaction, which may in turn lead to more social support (Shields & Kane, 2011). Facebook use enables college students to obtain online support, which is associated with greater perceived social support, and in turn is associated with greater psychological well-being (Liu & Yu, 2013; Nabi, Prestin, & So, 2013).

The current study was designed to examine the association between Facebook use and psychological well-being in Chinese college students. It was anticipated that the association between these two variables would be mediated through social support, self-esteem, and loneliness. This study also examined whether differences exist between users motivated to maintain relationships and users motivated to pursue new relationships. The following hypotheses were formulated based on previous research:

H1: There is a positive relationship between Facebook use and social support.
H2: There is a negative relationship between Facebook use and loneliness and self-esteem.
H3: Social support, self-esteem, and loneliness mediate the relationship between Facebook use and psychological well-being.
H4: Using Facebook to maintain existing relationships and to pursue new relationships have different associations with psychological well-being.

2 Method

2.1 Participants

Six hundred and eighty students from eight universities in Hong Kong participated in this study. Fifty-six percent of the respondents were female. Respondents' age ranged from 17 to 25 years ($M = 20.70$, $SD = 1.54$). Thirty-one percent of respondents were in Year 1 in college, 40% were in Year 2, and 29% were in Year 3 or 4.

2.2 Procedure

Participants completed a survey in February 2013. The questionnaires were distributed by student research assistants at the universities. The research assistants introduced the purpose of the study and invited potential respondents to participate. Participation was voluntary.

2.3 Measures

Well-Being. Psychological well-being and life satisfaction were assessed via self-report measures. The Psychological Well-Being Scale (PWS) is an 8-item instrument scored on a 7-point Likert scale (e.g., "I lead a purposeful and meaningful life") (Diener, Wirtz, & Biswas-Diener, 2009). Higher scores represent access to numerous psychological resources and strengths. The Satisfaction with Life Scale (SWLS) is an index of life satisfaction that reflects the positive side of an individuals' experience (Pavot & Diener, 2009). It is a 5-item instrument scored on a 7-point Likert scale (e.g., "I am satisfied with my life"). Cronbach's alpha was 0.898 and 0.895 for PWS and SWLS, respectively.

Facebook Use. The Facebook Intensity Scale (FIS) and Social Connection to Facebook (SCF) were used to measure Facebook use (Ellison et al., 2007; Kujath, 2011). The former scale includes two items that assess the time spent on Facebook (e.g., "About how many Facebook friends do you have?"): and includes six items to measure the emotional connection to Facebook (e.g., "Facebook is part of my everyday activity"). Higher total scores indicate greater intensity in Facebook use. The Connection to Existing Relationships (CER) comprises four items derived from SCF, including items about the use of Facebook to maintain existing relationships (e.g., "I have used Facebook to check out someone I met socially"). Higher total scores indicate a higher degree of using Facebook in social connection. The fifth item on SCF was used to assess the use of Facebook to pursue new relationships (PNR). Cronbach's alpha ranged 0.808–0.830 for FIS and CER respectively.

Social Support. The Multidimensional Scale of Perceived Social Support (MSPSS) was used in this study. It contains 12 items (Zimet, Dahlem, Zimet, & Farley, 1988). The items are scored on a 7-point Likert scale (e.g., "There is a special person who is around when I am in need"). Higher scores represent higher perceived social support. Cronbach's alpha was 0.940 for this measure.

Loneliness. The 10-item UCLA Loneliness Scale was used to measure the subjective feeling of loneliness (Russell, 1996). Items are scored on a 4-point Likert-type scale (e.g., "How often do you feel unhappy doing many things alone"); higher scores indicate greater levels of loneliness. Cronbach's alpha was 0.878 for this measure.

Self-esteem. Rosenberg's Self-Esteem Scale (RSE) was used to measure the self-esteem of participants. The 10-items are scored on a 4-point Likert scale (e.g., "I feel that I have a number of good qualities") (Robinson & Shaver, 1978); higher scores indicate higher levels of self-esteem. Cronbach's alpha was 0.81 for this measure.

2.4 Data Analysis

The Statistical Package for Social Sciences version 21 (SPSS) and Analysis of Moment Structures 21 (AMOS) were used to analyze the data. First, Pearson product-moment correlations were used to examine the strength of the associations between the dependent and independent variables. Next, AMOS was used to examine the relationships between Facebook use, self-esteem, social support, and loneliness, with students' well-being. Since all scales adopted in the studies were validated, standardized and well used, path analysis was used to test the relationships among the variables.

3 Results

3.1 Facebook Use and Well-Being

More than 50% of the respondents had more than 300 Facebook friends (22% had 200 or fewer). Eleven percent of participants reported spending less than 10 min per day on Facebook and more than 55% of them spent 10–60 min. As predicted, CER was positively related with PWS ($r = 0.158$) and social support ($r = 0.195$). However, FIS was positively related to loneliness ($r = 0.086$), and was not related to the well-being measures. Moreover, PNR was not related to any well-being measures. In addition, social support was positively correlated with PWS ($r = 0.683$) and SWLS ($r = 0.589$). Self-esteem was also positively related to PWS ($r = 0.447$) and SWLS ($r = 0.391$). Finally, loneliness was negatively related to PWS ($r = -422$) and SWLS ($r = -0.410$) (Table 1).

3.2 Testing the Model

In the original Model 1, the Facebook variables were hypothesized to have a positive relationship with self-esteem and social support and have a negative relationship with loneliness. Moreover, self-esteem and social support were considered to be positively related with the well-being variables and loneliness to be negatively related with the dependent variables. Results of the structural equation modeling analysis indicated that the original model failed to yield an acceptable fit: χ^2 (13, $N = 671$) = 916.548, $p < 0.001$; RMSEA = 0.322; CFI = 0.474; NFI = 0.475; and GFI = 0.745. The paths from FIS to self-esteem and social support; from CER to self-esteem and loneliness; and from PNR to self-esteem, social support, and loneliness were not significant. Thus, Model 2 was constructed to remove the nonsignificant paths and a path from FIS to CER was added. The results show a better fit to the data: χ^2 (8, $N = 330.038$) = 492.378, $p < 0.001$; RMSEA = 0.345; CFI = 0.764; NFI = 0.761; and GFI = 0.873 (Fig. 1).

Table 1 Mean, standard deviations and correlation matrix between variables

Variable	Variable								
	1	2	3	4	5	6	7	8	9
1 Psychological well-being	–								
2 Life satisfaction	0.679***	–							
3 Facebook intensity	0.048	0.001	–						
4 Connection to existing relations	0.158***	0.067	0.588***	–					
5 Pursuing new relations	0.017	0.073	0.376***	0.280***	–				
6 Self esteem	0.447***	0.391***	0.002	0.003	0.009	–			
7 Social support	0.683***	0.589***	0.070	0.195***	−0.006	0.389***	–		
8 Loneliness	−0.422***	−0.410***	0.086*	0.004	0.037	−0.463***	−0.451***	–	
9 Sex (Male = 1, Female = 0)	−0.096*	−0.105**	0.083*	−0.006	0.094*	−0.026	−0.181***	−0.071	–
10 Year of study (year 1 = 1, other years = 0)	−0.011	−0.062	−0.076*	−0.009	−0.073	−0.051	−0.036	0.029	−0.080*
Mean	41.62	23.49	25.45	15.47	3.40	19.18	64.40	22.11	–
Standard deviation	6.80	5.48	6.16	2.55	0.95	3.83	10.78	5.34	–

Note *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ with listwise deletion

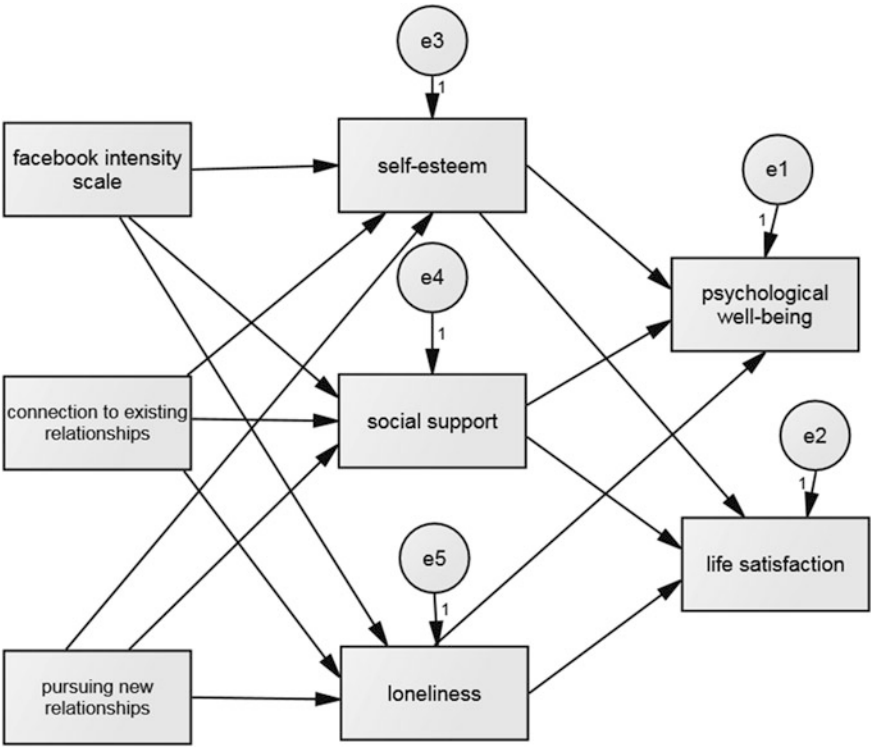

Fig. 1 Hypothesized path model

According to the suggestion from the modification indices, Model 3 was tested by adding paths from FIS to PWS and from SWLS to PWS. After removing seven paths and adding three new paths, the fit of the model improved substantially and the chi-square value of modified model reduced by 919.761. Therefore, the final model was adopted. This final model showed a good fit to the data: χ^2 (5, $N = 671$) = 3.213, $p = 0.667$. Moreover, the RMSEA was less than 0.001, which corresponds to a good model fit (McDonald & Ho, 2002). Values of CFI, NFI, and GFI were all greater than 0.9, which also indicates an acceptable model fit (Bentler, 1990; McDonald & Ho, 2002). FIS had a significant positive association with CER ($\beta = 0.585$, $p < 0.001$). CER had a direct and positive association with PWS ($\beta = 0.062$, $p < 0.05$). Social support had a significant negative association with loneliness ($\beta = -0.467$, $p < 0.001$). SWLS had a significant positive association with PWS ($\beta = 0.416$, $p < 0.001$). CER had indirect associations with PWS ($\beta = 0.180$, $p < 0.001$; $\beta = 0.384$, $p < 0.001$) and SWLS ($\beta = 0.180$, $p < 0.001$; $\beta = 0.496$, $p < 0.001$) via social support. In addition, FIS had indirect associations with PWS ($\beta = 0.122$, $p < 0.001$; $\beta = -0.088$, $p < 0.01$) and SWLS ($\beta = 0.122$, $p < 0.001$; $\beta = -0.185$, $p < 0.001$) via loneliness (Fig. 2).

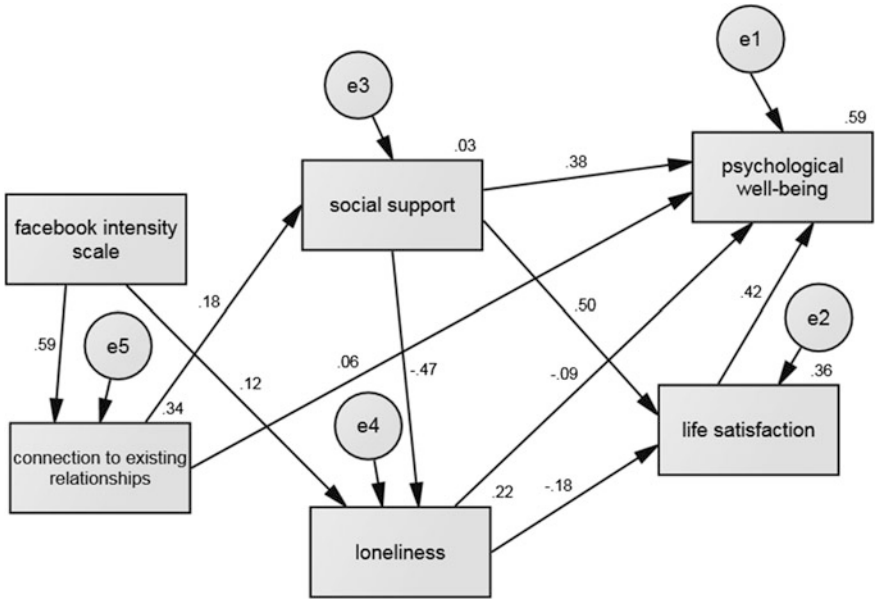

Fig. 2 SEM results of the hypothesized path model

4 Discussion and Conclusion

The current study examined the relationship between Facebook use and well-being among Chinese college students. The findings confirmed that Facebook use was associated with participants' well-being. CER was positively related to social support, but the FIS and PNR were not related to social support. Moreover, Facebook use was not associated with self-esteem among Chinese college students. Moreover, FIS was positively associated with loneliness. In addition, the results confirmed that social support and loneliness mediated the relationship between Facebook use and the well-being of college students. Moreover, the relationship between Facebook use and well-being was significant for those who used Facebook to maintain existing relations but not for those who were pursuing new relationships.

The intensity of Facebook use was not directly associated with the well-being of Chinese college students, but it was indirectly related to their well-being through the use of Facebook to connect to existing relations. High-intensity Facebook use was associated with high levels of loneliness, which in turn was related to low levels of PWB. This result is consistent with previous research that reported that excessive use of the Internet increased loneliness and decreased psychological well-being (Niemz, Griffiths, & Banyard, 2005). Using Facebook for reading simply messages and news may have a substitution effect that reduces the amount of time spent on rich interactions with close friends (Kraut & Burke, 2015), and in turn increases loneliness.

The effect of using Facebook to maintain existing relationships was positive. This finding is consistent with previous work (Valenzuela et al., 2009; Yang & Brown, 2013). High levels of CER were associated with high levels of social support and PWB. Moreover, CER was indirectly related to life satisfaction through social support and loneliness. Close connections with established friends from the college may serve as a source of social support for students. However, using Facebook to pursue new relationships was not associated with all other variables, thereby suggesting that the benefits of Facebook use depend on the motivation for use. Relationships established with acquaintances via Facebook may not be able to help students to handle the difficulties encountered in college. The type of networks established in Facebook and their relationships with social support should be examined in further studies.

Intensity of Facebook use was positively related with loneliness. High levels of Internet use have been associated with high levels of loneliness (Moody, 2001). Being a university students have numerous opportunities to meet with others face to face (Hashim & Khodarahimi, 2012). However, as students progress through university and their friends leave their social networks, loneliness may increase. The evaluation of their networks may increase their loneliness, especially when the actual outcome deviates from their ideal situation (Hashim & Khodarahimi, 2012). Therefore, high-intensity Facebook use may increase loneliness due to their frequent review of their network.

While there were many notable strengths, the study has also had several limitations. The present study focused on only the association between the intensity of Facebook use and well-being of participants. However, the nature of feedback from Facebook may have different effects on users' well-being. Positive feedback from Facebook can enhance social self-esteem and well-being, but negative feedback hinders self-esteem and well-being (Valenzuela et al., 2009). Different types of activities performed on Facebook can also stimulate different effects on well-being (Kraut & Burke, 2015; Yang & Brown, 2013). Further studies are recommended to explore the influence of the content of feedback and types of activities performed on Facebook on the well-being of Chinese college students.

In addition, the current study was a nonexperimental, cross-sectional study; thus, causal relations cannot be inferred. Longitudinal studies are therefore recommended to further examine the predictive validity of changes in Facebook use over the college years on the well-being of Chinese college students. Moreover, respondents of this study were not selected via random assignment. Therefore, the results may not be generalizable to other Chinese college students. A more comprehensive and large-scale study based on random sampling is thus recommended to understand the effect of Facebook use on the well-being of Chinese college students.

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Exploring the Relationships Among Peer Influence, Media Influence, Self-esteem, and Body Image Perception

Wing Yi Tsang

Abstract Body image is one of the important concerns among teenagers. They may pursue socially acceptable and favorable body figure in order to get recognition from others and therefore, enhance self-esteem. This study explored the determinants in affecting the body image perception among youngsters in Hong Kong. The research question is: What are the factors affecting people's perception of body image? It was hypothesized that peer influence, media influence, and self-esteem influenced the university students' body image evaluation. A survey was distributed and successfully collected from 250 undergraduate students. The results showed the peer influence had a direct, significant, and negative relationship with body image perception ($\beta = -0.340$, $p < 0.01$), and self-esteem had a direct, significant, and positive relationship with body image perception ($\beta = 0.339$, $p < 0.001$). However, media influence had no significant relationship with body image perception among the university students ($p > 0.05$). The variance explained body image perception by the model with R^2 was 0.261. The implications of these findings were discussed.

Keywords Body image · Perception · University students · Peer influence · Media influence · Self-esteem

1 Introduction

Perception of body image is an ongoing process during lifetime, especially in adolescence. People may pursue socially acceptable and favorable body figure in order to get recognition from others and therefore, enhance self-esteem. In order to achieve the "ideal" body shape, some of them carry out healthy methods such as exercising and dieting. However, some of them may undergo a risk to have cosmetic surgeries as to correct unattractive body and facial features. According to a

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statistic conducted by Zuckerman (2014), over 236,000 cosmetic procedures were performed on patients between 13 and 19 in the U.S., in which more than 75,000 were surgical procedures such as nose reshaping, breast implantation, breast lifts, liposuction, and tummy tucks. The numbers demonstrated that teenagers pay lots of concern to their body image.

Pressure on youngsters to conform the beauty standards increase the difficulty to figure out what constitutes a "normal" appearance and when the desire to improve one's appearance is questionable or even crosses the moral conduct. Therefore, the objective of this study is to explore the reasons that encourage people to have positive or negative perception of body image. We set the following research question: What are the factors affecting people's perception of body image?

The rest of this paper include a literature review of the researches on body image and identify the factors that influence people's evaluation of body image. Then, method used, including background, subjects, measurement items, and data collection. Findings reported the data analysis of survey results. Implications are given at the end.

2 Literature Review and Hypotheses Development

2.1 Body Image

Body image as the picture of one's body which is formed in their mind, the way in which the body appears to themselves (Schilder 1935). It is a concept which involves feelings, attitudes, and perceptions that people have about their own body, and is influenced by the adoption of social standards (Rodriguez Aguilar et al. 2010). Sheldon (2010) said youngsters are now living in an environment which looks are of utmost importance and pressure to achieve the ideals of attractiveness is high. Gender can be one of the reasons in affecting people's perception of body image. Body dissatisfaction is typically characterized as an issue faced predominantly by females. Usmiani and Daniluk (1997) found that women experience higher pressure than men to conform to societal norms in regard to their appearance, including the shape and size of their bodies. Moreover, a research conducted by Muth and Cash (1997) showed that compared to men, females have more negative body image evaluations, stronger investments in their looks, and more frequent body image dysphoria. Meanwhile, Carlson Jones (2001) claimed that same-sex peers and celebrities are the targets of social comparisons for physical attributes and primarily associate with body dissatisfaction. In general, there are some factors that would affect people's perception of their body shape. Pressure from peers, family, and traditional media can be considered as the factors. According to Musaiger and Al-Mannai (2013), Pressure from friends and parents, in addition to the media, have a significant impact in managing attitudes toward body image among teenagers. Positive appearance-related comments are associated positively with self-objectification (Slater and Tiggemann 2015). Thus, the higher pressure from

peers, family, and media, the more negative perception of body shape. Apart from that, self-esteem links with feelings about one's appearance. Clay et al. (2005) examined that self-esteem declines substantially with pessimistic changes in body image during middle adolescence. Therefore, the higher the self-esteem, the more positive evaluation of body image.

Therefore, from the above literature review, we recognized several potential factors that affect how people think about their body image, including gender, peers and family support, media, and self-esteem. Major factors identified in this study are going to discuss and explain in the following paragraphs.

2.2 *Peer Influence*

Physical comparison between friends was an important factor of developing body image and shape dissatisfaction (Sides-Moore and Tochkov 2011). According to Snapp et al. (2012), high familial support; low levels of perceived sociocultural pressure from family, friends, and media regarding the importance of achieving a thin and beautiful ideal; positive physical self-concept, which link with a more positive body image. Normally, girls are supposed to have more appearance conversations. However, Carlson Jones and Crawford (2006) proposed that boys suffer more from appearance pressure and teasing. Also, men talk with friends about muscle building at a rate greater than girls discuss about dieting. Besides, some people may argue that family influence is more significant than peers' on body perception. Still, Sheldon (2013) refuted that peer pressure is unavoidable and most often negative, especially for girls, which badly influences how college students evaluate their bodies. Sheldon (2010) also pointed out high verbal or behavioral pressure from peers urges teenagers to compare themselves to the models in fashion magazines and on TV. These acts may even increase the media influence on perception of body image indirectly.

From these, we argue that peers contribute to influence teenagers' attitudes of body image, which may either be a positive or negative perception. Not only girls, boys are also confined to peer pressure of body image. When a person receives negative appearance comment from friends, he/she may build a negative body image, and vice versa. Then, we hypothesize.

H1 The higher peer pressure, including verbal and behavioral, that an individual receives, the more negative his/her body image is perceived.

2.3 *Media Influence*

Media is the most influential in affecting perception of body image (Vartanian et al. 2001). The promotion of "perfect" body shape on media pressurizes the teenagers to

conform to those "ideal" standards, which may create negative feelings to individuals about their appearance. Guðnadóttir and Garðarsdóttir (2014) said the exposure to media images of ideal body shape pursuit thinness among women and muscularity among men. Moreover, Yamamiyaa et al. (2005) claimed that the exposure to thin and beautiful models in media images adversely affected people's body evaluation with high level of internalization. The more exposure to those media materials, the greater negative impact in body image perception, if one cannot fit the standard. Besides, Musaiger and Al-Mannai (2013) said the use of Internet and reading women's magazines have a prominent impact in asking girls to lose weight. Also, they discovered that the media is 2–3 times influential on obese girls than nonobese girls. It reveals that media has different level of influence toward teenagers, even the same sex, in appearance evaluation. As women are supposed to pay more attention to their body image than men, most of the previous researches had just focused on how media affects females. It urges men to think the media just have mild impact on their behaviors. However, the media do have a significant influence on how they perceive their body image (Kennedy 2000). Cramblitt and Pritchard (2013) indicated that the more time men spend on media, especially in sports and health scope, higher their drive for muscularity and greater concern on body image. Despite traditional media, Kim and Chock (2015) discovered that the usage of social media affects people's attitudes toward body image. The more frequent use of social media, the greater determination in driving for thinness and muscularity among youngsters. They also suggested viewing and commenting on peer's profiles are significantly linked with the drive for thinness of female users. As media materials are powerful in affecting people's evaluation of body image, Clay et al. (2005) promoted to deconstruct the internalization of body image by viewing advertising and media images. Nevertheless, Yamamiyaa et al. (2005) discovered that not all media users are equally susceptible to these effects. Media-literacy psychoeducation prior to the media exposure avoids this adverse effect.

Media is powerful enough in altering one's body image evaluation. However, it carries different level of influence toward teenagers, even on same sex, in appearance evaluation. Therefore, it is hypothesized that

H2 The longer exposure to media materials, especially beauty, fashion and health-related images, the more negative body image perception if one cannot fulfill the "ideal" standard.

2.4 Self-esteem

Self-esteem is significantly associated with body image measures (Mendelson et al. 1996). Abell and Richards (1996) stated that body image and self-esteem are closely related to younger populations and have a greater impact on them. The level of self-esteem of women is generated from the whole body shape and image, whereas men's self-esteem is originated from muscularity (Grossbard et al. 2009). People

who have negative appearance evaluation and low self-esteem are linked with dissatisfaction with body shape and size. In contrast, people with high self-esteem, positive mood and body satisfaction are more favorable irrespective of their levels of appearance evaluation (Thøgersen-Ntoumani et al. 2011). They demonstrate the self-esteem and perception of body image are mutually related. Moreover, physical fitness plays a crucial role in affecting one's self-esteem toward body image. Lowery et al. (2005) said the more positive physical fitness is positively associated with self-esteem and body image. On the other hand, those who suffered from undesirable body shape may have low self-esteem that is harmful to one's growth. In addition, being bullied because of body shape may spoil one's self-esteem. Grilo et al. (1994) claimed that those who are being teased about weight or size while growing up might have a risk of developing negative body image and low self-esteem. Links between body shape and self-evaluation explain how body dissatisfaction impacts on self-esteem and mood in eating disorders. People with negative self-esteem and body image increase the risk of eating disorder symptoms (Blechert et al. 2011). It shows that low self-esteem due to negative body image perception may lead to disastrous effect.

Self-esteem is closely related to the perception of body image, particularly among teens, the stage in which recognition from others is important. People who have negative appearance evaluation and low self-esteem are associated with dissatisfaction of body shape. Then, we propose the following hypothesis.

H3 The lower level in self-esteem of an individual, the more negative his/her body image is perceived.

3 Methodology

3.1 Background

The concept of body image was first formulated as an important psychological phenomenon by a German writer, Schilder, in his monograph *The Image and Appearance of the Human Body*, which was published in 1935. "The picture of our own body which we form in our mind, that is to say the way in which the body appears to ourselves," he said. Nowadays, many teenagers may undergo cosmetic surgery in order to beautify themselves to become more attractive and enhance their body image.

3.2 Subjects

An online survey instrument to collect respondents' perception of their body image was distributed to 300 undergraduate students of age ranged from 18 to 25. In the end, 250

(83.33%) were completed and returned. This sample was chosen because undergraduate students were primarily concern how others perceive them through appearance.

3.3 Measurement Items

In the first part of the questionnaire, the subjects were asked to provide their demographic data, like sex and age. In the second part, more opinion was asked. For peer influence (PI), three items were adapted from *Perceived Sociocultural Pressure Scale* (Goodman 2005), measured by a 5-point scale, ranged from 1 (*none*) to 5 (*a lot*). For media influence (MI), six items were adapted from *Sociocultural Attitudes toward Appearance Scale* (Heinberg et al. 2004). For self-esteem (SE), three items were adapted from Rosenberg Self-Esteem Scale (Rosenberg 1965), measured by a 5-point Likert scale, and ranged from 1 (*definitely disagree*) to 5 (*definitely agree*).

3.4 Data Collection

The questionnaire was set and distributed to 300 undergraduate students via Google online questionnaire platform. Email invitations were sent through researchers' personal network. The respondents came from different universities in Hong Kong with different years of study.

4 Findings

4.1 Descriptive Statistics of Respondents and Variables

The 250 subjects in the sample included 68 male (27.2%) and 182 female (72.8%), with a mean age of 21.064 years old. They came from different years of study in four different universities in Hong Kong. Half of the respondents have fair body image perception, whereas 52 (20.8%) and 54 (21.6%) of them have positive and negative view of body image, respectively, in which only 16 females had positive body image perception and 42 of them had negative view toward body image. The descriptive statistics of the variables were shown in the below table (see Table 1).

Table 1 Descriptive statistics of constructs (N = 250)

	Min	Max	*M*	SD	Alpha
Body image perception					
BI1	1	7	3.60	1.431	0.744
BI2	1	7	4.46	1.371	
BI3	1	7	3.73	1.542	
Peer influence (*PI*)					
PI1	1	7	3.69	2.061	0.808
PI2	1	7	3.54	2.077	
PI3	1	7	3.12	1.869	
Media influence (*MI*)					
MI1	1	7	5.17	1.655	0.942
MI2	1	7	4.55	1.736	
MI3	1	7	4.30	1.952	
MI4	1	7	4.07	1.966	
MI5	1	7	4.07	1.962	
MI6	1	7	4.72	1.869	
Self-esteem (*SE*)					
SE1	1	4	2.90	0.665	0.744
SE2	1	4	3.10	0.545	
SE3	1	4	2.92	0.813	

4.2 Instrument Validation

Internal consistency was tested by reliability Cronbach's α-value where values greater than 0.7 is considered reliable (Nunnally and Bernstein 1994). The alpha values for body image, peer influence, media influence, and self-esteem were 0.744, 0.808, 0.942, and 0.744, respectively. As all the values were over 0.7, therefore, the instrument was considered reliable and exhibited internal consistency. Three components were extracted by Principal Components, Varimax Rotation factor analysis. The Eigen values were 7.332, 1.664, and 1.167 where the percentage of total variance explained was 72.59%. The constructs exhibited convergent validity if "*the items that are indicators of a specific construct converge or share a high proportion of variance in common*" (Hair et al. 2010).

As a good rule of thumb, the standardized factor loading estimates should be 0.5 or higher, and ideally 0.7 or higher (Hair et al. 2010, p. 709). From the table, all factor loadings are greater than 0.7, showing an acceptable value for convergent validity of the instrument. At the same time, the constructs were all distinct without any significant cross-loadings, which exhibited discriminant validity (Table 2). Therefore, the instrument was both reliable and valid. Summed mean score were computed for each construct and for regression analysis of their relationship test (Table 3).

Table 2 Factor analysis

	Component		
	1	2	3
PI1		0.758	
PI2		0.809	
PI3		0.756	
MI1	0.705		
MI2	0.839		
MI3	0.856		
MI4	0.827		
MI5	0.746		
MI6	0.807		
SE1			0.797
SE2			0.749
SE3			0.810
Eigen values	7.332	1.664	1.167
% of variance (%)	52.37	11.89	8.34

Table 3 Descriptive statistics of summed mean scores

Constructs	Min	Max	*M*	SD
BI	1	7	3.93	1.179
PI	1	7	3.45	1.704
MI	1	7	4.36	1.586
SE	1	4	2.97	0.557

4.3 Summary of Model Testing Results

In this study, there were three factors, direct path analysis toward dependent without any indirect effects in the model, therefore, the usage of linear regression is enough and appropriate to test the model for the direct effects on body image perception. For the model of body image perception, it was significant ($p < 0.001$) and the R^2 was 0.261. That means, the model explained 26.1% of the variance.

For H1, it was supported. We found that the path was significant and the standardized coefficient was −0.340 (unstandardized coefficients −0.130, std. error 0.044, $p < 0.01$) for the peer influence (PI) toward body image perception (BI). That means, for every standardized unit of peer influence increased, there would be 0.340 standardized unit of body image perception decreased. The higher peer pressure that an individual received, the more negative his body image was. For H2, it was not supported ($p = 0.103 > 0.05$). There was no significant relationship between media influence and body image perception. It revealed that the longer exposure to media materials did not lead to more negative body image perception if one cannot fulfill the "ideal" standard. For H3, it was supported. We found that the path was significant and the standardized coefficient was 0.339 (unstandardized

Table 4 Linear regression model testing results

	Model summary				ANOVA	
	R	R^2	Adjusted R^2	SE of estimate	F.	Sig.
Body image perception	0.511	0.261	0.229	0.5780	8.112	0.000

Table 5 Summary of path coefficients

Factor	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	SE	Beta		
PI	−0.130	0.044	−0.340	−2.992	0.003
MI	0.074	0.045	0.180	1.642	0.103
SE	0.396	0.107	0.339	3.705	0.000

coefficients −0.396, std. error 0.107, $p < 0.001$). That means, for every standardized unit of self-esteem increased, there would be 0.339 standardized unit of body image perception increased. The higher the level in self-esteem of an individual, the more positive he/she in perceiving the body image (Tables 4 and 5).

5 Discussion

This study aims to explore the reasons that encourage people to have positive or negative perception of body image. The research question: What are the factors affecting people's perception of body image?

5.1 Body Image Perception

Body image is a concept that involves feelings, attitudes, and perceptions that people have about their body, and is affected by the adoption of social standards (Rodriguez Aguilar et al. 2010). In this study, most of the respondents had fair body image perception. However, more female respondents had negative perception than male toward body image. The model of body image perception (BI) was significant ($p < 0.001$). As mentioned before, body dissatisfaction is typically characterized as an issue faced predominantly by females who pay more attention and investment to their appearance and body shape than male do. Moreover, according to the latest population statistic by HKSAR in mid-2015, the sex ratio is 855 male per 1000 female. Due to the imbalance sex ratio, female have to maintain an "ideal" body shape and good appearance as to attract male. Moreover, since the Hong Kong

society pays less concern in male's body shape than female, so they are suffer less pressure in managing a good body shape. As a result, male respondents may have more positive attitude in body image perception.

5.2 Peer Influence and Body Image Perception

Physical comparison between friends is an important source of developing body image and shape dissatisfaction. Thus, the model of peer influence (PI) was significant ($p < 0.01$) in this research. Peers always stick together when they are in campus or even out-of-campus. In fact, body image is one of the topics that they usually discuss during interaction. Therefore, teenagers are reachable to receive comments about appearance evaluation among friends. It demonstrates that peer pressure is unavoidable, and most often negative, which badly influences how university students perceive their bodies. Moreover, peer is influential in socialization process. Since no one want to be isolated from friends, youngsters may try to have a good body image in order to gain recognition from peers. However, being teased by friends leads to negative body image perception. From that, pressurization occurs among peers toward body image evaluation.

5.3 Media Influence and Body Image Perception

Media is always depicted as the most influential source in affecting people's body image (Vartanian et al. 2001). The promotion of "perfect" body shape on media pressurizes teenagers to conform to those "ideal" standard, which may create negative feelings to individuals about their appearance. However, the model of media influence (MI) was not significant ($p > 0.05$) in this research, and should be rejected. It showed that the media do not closely affect university students' body image perception. The influence of media, especially traditional media, is decreasing gradually to teenagers. As they are experienced in media exposure, so their media- literacy psychoeducation helps them to avoid the adverse effect from media. In addition, universities students are supposed to fully develop their critical thinking in reading media materials, therefore, media are less influential to them in affecting their body image perception. Some of them may even doubt of the authenticity of any materials presented in the media. As a result, not all media users are equally susceptible to the negative effects brought by the media.

5.4 Self-esteem and Body Image Perception

Body image is closely related to young populations and has a great impact on them. Most of the youngsters generate self-esteem from personal or others' body image perception. In this research, the model of self-esteem (SE) was significant ($p < 0.001$) and supported. Positive self-esteem is linked with one's positive appearance evaluation or praises by others because of body shape or appearance. Nevertheless, people who have undesirable body size and negative appearance evaluation may link with low self-esteem. In addition, someone who is bullied or teased by others because of body shape, he may feel isolated and unconfident, thus low self-esteem. They demonstrate the self-esteem and perception of body image are mutually related.

After the data analysis, we confirmed the relationship between peer, media, self-esteem, and body perception, which have answered the research question. It is important in a media study to examine individual psychological beliefs and attitude that affect people behavior. This study contributes to understand what influence people's body perception.

5.5 Limitations and Future Studies

There were a number of limitations in this study, and they offer opportunities for future research. As it was not a random sampling in selecting respondents of questionnaire, so the data should be collected with a more rigorous sampling in the future studies. Moreover, the generalizability was limited in this study since it was conducted in only four universities in Hong Kong. Furthermore, this study was not globally applicable as it had been carried in Hong Kong, and only reflected the situation in Hong Kong. Therefore, future studies were required in order to compensate those limitations.

6 Conclusion

The most important finding of body image perception is that the media influence does not significantly correlated to the body image perception among the university students in Hong Kong. Typically, media are expected to have strong impact to teenagers. However, the university students are no longer be cultivated by the exposure to media materials of "ideal" body shape. Media-literacy and critical thinking avoid them from being influenced by the adverse effects of media in perceiving their body image. As a result, the model of media influence is rejected in this study. However, the other two factors: peer influence and self-esteem are significantly related to teenagers' body evaluation. They suggest that the higher

peer pressure that an individual receive, the more negative his body image is. Also, the lower level in self-esteem, the more negative in perceiving the body image. In addition, future studies are required to compensate the limitations in this study.

Appendix

Measurement items used in the study

Construct	Measurement items
Peer influence (*PI*) (Goodman 2005)	
PI 1: I've felt pressure from my friends to lose weight	
PI 2: I've felt pressure from people I've dated to lose weight	
PI 3: Peers at school tease me about my weight or body shape	
Media influence (*MI*) (Heinberg et al. 2004)	
MI 1: Media are an important source of information about fashion and "being attractive"	
MI 2: I compare my body to the bodies of people who are on TV	
MI 3: I compare my appearance to the "model" appear on social media	
MI 4: I've felt pressure from media and social media to be thin	
MI 5: I've felt pressure from media and social media to have a perfect body	
MI 6: Pictures on social networking are an important source of information about fashion and "being attractive"	
Self-esteem (*SE*) (Rosenberg 1965)	
SE 1: I feel that I have a number of good qualities	
SE 2: I am able to do things as well as most other people	
SE 3: I take a positive attitude toward myself	

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The Roles of Information Seeking and Information Evaluation for Decision-Making Behaviors

Pui-Yi Chiu and Chi-Keung Chan

Abstract This study examines the roles of information seeking and information evaluation for decision-making behaviors, 25 undergraduate students (7 males and 18 females, M_{age} = 18.60, SD_{age} = 1.12) participated in an experiment about information choices on three different types of tasks—academic, affective, and life event. They sought and evaluated information from two major sources—via the Internet or human interactions. The results showed that there was a full mediation effect of information evaluation on the relationship between preference of information seeking and decision-making of information choices for academic and life event-related tasks. Information evaluation had a partial mediation effect for affective task. It showed that evaluation of information by participants played an important role in decision-making behaviors, depending on the contents and natures of the tasks. The effect was relatively high in academic and life event-related tasks, and relatively weak in affective task.

Keywords Information seeking · Information evaluation · Decision-making · Information choice

1 Introduction

Internet has been changing human behaviors in information seeking and decision-making. Some people prefer using Internet to gather information more than from interpersonal interactions and vice versa. Byström and Järvelin (1995) suggested that information-seeking preference predominately predicted people's decision-making. However, does people's information-seeking preference necessarily mean they blindly use those information sources for making decision? Robson and Robinson (2013) summarized and found out that all of the

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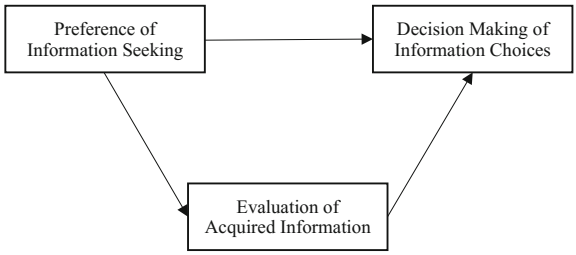

Fig. 1 Conceptual framework of this study

information-seeking models include a process of information evaluation, that is, how people evaluate acquired information. Byström and Järvelin (1995) further suggested when making decision on different types of tasks, the information needs are different. It raises a question whether information-seeking preference or information evaluation plays a more important role in human decision-making behaviors across different types of tasks.

This study aims to examine the roles of information-seeking preference and information evaluation in decision-making behaviors across different types of tasks. Figure 1 illustrates the conceptual framework for this study and there are four hypotheses in this study:

1. Preference of information seeking (via Internet or human interactions) significantly predicts decision-making.
2. There are different preferences in information seeking across different types of tasks.
3. There is a mediation effect of information evaluation on the relationship between preference of information seeking and decision-making.
4. There is a mediation effect of information evaluation on the relationship between preference of information seeking and decision-making varies across different types of tasks (academic, affective, and life-related event).

2 Literature Review

2.1 Work-Task Information Seeking and Retrieval Model

Byström and Järvelin (1995) suggested a model for understanding the process of information seeking and decision-making when a person is assigned with a task. Generally, there are four steps in the model. These four steps include: (1) Information need analysis, (2) choice of action, (3) implementation of chosen action, and (4) evaluation.

When people do various tasks, information need is formed if there is a gap between their knowledge and what the tasks require. They analyze the information

need and decide what information is suitable and appropriate for handling the task. This analysis of information helps them to choose actions to seek the information they need. In other words, people compare different information sources and channels to find which one is useful for them to deal with a specific task. Then, they implement the chosen actions, evaluate and determine whether obtained information is sufficient and appropriate. They judge whether the information is relevant and can satisfy their information need. If they feel that the information is not good enough or cannot satisfy their needs, they will get back from the top of the process and seek for other information. This model demonstrates that the importance of information evaluation, since it determines the cycle of the information seeking process and the choices of information for completing various tasks.

2.2 Information-Seeking and Communication Model (ISCM)

Robson and Robinson (2013) synthesized a few models in information seeking and developed the Information-seeking and Communication Model (ISCM). ISCM includes active and passive information-seeking behaviors, in which active information seeking means the information seekers ask for information intentionally and passive information seeking means receiving information passively (e.g., mass media). In this study, the focus is on active information-seeking behaviors. In general, there are four main steps in the model for active seeking. It includes (1) Choose information sources, (2) seek information, (3) assess, use or dismiss information, and (4) take actions and make decisions.

When people seek information, they firstly choose the information sources depending by utility and credibility. Robson and Robinson (2013) explained that these two key factors influence people's choices of information sources. Utility means how useful, relevant, timely, accessible and easy-to-use the information is. Credibility is how people perceive the information to be trustworthy and reliable as well as concerning the authority and bias of the acquired information. After the information seekers have chosen the information sources, they begin to seek for what they need. Once they have found suitable information, they assess, use or dismiss the information depending on the utility and credibility again. In other words, this is an iterative step of information evaluation. Utility and credibility also play important roles in the evaluation process. If the needs of the seekers are satisfied, they would take actions and make decisions. Dissatisfaction from information seeking and information evaluation lead back to previous steps.

From the ISCM, the vital role of information evaluation in the information-seeking process is again presented. It is also suggested that utility and creditability determine how people choose information. In this research, utility

and creditability were grouped together and included as the relevance of the information obtained because the word "relevance" was easier for participants to understand in the experiment.

2.3 Internet Versus Social Interaction

In this research, information-seeking preference was divided as seeking from the Internet or social interaction. In daily life, people make use of the Internet and/or social interaction in information seeking based on their needs.

Lo and Chu (2015) studied about the information seeking behaviors of students in one of the post-secondary institutions in Hong Kong. They found out that Internet usually is the first resource for art students to resort to when seeking information. Students also showed a strong need for career advice and like to interact with peers who are in the same field through social network and in person. These findings suggested that students would make use of both Internet and human interactions for obtaining helpful information to address their needs.

Another study suggested that students choose Internet information or social interaction information for different reasons (Bronstein, 2010). According to the results, the main preference criteria for Internet information sources was the ease to access and use, while the main preference criteria for social interaction sources was the quality and reliability of the information from the source.

Besides, preference in information seeking is greatly affected by the roles and responsibilities of people. For example, a psychologist may prefer making use of personal libraries, search engines, and their colleagues as information sources (Kostagiolas, Samioti, Alexias, Korfiatis, & Niakas,2012). Students may depend on the Internet and library at the first place (Lo & Chu, 2015). In this study, the target participants of this study are college students who usually use a wide range of information sources.

2.4 Selection of Categories of Tasks

Tasks with altered levels of complexity require different levels of information processing. Tasks can be categorized into a few types according to the structure and complexity of the tasks (as cited in Byström & Järvelin, 1995). In this study, three decision tasks that are typical to college students' life were chosen. For these decision tasks, people know that there are possibilities to resolve but they have not known how much information required to perform the tasks yet. Therefore, the amount of information needed remains unknown and mainly indeterminable. For instance, a student starts an individual research project and he/she does not completely know how much information he may need to complete the project. However, he/she is sure that he/she can search the information to complete the task.

The three self-developed tasks used in the experiment including an academic task, an affective task, and a life event-related task. It was found that for a riskier and more important decision and problem, people would tend to seek advice from others; while people are more likely to depend on Internet resources for a less important decision and problem (Simoes & Soares, 2010). The selected task types had different levels of importance and required participants to seek for more information in order to make their decisions. It is anticipated that there are individual differences in information seeking, information evaluation, and decision-making when handling different types of tasks.

3 Methods

3.1 Participants

In this study, 25 participants who were undergraduates from a private university in Hong Kong participated in this study. There were 7 males (28%) and 18 females (72%). The age range was 17–21 (M = 18.60, SD_{age} = 1.12). According to Spink and Heinström (2011), the relationship between people is a factor to affect information seeking and sharing among people. In order to encourage interpersonal interactions, participants were asked to come to the experiment with a peer and must know each other prior to the experiment. Although there were only 25 participants, each participant needed to complete three tasks. Both qualitative and quantitative data were gathered across three tasks for all 25 participants. Thus, the power of the research design was guaranteed.

3.2 Materials and Measures

In this study, there were two independent variables and one dependent variable. The dependent variable was the decision-making of information choices. The independent variable were the preference of information seeking and evaluation of acquired information. Evaluation of information was also considered as mediator variable in the mediation analyses. These variables were measured by ratings in observation and scoring on written tasks which are detailed described later.

The participants were requested to complete three tasks of three scenarios by making the best choice of information to solve the problem. They were given 15 min for each task to seek and evaluate information and write down their decision for each scenario. The participants were invited to seek information from Internet and/or social interactions with other participants. The description of each task (scenario) is summarized as follow:

- Academic Task: Thinking of a term paper topic
- Affective Task: Solving a romantic relationship issue
- Life event-related Task: Deciding whether going for a working holiday or not.

For information-seeking preference, participants' preference of information sources by seeking information from Internet sources or through human interactions at the beginning of the experiment. The first source (Internet or human interactions) they sought was marked as the information-seeking preference (a dichotomous indicator). It was coded as "1" for the preference of information seeking was from the Internet and it was coded as "0" for the preference of information seeking was from human interaction.

For information evaluation, participants jotted down what information they had sought from their sources via Internet and human interactions (with another participant)—and rated for the relevance of information from both sources on a 10-point scale. This indicated how they valued the information they sought. Then, the average rates of two types of information sources were compared by the following equation. The range for the composite score of information evaluation was from 10 to −10 for each task.

$$\frac{\text{Total Rating Scores of Internet Info}}{\text{Number of Internet Info}} - \frac{\text{Total Rating Scores of Human Interaction Info}}{\text{Number of Human Interaction Info}}$$

For decision-making of information choices, the experimenter matched the keywords in jotted notes from the participants and their final decision of information choices for each task. The number of matched keywords between the jotted notes and the final decision indicated what information source (via Internet or human interactions) a participant relied on. By matching the keywords, the number of used and acquired information from each source (Internet or human interactions) were computed and compared with the following formula. The range of scores was from 1 (purely from Internet) to −1 (purely from human interactions).

$$\frac{\text{Used Info from Internet}}{\text{Acquired Info from Internet}} - \frac{\text{Used Info from Human Internactions}}{\text{Acquired Info from Human Interactions}}$$

4 Results

4.1 Effect of Information Seeking on Decision-Making

Hypothesis 1 postulated that preference of information seeking would affect decision-making of information choices. To test this hypothesis, a series of linear regression analyses were performed for the overall (three tasks combined) and the three different tasks separately.

Table 1 Correlations between information seeking and decision-making in general, academic task, affective task, and life event-related task

	Measure	*M*	*SD*	Point-biserial correlation
				Information seeking
General	Information seeking	0.31	0.46	
	Decision-making	0.24	0.92	0.86***
Academic task	Information seeking	0.40	0.50	
	Decision-making	0.024	1.01	0.85***
Affective task	Information seeking	0.20	0.41	
	Decision-making	0.39	0.81	0.87***
Life event-related task	Information seeking	0.32	0.48	
	Decision-making	0.32	0.93	0.86***

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$

Table 1 summarizes the means, standard deviations, and point-biserial correlations. The correlations between information seeking and decision-making for the overall, academic task, affective task and life event-related task were 0.86, 0.85, 0.87, and 0.86, respectively. These correlational results suggested that there is a strong relationship between preference of information seeking and decision-making of information choices across three tasks and overall. Results of linear regression analyses showed that preference of information seeking were significant predictors of decision-making of information choices. The preference of information seeking significantly accounted for 73.4, 70.6, 75.0, 72.7% variance in decision-making of overall, academic task, affective task, and life event-related task, respectively. Therefore hypothesis 1 was supported.

4.2 Tendency of Information-Seeking Preference in the Three Tasks

Hypothesis 2 assumed that people have different preferences of information sources in different types of tasks. One-way ANOVA was conducted to test whether there was significant differences in information seeking between different types of tasks. From the results, there was no statistically significant differences between group means between the three tasks, $F(2, 72) = 1.18$, $p = 0.313$. Therefore, hypothesis 2 was not supported.

4.3 Mediation Effect of Information Evaluation

Hypothesis 3 postulated that there is a mediation effect of information evaluation on the relationship between information seeking and decision-making. To find out, a mediation analysis was conducted. First, as stated above, the zero-order correlation between information seeking and decision-making was 0.86. Then, both information seeking and information evaluation were placed as predictor variables and decision-making as the outcome variable. The overall equation was significant; $R^2 = 0.88$, $F\ (2,\ 72) = 264$, $p < 0.001$. Information evaluation significantly predicted decision-making after controlling for information seeking, $\beta = 0.62$; $t\ (72) = 9.24$, $p < 0.001$. The magnitude of relationship between information seeking and decision-making was weaker but still significant after controlling for information evaluation, $\beta = 0.37$; $t\ (72) = 5.57$, $p < 0.001$ as compared to the direct relationship in the simple linear regression ($\beta = 0.86$). These results suggested that information evaluation partially mediated the relationship between information seeking and decision-making. Therefore, hypothesis 3 was partially supported and there is a partial mediation effect of information evaluation on the relationship between information seeking and overall decision-making.

4.4 Mediation Effect of Information Evaluation Across Three Tasks

The previous section showed that there is a partial mediation effect of information evaluation on the relationship between information seeking and overall decision-making. Hypothesis 4 proposed that this mediation effect would still exist across the three task types—academic task, affective task, and life event-related task. Therefore, three mediation analyses were performed separately for each task.

For the academic task, the overall equation was significant; $R^2 = 0.97$, $F\ (2,\ 22) = 416.51$, $p < 0.001$. Information evaluation significantly predicted decision-making remained significant, after controlling for information seeking; $\beta = 0.93$; $t\ (22) = 14.81$, $p < 0.001$. Above all, the direct relationship between information seeking and decision-making on academic task became insignificant after controlling for information evaluation ($\beta = 0.07$; $t\ (22) = 1.11$, $p = 0.276$) as compared to the direct relationship in the simple linear regression ($\beta = 0.85$). These results suggested that information evaluation fully mediated the relationship between information seeking and decision-making on academic task.

For affective task, after controlling for information seeking, information evaluation significantly predicted decision-making; $\beta = 0.35$; $t\ (22) = 3.32$, $p = 0.003$. Since after controlling for information evaluation, the direct relationship between information seeking and decision-making also was weaker ($\beta = 0.66$; $t\ (22) = 6.28$, $p < 0.001$) as compared to the direct relationship in the simple linear regression

($\beta = 0.87$). These results showed that information evaluation partially mediated the relationship between information seeking and decision-making in affective task.

Lastly, for the life event-related task, information evaluation significantly predicted decision-making after controlling for information seeking; $\beta = 0.78$; $t\ (22) = 5.30$, $p < 0.001$. Besides, the direct relationship between information seeking and decision-making became insignificant after controlling for information evaluation ($\beta = 0.18$; $t\ (22) = 1.19$, $p = 0.245$) as compared to the direct relationship in the simple linear regression ($\beta = 0.86$). These results suggested that information evaluation fully mediated the relationship between information seeking and decision-making on life event-related task.

Therefore, hypothesis 4 was supported. There is a partial mediation effect of information evaluation on the relationship between information seeking and decision-making in affective task as well as a full mediation effect in both academic and life event-related task.

5 Discussion

5.1 Information Seeking and Decision-Making

The results supported hypothesis 1 that the preference of information seeking, via the Internet or human interactions, significantly predicted decision-making in general across the three tasks. The correlations between the two variables indicated a strong relationship. As expected, when participants preferred to search information from Internet sources, they would stick to their information choices at the end of the decision-making. Similarly, participants who first chose to ask for information through human interactions would make decision based on that information at the end.

These results were consistent with what Robson and Robinson (2013) and Byström and Järvelin (1995) mentioned in their information behavior models that as information seeking is the first priority in the order of the information behavior process, the preference in seeking information eventually affects the decision-making of information choices at the end. These findings also supported why the hypothesis 2 was not supported because the effect of information-seeking preference on decision of information choices are consistent across different types of tasks.

5.2 Mediation Effect of Information Evaluation

Hypothesis 3 was partially supported and there is a partial mediation effect of information evaluation on the relationship between information seeking and

decision-making in general. This is consistent with the emphasis of information evaluation in the information behavior process (Byström & Järvelin, 1995; Robson & Robinson, 2013). Although the preference of information seeking predicted the decision-making of information choices, the relationship was weaker after controlling for information evaluation. These results indicated that people tend to evaluate the quality and the content of the obtained information rather than simply believing and using the information sought.

5.3 Mediation Effect of Information Evaluation with Tasks

Hypothesis 4 tested whether the mediation effect of information evaluation on the relationship between preference of information seeking and decision-making of information choices exist for different types of tasks. Overall, in all three tasks, academic task, affective task and life event-related task, there were partial or full mediation effects of information evaluation on the relationship between information seeking and decision-making. The mediation effect was only partial for affective task and there was full mediation effect for both academic and life event-related tasks.

It was interesting to find out that the mediating effect of information evaluation on the relationship between information seeking and decision-making of information choices were varied across the three task types. People make decision based on the quality of information when the tasks (academic and life-related event tasks) have relatively objective and information-based answers or references for a particular topic (Gross & Latham, 2011). People would evaluate and make sure the information they have found was the best choice and the best answer to address a topic and to complete a task.

On the other hand, people tend to rely more on the information sources and evaluating the credibility and quality of the obtained information when it comes to some topics with relatively subjective and social-based answers or references (relationship topics). Thus, affective task gives participants a sense of uncertainty in decision-making. These results were consistent with the past research that people would preferentially use colleagues (human interaction) as an information source when facing uncertainty (Marshall, West, & Aitken, 2013). Although evaluating the obtained information partially mediated the relationship, preference of information seeking still significantly predicted the decision-making on information choices in a task with more uncertainty.

5.4 Implications of the Study and Directions for Future Research

This study is an important step in understanding the role of information evaluation in information behaviors for doing different tasks. The results suggested that people, especially students, should beware of the creditability of the information sources they use. Although in academic task, college students tend to evaluate the quality of information before making use of it; in other situations, such as making some important but uncertain decisions, they may ignore the information quality and directly use the information acquired from the sources they trusted. They should learn to evaluate with the acquired information, even if it is from the human and/or Internet sources they trust. In future studies, the role of information evaluation on human decision-making behaviors with more types of tasks can be further investigated.

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Sharing Data and Knowledge: Exploring Relationships and Difference Among Day, Time, Gender, Place, and Smartphone Use

Eiswein Tsz Kin Wong and Will W.K. Ma

Abstract Smartphones are popular. People use smartphones in many different ways. This study aims to explore the smartphone use of people by developing an alternate data collection method. It is proposed that data is collected by a large number of researchers who record smartphone use of the public. This study developed a smartphone app to implement this alternate data collection method. The pilot results included 4760 data sets from Hong Kong, Taiwan, Singapore in 90 days. Significant relationships are found between smartphone use and gender ($\chi^2 = 151.19$, $df = 7$, $p < 0.001$); smartphone use and places ($\chi^2 = 778.77$, $df = 14$, $p < 0.001$); smartphone use and weekday ($\chi^2 = 240.23$, $df = 42$, $p < 0.001$); and smartphone use and time ($\chi^2 = 782.38$, $df = 154$, $p < 0.001$). The study suggests sharing the raw data so that researchers could analyze in their own way.

Keywords Smartphone use · Gender · Global · Methodology · Smartphone app

1 Introduction

Recently, mobile phone ownership rate meets a high percentage in different places. In popular cities and countries, mobile phones are very common among their citizens. 95.4% of women and 96.8% of men in Hong Kong own mobile phone (Census and Statistics Department, 2016), 92% of American adults own mobile phone. The more important is 68% of American adults have a smartphone (Pew Research Center, 2015). Different from traditional cell phone, smartphone combines the pocket-sized communication device with computer-like capabilities (Carroll & Heiser, 2010). Previous study shows that smartphone has four main usages, namely

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user interactions, application use, network traffic, and energy drain (Falaki et al., 2010). Apps were not appeared until 10th July 2008 which was the day that App Store went online. There were only 500 apps available at the beginning but App store hosted more than 10 million download within 3 days (Apple, 2008a, b). Application use in smartphone is not only a time-consuming user activity for users, but also an activity that beneficial for learning and health (Dennison, Morrison, Conway, & Yardley, 2013; Tossell, Kortum, Shepard, Rahmati, & Zhong, 2015).

Smartphone use influences our life in different ways. In this study, we try to explore daily smartphone use. The objective of this study is to understand how people use smartphones.

We set the following research questions:

(1) What kind of app do people use in smartphones?
(2) Does gender affect smartphone use?
(3) Does place affect smartphone use?
(4) Does time or day affect smartphone use?

The paper was organized as follows. Firstly, it explained the development of the data collection app. Then, it discussed the rationale to categorize smartphone use. The study reported the pilot data and analyzed the data with respect to a number of factors. It discussed the implications of the results, limitations and further studies in the end.

2 Method

2.1 How Data Collection Is Conducted

This study was started in the summer of 2016, with a view to suggest a new way to collect smartphone use data. A mobile app was developed (SY MediaLab Big Data Project, 2016) to allow researchers to observe and to collect smartphone use. Researchers went to different public places to observe how people were using smartphone use. They recorded the data by choosing among eight different uses, including Game, Instant Communication, Video, Social Media, Phone Call, Information Browsing, Photo, and Listening. Researchers could record the smartphone use of any five people around them. The screen displayed eight blue buttons for male; and another eight pink buttons for female. Researchers then pressed the submit button to send the data which would be saved in the server. If the researcher pressed the wrong button and wanted to change, they could press the icon once more to remove it in order to select the correct button again. The server recorded the smartphone use, the date, the time, the gender, and the GPS location, without any individual or personal identities. The project website would automatically update the database and show real-time generated graphs on the website (http://www.symedialab.org.hk/symlbd/index.php). The project website would also provide a download link for the public in order to download the raw data. The public could

therefore suggest their own way to analyze the data. Hence, the project achieves the goal of sharing data and knowledge.

2.2 Rationale to Data Collection Method

We are used to conduct survey for data collection and it is appropriate when the data is related to respondents' opinion or attitude. However, it is not always accurate if we collect smartphone use which is depended on respondents' memory. It would be much accurate if we could collect the data, for example, through telecommunication companies or communication platforms. While each company could only cover their customers or members and such confidential data would not easily be shared. Therefore, this project proposed an alternative: to recruit a large number of researchers who help to collect data at different time, different date, and different places. This project could be conducted all over the world.

2.3 Classification of Smartphone Use

In this study, smartphone use were classified into eight different uses, including Game, Instant Communication, Video, Social Media, Phone Call, Information Browsing, Photo, and Listening.

Firstly, Phone Call is a traditional and basic function of smartphone that the public use to communicate with others. Secondly, Photo, Audio (Listening) and Video are multimedia production and presentation tools for a smartphone. Users could make and play multimedia elements with smartphones. Thirdly, smartphone provides game for entertaining and for fun. Fourthly, smartphones provide frequent social interactions through connection to the Internet. According to the media richness theory (Daft & Lengel, 1986), whether a medium is rich or lean, is depended on four dimensions, including the capability of providing immediate feedback, number of cues and channel utilized, personalization, and natural language. We classified computer-like functions in smartphone use into three groups based on their level of media richness, namely Information Browsing, Social Media and Instant Communication.

The above classification covers most of smartphone use. It might sacrifice providing further details but it offers a strict forward data collection for smartphone use.

3 Results

3.1 Descriptive Statistics of Respondents

In this study, we reported the pilot data collected during the 90 days, from 18th July to 15th October, 2016. There were 4760 data sets. The details of weekday, time and gender were summarized in Table 1. Researchers randomly collected data at different time and places, the weekday of data collection ranged from 355 to 1355; time of data collection ranged from 5 to 705; male users consisted of 2245 and female users consisted of 2515. The descriptive statistics for the measurement items, places and smartphone use were shown in Table 2.

From the 4760 data sets, most people played Game (1061, 22.3%), followed by Instant Communication (915, 19.2%), Social Media (744, 15.6%), Phone Call (593, 12.5%), Information Browsing (563, 11.8%), Listening (433, 9.1%), Video (322, 6.8%), and Photo (129, 2.7%).

Table 1 Descriptive statistics of weekday, time, and gender

Weekday	*f* (%)	Time	*f* (%)	Gender	*f* (%)
Monday	460 (9.7%)	00:00	55 (1.2%)	Male	2245 (47.2%)
Tuesday	685 (14.4%)	01:00	35 (0.7%)	Female	2515 (52.8%)
Wednesday	640 (13.4%)	02:00	10 (0.2%)		
Thursday	820 (17.2%)	03:00	15 (0.3%)		
Friday	1355 (28.5%)	04:00	0		
Saturday	355 (7.5%)	05:00	10 (0.2%)		
Sunday	445 (9.3%)	06:00	5 (0.1%)		
		07:00	50 (1.1%)		
		08:00	100 (2.1%)		
		09:00	705 (14.8%)		
		10:00	115 (2.4%)		
		11:00	200 (4.2%)		
		12:00	295 (6.2%)		
		13:00	180 (3.8%)		
		14:00	235 (4.9%)		
		15:00	175 (3.7%)		
		16:00	185 (3.9%)		
		17:00	340 (7.1%)		
		18:00	525 (11%)		
		19:00	395 (8.3%)		
		20:00	345 (7.2%)		
		21:00	420 (8.8%)		
		22:00	180 (3.8%)		
		23:00	185 (3.9%)		

Table 2 Descriptive statistics of smartphone use and places

Smartphone use	*f* (%)	Places	*f* (%)
Game	1061 (22.3%)	Hong Kong	3885 (81.6%)
Instant communication	915 (19.2%)	Taiwan	510 (10.7%)
Video	322 (6.8%)	Singapore	365 (7.7%)
Social media	744 (15.6%)		
Phone call	593 (12.5%)		
Information browsing	563 (11.8%)		
Photo	129 (2.7%)		
Listening	433 (9.1%)		

Moreover, most of the data was collected at Hong Kong (3885, 81.6%), followed by Taiwan (510, 10.7%) and Singapore (365, 7.7%).

3.2 Chi-Square Test

A chi-square test was performed and significant relationships were found between smartphone use and gender ($\chi^2 = 151.19$, $df = 7$, $p < 0.001$) (see Table 3); smartphone use and places ($\chi^2 = 778.77$, $df = 14$, $p < 0.001$) (see Table 4); smartphone use and weekday ($\chi^2 = 240.23$, $df = 42$, $p < 0.001$) (see Table 5); and smartphone use and time ($\chi^2 = 782.38$, $df = 154$, $p < 0.001$) (see Table 6).

4 Discussion

4.1 Research Objective: Determine the Basic Information of Smartphone Use

This research aimed to explain a social phenomenon which was the smartphone use among people. We investigated the smartphone use by finding what people used, when people used, where people used and tried to provide evidence to explain why they used and how they used. We used the collected data to find (1) the smartphone use; (2) the relationship between smartphone use and gender; (3) the relationship between smartphone use and places; (4) the relationship between smartphone use and weekdays; and (5) the relationship between smartphone use and time. This project used the collected data and found different angles to compare smartphone use among people and tried to explain the smartphone use behavior. It is because the research has just started for 90 days, the pilot data we collected is limited where data from some places, some weekdays and some time slots are few. When the

Table 3 Chi-square test between smartphone use and gender

Gender	Smartphone use								Total *N*	χ^2	*df*	*p*-value
	Game	Instant communication	Video	Social media	Phone call	Information browsing	Photo	Listening				
Male	650	340	122	309	275	293	50	206	2245	151.19	7	0.000
Female	411	575	200	435	318	270	79	227	2515			

Table 4 Chi-square test between smartphone use and places

Places	Smartphone use								Total *N*	χ^2	*df*	*p*-value
	Game	Instant communication	Video	Social media	Phone call	Information browsing	Photo	Listening				
Hongkong	682	783	297	693	470	494	70	396	3885	778.77	14	0.000
Taiwan	296	51	11	33	19	33	59	8	510			
Singapore	83	81	14	18	104	36	0	29	365			

Table 5 Chi-square test between smartphone use and weekday

Weekday	Smartphone use								Total *N*	χ^2	*df*	*p*-value
	Game	Instant communication	Video	Social media	Phone call	Information browsing	Photo	Listening				
Monday	101	87	37	92	35	55	9	44	455	240.23	42	0.000
Tuesday	122	110	59	116	101	94	4	79	685			
Wednesday	170	139	37	77	70	83	10	54	640			
Thursday	144	158	71	150	136	81	8	72	820			
Friday	374	254	73	153	168	135	69	129	1355			
Saturday	66	58	23	52	47	63	17	29	355			
Sunday	84	109	22	104	36	52	12	26	455			

Table 6 Chi-square test between smartphone use and time

Time	Smartphone use								Total N	χ^2	df	p-value
	Game	Instant communication	Video	Social media	Phone call	Information browsing	Photo	Listening				
00:00	13	12	4	8	9	3	4	2	55	782.38	154	0.000
01:00	2	4	6	6	5	5	2	5	35			
02:00	2	1	1	1	0	2	0	3	10			
03:00	3	1	2	1	4	2	0	2	15			
04:00	0	0	0	0	0	0	0	0	0			
05:00	0	0	0	2	0	7	0	1	10			
06:00	1	1	2	0	0	0	0	1	5			
07:00	9	10	3	5	6	11	1	5	50			
08:00	15	21	4	23	2	24	1	10	100			
09:00	154	97	50	142	58	120	1	83	705			
10:00	11	37	4	30	9	14	0	11	115			
11:00	25	45	20	28	27	15	3	37	200			
12:00	59	46	20	39	50	33	21	27	295			
13:00	15	33	14	31	41	16	16	14	180			
14:00	51	39	14	28	63	21	6	13	235			
15:00	33	31	18	27	28	20	2	16	175			
16:00	37	37	10	31	28	18	15	9	185			
17:00	86	64	11	44	53	34	18	30	340			
18:00	131	107	37	65	52	74	12	47	525			
19:00	85	112	17	47	61	46	9	18	395			

(continued)

Table 6 (continued)

Time	Smartphone use								Total *N*	χ^2	*df*	*p*-value
	Game	Instant communication	Video	Social media	Phone call	Information browsing	Photo	Listening				
20:00	71	84	20	83	34	40	4	9	345			
21:00	204	50	29	40	38	29	6	24	420			
22:00	24	39	18	35	16	9	4	35	180			
23:00	30	44	18	28	9	20	4	32	185			

research continuously conducts in the future, the data will be richer and the result will be more meaningful.

4.2 Results: Trend of Smartphone Use

The results showed the smartphone use of people. Significant relationships were found between smartphone use and gender, smartphone use and place, smartphone use and weekday, smartphone use and time.

4.3 Data Sharing: Sharing the Knowledge

This study suggested an alternate way to recruit a large number of researchers to collaboratively collect data together. This study developed an app to implement this data collection method. With this app, it makes possible that researchers from all over the world can collect data together. This project offers the raw data download link. It provides a rich pool of data so that smartphone use data around the globe could be shared.

Data could be analyzed according to researcher's needs, for example, only analyzed data with a lower limit of data (e.g., >200) in order to reduce systematic bias. Another example like only compare any 2 places (e.g., Hong Kong and Taiwan) is also feasible.

4.4 Limitations and Future Studies

It was because the data was collected by observation, the recording process should be simple and fast and context should not be too much and complex. Also, people were passing to and fro which made the number of data that collected in one time was limited. Therefore, the design of the app is direct, simple and easy to understand. In the future, it would be possible to add more elements in it if there is a need. Goal of collecting data is appropriate to achieve the research objective: To understand smartphone use. Although the data we collected is monotonic, it could accurately record the action at that time. If we continuously conduct the research at different time and places, the database could provide useful raw data like the long-term change and trend. On the other hand, there might be bias toward some researchers who collected more data than the others. Similarly, there might be problems in certain time interval, or in certain places. To solve the potential problems, for example, we could use random sampling method to extract same amount of data from each researcher. This could also be applied to day, time, or place. Once we obtain the raw data, we could set up analysis method and procedure

that we need. In addition, such potential problem could be reduced if we have large enough number of researchers.

5 Conclusion

This project has some pilot results which already show significant relationships among time, weekday, gender, place, and smartphone use. In the future, so long as the data collection continues, there would be more data over time, and we would be able to analyze the data in different ways, such as, trends. This project has already developed app for both IOS and Android platforms. The app is free to download at App Store and Google Play. This project openly invites researchers from the world to join the data collection. Download the app, register, collect data and share the data and knowledge together.

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Internet Plagiarism at the Fingertips? Legal Warning to Professionals and Future Professionals

Kar-wai Tong

> *The Internet embraces all variations of the concept of plagiarism.*
>
> —Sutherland-Smith (2008, p. 34).

Abstract This chapter examines the legal impact of alleged plagiarism in the Information Age on professionals and people who plan to become professionals. Through examples of litigations in Australia and a few other common-law jurisdictions, the current manuscript discusses plagiarism in general and particularly in the cyberspace, with a hope of arousing professionals' and future professionals' alertness to the possible legal risks of disqualifications arising from plagiarism allegedly committed at any point of time before and after they become professionals.

Keywords Plagiarism · Internet plagiarism · Legal risks · Professional disqualifications

1 Introduction

Imitation is important for knowledge transfer in the process of human development (Ghosh, 2007, p. 228), and there are good and bad imitations (Randall, 2001, p. 67). At Aristotle's time, imitation or *mimesis* was seen as a human instinct and considered a positive process to cause learning and pleasure (Granitz & Loewy 2007, pp. 294–295). In modern days, imitation may bear more than one meaning, for instance, (a) the adoption of other writers' tone, style and attitude, or a re-creation, (b) a representation and (c) copying or plagiarism (Cuddon, 2013, p. 357). In particular, plagiarism as a form of imitation is perceived as an uncontrollable social issue (Maruca, 2006, p. 78) and elimination of plagiarism may not be possible (Malloch, 1976, p. 174).

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2 Literature Review

Plagiarism is not new and may be "as old as education itself" (Hawley, 1984, p. 35). It is an academic integrity issue and people's perception towards it rests on a continuum of seriousness (Pincus & Schmelkin, 2003, p. 206). Scholars may have had similar attitudes towards plagiarism since the medieval period (Sadeghi, 2016), but their perceptions may not be the same as students' viewpoints (Brimble & Stevenson-Clarke, 2005; Kwong, Ng, Mark, & Wong, 2010). Plagiarism creates questions that may confuse both teachers and students, especially when there is a flood of readily accessible and retrievable information in the cyberspace (Eisner & Vicinus, 2008, pp. 1–2). There are exceptional cases like French education where plagiarism is not a taboo in teaching and writing practices (Donahue, 2008, p. 90), but teaching staff, acting as "plagiarism police" (Howard, 2002), have difficulties in defining plagiarism, as well as catching and disciplining students who have committed plagiarism (Howard 1999, p. 3). Students who have cheated in classrooms may have a higher chance of committing future dishonest acts in the work context (Nonis & Swift, 2001). Worriedly, students often rationalize and attach little importance to such misbehaviour (Park, 2003, p. 483).

2.1 What Is Plagiarism?

The word "plagiarism" was originated from Latin expressions in the second century B.C. (Randall, 2001, p. 61), namely from the root *plagiarius*, which bears a meaning of abducting or kidnapping (Mundava & Chaudhuri, 2007, p. 170). There is neither a universal contemporary definition of plagiarism (Bennett, Behrendt, & Boothby, 2011) nor a single definition working well in any circumstances (Donnelly, Ingalls, Morse, Post, & Stockdell-Giesler, 2013, p. 3). What is pretty certain is that the world does not "run short" of its definitions (Onge, 1988, p. 51), which may come from a diverse range of categories such as dictionaries, academia and governments (Snider, 2013, pp. 14–16). In dictionaries, the *Oxford Advanced Learner's Dictionary* defines the word "plagiarize" as "to take somebody else's ideas or words and use them as if they were one's own" (Hornby, 1995, p. 880). Similarly, but not identically, the *Cambridge Advanced Learner's Dictionary* explains that "to plagiarize" is "to use another person's idea or part of their work and pretend that it is [one's] own" (2003, p. 943). The *Collins COBUILD English Language Dictionary* elucidates plagiarism with two meanings: (a) "the action of using or copying someone else's idea or work and pretending that [one] thought of it or created it; using showing disapproval", and (b) "an idea or a piece of writing or music that has been secretly copied from some else's work; used showing disapproval" (Sinclair, Hanks, Fox, Moon, & Stock, 1987, p. 1091).

With respect to academia, institutional examples are given as illustrations. In the UK, the University of Oxford (no date, p. 6) treats plagiarism as "presenting someone else's work or ideas as [one's] own, with or without their consent, by incorporating it into [his or her] work without full acknowledgement", and irrespectively of one's being intentional or reckless, plagiarism is considered a disciplinary offence. In the United States, the Harvard University (2016) considers that plagiarism in academic work is "draw[ing] any idea or any language from someone else without adequately crediting that source in [one's] paper", that the source is not a matter of concern, may it come from other authors or students, anonymous works on websites, or online term-paper mills, and that plagiarism is "stealing" and is not acceptable even if it is committed unintentionally or by accident. The National Science and Technology Council considers plagiarism in the context of research misconduct and defines research misconduct as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results" (Office of Science and Technology Policy of the United States 2000, p. 76262). In addition to educational institutions, scholars have had multiple opinions on the characteristics of plagiarism. Leight (1999, pp. 221–222), after studying about 70 textbooks, concluded that there are four principal metaphors for plagiarism, namely (a) stealing and accordingly morally wrong, (b) violating an unwritten students' code of conduct, (c) "borrowing" without acknowledgment and (d) failure to intellectualize like a scholar. Park (2003, p. 475) identified four common approaches of students' plagiarism: (a) "stealing" others' materials as their own (e.g. buying papers from a paper mill, copying others' papers without giving credits to the authors), (b) submitting others' work as their own, (c) copying direct quotes with full citations, but without quotation marks, to pretend paraphrasing has been done and (d) paraphrasing others' work without appropriate citations. Pecorari (2013, pp. 12–14) pointed out other four criteria constituting plagiarism, including (a) the co-existence of two similar texts, (b) the similarity arising from the reliance of the later text on the earlier one, (c) inappropriate relationship between the two texts and (d) one's intention to copy in a deceptive manner.

Governments have given diverse responses to plagiarism. In the United States, some states "go beyond the walls of the university" to manage students' plagiarism (Rodriguez, 2004, p. 127), and there has been an evolutionary process of regulatory responses to plagiarism (Anderson & Steneck, 2011, p. 92). In India, to deter academic people from committing further plagiarism, the media reported that its university grants commission would submit a bill to the parliament for legislative enactment which makes plagiarism a legal offence and incorporates a range of penalties such as deregistration of students and termination for teachers' services (Pandey, 2016). In Europe, jurisdictions consisting of Germany, Finland, France, Romania, Hungary, Luxembourg and Austria have realized the need to strategically intervene at the national level to manage academic integrity in the higher education sector, whilst others such as Belgium, Spain, Italy, Greece and the Netherlands have had no strategies at any level (Glendinning, 2014, p. 16).

2.2 Causes of Plagiarism

The causes of committing plagiarism are not unified. It may be due to lack of appropriate education about academic ethics (Tayraukham, 2009, p. 574) and/or by reason of ignorance about plagiarism when people download online materials (Dawson & Overfield, 2006). In addition to insufficient education and ignorance, there are other possibilities leading to plagiarism, for instance, a utilitarian approach to attain a better grade, time pressure, personal values and judgements about plagiarism, defiance of and negative attitude towards doing an academic task, denial of cheating, temptation due to information availability from the virtual networks, and self-perceived low chance of getting caught (Park, 2003, pp. 479–480).

2.3 Forms of Plagiarism

There are various forms of plagiarism (Clegg & Flint, 2006, p. 383). Subject to the degree and intensity of plagiarism, it may generally include complete plagiarism, partial, substantial or minimalist plagiarism, plagiarism with or without citations, and self-plagiarism (Vishwakarma & Mukherjee, 2014, p. 150). In practice, plagiarism may be committed if one copies information verbatim, presents others' ideas without attribution, paraphrases others' manuscripts, intentionally gives wrong citations and collusion (Mahmood, 2009, p. 1349). People's classifications of plagiarism are manifold. Howard (1995, pp. 799–780), for instance, differentiated three forms of plagiarism—cheating, lack of acknowledgement of sources and patchwriting, where the word "patchwriting" was coined to turn the negative sense of plagiarism to inexperienced learners' positive motivation to gain knowledge in little known areas of study. Pecorari (2013, p. 16) also categorized plagiarism into three forms, in which prototypical plagiarism means an intention to deceive readers by repeating an earlier text, patchwriting refers to any unintentional plagiarism, and textual plagiarism is an umbrella term to cover the former two as sub-types.

2.4 A Worldwide Trend

Plagiarism as a form of academic dishonesty has become a contemporary worldwide issue (Smedley, Crawford, & Cloete, 2015, p. 168), though some people may challenge the traditional unethical views on plagiarism and argue that cultural and contextual factors should be taken into consideration (Johannesen, 1995, p. 186). It may be committed in multitudinous academic disciplines such as humanities and social sciences, pure sciences, fines arts, as well as other professional trainings like medicine and engineering (Bradley, 2011). Plagiarism is not time dependent or territory bound. To cite a few examples, in 1995 in the United States, the Office of Scientific Integrity of the National Institutes of Health and the National Science

Foundation, respectively, reported that approximately 30 and 50% of cases under their investigations involved allegations of plagiarism (Parrish, 1995, p. 521). In 2012 in Pakistan, a study involving 365 graduate or postgraduate students revealed that intentional plagiarism was not uncommon (Ramzan, Munir, Siddique, & Asif, 2012). Worst still, setting extremely bad examples to students, plagiarism has also been increasingly committed by academicians, politicians and journalists (Ercegovac & Richardson, 2004, p. 306). Alleged cases may involve speeches and presentations of top university administrators containing others' sources without attribution (Bergmann, 2009, p. 129), staff of higher educational institutes eagerly advancing their academic standing or getting a career promotion (Buckeridge & Watts, 2013, p. 223), a wife trying to help her husband to run a presidential election (Roberts & Jacobs, 2016) and a journalist having plagiarized material from other news entities (CNN, 2003). Similar types of incidents were discussed in academic articles (Rieder, 2003; West & Byrne, 2009, p. 310) and reported in newspapers (Kumar, 2006; Leung, 2015), for example. In addition to attracting media attention (Sutherland-Smith, 2010, p. 5), plagiarism is more than a moral issue and may have legal implications as well (Divan, Bowman, & Seabourne, 2015, p. 359).

3 Plagiarism in the Information Age

The Information Age is a revolutionary age. The Internet has boosted the "democratization of texts" and challenged the conventional copyright, as people could transform themselves as authors and share work with others much easier through the virtual network than the old good days (Diogenes, Lunsford, & Otuteye, 2009, p. 20). On the other side of a coin, it is also much easier nowadays to make use of readily available information from the Internet (Heckler & Forde, 2015, p. 63), whether by "cut and paste" techniques or document downloads, and plagiarism will be alleged, irrespectively of intention or carelessness, if there are insufficient paraphrasing or incomplete citations (Sutherland-Smith, 2008, p. 34).

Plagiarism is an area of concern especially in this digital era (Harms, 2006, p. 2), as the Internet has transformed people's learning and teaching processes and facilitated reading, sharing, copying, disseminating and even stealing of intellectual property (Gerhardt & Wessel, 2010, p. 26), The change of behaviours has exacerbated issues of plagiarism (DeVoss & Rosati, 2002, p. 197). There are increasingly more people looking for "cooked solutions and shortcuts" in the virtual environment for academic studies and assignments (Ramzan et al., 2012, p. 73). In addition to the reasons of offline plagiarism mentioned above, the risk of plagiarism correspondingly rises with people's enhanced access to the cyberspace, as students and other persons may have a misunderstanding that online materials from the Internet are public information without the need of attribution (Oliphant, 2002, p. 79). In the United States, research found that 33% of high school students under investigation plagiarized by copying a document from the Internet (Josephson Institute of Ethics, 2006, p. 3). Another comparative survey with 1305 university

students indicated that digital plagiarism in the context of online "cut and paste" practices without citations has exceeded traditional plagiarism (Stephens, Young, & Calabrese, 2007, p. 233). In the UK, a study involving 1222 undergraduate students revealed that about three-fifths of students self-reported at least a moderate level of Internet-based plagiarism during the past 12 months and that there was a strong correlation between students' online plagiarism and their self-reported levels of offline plagiarism (Selwyn, 2008). The Office of the Independent Adjudicator (2014) in England and Wales also reported that plagiarism is not uncommon at universities that a number of students' work may have been "ghosted" or taken from the Internet. In Turkey, a study with 386 first- and fourth-grade student teachers as respondents confirmed that their academic integrity was influenced by technology (Eret & Ok, 2014, p. 1011).

4 Plagiarism Versus Copyright

Plagiarism and copyright are not equivalent conceptions. Although plagiarism may be perceived as a serious crime or specifically "literary theft" (Marsh, 2007, p. 10) or it may appear as a prima facie case of "quintessential act of wrongful copying" (Stearns, 1992, p. 514), it is arbitrary to assume that plagiarism is without any reasonable doubt in any cases equivalent to a transgression of copyright law, as in some cases, authors concerned may not have the intention to violate customary practices in the academic field (Pecorari, 2003, p. 317). On the contrary, having quoted appropriate citations may still face allegation of copyright infringements (Alger, 2008, p. 10). For example, whilst proper attribution may meet the ethical aspects of plagiarism, it may not fulfill the statutory requirements of fair use as stipulated in section 107 of the Copyright Act in the United States, which provides for four factors to be contemplated, namely (a) the purpose and character of the use (e.g. for commercial or non-profit educational purposes), (b) the nature of the original work, (c) the amount and substantiality of the portion used relative to the original work as a whole; and (d) the effect of the use upon the potential market for or value of the original work.

Copyright law influences each person (Harris, 2014, p. XVII). At the international level, the Berne Convention for the Protection of Literary and Artistic Works adopted in 1886, for instance, protects authors' rights in their literary and artistic works by constituting a union across the globe (Article 1). The Agreement on Trade-Related Aspects of Intellectual Property Rights, with an acronym of TRIPS, effective on 1 January 1995 (World Trade Organization, 2016) provides for the minimum international standards for protection of intellectual property rights (Articles 1-3), including copyright and related rights (Part II, section 1). In 1996, realizing the impact of information technologies on the creation and use of literary and artistic works, together with considering Article 20 of the Berne Convention, jurisdictions in the capacity of contracting parties adopted the WIPO Copyright Treaty as a special agreement [Article 1(1)] to protect authors' works and rights in the digital context (World Intellectual Property Organization, no date). In the same year, with similar

concerns about the impact of information technologies on the production and use of performances and phonograms, contracting parties agreed the adoption of the WIPO Performances and Phonograms Treaty ("WPPT") to guard against the rights of performers and producers of phonograms (Articles 2-3) in the cyberspace.

At the constitutional level, in Australia, the Commonwealth of Australia Constitution Act stipulates that the parliament can make laws in relation to copyrights, patents of inventions and designs, and trade marks [Part V, section 51 (xviii)]. In Canada, section 91(23) of the Constitution Act 1867 extends the exclusive legislative power to the parliament to make laws for copyright matters. In the United States, its Constitution promotes the development of science and useful arts by protecting authors' and inventors' exclusive rights to their work and discoveries for a limited period of time (Article 1, Section 8). In Hong Kong, though it is not a country, its Basic Law, a "mini-Constitution" of Hong Kong as it is sometimes referred to (Fung, 1996, p. 294), also spells out the making of government policies to provide legal protection for accomplishments in research on science and technologies, patents, discoveries, and inventions (Article 139), as well as literary and artistic creation (Article 140). Despite the availability of some legal protections, authors' rights are not fully shielded, as exemplified by the revelation of Davies and Garnett (2010, pp. 5–6, paragraphs 1-002–1-007) that out of five moral principal rights of authors, only two, namely rights of attribution (alternatively referred to paternity) and respect (also known as integrity), are under the protection of the Berne Convention, the WPPT (for performers), and the national laws, whilst the other three, i.e. authors' rights of disclosure, retraction and access, are only protected in some jurisdictions.

That said, authors' copyrights are at least protected by law to a certain extent. Unlike copyright, plagiarism is not a legal term (Stearns, 1992, p. 514) and sufficient legal protection against plagiarism may not always be in place. Academic work explaining legal risks in the context of plagiarism is also limited, let alone those with a focus on the Internet plagiarism. What would be the legal impact on persons who have committed plagiarism, which is not necessary an infringement of copyright? Through legal research on Australian litigation cases and with support of a few court case examples from other jurisdictions, the author attempts to succinctly highlight possible legal implications due to Internet plagiarism.

5 Legal Risks of Alleged Plagiarism in the Information Age

Plagiarism cases in this Information Age are more than disputes on copyrights and may also be brought to court. In the UK, for instance, in *R* (*on the application of Mustafa*) *v Office for the Independent Adjudicator for Higher Education,*[1] the

[1][2013] EWHC 1379 (Admin) (Queen's Bench Division (Administrative Court), UK).

claimant was a university student and he was caught plagiarized in an essay by significantly copying contents from websites without the use of quotation marks or appropriate referencing citations, and the court refused his application for judicial review of the defendant's rejection to handle his complaint against his university. Plagiarism occurs in both offline and online circumstances, as the Internet is not a legal-risk-free environment (Stebelman, 1998, p. 48). However, it is a risk to arbitrarily assume the negative association between the Internet and plagiarism (Reyman, 2013, p. 31). In the forthcoming sections, the author tries to identify possible legal outcomes of plagiarism through real court cases.

5.1 Research Methodology

The author conducted legal research in late November 2016 through the Westlaw, a renowned online legal library widely recognized by legal professionals and scholars, which provides online legal databases of statutes and secondary legislation, case precedents, legal journals, commentary, etc. (Thomson Reuters, 2016). Under the umbrella of the Westlaw, the "Westlaw Asia" (previously named "Westlaw HK & UK") facilitates legal research in Australia, Hong Kong, the UK, etc., and the "Westlaw Next" (previously referred to "Westlaw International") allows access to legal information in jurisdictions such as Australia, Canada, the European Union, New Zealand and the United States.

Court cases in Australia, a common-law jurisdiction, are examined for the current study. The author first checked court cases in Australia in the Westlaw Asia by using "plagiarism" as a search keyword and a total of 99 results was identified. He continued to survey within these 99 results by inputting "Internet" and "online" as respective keywords for two independent searches, and the numbers of results were correspondingly reduced to 19 and 12. He then scanned their case classifications and keyword-highlights in the text of court judgments, disregarded extraneous findings, and located eleven and four potential cases from the two respective searches, with three cases overlapping, making a total of 12 cases. He read the judgments of these twelve cases and identified four plagiarism-related cases. The remaining ones were not relevant to the current study (Table 1). The four relevant cases are discussed below.

6 Impact of Plagiarism on "A Fit and Proper Person"

The requirement for being a "fit and proper" person is not new to professionals. Statutory or professional bodies such as the Board of Architects Singapore (2016, Article 2) for architects, the Civil Aviation Authority of the UK (Gov.uk, 2016) for aircraft maintenance engineers, and the ACCA (2013, pp. 78–79) for accountants will check if applicants for new registrations or renewals of registration are fit and

Table 1 Search results on the Westlaw Asia (in late November 2016)

Processes	Number of results
(a) Using "plagiarism" in search of Australian court cases	99
(b) Inputting "Internet" for search within results of (a)	19
(c) Inputting "online" for search within results of (a)	12
(d) Scanning the results of (b) and (c) by reading case classifications and keyword-highlights in the text of court judgments and disregarding irrelevant findings	12 (after excluding 3 duplicated cases)
(e) Scrutinizing each result of (d) above by examining the court judgments	4 plagiarism-related
	3 defamation-related[a]
	2 migration-related[b]
	3 others respectively about access to personal information[c], trade practices[d] and race discrimination[e]

[a]*Carleton v Australian Broadcasting Corporation* [2002] ACTSC 127 (Supreme Court of the ACT, Australia); *Carolan v Fairfax Media Publications Pty Ltd (No 6)* [2016] NSWSC 1091 (Supreme Court of New South Wales, Australia); and *Madden v Seafolly Pty Ltd* [2014] FCAFC 30 (Federal Court of Australia)

[b]*SZKMP v Minister for Immigration and Citizenship* [2007] FCA 1646 (Federal Court of Australia); and S*ZLYI v Minister for Immigration* [2008] FMCA 1169 (Federal Magistrates Court of Australia)

[c]*AQJ v University of New South Wales* [2013] NSWADT 306 (New South Wales Administrative Decisions Tribunal, Australia)

[d]*Seafolly Pty Ltd v Madden* [2012] FCA 1346 (Federal Court of Australia)

[e]*Rana v Deakin University* [2012] FMCA 575 (Federal Magistrates Court of Australia)

proper persons, and such requirement is usually underpinned by law, e.g. section 78 of the Lifts and Escalators Ordinance (Cap 618) of Hong Kong for lift engineers and section 6 of the Veterinarians Act 2005 of New Zealand for veterinarians. In the legal field, in addition to the checking by professional bodies for lawyers, the court will also consider the moral character of an applicant to see if he or she is a fit and proper person to practice law (Bartlett, 2008, p. 309).

Internet plagiarism and/or conventional tradition may affect one's professional status. In the legal research described above, four plagiarism cases have been identified. In *Psychologists Registration Board (Vic) v Glamcevski,*[2] the respondent made a pretense of being a registered psychologist on some occasions but in fact he was not. One of the two allegations challenged that the respondent had submitted four plagiarized case studies to the applicant, Psychologists Registration Board, three of which allegedly concerned the work done by one of the respondent's colleagues and the fourth one contained material downloaded from two websites

[2][2010] VCAT 1927 (Victorian Civil and Administrative Tribunal, Australia).

(paragraphs 3, 6 and 7 of the judgment). The Victorian Civil and Administrative Tribunal observed in the judgment that "the plagiarism [was] so extensive in each and every one of the relevant case studies admitted by the respondent that it must necessarily be very little of his own work" (paragraph 46). The tribunal was concerned about the respondent's behaviour which, if continued, may be harmful to his future clients (paragraph 56), and had also serious doubts as to whether he was a fit and proper person to practice as a psychologist (paragraph 60). The respondent was subsequently reprimanded once and was fined AU$3500.

The other three court cases identified in the current legal research concerned admission to practice law. In a case heard before the Queensland Court of Appeal, *Re Liveri,*[3] the Legal Practitioners Admissions Board in New South Wales rejected the applicant's application for admission as a legal practitioner on the basis that she was unfit for legal practice, arising from alleged counts of her online (paragraphs 5–6 of the judgment) and other serious plagiarism (paragraphs 11–12) when she was a law student. The applicant made appeals twice and the Court of Appeal subsequently adjourned the case for at least six months, with the following remark in the judgment (paragraph 24):

> If and when the application does again come before the Court, the Court will need to be persuaded on appropriately cogent material that a finding of fitness is warranted. The mere lapse of time would not, without more, in a case of this overall concern, warrant the Court's concluding that fitness has been demonstrated. It is especially the applicant's subsequent attitude to the established misconduct which warrants a circumspect approach.

In *Re Humzy-Hancock,*[4] the applicant submitted an application for admission to practice law. In the application, he disclosed that he had been disciplined by a university owing to three incidents of alleged academic misconduct when he was a law student, namely one count in 2003 of wrongful collaboration with another student in writing an assignment (paragraph 3), and two counts of Internet plagiarism in 2005 respectively in his own assignment (paragraph 16) and a take-home examination (paragraph 37). The Supreme Court of Queensland, the highest court in Queensland, ruled that none of the two alleged plagiarism occasions were proven and the application did not intend to pass off other's work as his own.

Re Legal Profession Act 2004[5] was another case concerning a person named "OG" who applied for admission to legal practice. In the case, a crucial question before the Supreme Court of Victoria was whether OG had sufficiently made a disclosure including plagiarism to the Board of Examiners of an institute of practical legal training (paragraph 2 of the judgment). The disclosure in dispute involved one of OG's previous assignments which he was given a zero mark because of alleged collusion with another student to complete the academic task while he was studying a business degree at a university [paragraph 73(6)]. Subsequently, the Supreme Court of Victoria revoked the original order admitting

[3] [2006] QCA 152 (Court of Appeal of Queensland, Australia).

[4] [2007] QSC 34 (Supreme Court of Queensland, Australia).

[5] [2007] VSC 520 (Supreme Court of Victoria, Australia).

OG to the legal profession, as 'he deliberately or recklessly misrepresented to the Board of Examiners the circumstances in which he came to be awarded a zero grade or mark for his second assignment. His actions, therefore, were the antithesis of a "realization … of his obligation of candour to the court in which he desire[s] to serve as an agent of justice"' (paragraph 125).

7 Discussion

Though plagiarism is not a legal concept (Stearns, 1992, p. 514), it is not legal-risk free and its impact is retrospective. Some people may regard the above four cases as "unique" (Wardle, 2013, p. 405). In fact, they have profound impact on professionals and other people with a target to become professionals. *Psychologists Registration Board (Vic) v Glamcevski* and *Re Liveri* have indicated a strong signal that plagiarism does have legal implications to ones' desires of being professionals. *Re Humzy-Hancock* has showcased how plagiarism has created additional legal barriers to the achievement of a professional status. *Re Legal Profession Act 2004* has given a loud and sound message that even when a person has been approved to be admitted to a profession, such endorsement could still be revoked because of his or her history of plagiarism.

Other people may have views that the four cases cited are "of little relevance" as they were judgments in Australia only (Jowitt, 2007, p. 216). In fact, cases with similar facts also happened in other jurisdictions, and this is not surprising at all in view of the widespread global phenomena of plagiarism as addressed in the foregoing sections. In the UK, in *Dr Fazal Hussain v General Medical Council,*[6] the appellant had been a holder of PhD degree since 1985 (paragraph 5 of the judgment). He commenced medical training as a general practitioner in 2009 (paragraph 7) and the training was suspended one year later because of, among others, his alleged plagiarism from a few websites and a publication during the training period (paragraphs 3c–3e). The trial judge at the Administrative Court in Manchester upheld the decision made by the Fitness to Practise Panel of the Medical Practitioners' Tribunal Service that he was not fit to practice medicine because of misconduct and his name should be deleted from the medical register. Upon his appeal, the Court of Appeal in the UK subsequently dismissed his application. In Hong Kong, in *Dr Tse Kit Ming v Dental Council of Hong Kong*,[7] the appellant made an appeal against the disciplinary rulings of the Dental Council of Hong Kong arising from two charges, one of which being his alleged use of another dentist's clinical case, without the latter's consent, in his own published article (paragraph 2 of the judgment). With regard to this plagiarism charge, the Council decided to remove the appellant's name from the general register of dentists for a period of two

[6][2014] EWCA Civ 2246 (Court of Appeal, UK).

[7][2015] HKEC 748 (Court of Appeal, Hong Kong).

months with a suspension period of two years, and during which, the appellant had to obtain 10 points of continuing professional development ("CPD") in professional ethics and should commit no further disciplinary offence (paragraph 3). Upon appeal, the Court of Appeal set aside the Council's requirement for CPD points (paragraph 48) but refused to intervene its suspended removal order (paragraph 41). In Canada, in *Mohan v Law Society of British Columbia,*[8] the appellant was allegedly involved in two incidents: cheating in an examination when he was an undergraduate student and alleged plagiarism when he was a law student (paragraph 3 of the judgment). He submitted an appeal to the British Columbia Court of Appeal against the decision of a review board of the Law Society of British Columbia which overturned the approval of a hearing panel for him to be enrolled as an articled student (paragraphs 1–2). Subsequently, the Court of Appeal set aside the ruling of the review board and restored the approval of the hearing panel (paragraph 55).

8 Conclusion

The court cases discussed in this chapter provide real and serious legal lessons for professionals and future professionals. Any history of plagiarism may influence a person's progression towards a profession. It is true that court decisions in litigations have to be subject to the merits of each case, but it is the author's submission that any plagiarism cases, no matter whether they are finally proven to be genuine or not, unnecessarily increase the legal risks of professional disqualifications, not to mention the associated time and cost implications, as well as personal pressure involved in litigations. To enhance one's integrity and protect his or her fitness to practice a profession, people must try their best to avoid committing any plagiarism or likely behaviours.

9 Limitations and Future Directions for Research

To the best knowledge of the author, the law and the court cases discussed above are up to date as at late November 2016. Because of resource and space constraints, the current legal research could only cover litigations in Australia, with support of a few legal stories in other jurisdictions. The present depth and breadth of study may not warrant any generalizations or give any global pictures about legal risks inherent in plagiarism. The author suggests future legal studies in jurisdictions other than Australia to explore other legal risks of plagiarism, if any, with a hope that the results could enhance legal deterrence to the furtherance and spread of the globalization of plagiarism.

[8]2013 BCCA 489 (British Columbia Court of Appeal, Canada).

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