Journal of Communication and Education

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Editorial

The Journal of Communication and Education (JCE) is an online journal of the Hong Kong Association for Educational Communications and Technology (HKAECT) and publishes research papers in the fields of education, communication, and technology. Since there are many other academic journals in the field of educational technology, why do we need another one?

Herbert Marshall McLuhan (1964) believed that media have effects in that they continually shape and re-shape the ways in which individuals, societies, and cultures perceive and understand the world. Nowadays, the digital technology is deeply embedded in everyday experience (McCarthy & Wright, 2004), and it has been enabling the use of multimodal interfaces that combine speech, touch, gesture, pens, and haptic interfaces (Rowe, 2013). "A technology is not merely a system of machines with certain functions; rather, it is an expression of a social world" (Nye, 2006; p. 47). And human-computer interactions in the future would be more like human-to-human communication (Rowe, 2013). With the advances in information and communication technology (ICT), the Internet and new media are enabling the emergence of new mechanism of human associations as well as social connections which are shaped by – yet also shape – the development of communication and education in a participatory culture (Slevin, 2000; Jenkins, 2009).

As an international forum, the JCE aims to address and publish issues in communication and education – in theory and practice, whereas communication is apprehended as the human communication process of making sense out of the world and sharing that sense with others through technical and non-technical means whereas education is understood in a broad sense as any form of teaching, learning and training occurs in a variety of contexts and environments. The content of this inaugural issue may illustrate the JCE's emphasis.

"Scholarship before Technology: Re-thinking the Relationship between Technology and Scholars" provides a review of the literature concerned with some of the underlying implications of technology used by academic researchers. "The Influence of Playfulness and Subject Involvement on Focused Attention When Using Social Media" applies flow theory to hypothesize that playfulness and subject involvement predict the flow state of focused attention when using Facebook. "Learning with video representation: A case study on the usage of multimodal elements for explaining community issues" presents a case study on six Hong Kong grade 10 students' learning with creating video artifacts integrating multimodal elements to explain community issues. "The Impact of Multimedia on Social Learning" illustrates the need of multimedia in education and explains the reason behind the slow development, and describes a practical use of multimedia in social learning, both the pedagogical and pragmatic aspects. Finally, the book review of "The Social Media Bible: Tactics, Tools, and Strategies for Business Success" attempts to address the question: What can a book on social media marketing offer to education?

Allan H.K. Yuen
Editor

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Scholarship before Technology: Re-thinking the Relationship between Technology and Scholars

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Abstract: This study provides a review of the literature concerned with some of the underlying implications of technology used by academic researchers. This is a growing area of academic research as a result of the fact that the increasing use of network technologies is rapidly changing many aspects of research activities. Among these changes, it is the qualitative (rather than quantitative) change that merits careful thought and investigation. The article maps the main themes of research on the scholarly use of technology using 106 articles, reports and books across varied disciplines. The review concludes that the current literature has been overshadowed by research with a strong technical emphasis, focusing on large-scale collaboration, and takes a quantitative approach to studying the quantitative impact of technology use in the distributed research of sciences. Empirical research into the qualitative implications of technology use in real-world interdisciplinary research settings (particularly in the social sciences and the humanities) is urgently needed to add conceptual depth to the current analysis of technology use in academia.

Keywords: technology, academia, qualitative impact, e-research, distributed research

1. Introduction

There is growing interest in issues connected with technology use in academia. All forms of scholarly practice have, to some extent, changed with the increasing use of new technologies in academia (Lynch, 2008). The worldwide web, for example, is providing academics with opportunities to access millions of pages of information, thus extending their knowledge based on the information at hand. Extensive resources are restructuring the way people live, work and learn, regardless of space and time (Bonk & Cunningham, 1998). The web has grown into a vast repository of information, with "over a billion interlinked pages created by the uncoordinated actions of tens of millions of individuals" (Kleinberg & Lawrence, 2001, p. 1849). Email has led to increased electronic global interconnectivity. By the early 2000s, its usage rates had nearly reached 100% in research: 95-100% for American biologists, mathematicians, physicists, and sociologists (Walsh, Kucker, Maloney, & Gabbay, 2000), and 99.7% for European astronomers, chemists, computer scientists, psychologists and economists (Barjak, 2004). In the 1990s, the development of the web led to a rapid growth in e-journals, which numbered over 8,000 by the year 2000 (Okerson, 2000). In the new century, blogging seems to represent a new means of publishing with unprecedented potential, as nearly half of Internet users (42%) (equivalent to one-third of all adults) have read blogs, with one-third of these doing so on a typical day (Smith, 2008). The use of Skype to hold video conferences with overseas collaborators is also continually expanding (Jankowski, 2009). Email, the web, blogging, e-journals, and Skype are but a few of these new technologies that affect virtually all forms of scholarly activities in academia (Nentwich, 2003). More distributed, networked, interoperable technologies are clearly changing the research world (Voss et al., 2007). The use of technology is ubiquitous in academia and has brought about significant change across the disciplines of education, sociology, and computer science.

2. Network Technologies

Academia is not simply a homogeneous community; it consists of distinctive specialities within varying disciplinary settings. Likewise, technology is itself greatly heterogeneous. In scholarly debate, there is no common way of classifying all technologies. Some of them are used in an inconsistent manner, and some are used interchangeably. Different terms, such as information technology, instructional technology, assistive technology and social technology, exist side by side. Although there are no satisfactory terms for all scholars, many of these terms that are widely used in scholarly debate have some implications for its capability. At the end of the 1970s, the term "information technologies" (IT) was commonly used among scholars to address new technologies, due to their capacity to process and store information. Through the 1980s, as interests turned to the communications function of technologies, many researchers used the term "information and communication technologies" (ICT) to refer to the dual functions of processing information and facilitating communication. In the 1990s, the Internet introduced the possibility of new technologies, which enabled interconnected personal computers to communicate via web servers using common Internet protocols. This led to the major technological shift from information and communication technologies to further new types of technologies. As new technologies are largely dependent on the network power of the Internet, some scholars (e.g. Castells, 2000) start to use the term "network technologies" to address them in their writings. Kling and McKim (2000) pointed out that the shift towards the use of network technologies in scholarly practice appears to be an inescapable imperative.

The use of the term "network technologies" does not merely reflect a choice in wording, but reflects on the capabilities of this kind of technologies to facilitate academic interactions in research. Central to the most recent literatures is the use of various technologies in connecting academics, in the sense that they communicate ideas and thoughts or exchange information and resources, etc.

3. Means of Investigation

There is a growing interest in meta-synthesis as a technique for generating new insights and understanding from qualitative research, as well as a means of enhancing the contribution of qualitative findings to the development of more formalised knowledge (Hannes & Lockwood, 2011; Thorne, Jensen, Kearney, Noblit, & Sandelowski, 2004). This study uses the technique of meta-synthesis to integrate results from a number of different but inter-related research studies examining the use of technology in academia. The technique has an interpretive, rather than aggregating, intent, in contrast to meta-analysis of experimental studies.

This research situates the discussion of technology use in the field of educational technology. The field began with an emphasis on the introduction of audio-visual communications media gradually became focused on the systematic development of teaching and learning facilitated by new technologies (Saettler, 1990). Scholars working in the field of educational technology are likely to migrate from other disciplines, as it has not been long since the field of educational technology was established. It is found that the publications were widely dispersed across a range of academic journals rather than contained in one or two discipline specific journals, as studies of technology use are carried out by academics drawn from several fields including sociology (social shaping, social organisation, group behaviour, and Internet studies), communication sciences (scholarly communication, CMC, learning sciences (HCI, and CSCL), and management studies (organisational behaviour). Each of these research fields has its own focus, relevant literatures, appropriate approaches, and methods. This richness, while possibly conducive to fostering new interdisciplinary research, has in actuality resulted in fragmented and often unsystematic approaches to studying technology. The studies, taking different perspectives to investigate the use of technology, remain isolated from each other. These studies rarely relate or connect to each others' findings. In each research tradition, an individual study will approach research questions from a different disciplinary perspective. Science and technology studies, for example, is

dominated by sociologists of all kinds. A truly interdisciplinary approach, one that highlights each research tradition, has not yet to emerge.

Considering the interdisciplinary nature of this area of studies, articles were identified by keyword searches across a wide range of different journals rather than by performing searches within one or two journals. Keyword searches were made via Oxford library catalogues and the following online article databases: Academic Search Premier, CSA Internet Database Service, ERIC, JSTOR, Google Scholar, Highwire, OAlster, OxLIP+, ProQuest and Scopus. The two main foci were 'technology' and 'academia'. Hence, the searching of databases incorporated words and phrases such as 'technology', 'computer', 'internet', 'web', 'ICT', 'email', 'e-journal', 'blogging', 'Skype' plus 'academia', 'higher education', 'research', 'university', and 'academics'.

The online databases produced hundreds of results, from which citation searches were performed to identify further relevant papers. The combined search strategies yielded 962 citations. In line with conventional systematic review methodology, the inclusion/ exclusion criteria (see table 1 below) were applied to these citations. Articles were excluded if they were about the usage of a standalone computer for research efficiency or productivity (e.g. to advance computing, to format research papers, or to run data analysis). Clearly network technologies can assist research work and are, to some degree, not separable from research process but they do not form the object of research in this interdisciplinary field of studies. Some use of technology for efficiency might be closely integrated with its use for communicative purposes in some circumstances. For example, some academics might use a web-based package to analyse their data in order to generate the same format of results to share with their colleagues overseas. In order to look at how they contact their overseas colleagues, there is a need to examine the impact of this web-based package. Thus, while indicating what is not included in this review, research papers including the uses of technology that are relevant, or perhaps indirectly relate, to the purposes of interacting with peers are carefully examined.

Table 1: Inclusion/Exclusion Criteria

Parameters	Inclusion Criteria	Exclusion Criteria
Language	Studies written in English	Studies not written in English
Publication Date	Studies published from 1994 (inclusive) onwards	Studies published before 1994
Outcomes	The uses of technology that are relevant, or perhaps indirectly relate, to communicative purposes	The usage of a standalone computer/ any data analysing tool/ any particular software developed for research efficiency or productivity
Study Type	Primary research	Book reviews, opinion pieces, literature reviews, policy documents
Citation Type	Journal articles, books, reports	Newspaper, Blog, Wiki

The final selection of 106 articles, reports and books were accessed as part of the literature review published in sources closely associated with educational technology research, and journals representing, variously, sociology, higher education, and information science and technology. Integrating findings across these studies enabled a set of recurrent and dominant themes to be identified.

4. Core Themes

4.1 Quantitative Approaches to Studying Scholarly Communication

In the literature, examining the scholarly use of technology is mainly concerned with the investigation into how scholarly communication is mediated by technology. Many of the studies in mediated communication have focused on traditional written communication channels (Tenopir & King, 2004), such as peer-reviewed journals and book publications (Alexander & Goodyear, 2000; Jankowski, 2009; Odlyzko, 1998; Rowlands, Nicholas, & Huntington, 2004). The vast majority of these studies have

emphasised analysis of co-authorship in e-journals (Kling & Callahan, 2003). In the humanities, the focus has been on the creation of networked repositories that serve as an intellectual framework for collective work in the humanities (Crane, 2008).

To investigate collaborative work using co-authored papers as the key measure, bibliometrics and sociometric approaches are often employed (Beaver & Rosen, 1978; Borgman & Furner, 2002; Laudel, 2002; Wouters, 1998). Some studies have involved quantitative analysis of survey data or secondary data collected from the Internet. Other techniques include social network analysis, and a number of social network analysis[1] tools, such as UCINET (Borgatti, Everett, & Freeman, 1999), have been used to construct sociograms and maps to clarify social forms of interaction. Because of its apparent ability to tease out the separate and conjoint effects of multiple variables, network analysis in social sciences tends to rely heavily on quantitative statistical models (Wellman & Berkowitz, 1988). It is typically positioned between the extremes of descriptive accounts and mathematical network orientations.

However, given the kinds of complex research practices it is often applied, the quantitative method has always been somewhat problematic. The quantitative approach to studying formal written communication seems not to be sufficient to capture a detailed picture of what is actually happening in scholarly communication. Bales'(2001) posits that if one can outline behaviours in a group as objectively as possible, it will be easier for people to accept what happened and change to improve accordingly. Yet, it is not always straightforward to categorise behaviours in the way indicated by Bales. The actual interaction of academics working together is an unstable, ever-changing process that is subject to all sorts of influences. The research world highly values "… face-to-face meetings, formally presenting ideas at conferences, exchanging views with old and new colleagues, taking field trips, and having fun" (Brunn & O'Lear, 1999, p. 299). Scholarly communication takes place via a number of written communication channels, in addition to conversational means. Many scholars (e.g. Becher, 2001; Trowler, 1998) stress the importance of formal modes of interchange, as well of as informal communication channels in research. Vidgen (2007) in his study also found it to be particularly useful in analysing the typically informal communication between academics who chosse to work together.

In the literature, nevertheless, there are limited studies of informal communication. As argued above, many of these studies tend to focus on documents and citation data rather than on the actual communication processes of researchers who do scholarly work. Little insight into underlying informal communication has been revealed (Lievrouw & Carley, 1990; Zuccala, 2006). On the one hand, as Borgman (2007) argues, perhaps the change to formal communication is the area where new technologies have irrevocably changed scholarship; hence, it attracts much more attention than other forms of communication. On the other hand, as Lievrouw (1990) claims, perhaps the structural component of scholarly communication rather than the interpersonal or social component is more likely to be tackled.

Many scholars have argued that it is more appropriate to employ a qualitative approach to investigate informal scholarly communication (Costa & Meadows, 2000; Gargiulo, 1993; Gersick, Bartunek, & Dutton, 2000; Lievrouw & Carley, 1990; Nentwich, 2005). These studies have clearly demonstrated that qualitative research methods, primarily by observation and interview, are capable of revealing detailed means of informal communication. In this research, there is also the suggestion that more

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[1]Social network analysis, rooted in sociology and education, grew out of Harvard University in the 1920s; it has been applied in a wide range of cases since its inception (Liebowitz 2007). Since the 1940s, sociometry as proposed by Jacob Moreno has attracted a lot of attention among social psychologists for understanding small group structure. These methods, however, were not adopted widely because computers were not then sufficiently sophisticated. In the 1960s, the realisation of graph theory and the introduction of high-speed computers significantly increased the size of the groups that were researchable within the scope of mathematical methods (Wagner 2005). The study of networks pervades all of science, but the most fundamental issue is their structure. Researchers are only now beginning to unravel the structure and dynamics of complex networks.

explorative research into informal mediated communication in real-world research environments is necessary.

4.2 Qualitative Change Matters

Many social studies about the role of technology in scholarly communication have been rudimentary. Their discussions have been frequently based on reporting technical progress, such as increasing access to different communication means, high-speed and remote communication, and inexpensive communication tools (Kling, McKim, & King, 2003). Some researchers have contributed to the view that the Internet has revolutionised formal academic communication (Ginsparg, 1995; Harnad, 1997; Odlyzko, 2002). Some have shown that recent technologies, such as email and electronic publishing, have profoundly changed patterns of communication(Tenopir & King, 2004). Some hold concerns that established communication conventions are altered with haste, as well as disrupting rigorous research traditions (Barjak, 2004; Kling & McKim, 2000). These studies on the use of technology have solely concentrated on the positive or negative perspectives of scholarly communication, leaving more profound changes to such communication unexplored. Our knowledge about what exactly has changed is, therefore, still fragmented.

In real-world research, the change to scholarly communication has not simply been related to the fact that technology advances or impedes communication. That is, the use of many new technologies does not only provide more, faster, and cheaper communication, as frequently assumed, but also has potentially led to more qualitative changes. Many researchers, such as Nentwich (2003), have stressed that many of the recent technological developments potentially lead to qualitative changes in the work environment of scholars, as well as changes to the content of their research. The use of technology has therefore entailed changes, some encouraging or disappointing, some invisible or influential, which have consequently created unique dynamics in research work. It is such qualitative changes that merit more investigations in scholarly debate. In contrast to quantitative changes as in degree (e.g. the speed of communication), qualitative change is understood as "to what extent" and "in what ways" in terms of the use of technology, such as in what research contexts technologies are used to facilitate research, and the role technologies play in some aspects of research activities.

4.3 Large-scale Research Collaboration

A great deal of research has explored the issues around large-scale collaboration with a new digital infrastructure, comprised of distributed and interoperable technology, which is generally recognised as e-research. This phrase refers to "a form of scholarship conducted in a network environment utilising Internet-based tools and involving collaboration among scholars separated by distance, often on a global scale" (Jankowski, 2009, p. 7). It is "the development of, and the support for, information and computing technologies to facilitate all phases of research processes" (JISC, 2008, p. 1). Traditional e-research, which is commonly known as e-science[2], is interested in how to advance scientific research by collaboration across disciplinary and geographical boundaries. It is closely associated with grid computer network architecture that enables global collaboration in the large-scale natural and biological science contexts (NeSC, 2010). The major contributions of e-research lie in the area of distributed access to large-scale datasets, the sharing of computational resources, and online environments for collaboration and communication (Jankowski, 2009).

Recently, there has been a major emphasis on adopting a social science approach in the development of e-research (Jankowski, 2009). The UK National Centre for e-social science (NCeSS) was established by the Economic and Social Research Council (ESRC) in 2004. The American Council of Learned Societies has also issued the Atkins report (2003) on cyber infrastructures for the Humanities and Social Sciences (ACLS, 2006). Alongside these policy developments, individual and small groups of researchers (e.g. Genoni, Merrick, & Willson, 2009; Halfpenny, Procter, Lin, & Voss, 2009) have begun to explore the emergence of e-research in the Social Sciences and Humanities. Researchers

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[2]Cyberinfrastructure is an American version of the European term "e-science".

exploring e-social science commonly take two approaches: one with a development perspective, and the other with a social shaping perspective. Studies that focus on social shaping investigate technological change that is affected by the social context in which it develops, rather than developing the technical capabilities of technology itself (MacKenzie & Wajcman, 1985). The main focus of the development perspective is data infrastructure and integration. The research from a social shaping perspective (e.g. Woolgar & Street, 2003) is interested in how technology is being used and what its implications are for research practices.

Although these two approaches have been taken in e-social science, most of the projects nevertheless followed the e-science route (Jankowski, 2009). In examining the changes wrought by network technology, scholars tend to study advanced technologies, such as high-performance computing, advanced computer communication networks, sensor array, grid, mining and visualisation and large-scale simulation. They focus on the incorporation of grid computer architectures into the infrastructure of the social sciences. Many researchers study how content, in the form of digital and often very large datasets and databases, is made available by technology, such as the NCeSS-funded Modelling and Simulation for e-social science[3], grid-enabling quantitative social science datasets (K. Cole, Schurer, Beedham, & Hewitt, 2003), grid technologies (A. Anderson, 2003), and statistical analysis and modelling (Peters, Clark, Ekin, Le Blanc, & Pickles, 2007).

Recent studies show that these advanced technologies are perhaps not used as widely as appears to be frequently assumed in the literature. In one of the few qualitative studies designed to systematically explore informal communication in academia, Harley and his colleagues (2008) conducted explorative interviews with faculty (including those in the natural sciences) mainly located at the University of California, Berkeley. Their research suggested much less interest in and use of new technologies for scholarship than is presented in the majority of the literature. Many research studies are too ready to invoke the hyperbole that has commonly described the growth of advanced technology itself. What is needed are studies that investigate those technologies that are used by the majority of scholars in real-world research contexts.

4.4 Distributed Research

Distributed work over geographical distance is not new, but this century has witnessed a rapid extension of this kind of work (MacDuffie, 2008). The use of many technologies has been regarded as one of the key factors that encourages and enables an increasing geographic distribution of work (Hinds & Kiesler, 2002). "It is now possible for more people than ever to collaborate and compete in real time with more other people on more different kinds of work from more different corners of the planet and on a more equal footing than at any previous time in the history of the world" (Friedman, 2007, p. 8).
In academia, it has also been increasingly common for geographically dispersed researchers to work together (Haythornthwaite & Lunsford, 2006; Hinds & McGrath, 2006). In the past, physical distance not only reduced the likelihood of distributed collaboration (mainly among scientists), but also had a negative impact on possible distributed work (Cummings & Kiesler, 2005; Kraut, Egido, & Galegher, 1990), as communication at a distance used to be very costly and slow (Borgman, 2007).

Today, in contrast, advances in technology have made distributed research feasible, as new technologies allow researchers to exchange information and resources more frequently and rapidly (Finholt, 2002; Sonnenwald, 2003). As Atkins notes, "New technology-mediated, distributed work environments are emerging to relax constraints of distance and time" (Atkins, 2003, p. 9). When network technology is widely used in this digitalised world, people are "unlocked from the shackles of fixed and rigid schedules, from physical limitations" (Salmon, 2003, p. 11). Thus, advanced network technologies are allowing researchers to share ideas and expertise across distance and time.

These new issues arising in distributed research have gained considerable attention in scholarly debate. A large number of researchers (e.g. Armstrong & Cole, 2002; Schunn, Crowley, & Okada, 2002) have focussed their research on the distributed work that is made possible by technological advances. Many

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[3]MoSeS: http://www.geog.leeds.ac.uk/projects/moses.html

of them (e.g. Kraut et al., 1990; Liang, Moreland, Argote, & others, 1995) have tended to study remote research collaborations that heavily relied upon technology in a distributed work environment. Cummings and Kiesler (2005) conducted a study of 62 scientific collaborations in 1998 and 1999, supported by a programme of the United States National Science Foundation, with a focus on the structure of such collaborations facilitated by technology at a distance. Sproull and Kiesler (1992) conducted field research in well-established electronic mail communities. Moon and his colleagues (2002) investigated an online work group whose members rarely meet if ever. It seems that these studies were often carried out based on the assumption that most of academic research today is conducted at a distance. Their studies seemed to imply that technology revolutionised the way scholars organise their research work and that academics working in the same office had already become a thing of the past. Very few studies have taken a broader approach to study how distributed research may be occurring as part of the real-world research environment. For those who looked at both distributive work and collocated work, it seems that they made an explicit distinction between face-to-face communication and communication at a distance in their research. For example, Nardi and Whittaker (2002), in an ethnographic study, studied the place of face-to-face communication in distributed work. These studies shed little light on how distributed work fits into the main collocated research environments (Cummings & Kiesler, 2007).

In the real world of research, researchers constantly engage in varied research activities in multiple research contexts, neither exclusively at a distance nor just face-to-face. For instance, some research requires intimate interactions, which often occur opportunistically in collocated groups but may be difficult to generate in distributed groups (Nomura et al., 2008). These studies perhaps implied the importance of studying the use of technology in natural research settings. Research into distributed research should not be taken out of the real-world research contexts that it takes place within. The focus of research into technology use should be neither constrained by a purely distributed work environment nor excluded from what is happening at a distance.

4.5 Why the Disciplinary Framework Matters

The success or failure of technology use is largely dependent on the contexts in which they are used (Matzat, 2004). The discussion of the qualitative change in scholarly communication needs to be situated in the research practices to which technology is applied (Fulk, 1993; Kirkpatrick, 2004; Williams & Edge, 1996). In academia, the research contexts feature in unique academic disciplines (Lattuca, 2001). Disciplines are seen as "recognisable communities of scholars that develop conventions governing the conduct of research and its adjudication", relying upon "technical language", "methods of analysis" and "standards of evaluation" (Salter & Hearn, 1997, p. 20). They serve as the structures of knowledge in which their members carry out the tasks of teaching and research (Beyer & Lodahl, 1976).

Recently, research practice that is of an interdisciplinary nature is growing, for the current "demands of many societal, environmental, industrial, scientific and engineering problems that cannot be adequately addressed by single disciplines alone" (NSERCA, 2006, p. 1). The importance of interdisciplinary research also reflects the fact that since 2001 the UK Research Assessment Exercise (RAE) has explicitly stressed its importance (HEFCE, 1998 Paragraph 30-31). With this increasing growth in interdisciplinary research [4], the development of interdisciplinarity clearly challenges the way knowledge is understood, produced, and disseminated in research, as well as the way and extent to which academic researchers work (Shailer, 2007). This spotlights the importance of investigating the use of technology in support of research in such interdisciplinary settings.

However, in the studies of network technology use, much attention has been given to interdisciplinary settings that are usually dominated by the research culture of the hard sciences. A number of researchers have worked on science communication, and have claimed that new technologies are changing the ways

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[4]It is worth noting that the trend toward interdisciplinarity is not against disciplinarity, as in the meantime the growth of knowledge has rapidly produced increasing specialisation of individual academics and research disciplines (Ziman 1994).

in which scientists discuss research ideas within scientific communities (Bates, 2000; Nowotny, Scott, & Gibbons, 2001; Schneckenberg, 2008). Price originally coined the term "invisible college" in reference to a communication network of scholars, and subsequently it is mainly (perhaps exclusively) used to describe communication relationships among scientists (Zuccala, 2006).

Fewer studies have looked into what is happening in the social sciences and humanities (Costa & Meadows, 2000). This is perhaps due to the fact that, in the past, social sciences and humanities research has been commonly perceived as an individual endeavour that requires little use of technologies for academic interaction. Nonetheless, this image is changing given the increasingly wider adoption of network technologies in these areas (Fry & Talja, 2007). The use of technology in research spreads out across every single academic discipline (Oblinger, 2008). Nowadays, social scientists and humanities researchers frequently interact with fellow researchers using various technologies. Nevertheless, the extent and ways in which the use of network technologies have impacted on scholarly communication (and on intellectual engagement, such as learning) in the social sciences and humanities is still not clear.

4.6 Technical Focus

The traditional approach to studying technology has been in itself somewhat technology driven. A large proportion of the literature on technology in support of research has been dominated by a series of technical reports advocating the capability of technology itself (e.g. Berge & Collins, 1995; Duggan, 2003). A number of discourses of technological understanding (e.g. Hiltz & Turoff, 2005; Mayadas, 1997) are only conceived of by extrapolating from the features of technologies. Researchers often look into the technical side of technology to support the use of technology, and overlooked the human aspects of technology that potentially affect and shape the use of it. A number of scholars (e.g. Birchfield & Megowan-Romanowicz, 2009; Larusson & Alterman, 2009; Lymer, Ivarsson, & Lindwall, 2009) have investigated computer support for shared knowledge, but they mainly focus on the practical design of technologies to support collaborative learning. Secondly, many studies (e.g. Lee, Girgensohn, & Zhang, 2004; Stolterman & Wiberg, 2010; Zhang, Ackerman, & Adamic, 2007) have tended to study the human factors of technology in so much as they could facilitate better design of future technologies from a technical point of view, which is usually conducted by researchers in the sub-field of computer science research. Thirdly, a number of studies (e.g. Gaines, Chen, & Shaw, 1997) have explored human discourse through technical infrastructure with regard to Shackel's (1991) basic human factors: utility, usability, and likeability. There is, perhaps, a general belief among scholars that the discussion of technology itself could lead to better use of technologies, meaning that far more attention has been paid to the design of technology than could support scholarly practice.

It seems that these researchers commonly think about how to harness the power of new technology for our research needs without critically engaging with an understanding of how technologies and academics interact. In this respect, the underpinning assumptions of how technology and academics interact are often unarticulated in discussions of technology in academia. Little concern has been paid to a comprehensive discussion of the relations between technology and human beings.

Recently, it is commonly argued that a social approach instead of a technical approach is needed to address research questions in order to understand how technology can be used to advance research (e.g. W. H. Dutton, Goldin, & Jeffreys, 2010; MacKenzie & Wajcman, 1985; Schroeder & Fry, 2007). What has changed is certainly beyond a purely technical perspective, such as "the expanded capacity to send, receive, and use information" (Ikenberry, 1999, p. 57) and "the capacity to bridge time and space" (Garrison & Anderson, 2003 p.xi). It has long been argued that the adoption of technology is less a function of technology itself than of the use of it by human beings (DeSanctis & Poole, 1994; Karsten & Jones, 1998; Menold, 2009; Orlikowski, 1992), as technologies are subordinate to actual uses and many other influences (Nentwich, 2003). Clearly, social studies into the use of technology in research are now, more than ever, at a premium.

5. The Challenge of Researching the Use of Technology in Academia

The challenge stems from the fact that technology is largely heterogeneous, and keeps changing all the time. Numerous terms have been used in the literature to address different technologies, such as information technology, instructional technology, assistive technology and social technology, not to speak of its countless applications (e.g. email, instant messaging, and video conferencing). These technologies vary, for example, from the capacity of carrying megabites of communication, to the speed of exchanging information, as well as to the way in which it used to facilitate different research activities. Technologies are commonly used for all sorts of purposes in different research settings. Apart from the numerous kinds of technologies, one technology can be seen as a different technology when it is used for different purposes (e.g. email is sometimes used for conversation, and sometimes used for exchanging papers). In a situation such as this, when new types of technologies rapidly alter scholarly practice, it is relatively difficult to identify which technology to study, what features to discuss, and in what field the discussion can be situated. This challenge requires this type of research to specify precisely what aspects of technology are being studied and how to study them. Perhaps, rather than trying to explore the use of all technologies as if they were the same, it is important to specify what kind of technologies are being used in research and for what purposes.

More importantly, these technologies continue to evolve, and new technologies rapidly become dated. Research studies that contain empirical evidence of technology use are out-dated the minute they are published (Nentwich, 2003). In many studies, there is an attempt to stay current and relevant by developing theories that equip scholars to understand the use of new technologies as they emerge (C. R. Scott, 2009). There is a clear expectation that theoretical accounts of technology that exist today can still be applied to future studies tomorrow. Nevertheless, the study of the scholarly use of technology is not rich in theory, in the sense of empirically testable propositions that have been around long enough to be able to adequately or explicitly solve research problems in the social

6. Conclusion

The increasing use of network technologies in research is changing many aspects of research activities, a situation which in itself draws attention to the importance of studying it. Among these changes, it is the qualitative (rather than quantitative) change that merits careful thought and investigation. In the literature, little attention has previously been paid to the interdisciplinary research settings (rather dominated by the hard sciences) where such qualitative changes occur. The current literature has been overshadowed by research with a strong technical focus, looking into large-scale collaboration, that takes a quantitative approach to studying the quantitative impact of technology use in distributed research of sciences. Qualitative research that attempts to investigate the use of technology in real-world interdisciplinary research settings is urgently needed. Empirical research into the qualitative implications of technology use in real-world interdisciplinary research settings (particularly in the social sciences and the humanities) is argued to be able to further add an additional depth to the current analysis of technology use in academia.

To investigate into this matter, there is a need to be aware of the connected challenges. Firstly, the attempt to research into the qualitative implications of technology use in academia situated itself in an interdisciplinary field, while offering various literatures, approaches, and methodologies, presents undeveloped, patchy and evolving research areas. Secondly, technology is largely heterogeneous, and keeps changing all the time. In this ever-changing context, the ways in which technology fits into real-world research contexts, where research endeavour can be continuously advanced, is the key question that that needs to be answered.

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About the Author

Dr. Jingjing Zhang is an Assistant Professor at the Faculty of Education of BNU, specialising in learning and technology. She received her BSc in Computer Science from BNU, and an MRes from University College London (UCL). As an undergraduate, she was awarded 2003 AIEJ Scholarship for a one-year exchange study at Tokyo Gakugei University. She received an MSc and a DPhil from the University of Oxford. At Oxford (MSc, DPhil), she was a Clarendon scholar and a member of Brasenose College (funded by ORS scholarship). Her early research in machine learning and information visualisation has led to an educational product to analyse university curriculum structure. In the past few years, her research has been involved in work with educationists, sociologists and anthropologists. This has led a change of her research interests initially in machine learning in laboratory settings to social constructivism of learning in real-world settings. As well as to her recent research on the social sciences of learning and technology, she is also interested in the change to various forms of human relationships in the networked society, such as leadership, trust, and communication.

The Influence of Playfulness and Subject Involvement on Focused Attention when Using Social Media

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Abstract: Social media have become hugely popular. It not only has a very large user base, but also supports frequent interactions. However, research has so revealed that users can become addicted to the use of social media and are shielded themselves from the physical world. Why are these users so deeply involved in activities such as, sharing media and interacting with other users? This study applies flow theory to hypothesize that playfulness and subject involvement predict the flow state of focused attention when using Facebook. The results support our predictions. Playfulness had both a direct, significant and positive relationship (β=0.54, p<0.001) and an indirect, significant and positive relationship with focused attention through subject involvement (β=0.20, p<0.001), with a total combined effect of β=0.64. The reduced R-square for focused attention was 0.42. The implications of these findings are discussed.

Keywords: social media, playfulness, subject involvement, focused attention, flow theory

1. Introduction

Facebook is a hugely popular social media with a tremendous amount of interaction among its users. As of March 2013, there are 1.11 billion monthly active users. On average, 655 million Facebook's users log in any given day to interact with millions of objects, including personal accounts, groups, events and community pages. The average user is connected to 80 community pages, groups and events. On average, more than 300 million photos are uploaded each day (Facebook, 2013). This figure alone suggests that Facebook users spent a good deal of time on the site, have very frequent interactions with other users, and share much media content. Recent media coverage reveals that Facebook users are too involved, to the extent that their daily lives are unconsciously affected. For example, in a recent study Rosen (American Psychological Association, 2011) found that middle school, high school and college students checked Facebook at least once during a 15-minute study period. The study also detected the presence of psychological disorders such as antisocial behaviors, mania and aggressive tendencies in teenagers who have a strong Facebook presence. Using Facebook or video games on a daily basis increased teenagers' absence from school and the likelihood of developing stomach aches, sleeping problems, anxiety and depression. While this heavy use is easily revealed, which is not as clear are the

reasons behind people paying so much attention to social media that they do not notice the passage of time, a practice that caused significant emotional, psychological and cognitive problems.

Review of the literature reveals that there are both extrinsic and intrinsic factors to explain the phenomenon of online gaming and shopping addictions. However, there are fewer studies that explain the phenomenon of social media, such as Facebook. Therefore, we pose the following research questions:

RQ1. What are the factors affecting users to be deeply involved in social media?
RQ2. What are the relationships between these factors?

To address these research questions, the rest of the article proceeds as follows. The next section provides a literature review of the relevant constructs and the hypotheses hence developed. The third section explains the method of this study. The fourth section describes the findings and instrument validation. The fifth section reports the model testing results. The final section discusses the thrusts of this study and future trends.

2. Literature Review

2.1 Flow Theory

Flow theory has been used to explain deep involvement in an activity (Koufaris, 2002). As defined by Csikszentmihalyi (1975a, 1975b), flow refers to "the wholistic sensation present when we act with total involvement". When people are in a state of flow, it is as if "action follows action according to an internal logic which seems to need no conscious intervention on our part. We experience it as a unified flowing from one moment to the next, in which we feel in control of our actions, and in which there is little distinction between self and the environment; between stimulus and response; or between past, present, and future" (1975b, p.43). Flow is the kind of feeling that results from an activity that is interesting, fun and enjoyable.

This description matches the state that many Facebook users are observed to experience. For example, from the data collected in this study, Facebook users spend a lot of time each day logged in to Facebook. They take every opportunity to check Facebook even when there is only a very short time available (often less than ten minutes available each time). Overall, Facebook users log in many times a day and remain logged in for more than an hour in total, resulting in many hours of use each month. Previous studies applied flow theory to explain the use of information technologies (Ghani & Deshpande, 1994; Novak, Hoffman & Yung, 1998; Trevino & Webster, 1992). However, it has been argued that flow theory is too broad and ill-defined (Koufaris, 2002, p.207). It is important to identify more concrete emotional and cognitive components in flow research, such as enjoyment and focused attention to be used as valid metrics in explaining these phenomena (p.208).

2.2 Focused Attention and Subject Involvement

Focused attention is defined as "a centering of attention on a limited stimulus field" (Huang et al., 2011, p.4). Focused attention captures the full concentration of the subject. Hence, it would be a good measure to the flow state, or the deeply involvement of users in social media. Previous studies suggested that vividness, interactivity, and involvement determine the level of focused attention (Hoffman & Novak, 1996) with others suggesting a broad definition of involvement (Greenwald & Leavitt, 1984; Zaichkowsky, 1994). However, as Koufaris suggested (2002), involvement is generally considered "a person's motivational state (i.e., arousal, interest, drive) towards an object where that motivational state is activated by the relevance or importance of the object in question" (p.211). This explains why prior studies found a significant positive correlation between involvement and focused attention (Koufaris, 2002; Novak, Hoffman & Yung, 1998; Huang et al., 2011).

2.3 Playfulness

More recently, Abuhamdeh & Csikszentmihalyi (2009) studied flow in terms of intrinsic and extrinsic motivation and explained the importance of enjoyment in explaining the flow state (p. 1615). Intrinsic motivation is the motivation to engage in an activity purely for the sake of the activity itself (Lepper, Greene & Nisbett, 1973). When individuals are intrinsically motivated, they pursue activities for the interest and enjoyment those activities provide (Csikszentmihalyi, 1975a) and they often perform at relatively high levels (Amabile, 1996; Grolnick & Ryan, 1987). Webster and colleagues found support for the idea that playfulness had a role in predicting microcomputer use in the workplace (Webster & Martocchio, 1992). Hackbarth and Grover (2002) examined how playfulness and anxiety framed the perception of ease of use when using information technology. Other studies included this intrinsic motivational factor as an important determinant for understanding the flow state. For example, Shin and Kim (2008) studied perceived enjoyment and found that it significantly affected attitudes toward the intention to use Cyworld (p.380). Chou and Ting (2003) used playfulness to predict addictive cyber game behavior. They argued that play was an intrinsic value because the resultant happiness has its own value (p.665), and playfulness is of "key value to generate optimal flow" (p.665).

3. Model Framework and Hypotheses Development

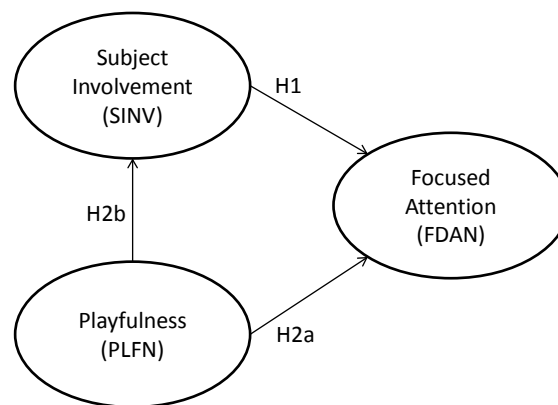Therefore, our proposed hypotheses are as follows:

Figure 1. Model Framework of Deep Social Media Use

The model includes three variables. Both subject involvement and playfulness would have a direct, positive and significant relationship with focused attention. Furthermore, playfulness would also have an indirect relationship with focused attention through subject involvement. That is, the more the perceived playfulness, the greater the subject involvement, and finally, the greater the focused attention in using social media.

3.1 Subject Involvement

In this study, subject involvement is defined as an individual's motivational state towards an object while focused attention is defined as a centering of attention on a limited stimulus field. In the use of social media, a lot of the system designs provide tools for social contacts and interactions among peer users. These kinds of activities both involve some passive participation, for example, browsing around friends' pages, status updates, or browsing uploaded photos. On the other hand, there are also some active participation, for example, clicking like button, comment on updates or photos, taking and uploading photos, tagging friends in status or in photos, etc. We think that users are interested in these social interactions, or else, they would not come and even not do anything. Users are involved in social contacts and interactions because of their interest in the process and their inner drive. The more activities the users are involved, the more the time and concentration would be resulted in the social

media for social interactions and social contacts. Finally, users might achieve at a state that they are concentrated on only the activities for social interactions with their peers in the social media. They are not aware of any other things around even though it is at a meeting, during the class, inside the bus or train. Therefore, we hypothesizes that,

Hypothesis 1:   An individual user's subject involvement in Facebook would have a direct, positive and significant effect on his/her focused attention during the use of Facebook.

3.2 Playfulness

The majority use of social media is not because of work. That is not the first reason for users being involved in social contacts. Rather, users spend their leisure time to meet people, to make new friends, and to have social contacts and interactions to maintain their friendship. They do not do so for money, or for achieving better performance in work though it may help some time in the future. It is not the main concern. It is important that users are interested in doing so, or else, they would not spend so much time in doing so. The more the user finds social media interesting, the more the user would spend time on social media. They would try one thing or another to have social contact with their peers. They then get feedback or responses. They feel good and would spend more time to meet with more others. The more they are involved in activities, they receive more feedback and responses, and they would spend more time on social media and activities. Sometimes, it is not necessary to do too much. For example, users browse through latest updates of their friends. They are so interested in learning what their friends are doing. They just read. They just like it. Therefore, they read more. They are focused on doing so, without noticing any other things happened. Hence, we think, there would be a direct effect of how a user perceived social media as fun and interesting that triggers the user to be focused to using social media. There would also be an indirect effect of how a user perceived social media as fun and interesting, the user would spend more time to involve in social contacts and interactions, and hence, the user would be more focused on the social media. Hence, we tests,

Hypothesis 2a: An individual user's playfulness on Facebook would have a direct, positive and significant effect on his/her focused attention during the use of Facebook.

Hypothesis 2b: An individual user's playfulness on Facebook would have a direct, positive and significant effect on his/her subject involvement during the use of Facebook.

4. Method

4.1 Background

This study investigated the use of Facebook as a platform to communicate and maintain friendships. Facebook (www.facebook.com) allows users to update their own information at any time and interact with other users as they wish. The platform is open to all who are over the age of 13 and users can learn about each other's activities through status updates and wall posts.

4.2 Subjects

This study targeted an undergraduate program in the Journalism and Communication Department of a university in Hong Kong during the 2011-2012 academic year. These young adults were heavy users of Facebook and this age group was among an important portion of Facebook users. We believed that studying these subjects would not only provide a good idea of how the students used Facebook, but would also shed light on its use among the general population.

4.3 Measurement Items

The questionnaire was designed as an adaptation of previously validated scales. Specifically, five items of subject involvement (SINV1-5), four items of focused attention (FDAN1-4) (Huang et al., 2011), and six items of playfulness (PLFN1-6) Chou & Ting, 2003) were included in the questionnaire. All items were measured on a 7-point Likert-type Scale, ranging from 1 "strongly disagree" to 7 "strongly agree". The major measurement items are listed in the appendix. The subjects were also asked to report their Facebook use, including frequency and duration of use. The degree of current computer use was measured using 7-point Likert-type Scale. The subjects were also asked to state demographic data in the first part of the questionnaire, including sex, age range, Internet knowledge and how many years they had been surfing the Internet.

4.4 Data Collection

The questionnaires were printed and distributed to all of the undergraduate students in the Department of Journalism & Communication at a general assembly. The completed questionnaires were collected before the assembly started. Instructors then helped to distribute the questionnaires in classes to those students who did not attend the assembly. Finally, there were a total of 717 students in the four-year undergraduate program (Year 1: 165; Year 2: 182; Year 3: 192; Year 4: 178) and 219 students completed and returned the questionnaire for a return rate of 30.54%.

4.5 Data Analysis

Firstly, a descriptive analysis of the instrument, including the means and standard deviation, is presented. Next, the internal consistency of the instrument was examined using Cronbach's alpha, composite reliability and the construct validity (discriminant and convergent validity) of the items was assessed by confirmatory factor analysis. The model structure was then evaluated against goodness-of-fit indices, and the predictive and explanatory power was calculated by structural equation modeling using LISREL.

5. Findings

5.1 Descriptive Summary of Respondents

A total of 219 respondents completed and returned the questionnaires. A summary of the descriptive analysis is shown in Table 1. Among them, the gender ratio is comparable to the university's (32:68). The age range was as follows: 18 (8, 3.7%), 19 (25, 11.4%), 20 (34, 15.5%), 21 (51, 23.3%), 22 (62, 28.3%), 23 (29, 13.2%), 24 (7, 3.2%) and 25 (3, 1.4%).

Table 1. Descriptive analysis of respondents

Gender:
Male: 64 (29.2%); Female: 155 (70.8%)
Age (18-25):
Mean: 21.21; Standard deviation: 1.493
Internet Knowledge
1. Beginners: 9 (4.1%); 2. Fair: 90 (41.1%); 3. Good: 108 (49.3%); 4. Expert: 11 (5%)
(1 not reported)
Internet Experience
1. 2-3 years: 2 (0.9%); 3. >3 years: 215 (99.1%)
(2 not reported)
Facebook Usage (No. of times last month):
1. Many times per day: 149 (68.3%); 2. Once per day: 42 (19.3%);
3. Fewer than once per day 27 (12.4%) *(1 not reported)*
Facebook Usage (Total hours last month):
1. More than an hour per day: 82 (37.4%); 2. One hour per day: 66 (30.1%);
3. Less than one hour per day: 71 (32.4%)

Facebook Usage (Time for each login):
1. More than 30 minutes: 70 (32.0%); 2. 20-30 minutes: 37 (16.9%);
3. 10-20 minutes: 73 (33.3%); 4. Less than 10 minutes: 39 (17.8%)

N=219

5.2 Summary of the Observed Variables

The descriptive statistics of the measurement items are summarized in Table 2. The mean scores and standard deviations for Subject Involvement (SINV), Playfulness (PLFN) and Focused Attention (FDAN) range from 4.41 to 4.95 and 1.138 to 1.435; 2.99 to 3.39 and 1.284 to 1.376, 3.39 to 3.73 and 1.226 to 1.349 respectively. All of the constructs satisfied the reliability criteria (alpha>0.70) as suggested in the literature (Nunnally & Bernstein, 1994).

Table 2. Descriptive statistics of items and Cronbach's alpha of constructs

	Mean	Std. deviation	Alpha values
Subject Involvement (SINV)			
SINV1	4.85	1.377	0.9020
SINV2	4.95	1.138	
SINV3	4.78	1.128	
SINV4	4.41	1.435	
SINV5	4.68	1.274	
Playfulness (PLFN)			
PLFN1	3.06	1.360	0.9480
PLFN2	3.22	1.346	
PLFN3	3.09	1.313	
PLFN4	2.99	1.284	
PLFN5	3.39	1.327	
PLFN6	3.01	1.376	
Focused Attention (FDAN)			
FDAN1	3.73	1.226	0.9230
FDAN2	3.39	1.320	
FDAN3	3.44	1.330	
FDAN4	3.42	1.349	

N=219

Discriminant validity is demonstrated if an item correlates more highly with items within the same factor than it does with items in a different factor (Campbell & Fiske, 1959). The inter-item Pearson correlation coefficients shown in Table 3 depict discriminant validity, where the inter-item coefficients within each measurement constructs are much higher than the correlations across constructs.

Table 3. Inter-item correlations of coefficients of items

	SINV1	SINV2	SINV3	SINV4	SINV5	PLFN1	PLFN2	PLFN3	PLFN4	PLFN5	PLFN6	FDAN1	FDAN2	FDAN3	FDAN4
SINV1	1.00														
SINV2	0.68	1.00													
SINV3	0.65	0.67	1.00												
SINV4	0.82	0.59	0.67	1.00											
SINV5	0.67	0.47	0.59	0.67	1.00										
PLFN1	0.35	0.32	0.25	0.38	0.27	1.00									
PLFN2	0.43	0.37	0.33	0.43	0.35	0.81	1.00								
PLFN3	0.41	0.33	0.28	0.43	0.32	0.81	0.83	1.00							
PLFN4	0.39	0.32	0.29	0.43	0.34	0.73	0.78	0.85	1.00						
PLFN5	0.44	0.35	0.31	0.43	0.34	0.72	0.69	0.74	0.69	1.00					
PLFN6	0.38	0.24	0.24	0.37	0.29	0.70	0.69	0.77	0.76	0.74	1.00				
FDAN1	0.35	0.30	0.29	0.37	0.28	0.47	0.46	0.49	0.42	0.40	0.37	1.00			
FDAN2	0.39	0.35	0.28	0.39	0.30	0.51	0.56	0.55	0.49	0.46	0.46	0.72	1.00		
FDAN3	0.39	0.35	0.24	0.37	0.31	0.50	0.51	0.54	0.47	0.47	0.46	0.67	0.78	1.00	
FDAN4	0.39	0.37	0.25	0.38	0.34	0.52	0.54	0.57	0.52	0.46	0.48	0.67	0.82	0.83	1.00

5.3 Structural Equation Modeling Using LISREL

LISREL software is designed to estimate and test statistical models of linear relationships among latent and manifest variables. It is an extremely powerful structural equation modeling technique that has been used extensively in previous research (Adams, Nelson & Todd, 1992; Taylor & Todd, 1995). LISREL was then used in this study to analyze the survey data and to perform the analysis of the measurement models of the constructs and the structural model testing.

Confirmatory factor analysis was used to test the measurement models for each of the construct. The factor loadings for each item were summarized in Table 4. The goodness of fit indices for these measurement models were listed in the Table 5. They all exhibited higher than suggested threshold values of 0.7 by prior studies (Hair et al., 2010). All the factor loadings were significant at $p<0.01$. Furthermore, average variance extracted (AVE) were assessed. The variance extracted refers to the square of a standardized factor loading that represents how much variation in an item is explained by the latent factor. The average variance extracted was then calculated as the mean variance extracted for the items loading on a construct and is a summary indicator of convergence (Hair et al., 2010). As shown in Table 4, AVEs for SINV, PLFN and FDAN were 0.75, 0.78 and 0.82, all exhibited 0.5 or higher, suggested adequate convergence (Hair et al., 2010, p.709). Moreover, literature also suggested that Cronbach's alpha would over- or underestimate reliability (Raykov, 1997, 1998). Instead, composite reliability would provide a better assessment of internal consistency (Fornell & Larcker, 1981). Calculated by the [square of the sum of standardized loadings], divided by the sum of [square of sum of standardized loadings] and [sum of indicator measurement error] (i.e., 1 minus the square of each loading), resulted composite reliability of each construct was summarized in Table 4. They were all greater than the benchmark for acceptable reliability values of 0.8 (Fornell & Larcker, 1981). Hence, the constructs exhibited internal consistency in the measurement.

Table 4. Confirmatory Factor Analysis

	Factor Loadings		Factor Loadings		Factor Loadings
SINV1	0.92	PLFN1	0.88	FDAN1	0.79
SINV2	0.90	PLFN2	0.89	FDAN2	0.96
SINV3	0.77	PLFN3	0.97	FDAN3	0.96
SINV4	0.91	PLFN4	0.90	FDAN4	0.91
SINV5	0.81	PLFN5	0.83		
		PLFN6	0.83		
AVE	0.75		0.78		0.82
Composite Reliability	0.94		0.96		0.95

Table 5. Summary of goodness-of-fit indices of measurement models testing

	Chi-sq/df	SRMR	RMSEA	GFI	AGFI	NFI	NNFI	IFI	CFI
[#]	<3	<0.05	<0.1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9
SINV	0.61	0.0071	0.0	1.00	0.98	1.00	1.00	1.00	1.00
PLFN	1.992	0.0082	0.065	0.99	0.94	0.99	0.99	1.00	1.00
FDAN	2.83	0.0084	0.091	0.99	0.94	1.00	0.99	1.00	1.00

[#]suggested by Hair et al. (2010)

The measurement models of each construct were found valid. Then, structural equation modeling was used to analyze the structure model. The proposed structural model fitted the data well, with the goodness-of-fit indices all exceeding those suggested in the literature (Hair et al., 2006) (Table 6). Figure 2 showed the resulting path coefficients of the overall model.

Table 6. Summary of goodness-of-fit indices of structural equation modeling testing

	Chi-sq/df	SRMR	RMSEA	GFI	AGFI	NFI	NNFI	IFI	CFI
[#]	<3	<0.05	<0.1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9
Model	1.38	0.029	0.039	0.94	0.91	0.97	0.99	0.99	0.99

[#]suggested by Hair et al. (2010)
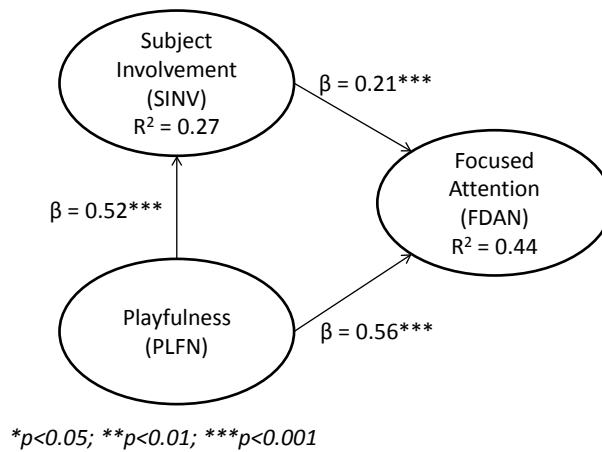

*p<0.05; **p<0.01; ***p<0.001

Figure 2. Structural equation modeling testing

The testing results shown that subject involvement had a significant, direct and positive effect on focused attention during Facebook use, with a standard path coefficient of 0.20 (p<0.001). Hypothesis 2 was supported. This coefficient suggests that every unit increment in subject involvement would literally strengthen an individual's (positive) focused attention during Facebook use by 0.20 units.

Playfulness had a direct and significant positive effect on focused attention, with a standard coefficient of 0.52 (p<0.001). Hypothesis 1a was supported. This coefficient suggests that every unit increment in playfulness would strengthen an individual's (positive) focused attention during Facebook use by 0.54 units. Playfulness also had an indirect effect on focused attention through subject involvement with a standard coefficient of 0.52 (p<0.001). Hypothesis 1b was supported. Playfulness, therefore, had a combined total effect of β= 0.64 (= 0.54 + 0.52 x 0.20) on focused attention.

The R square value shows that playfulness explains 27% of the variance in subject involvement, with subject involvement and playfulness combined explaining 42% of the variance in focused attention during Facebook use. The results are summarized in the Table 7.

Table 7. Summary of the hypotheses testing results

Causal Paths	Path coefficients	Hypotheses
PLFN → FDAN	0.54***	H1a, supported
PLFN → SINV	0.52***	H1b, supported
SINV → FDAN	0.20***	H2, supported

Reduced R^2: *Subjective Involvement (0.27); Focused Attention (0.42)*

*p<0.001

6. Discussion

The key findings of this study include that:

1. Playfulness has both a direct (β=0.54, p<0.001), and an indirect (mediated by subject involvement) (β=0.64, p<0.001), positive and significant relationship with focused attention; and

2. Subject involvement has a direct, positive and significant relationship with focused attention (β=0.20, p<0.001) and as a mediator between playfulness and focused attention.

Playfulness has a direct, positive and significant relationship with focused attention during Facebook use. This supports our first hypothesis [H1a]. Theoretically, play is regarded as an intrinsic motivation

for users who find interest and fun when using Facebook. Individual users are expected to have a relatively higher level of performance when using Facebook because they find the experience to be fun. This result is supported by previous studies that found playfulness to be key to achieving a flow state (Chou & Ting, 2003). More recently, Abuhamdeh & Csikszentmihalyi (2009) suggested that both intrinsic and extrinsic motivation exerted effects on Internet chess games, although they had different orientations: specifically, intrinsic motivation orientation was found to be associated with a stronger curvilinear relationship between challenge and enjoyment and extrinsic motivation orientation was found to be associated with a heightened affective responsivity to competitive outcome (winning versus losing). The results of this study confirm the value and importance of this intrinsic motivation that affects focused attention (flow state).

Playfulness also has a direct, positive and significant relationship with subject involvement [H1b] that, in turn, shares a direct, positive and significant relationship with focused attention [H2] during the use of Facebook. These support the second and the third hypotheses. Subject involvement refers to the motivational state that is activated by the relevance or importance of the object in question.

Our results suggest that an individual user who finds Facebook interesting and fun will also perceive Facebook as relevant and important and hence might center all his/her attention on using Facebook. This is a logical and reasonable conclusion. In the physical world, people involve in social contacts by phone, face-to-face and meeting. However, most people would have the experience that even though they live nearby, people are too busy to meet once a week or even once a month. Social media provide such a chance for people to meet, to talk, to contact at any time and at any place without much of a hurdle. People want to meet but they maybe too busy, too far away, or cannot make the move to meet. They have this need to meet. They want to do so but they cannot. Therefore, social media become relevant and important as social media help them to accomplish this need. People are interested in their friends. They enjoy spending time to know what are happening in their social circle. Social media also provide the tools for them to be involved. Real-time Chat, comment, status update, photos upload, videos upload, all these activities are provided by social media. The more the involvement, users would find the enjoyment there and hence, more time they would spend. Interestingly, that is why millions of interaction happened every single day. It seems that social media have some ways to understand the hidden needs of people and have rightfully provided the environment and relevant tools to satisfy them.

6.1 Theoretical Implications

Compared our results with a prior study by Huang et al. (2011), we get very consistent findings. In Huang et al. study, subject involvement had a direct and positive relationship with focused attention ($\beta=0.21$, $p<0.001$). In our result, we get comparable strength of the effect ($\beta=0.20$, $p<0.001$), supporting our findings in prior literature.

However, in the study of Huang et al., focused attention was hypothesized to be predicted by another factor, interpersonal interaction, which was either non-significant in web-based interaction environment ($\beta=0.09$, n-s) or weak in text-based interaction environment ($\beta=0.12$, $p<0.001$). The overall R-square for focused attention was only moderate (R-sq = 0.28). In our study, we argued that, based on the flow theory, users would be deeply involved only if he or she was based on intrinsic motivation to find social media interesting or fun. We hypothesized playfulness as the factor predicting focused attention. It turns out that playfulness has both a very strong and significant direct ($\beta=0.54$, $p<0.001$) and indirect effect (through subject involvement) ($\beta=0.64$, $p<0.001$) towards focused attention. The overall R-square has also greatly improved (R-sq = 0.42). This shows that the present study provides a better prediction and richer explanation to focused attention and the phenomenon of the flow state of using social media.

6.2 Limitations and Future Studies

In the study, we did not involve the functionality of any of the objects concerned, such as, interactivity speed (Huang et al., 2011). Future studies could consider that these functionalities might affect the

formation of perceptions of playfulness (i.e., whether the object is interesting or fun). At the moment, our argument is that when the individual user perceives Facebook to be interesting and fun, he/she would find Facebook to be more relevant and important. Moreover, Koufaris (2002) argued that product involvement would predict shopping enjoyment and this type of reverse causal effect may also be a potential consideration in further studies. Furthermore, the nature of social media is to develop and to maintain interpersonal relationship through all those social and interactive tools. The addition of relevant constructs from the interpersonal relationship perspective would fill the research gap in further studies (Ma & Yuen, 2010 & 20111; Ma, Sun & Ma, 2012).

Despite the importance of these findings, this study does have limitations. We targeted undergraduate students in our sample as a good proxy for the general user population because teenagers are active Facebook users. However, further studies of other subject domains are needed to support and generalize the results. In contrast, there are, at present, 800 million Facebook users, determining the sample size is difficult in empirical social research studies (MacCallum et al., 1999), suggesting that what "emerges from a large-sample factor analysis will be more stable than that emerging from a smaller sample" (DeVellis, 2003). Nonetheless, Comrey (1988) states that a sample size of 200 is adequate in most cases of ordinary factor analysis involving no more than 40 items. We use a sampling size of 219 and 16 items in total, falling within the recommended range.

7. Conclusion

This study adapts flow theory with playfulness, subject involvement and focused attention as constructs to explain the deep involvement of Facebook users. We found that playfulness is a key determinant of subject involvement and the focused attention of Facebook users. This provides empirical evidence and a concrete model framework for further studies aimed at understanding the phenomenon.

Appendix

Adapted measurement items and the sources

Items	Description
Subject Involvement (SINV) (Huang, et al, 2011)	
SINV1	For me, Facebook is Important.
SINV2	For me, Facebook is Interesting.
SINV3	For me, Facebook is Relevant.
SINV4	For me, Facebook is Means a lot to me.
SINV5	For me, Facebook is Needed.
Playfulness (PLFN) (Chou and Ting, 2003)	
PLFN1	I experience the highest happiness when using Facebook.
PLFN2	I experience the highest excitement when using Facebook.
PLFN3	I experience the highest satisfaction when using Facebook.
PLFN4	I experience the highest hopefulness when using Facebook.
PLFN5	I experience the highest amusement when using Facebook.
PLFN6	I experience the highest enjoyment when using Facebook.
Focused Attention (FDAN) (Huang, et al, 2011)	
FDAN1	When I use Facebook, I am deeply engrossed in what I am doing.
FDAN2	When I use Facebook, I am absorbed in what I am doing.
FDAN3	When I use Facebook, my attention is focused.
FDAN4	I concentrate fully on using Facebook.

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Learning with Video Representation: A Case Study on the Usage of Multimodal Elements for Explaining Community Issues

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Abstract: School is under debate on the shifting from teaching to learning under global technological development and society's demand on workforce. At one hand, school is more or less the same as before with long history of curriculum designed on various fixed boundary subjects. On the other hand, catalyzed by the rapid development of information and communication technology, students are familiar with multimodal reading and representation on community issues across disciplines beyond classroom. As students are now digital natives who show great interests to communicate with social media, the multimodal representation used in social media is introduced back to school activities together with traditional literacy development on reading and writing. This paper is going to present a case study on six Hong Kong grade 10 students' learning with creating video artifacts integrating multimodal elements to explain community issues. Three levels of student performance in written examination results were compared with respect to the usage of multimodal elements and multiliteracies development. It is found that the students' written examination performance is not in correlation with performance in using multimodal elements for meaning representation on community issues as well as the development of multiliteracies.

Keywords: multimodal representation, multiliteracies, conceptual artifact

1. Introduction

Traditionally, school focuses on teaching literacy which is about the capability in reading and writing (Adams & Hamm, 2000; Bazalgette, 2008). United States Government kicked off a campaign in 2002 promoting the 21st Century skills about developing essential skills for graduates which was a sign to shift away from the major emphasis on traditional literacy and subject-based knowledge at school (P21, 2010). The Hong Kong latest Senior Secondary School curriculum reform had followed the shift and re-grouped previous non-core subjects into a new core subject called Liberal Studies in 2009. The Liberal Studies subject emphasizes six themes across various traditional subjects on history, social studies, economics and geography, etc (Education Bureau, 2007). The objectives of the new subject are to enhance students to develop multiple perspectives on community issues, construct students' own perspectives with critical mind and thinking. Both the US and Hong Kong Government were trying to shift school from focusing on traditional subject-based knowledge transmission to essential thinking skills development across disciplines (Education Bureau, 2007; P21, 2010).

Along with the global development of information technology, youth are developing multiliteracies in the social media (Jewitt, 2008; Gee, 2010). Multiliteracies are defined as the capabilities in reading and producing meanings with various multimodal elements other than written mode only, the various multimodal elements frequently used by youth in daily communication including visual, audio, gesture, action and language, etc (Jewitt, 2008). Integrating the usage of various multimodal elements for meaning representation, the final outcome is named as multimodal artifact. By means of sharing and peer feedback on students' created multimodal artifacts within the social networking environment such as freeware as Blogger, Xanga and Facebook, knowledge is constructed (Bereiter, 2003; Goldman, 2007; Jewitt, 2008), and multiliteracies are then developed. A gap is emerged between literacy learned at school and multiliteracies development at the social network environment supported by information technology. At school, students learn subject knowledge and at the same time, the assessment of subject knowledge is mainly on written mode. In the social network community, students are actively engaged in multimodal communication on daily issues which are multi-disciplinary in nature. If school is going to re-define its role in digital era, school is facing challenging roles in shifting from subject-based teaching and written mode assessment to facilitate knowledge construction on community issues and developing students' multiliteracies in creating multimodal meaning representation within classroom context.

Information and communication technology enlarges an emerging gap between student learning and classroom teaching. Under the social communication network, students organize multimodal elements to represent and communicate meanings on issues across disciplines, while school is still focusing on text-based teaching and learning under clear boundary of subjects. Though global research has started to focus on research related to multimodal representation and multiliteracies (Gee, 2010; Guo, 2010; Hakkarainen, 2009; Lusk et al., 2009; Walsh, 2009), little research has been focused on learning with creating multimodal meaning representation in local context. It is a new area to explore whether local school is ready to shift to the global trend on multiliteracies development, and whether students are prepared to adapt to digital era demanding capabilities in multimodal meaning representation.

The paper is going to report part of the findings from a multiple-case study on six grade 10 students producing multimodal artifacts on community issues in a local secondary school in 2007. The study was guided by the following questions:

- What would be the multimodal elements used by students to explain the community issues when students are engaged in classroom tasks to make enquiry and represent the community issues in video artifacts?
- Would multiliteracies be developed or enhanced by representing community issues with multimodal elements in video artifacts?
- Will students good at traditional written examination perform better in creating multimodal meaning representation?

Lankshear & Knobel (2007) stated out that there are two mindsets in facing with technological change on society. Under the Physical-industrial mindset, technology is just another innovative idea while our economy and culture have not changed much to adapt for the technological change. While in Cyberspatial-postindustrial mindset, it assumes our society has been changing greatly by technology and we should have a new way of doing things. Entering into the age of knowledge-based society, a paradigm shift in teaching and learning has been proposed (Ezziane, 2007). The above guiding questions contribute to identify what directions the classroom teaching and student learning should be shifted, whether a traditional mindset should be kept or a new approach of teaching and learning should be implemented. Focusing on knowledge construction via multimodal meaning representation on community issues across disciplines might be introduced as the new mindset preparing for the change of school under new era of digital world. Basic concepts on literacy and multimodality are reviewed below to conceptualize the study.

2. Multimodality and Multiliteracies

Before the invention of Kindle of Amazon and iBook in Apple iOS, Kress (2003) had already given a reflective remark that the whole communication and representation landscape has been changing from written mode to multimodality, from book medium to computing screen:

> *On the one hand, the broad move from the now centuries-long dominance of writing to the new dominance of the image and, on the other hand, the move from the dominance of the medium of the book to the dominance of the medium of the screen. These two together are producing a revolution in the uses and effects of literacy and of associated means for representing and communicating at every level and in every domain (Kress, p.1, 2003).*

Multiliteracies were proposed along with the shifting from written mode to multimodal representation and from book medium to computing screen. New London Group (New London Group, 1996; Gee, 2010; Jewitt, 2008) defined the term "multiliteracies" in response to the changing conditions of the global economic situation and the new demand on workforce. New Literacies Studies were introduced which was about studying students' experience in using text, media and technology as multimodal production out of school context (Gee, 2010; Lanskshear & Knobel, 2007).

Jewitt (2008) elaborated that multimodal meaning representation was generated by combining various multimodal elements including image, gesture, gaze, body posture, sound, writing, music and speech, etc. It was suggested that all multimodal elements including written mode contribute to meaning representation in different ways; while the multimodal meaning representation facilitates the development of multiliteracies which is in contrast with traditional literacy development where text is the dominant role in meaning expression (Jewitt, 2008; Kress, 2010). Since written text has been the dominated medium for teaching, learning and assessment at school for more than hundred years, Jewitt (2008) remarked that multimodal meaning representation is facilitated beyond the school context where students like to create multimodal artifacts for communication and representation. In the new digital era, students showing great interests on social media are actively participating in creating multimodal artifacts to represent their understanding of social issues (Kress, 2010; Jenkins, 2009; Jewitt, 2008).

3. Framework of the Study: From Written to Multimodality

The study is not restricted to explore the shifting of written mode to multimodality, but also focuses on student learning aspects including knowledge construction and meaning representation.

Both Bransford et al (2000) and Bereiter (2002) regarded knowledge construction is a strategy for students learning to adapt to knowledge age society. Bransford et al (2000) proposed that students should go into their community to conduct enquiry on interested topics. As a result of making enquiry on relevant and interesting topics, students will construct conceptual artifacts to explain the issues (Bereiter, 2002). Creating conceptual artifact will help to facilitate knowledge construction on the issues and the constructed knowledge is transferrable to real world context (Bransford et al, 2000). However, the modes of the process of creating conceptual artifact and the modes of final conceptual artifact have seldom been discussed and explored. It was assumed that textual communication was dominant in the process of creating artifact and textual conceptual artifacts were constructed under traditional mindset. Referring to multimodality discussed by Kress (2010), Jewitt (2008) and Gee (2010), students are familiar with multimodality rather than mono written mode during their social communication supported by technology; knowledge construction process and the production of final conceptual artifacts should also be shifted from written to multimodality under the advancement of technology.

With solid background in knowledge representation and had explored using video as a research tool, Goldman (2007) further conceptualized the process of knowledge construction to making enquiry with video production and representation.

Goldman (2007) regarded that a video artifact can be the outcome of creating conceptual artifact to explain the world issue. In order to clearly separate the process of creating representation and the outcome of representation, Goldman defined "re-presentation" as the initial artifact created by the interaction between an external visual image and initial perception of the visual in our mind (Figure 1), while series of re-presentations can be produced by continuous interactions and finally a final and refined representation is constructed to help to explain the world issue. With the purpose of explaining a community issue, the final representation serves the same function as a conceptual artifact (Bereiter, 2002). The process of iterative creation and refinement of re-presentations on world issue can be named as knowledge representation.
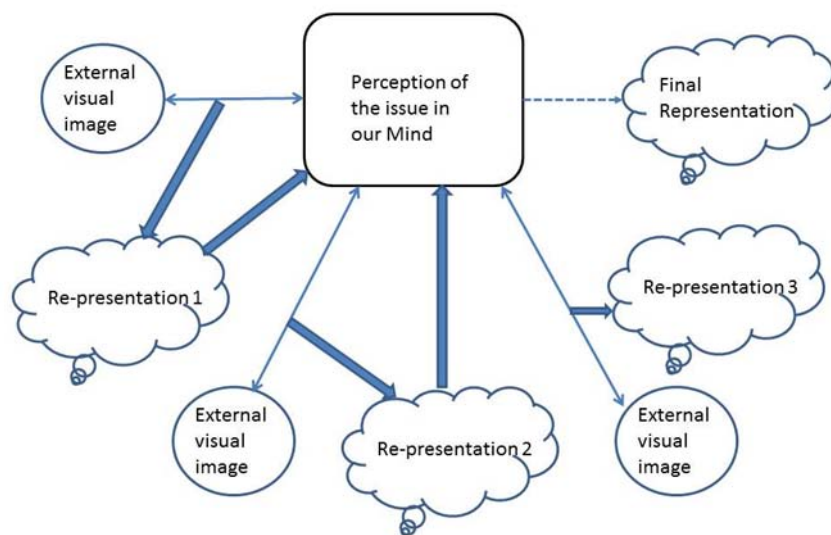

Figure 1. Re-presentation and representation framework proposed by Goldman

Goldman claimed that creating video artifact to represent community issues involved a lot of video interviews and video segment selections. In conducting video interviews, different experiences or layers of meaning interpretations on world issues were collected and constructed. The selections of video interviews in the final artifact are actually creating one's meaning interpretations on the world issues (Goldman, 2007).

4. Methodology

4.1 Case Study

Multimodality and multiliteracies are new research agendas in local secondary school context, research on these agendas are under development. Intrinsic case study method (Stake, 2005) was applied to develop the issues, contexts and interpretations on the multimodal artifacts and the students multiliteracies development at Hong Kong secondary schools. In preparation for the new curriculum reform in Hong Kong, a local secondary school H was invited by Education Bureau (EDB) to conduct a non-written mode Independent Enquiry Study (IES) Report project guiding students to make enquiry and create video representation on community issues in 2007. At the same time, school-based rubrics assessment on the non-written mode IES report was developed and applied. A class of grade 10 students from School H was selected to participate in the project. Considering the depth of data research, the management of data collection and the availability of students for observation and interview, purposive

samples were considered (Stake, 2005). With the consideration of the relationship of students' performance in written examination and multimodal meaning representation, two students who showed good performance in the grade 9 final written examination, two students showed above average performance, and two students showed below average performance in grade 9 written examination were identified as samples for study. The purposive samples might not be typical among the class but these six students were willing to be observed and interviewed, they showed great potential for researcher to learn on the cases which are more important than the issue of representativeness (Stake, 2005).

4.2 Research Design

The whole research focused on engaging students to produce video artifacts to explain community issues to peer and teachers. In producing a video artifact, it involves the process of creating video representations. The process of video representation includes the iterative construction process of creating re-presentations and representation in a final video artifact which is composed of various multimodal elements (Goldman, 2007, Jewitt, 2008). At the same time, four teachers from school H were invited to develop assessment rubrics to evaluate the process of creating re-presentations and final video artifacts. Various tasks were then designed to facilitate the process of re-presentations and the final video artifact. The designed tasks and corresponding rubrics assessment are listed at Table 1.

Table 1. Various tasks and corresponding rubrics assessment on multimodal production

	Tasks	**Assessment Tool**
Stage One	Re-presentation 1: Written enquiry Proposal	Rubrics on enquiry proposal
	Re-presentation 2: Verbal presentation with PowerPoint	Rubrics on verbal presentation
Stage Two	Re-presentation 3: PowerPoint Proposal on data collection	Rubrics on PowerPoint
	Re-presentation 4: Verbal presentation on the data collection	Rubrics on verbal presentation
Stage Three	Final Video artifact: 2-minute video	Rubrics on video artifact

In this paper, the rubrics scoring on the final video artifacts were compared against students' performance on previous written examination result. In a traditional mindset, students showing good performance in written examination should perform well in other areas such as creating video artifact explaining community issues.

The assessment criteria and corresponding scoring developed by the four teachers on the final video artifact:

Table 2. Assessment criteria on final video artifact and scoring distribution

Assessment criteria on final video artifact	**Scoring (Total 60)**
Usage of collected data	10
Data analysis with multiple perspectives	10
Critical mind, logical argument and conclusion	10
Enquiry capability	10
Presentation technique (organization)	15
Usage of multimodal elements (Narration, interview, sound effects or music)	5

As the IES report was designed to have school-based assessment required by EDB, the assessment criteria were developed by teachers according to their knowledge and requirement of the final video artifacts on making enquiry of the community issues. Without any background in using multimodal elements for meaning representation, the teachers focused on the usage of collected data, multiple

perspectives, logical argument and enquiry capability, while the usage of multimodal elements were given the least portion of scoring. In other words, teachers focused on the student learning on enquiry capability and argument presentation, and had put less attention on the development of using multimodal elements for meaning representation.

4.3 Data Collections

Besides the collections of rubrics scoring on each final video artifact, the video artifacts were collected for multimodal analysis on the usage of multimodal elements for meaning representations. The rubrics scoring and multimodal analysis were then triangulated with reference to previous written examination performance.

4.4 Data Analysis

The video artifacts were coded with qualitative analysis method and pattern of categories (Huberman & Miles, 1994) on the usage of multimodal elements were generated for analysis and discussion.

Adapted from Iedema (2001), Jewitt (2008) and Kress and van Leeuwen (2006), a multimodal discourse analysis framework on the usage of multimodal elements: audio, screen composition, screen movement, people movement and gesture, etc., was proposed to analyse the students' final video artifacts. Patterns of multimodal elements used for meaning representation are identified from the six video artifacts for further analysis. The observed usage of multimodal elements is listed at Table 3.

Table 3. Identified Multimodal Elements on a video artifact

Multimodal elements conceptualized from literatures	Observed multimodal elements used in the video artifacts
Text mode	Caption and subtitles
Verbal mode	Dialogue and narration
Audio mode	Music and sound effect
Screen composition mode	Camera shot size People and object position
Screen movement mode	Camera movement People gesture and action
Visual effect	Fast speed motion

5. Findings

5.1 Multimodal Analysis of the Video Artifacts

The six video artifacts were coded according to the usage of multimodal elements for explaining community issues. Three categories of video artifacts are identified from the coding.

Category 1:   Using various multimodal elements to explain community issues
Under this category, students had made use of various multimodal elements and demonstrated competency in managing these elements to represent meanings explaining the community issues. The explanations represent students' own understanding on the issues generated from their understanding on the issues. Two video artifacts are coded under this category: "Youth Pressure" and "Daydream". "Youth Pressure" was produced by Amy, who showed below average performance in previous written examination. "Daydream" was produced by Daisy, who showed above average performance in previous written examination. The summary of multimodal elements used by one of the videos is listed below as an example of the category.

"Youth Pressure": Summary of multimodal elements used for meaning representation

The video has made use of screen movement, people movement, gesture, screen composition and music to explain different pressure faced by the youth at school. The video clearly explains that youth pressure comes from parent and teachers' expectations on examination result, one's expectation on examination result and peer daily interaction.

Category 2:   Using multimodal elements to describe community issues but could not give meaningful explanation on the issues

Under this category, students showed intention to make enquiry to understand the community issues, but they were lack of basic skills, knowledge and capability to conduct enquiry and as a result, no meaningful representation could be perceived from the final video artifacts. Two video artifacts were identified under this category: "Earn Your Living" by Bruce and "Public Study Room" by Cathy. Both students showed good performance in previous written examination. The summary of multimodal elements used by one of the videos is listed below as an example of the category.

"Earn Your Living": Summary of multimodal elements used for meaning representation
The video had made use of screen movement and people movement to represent the busy lunch time in a food court. However, shaky pan shot, dark environment and too noisy background sound were perceived which had sidetracked audience's attention to understand the meaning represented by the multimodal elements. Bruce had tried to conduct interviews on people's perception on the concept of "busy" but the video showed that he was lack of knowledge in asking open-ended questions to trigger explanatory answers and as a result, audience could not perceive any unified meaning to explain further on the busy lunch time.

Category 3:   Using multimodal elements to describe community issues but had not explained further on the issues

The video artifacts had made use of various multimodal elements to create a descriptive video to audience. The students just captured what they had seen on locations and did not try to explain further on what they had captured by camcorders and any implications of his or her captured scenes. Two videos are identified under this category: "Old people" by David and "Staff Room" by Eric. David came from below average performance in written examination while Eric came from above average performance in written examination group. The summary of multimodal elements used by one of the videos is listed below as an example of the category.

"Old people" Summary of multimodal elements used for meaning representation
The video demonstrated various skills in managing screen composition, subtitles keying and background music to show different recreational activities of old people in the community. The wide shot of old people situated at the community has given a meaning of lonely, while the close up on the facial expression creates impact to audience about the lonely living of the old people. However, the video just showed the activities of old people in the community and had not provided further information to explain the issues of lonely.

5.2 Rubrics Scoring on the Final Video Artifacts

Four teachers had graded the final video artifacts with reference to their rubrics assessment criteria. The average rubrics scoring given by the four teachers on the six video artifacts are listed at Table 4:

Table 4. Rubrics scoring on the six video artifacts

Name of the video artifact	Average Rubrics scoring (60)
Youth pressure (BA)	39.5
Old people (BA)	37.3
Daydreaming (AA)	37
Public study room (GD)	34.4
Earn your living (GD)	32.8
Staff room (AA)	21.8

GD – Good in written examination performance
AA – Above average in written examination performance
BA – Below average in written examination performance

Looking into the criteria of the usage of multimodal elements for meaning representation, the six students' average scores on the usage of multimodal elements are tabled below.

Table 5. Rubrics scoring on using multimodal elements for meaning representation of the six video artifacts

Name of the video artifact	Rubrics scoring on using multimodal elements for meaning representation (5)
Daydreaming (AA)	4.75
Youth pressure (BA)	4.25
Public study room (GD)	3.75
Old people (BA)	3.5
Earn your living (GD)	3.25
Staff room (AA)	2.5

5.3 Triangulation of the Two Sources of Findings with My Guiding Questions

5.3.1 Multimodal Elements Used by Students for Meaning Representation

It is found that though students did not learn the usage of multimodal elements from the school curriculum, most of the students could make use of various multimodal elements for meaning representation. The identified usage of multimodal elements includes text mode such as caption and subtitles; verbal mode such as dialogue and interview; audio mode such as music and sound effect; screen composition mode such as shot size, people and objection objections; screen movement mode such as camera movement, people gesture and movement and visual effect mode such as fast speed motion. All the modes are integrated into video artifacts to represent meanings to the audience. Some students could successfully explain community issues to audience, while some students could only represent what they have observed and could not explain further on their observation. As the knowledge of multimodal production and representation are not within the school curriculum, the findings show that some students had already developed knowledge on multimodal meaning representation beyond the school curriculum.

5.3.2 Usage of Multimodality and Multiliteracies Development

For those students identified in category 1, they have successfully explained the community issues with the usage of multimodal elements. The explanation demonstrated that they had performed higher multiliteracies development in managing various multimodal elements for meaning representation. The rubrics scoring given by teachers supported that category 1 students not even perform better in usage of multimodal elements, they could also perform better in creating final video artifacts to explain community issues, with respect to scoring in data collection, critical mind and logical argument. Students showing higher capabilities in using multimodal elements have performed higher capabilities in explaining communities in video artifacts. The usage of multimodality could enhance the development of multiliteracies.

5.3.3 Written Examination Performance and Multiliteracies

Comparing the multimodal analysis and rubrics scoring, both students, Bruce and Cathy, showing good performance in written examination could not demonstrate good performance in both the usage of multimodal elements to represent meaning, and the creation of final video artifact to explain community issues. The findings imply that students' performance in written examination is not correlated with the

performance in using multimodal elements to create meaning representation, and the development of multiliteracies.

On the other hand, a student, Amy, showed below average performance in written examination, could make use of various multimodal elements to explain a community issue to audience, and at the same time, received higher rubrics scoring on the final video artifact graded by teachers. It further supports that performance in written examination is not correlated with the performance in using multimodal elements to explain a community issue to others.

6. Discussion

6.1 Using Multimodal Elements for Meaning Representation

Referring to the multimodal analysis of the six video artifacts, it is found that some students are familiar with using multimodal elements to explain the community issues, performed prior knowledge of using multimodality for meaning representation which must be learned beyond existing school curriculum.

Looking into individual case, such as Bruce, he was lack of adequate knowledge and skill in managing video camcorder to produce a steady pan shot, to control optimum lighting for video recording and to get audible dialogue from noisy background environment. On the other hand, Amy and Daisy demonstrated more capabilities in managing video camcorder, screen composition, screen movement and audio mixing to present meaningful stories to audience. Bruce, Amy and Daisy received the same school curriculum and additional workshops on making video on community issues, and Bruce was assumed to have higher learning capability by showing better performance in written examination. The better performance of Amy and Daisy in multimodal representation implies both students had learned the multimodal representation knowledge out of the school context. Further research should be conducted to explore whether students could develop multimodal representation in social media communication.

6.2 Multiliteracies and Written Examination Performance

It is found that the performance in written examination is not correlated with the development of multiliteracies, as multiliteracies are defined as the usage of multimodal elements for meaning communication and representation. If a knowledge-based society demands workforce having knowledge on multimodal meaning communication and representation, the findings imply that our students showing good performance in written examination are not well prepared for the knowledge-based society, or there is a missing gap in our traditional literacy curriculum which could not prepare students to facilitate the development of multiliteracies.

6.3 Enquiry-based Learning in Secondary School

Global literatures support that the advancement of information technology has provided new opportunity of student learning with making enquiry (Chang & Wang, 2009). The video representation on community issues in fact is trying to explore how to make enquiry on community issues and represent the enquiry outcomes with multimodal elements. The identified category 1 shows that students had performed understanding and had explained the community issues with multimodal artifacts. For example, Amy had explained the sources of pressure at school, while Daisy had explained the phenomenon of daydream at classroom and the topics of daydream made by students. Such explanations showed that both Amy and Daisy had observed, and asked relevant questions in order to understand the issues. For category 3, the students produced descriptive video without giving any explanation on their description, or they did not try to make any enquiry to understand the topics. They just saw whatever appeared and shot into final video artifacts. Only the two students showing good performance in written examination had tried to conduct enquiry on community issues but in vain. Both Cathy and Bruce did observe and ask questions in order to understand the issues, but they were lack of

knowledge on how to get useful information to understand the topics. As the non-written IES report project was an add-on project into normal classroom activities, the teachers did not have any planned curriculum to develop students' enquiry skills. More staff development programmes should be organized to enhance secondary school teachers' knowledge on teaching how to make enquiry on community issues.

7. Looking Ahead

With the limitations on purposive sampling on the six cases of students, it is not valid to generalize my findings beyond school H. However, the latest curriculum reform on the local new senior secondary school curriculum has opened the door to enquiry based learning with multimodal production and representation. The curriculum of Liberal Studies has been promoting students going into the community to make enquiry. The blooming of social network such as Facebook has helped to speed up the enquiry process and sharing of learning outcomes in multimodality among the youth. While the school curriculum is still focusing on traditional literacy on textual reading and writing. In fact, students are developing multiliteracies out of school; school should consider how to shift the curriculum to enhance multiliteracies within the context of classroom learning. Engaging students to make enquiry on community issues are shifting to student-centered knowledge construction on multi-disciplinary topics. Integrating information technology into education has been promoted for more than 10 years in Hong Kong, multimodal production on community issues and multiliteracies development provide more concrete directions for enhancing student learning across disciplines fitting to the knowledge-based society. It is expected that more research should be conducted on student learning with creating multimodal artifacts on community issues.

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The Impact of Multimedia on Social Learning

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Abstract: Considering the ever-changing world around us, people in or out of the educational area show numerous interests in pursuing the possibility of incorporating technologies in learning procedures, to meet the new requirements for individual developments and social goods at large. This article, after dissecting the pedagogical theory of social learning in practical contexts, claims that multimedia has the potential to positively promote people¡¦s social learning process.

Keywords: multimedia, social learning, technology-supported learning

1. Introduction

In this day and age, multimedia almost permeates into every corner of people's daily life. In the education field, there also exists numerous technology disciples who speak highly of the combination of learning and educational multimedia, but such optimistic expectation goes with little progress. In this article, it will first illustrate the need of multimedia in Education and explain the reason behind the slow development. After that, it will describe a practical use of multimedia in social learning, both the pedagogical and pragmatic aspects.

2. What is Multimedia?

Multimedia, as a word is the combination of "multi-" and "media". "Multi-" means many and "media" indicates the sense of agency, channel or instrument in the Merriam-Webster Dictionary. As to an engineer, it "is the combination of different elements (whether medium, modality, technology, algorithm, or application) that provides a fuller experience of the effect of that combination" (Chen, 2004), while multimedia in the education is often regarded as the synonym of Information and Communication Technology (ICT), together serving as the umbrella terms for numerous digital technologies (Eurelings, 1998). People's use of multimedia in education has been for years. For example, it is not uncommon to see the videos, audios or still pictures play their roles in the classroom. However, such utilization is just "repackaging" the content in a contemporary way, or we can put it here, in a electronic way. What we need, actually is to "reengineering" the learning process (Collis, 1997). Accompanying the change of the medium transferring information, people's methods of obtaining information should also undergo a reform.

3. Why Multimedia?

The current education system needs change, people should not stand still until one day it cannot continue as normal. This call comes from the novel affordances of the technology, the inborn genes of contemporary students as well as the challenges of the society as a whole.

3.1 From the Society

In recent years, the twin force of economic development and digital technology innovation have ensured a worldwide platform of competition, just as shown by Thomas Friedman in his outstanding bestseller book The World Is Flat (Friedman, 2007). People began to worry that the existing education system that inherited from the nineteenth century might not scale up to its destiny of fostering individual innate capabilities and ensuring people's progress in the real world (Robinson & Aronica, 2009). Meanwhile experts' favor of multimedia-mediated education research has provided some constructive perspectives as how to upgrade people's learning experience (Cheng, et al., 2010). Concepts like Multimedia in Problem-based learning, Multimedia in distance learning, Multimedia in social learning et al. were heard more frequently. Political efforts, from the forums sponsored by OECD and UNESCO, to conferences run by some developing countries, and academic endeavors , such as Berkeley, MIT sharing their open courses online (Bonk, 2009),both hope to exploit multimedia and ICT solutions to put forward an effective nationwide or even worldwide educational reform (Iiyoshi & Kumar, 2008).

3.2 From the Students

Students nowadays are often tagged as millennials, digital generations, technology consumers or more frequently, as digital natives. No matter what the adults name them, the sharing attribute they embody is the capability to search information independently with the help of digital media and the Internet, which means the simply way of teaching as information transmission, employed wildly in the existing formal education system, will no longer cater to the current students' needs, for most of the basic information is just exposed to them outside the classroom. With the spread of open source trend, represented by wiki and linux, actually, students will be more accessible to the information they need.

On the other hand, multimedia and ICT tools have actually become an indispensable part of the digital natives' routine life. Every day they communicate with instant messages, share updated status with Facebook and twitter, read on the blog, and watch on the YouTube. It will dramatically impede the learning efficiency, increasing cognitive load, if schools determine to build a completely different learning environment compared to their living environment. What is worse is that the knowledge students absorbed in the school cannot apply in their future digital-supported career life. Due to the above mentioned reasons, it is high time for schools to "connect with children's out-of-school experiences" (Buckingham, 2005).

3.3 From the Technology

It is not only the educators are technology enthusiasts, but also people from all walks of life are obsessed with technologies. As a matter of fact, technology has indeed transformed the ecosystems of many industries, from the newspaper publishers to retail businesses and to other sectors where contents can be digitalized in an appropriate way (McHaney, 2011). But, before we ask what the technology can offer to the education field, it will be more rational if we can identify what the learners really need (Laurillard, 2008a).

From Skinner's behaviorism in the 1950s, to Piaget's Cognitivism in 1970s (Smaldino et al., 2012), until the contemporary learning theories concerning the Constructivism. High-level meaningful learning are repeatedly related with adjectives like active, collaborative, cumulative, reflective and so forth. Fortunately, the integration of multimedia in education brings with it such characteristics. Mayer (2005) believed that people would conduct deep learning under circumstances with words and pictures. Eurelings (1998) continued that multimedia in education would shape an authentic learning environment featuring the improvement of students' activities. Ivers and Barron (1998) also suggested that multimedia projects would diverse students' way of constructing their own knowledge and solving problems.

It seems that integrating multimedia and ICT promises numerous sweet and romantic stories. Concerning the pressure from these aspects, such a marry is not just a need, but almost seems like a must. The education reformers and technology enthusiasts are so eager to construct an image of multimedia utopian where a best possible learning environment will ensue:

- Learners to become increasingly active;
- Teachers to become increasingly collegial;
- Materials to become increasingly authentic. (Lieshout, Egyedi, & Bijker, 2001)

But, why compared to incorporating technology in workplaces, the progress in the education field seems relative slow? Laurillard (2008b) combined the explanations given by Laurillard (2006), DfES (2005), Readings (1996) and Elton (1999), concluding that the educational system per se and the traits of ICT serve as the main culprits. The ICT change is too radical to follow; the complex education system run by a hierarchical command, similar to a national enterprise and the leaders are generally not welcome this trend of change, which might ensue crisis. Similarly, Buckingham (2005) pointed out that the major causes for gap between rhetoric and reality was first the irrational allocates of investments, then the limitation of profit model of the current learning technologies and also the continuous changing nature of the technology. To sum up, maybe, to some cases, people's eager to incorporate multimedia in education needs more detailed and realistic objectives (Goodyear, 1997). In the following passages I would like to share the concrete practice of embedding multimedia and ICT in social learning.

4. The Impact of Multimedia on Social Learning

The idea of social learning is not a contemporary new one, having been a crucial part of early developments of science of psychology (Salomon & Perkins, 1998). Currently, with the growing favor of Vygotsky's sociocultural theory and Piaget's socio-cognitive conflict theory, as well as Lave and Wenger's situated learning theory, the concept of social learning has steadily been in the spotlight, which, of course, cannot ignore the aid of political slogans like 'learning society', 'knowledge society', etc.

Generally, social learning consider our understanding as something constructed through 'conversations' and 'interaction' with 'others', focusing on how we are learning instead of what we are learning (Brown & Adler, 2008). Here 'others' should include not only the people but also the surrounding learning environments.

4.1 *"Interaction"*

Vygotsky laid considerable emphasis on social interaction, regarding it as a key component in social learning (Tu, 1999). Whilst Piaget stressed that in such social interaction, "disequilibrium forces the subject to go beyond his current state and strike out in new directions" (Piaget, 1985). In this sense, Piaget emphasized that people could learn more from peers, as among age peers there was mutual control over the interaction (Palincsar, 1998). Vygotsky was critical of Piaget's theory, he proposed that there were two development levels: the actual and the potential levels of development where he introduced the construct of the Zone of Proximal Development (ZPD) (Vygotsky, 1978). "The actual development level is determined by independent problem solving and the ZPD is determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 85).

The conflict between Vygotsky and Piaget is typically considered as stemming from the view of learning from different aspects, and neither of them neglects the value of the other (Laurillard, 2009). In this respect, multimedia provides new possibilities of peer-learning, for it creates the possibility that the age peer learning and the novice-expert or apprentice- scholarship learning style can co-exist in a harmonious way.

4.2 "Conversation"

Dewey (1916) insisted that communication served as the central role in education. Laurillard (2002) argued that dialogue was fundamental to education. Mayes and Fowler (1999) considered reflective thinking as a kind of dialogue with oneself. Such argument, to some extent, led the clout of conversation to a new level, for reflection triggered transformative learning and was generally analogous to high-order mental processes (Mezirow, 1990). Meanwhile, Sharples (2005) pointed out that "learning is a continual conversation: with the external world and its artifacts, with oneself, and also with other learners and teachers" (p.3). Laurillard (2002) combined the idea of Conversation Theory with learning technology, resulting in her well-known Conversational Framework.
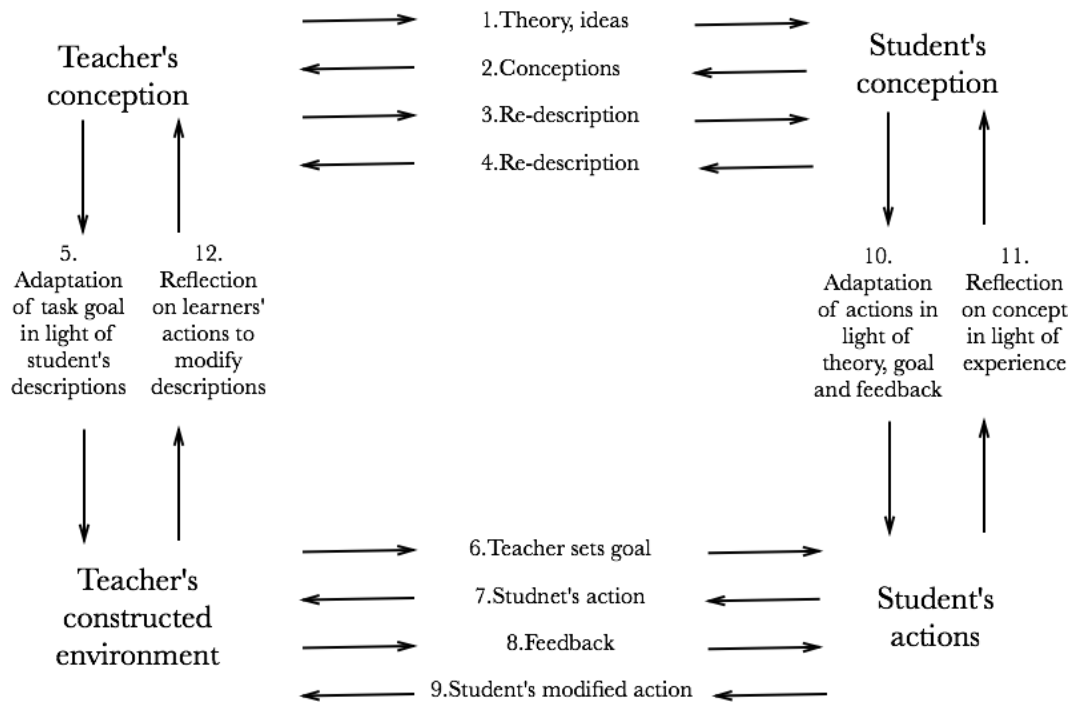

Figure 1. A Conversational Framework from Laurillard (2002) p.87

That is, also, where multimedia works. The Conversational Framework shows the relationship between the learner and the partner; actually the partner can be a teacher, an expert, a peer or even a computer, a learning system. With the emergence of more and more social networks, instant messaging tools, people, especially the digital natives are used to communicate more in the virtual world than in the real world. The distribution of virtual communities of practice in which people work together voluntarily to update and maintain the open source software exemplifies such trend (Brown & Adler, 2008).

Besides dealing with above mentioned pedagogical issues, the multimedia and ICT, can also offer some practical remedies for the anemia of our current education system, owning to the characteristics like accessibility and flexibility.

To the developed world, the flexibility is conducive to the ambitious goal of personalized education. The academic (deep) learners can choose to grasp knowledge in a more deep way, searching some related materials and resources from the Internet. Thanks to the OER movement and the spirit of sharing engaging in the web 2.0 era, whatever learners want to pursue is just at their disposal. On the other hand, the surface learners will be more likely to continue their exploring of certain concepts grounding on the most ideal learning experience of the one-to-one guide and tutor (Laurillard, 2008c) which is the feature embraced by learning technologies.

Such personalized feature embodied in the technology can be persuasively demonstrated by the Long Tail phenomenon. First introduced by Chris Anderson in his New York Times bestseller book The Long

Tail, the long tail theory was initially implemented in the e-commerce industry, where Anderson found that contrary to the traditional nature of the market, the Internet-based companies- Netflix, Amazon, Rhapsody and the like- made most of their money from the niche products, products that were not on the top-seller lists (Anderson, 2008).
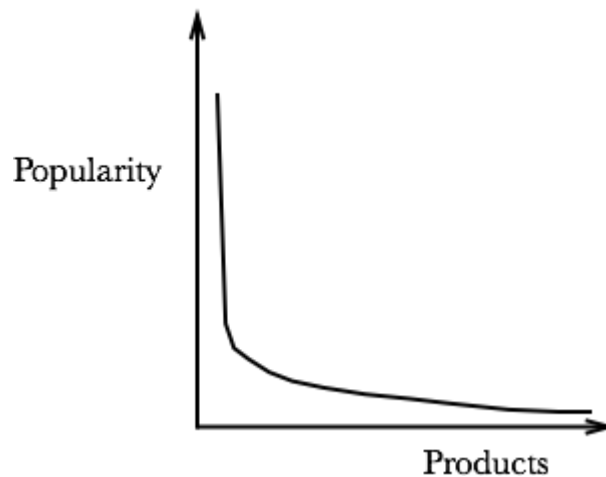

Figure 2. The Long Tail: adapted from Anderson (2008)

When it comes to the educational field, it means that apart from the mainstream theories people can obtain from the school education, they can explore their individual interests through the Internet (Brown & Adler, 2008).

To the developing world, the multimedia and ICT can also find their places. As the most intense problem in the underdeveloped regions is the disproportionately distributing education resources, the accessibility trait of multimedia would assure the learners in the remote or poverty-striking areas be in a position to approach high level learning resources and experience through the active interaction and communication with other learners from different cultures, customs and even continents which might simultaneously contribute to the equal development of the whole area and foster mutual understanding to some degree.

Of course, the flexibility and accessibility will also play their roles in attracting disabled and disaffected learners to the learning system who require specialist attention and understanding (Laurillard, 2008a). Meanwhile the aspiring politic slogans like 'No Child Left Behind' and 'Every Child Matters' and social ideas like 'life-long learning' and 'knowledge economy' might be realized to some extent, not only on the blueprint of the governments.

5. Conclusion

The recent development of society calls for the adaption of the learning system. Learning, nowadays, is no longer a specific-period activity. People should update their knowledge for their companies, schools and community they live. Fortunately, with the help of emerging technologies like multimedia and ICT, such catastrophic change might occur. But the infusion of technology into a certain sector has never been a short-term task. We should scheme it in a long-term way, putting all the related factors in. When educators turn to educational multimedia, they should guarantee it is not out of their favor of novelty, but from the real needs of learning. In this article, it shares one example of integrating multimedia in social learning. Undoubtedly, multimedia can also have its impacts on other learning concepts, but no matter what kind of learning is, its corporation with multimedia should be based on the sound pedagogical reasons (Jones, 2007).

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Book Review: The Social Media Bible

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> *The Social Media Bible: Tactics, Tools, and Strategies for Business Success* (2nd ed.) by Lon Safko, HoboKen, N. J.: Wiley, <2010>, ISBN 9780470623978 (pbk.), Pages 792, Price $24 USD.

The field of education is often viewed as supporting other disciplines such as sociology, psychology and arts. From within education, however, the reverse holds equally true. We utilize the advances in those grand disciplines, both old and new, and make them ours in the benefit of education. Thus, research and practice in educational administration and management, for example, has been heavily nurtured by the field of business administration with its managerial knowhow, leadership discourses, decision making theories and perhaps even moral philosophy. With this backdrop, I took up the task of this book review with a single question in mind: What can a book on social media marketing offer to education?

At first sight, the book The Social Media Bible: Tactics, Tools, and Strategies for Business Success by Lon Safko appeared as having little relationship to my research interests in education. This was to be proven wrong as "What's in it for me" kind of signposts in the book started turning my attitude into "What's in it for education" sort of mindset. In fact, most beneficial reading attitude for this book would be that of translating on the go the business context into the contexts of pedagogy, content and knowledge management relevant to our field.

The book is divided into three parts. The first part entitled 'Tactics' provides a review of the state-of-the-art of social media. This part accounts for about two third of the book and, I believe, it is where the readers in the field of education would benefit most. After a practical definition of social media, the book goes on to provide readers with details on the Web forum, Podcasts, Wiki, RSS feeds and other social media tools. While reading, I realized that I have been overestimating my knowledge about several social media tools, for example, the best time of the day to send out a bulk email. I was now subconsciously translating it into my own context: "What time is the best time of the day to send out promotional bulk emails about my X degree programme?"

A typical chapter of this twenty two-chapter long first section is organized into subsections such as 'What's in it for You?' (relevance for reader); 'Back to the beginning' (historical background of a social media platform); 'What you need to know' (applicability); a subsection on smart usage with different subtitles; 'Commandments' (suggestions to reader) and a 'Conclusion' that comes with resources and references. The informative strength of this part of the book with its descriptions of the social networking tools gets furthered with text boxes inserted throughout with practitioners' essay-interviews called 'Expert insight' and the 'Return of investment (ROI) of social media'.

I found inadequate the title 'Tactics' for this first part of the book not only because there is an ad hoc section devoted to strategy later in the book but also because it is mainly descriptive in nature. The second part of the book by the title 'Tools' is a two hundred-page long classification of extant social media platforms into 15 major categories, to name a few, Social networks, Microblogging, Livecasting,

Virtual worlds and Gaming. This second part gave me the impression of a handbook within a treatise because the social media tools already discussed in the first part are repeated, except that now they are presented succinctly and distinctly categorized. The added value of this yellow pages directory-like section is the exact information where to find service providers, for example, 'Second Life' and 'Kaneva' for virtual worlds-platform. The latter makes this part of the book a resource section, handy perhaps for those education practitioners in need of a first generic information about a social media platform and its service provider.

Reading the last and the shortest Part III 'Strategy', what lingered in my mind was some scenarios with protagonists such as faculty deans, program heads, school principals and administrators of educational institutions. Suppose that you are in charge of a Master degree programme and you are about to kick off a PR and media campaign to promote your programme. After identifying all the currently available resources, you will find yourself having no other choice but to make use of several social media tools. You are also likely to realize that all the chosen social media tools should be integrated in order to be implemented and its effects measured after the implementation. This is exactly what the third part of the book is all about.

It would be rather pointless to give a biographical profile or credentials of Lon Safko in this book review. This is because this book is to be read on an "as is" basis, which is the only way of reading a book of this kind. As for reading experience, I felt neither spectacular surge of enthusiasm nor ebbing interest throughout. I think that calling this book a handbook of social media is a disservice. It is a resource book of almost biblical proportion and comprehensiveness that has been written based on a serious research undertaken by the author and his apparent team of fact finders.

To conclude by returning to my opening remark, the many contributions of business administration to the field of education have been on the organizational management of educational institutions. I believe that The Social Media Bible with its eyes wide open street smartness that characterizes all profit-oriented business book genre—perhaps it transcends the genre—have much to offer to education or, the other way around, education could draw important insights about social media and use them for the benefit of contemporary education. This is obviously a must read for teachers and students in direct contact with media-communication education programmes let alone theorists looking at sociology of education, which is rather unfathomable today without social media. With the current speed of developments in social media, readers will probably see many more editions of this book, each with significant amount of updates.

<div style="text-align: right">Jae Park</div>

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Dr. Jae Park is an Assistant Professor of International Education and Lifelong Learning at the Hong Kong Institute of Education. He holds the degree of Doctor of Education from the University of Hong Kong, where he continues as a research associate and a visiting lecturer. His interest in communication and technology in education is part of his broader research interest in sociology of education (technological, cultural and ecological discourses) and philosophy of education. He recently published in *International Studies in Sociology of Education*, and *Ethics & Behavior*. He serves as the Secretary of the Comparative Education Society of Hong Kong.