

Teachers' experiences of using Learning Technology in Pakistan

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Abstract

Education technologists are exploiting the benefits of technology to transform teaching methods in universities and promote interaction and collaboration; aspects important within pedagogical practices of Networked Learning. Despite the extensive use of learning technology, limited research has been conducted to understand how faculty members experience learning technology within their face-to-face pedagogical practices; and much of the existing literature is primarily located within the context of culturally western universities. This study aims to address this gap by illuminating the phenomenon of teachers' experiences of using learning technology within their teaching practices at Hazara University (HU) located in Mansehra, Pakistan. Adopting an interpretivist paradigm, phenomenographic analysis was used to understand and describe qualitatively different ways teachers experience the use of learning technology, which are '*retaining attention*', '*professional skills development*', '*information enrichment*', '*connectivity*' and '*omnipotential*'. Retaining attention was described as the least complex; whereas the omnipotential category is relatively most sophisticated and is inclusive of other conceptions. The meanings (*what* aspects) of these categories are related to the *how* aspects or variations that are '*prior exposure of technology*', '*research-informed teaching*' and '*perceived scope of technological use*'. The relationships between *what* and *how* aspects of the phenomenon, are summarized and presented in a tabular form. The paper suggests that to make a smoother transition into networked learning environments, academics may be better prepared to 'overcome the alienation and otherness of online spaces' and be actively involved in networked learning environments when they experience learning technology onmipotentially. To further elaborate on this, omnipotential conception shall be analyzed using the framework of intentionality to better understand the conceptualization of the acts and intents of the teachers that facilitate their meanings of this conception. This is an area which could prove insightful for future research in this field.

Key words:

conceptions, learning technology, pedagogical practices, higher education, phenomenography, Pakistan

Introduction

There has been a significant increase in the use of e-mail, internet and computer conferencing, especially in the technologically advanced countries, allowing interactions and collaboration for supporting networked learning as defined by Goodyear et al. (2005) below:

learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources (Goodyear et al., 2005).

Such connections and interactions can take place between people and online learning material in the form of text, video, shared workplace and occur principally through electronic media, allowing learning to be 'time and place independent' (Vrasidas and McIsaac, 2000). These interactions can and increasingly do also involve face to face communications with the teacher and students (Roberts, 2003). Hodgson & Watland (2004) suggest there is much to understand about the networked learning in terms of teaching and learning methods and approaches for students and lecturers, and according to Brower (2003), more attention is required to understand effective utilization of technology within online pedagogical practices. This transition towards the adoption of developing

learning technology can introduce ‘unfamiliarity’ that challenges our perceptions of the world around us, as Boon and Sinclair (2012) state:

With one foot in the real and another in the virtual, users must come to terms with both difference and disquiet in order to participate effectively in networked learning environments (Boon and Sinclair, 2012).

This raises questions about teachers’ experiences of using learning technology within pedagogical practices generally and in networked learning settings specifically. Considering the metaphor, ‘one foot in the virtual and another in the real’, we wondered if this transition could be made smoother through better understanding of teachers’ experiences of using learning technology within ‘conventional’ ‘face-to-face’ pedagogical practices where learning technology is now an embedded dimension for many teachers. Our understanding of this aspect is not comprehensive as this area has not received much attention (Gonzalez, 2010). Such understanding may provide insights for better designed networked learning environments that assist academics to make the transition into virtual settings. Hartley (2010) is of the opinion that information technology has encouraged teachers and students to be creative and active with their learning approaches. However, it cannot be assumed that faculty members have uniformly benefitted from the adoption of technology within their pedagogical practices as Turvery’s (2010) research suggests teachers experience and benefit from technology in different ways. Introduction of educational technology into pedagogical models results in changes in students’ activities may affect their conceptions and approaches to learning. How well do we understand these affects is debatable. This is further reflected in the dilemmas teachers face when dealing with aspects such as what and how do we teach while adopting educational technology within different pedagogical models (Saljo, 2010). This all raises question around how teachers experience and adopt learning technology within their teaching practices.

Gonzalez (2010) suggests conventional universities are increasingly incorporating eLearning within their pedagogy practices but this emphasis has not resulted in a significant increase in research publications in this field. In a phenomenographic study of conceptions of teaching using eLearning based on two campus-based research intensive Australian Universities, he identified conceptions that varied from ‘eLearning as a medium to provide information’ to ‘eLearning as a medium for engaging in communication–collaboration–knowledge building’ (Gonzalez, 2010). Teachers who view eLearning as a source to extend information to students in the shape of lecture material, links to relevant websites and also online resources, perceived technology as delivery vehicle rather than a platform or space for student learning. There were also teachers who perceived eLearning as means to promote discussions and dialogue to develop knowledge and understanding that might provide students richer learning experiences. Roberts’s (2003) research, based in a Scottish university, identified similar conceptions of the use of Web within teaching practices which were to ‘provide information’, for ‘individual and independent self-paced learning’ and for ‘group analysis, decision making and dialogue’. While McConnell and Zhao (2006) preliminary research findings from interviews of Chinese university teachers suggested they preferred face-to-face lectures and viewed eLearning as a source mainly to upload learning material for students’ individual learning.

Considering the scope of use of technology, Gonzalez (2010) suggests that more research is needed to comprehend teachers’ use of technology within their established, face-to-face teaching as this ‘field is only at the beginning of understanding the complexities of what university teachers think eLearning is good for in their ‘established’ face-to-face university teaching ... with important implications for academic development’ (Gonzalez, 2010). While these mentioned studies have provided much to our understanding on the use of learning technology in pedagogical practices, it would be interesting to pursue this research further in a different non western context. Marton et al (1993) stated research in a different setting and with a different group could reveal ‘new’ conceptions that may improve our understanding of a phenomenon. With this intention, the study reported in this paper is based in the relatively unexplored context of a culturally South-Asian university, such as Hazara University (HU) in Pakistan, where there may be different understanding of the use and benefits of learning technology along with possible contextual limitations. Although there is growing interest towards the use of technology in education within Pakistan (Deepwell and Malik, 2008), we know little about the perceptions of teachers regarding learning technology in a government university in Pakistan. Malik & Shabbir (2008) stress the need for further research to ensure smooth transition towards technology assisted pedagogical practices in Pakistan. Thus, this research aims to explore: *‘Teachers’ experiences of using learning technology in a government university in Pakistan’*.

Research Context

Hazara University (HU) was formed in 2002 with the initiative of Higher Education Commission (HEC) Pakistan. Since then, it has grown in size and disciplines. It has three campuses which host Faculties of Science, Arts, Health Sciences, Law and Administrative Science and also a School of Cultural Heritage and Creative Technologies (www.hu.edu.pk). There are around 20 departments that offer undergraduate and postgraduate courses. HU is striving and developing into a research university; one of its initiatives is National Center for Collaborative Research & Training at the main campus that seeks to provide opportunities and platform to researchers from across the country to contribute and share their knowledge and expertises with others. Also, Quality Enhancement Cell, an initiative of HEC to ensure improved and similar quality of education in the universities across the country, has been established recently within the university.

Methodology

Phenomenography was used to explore the qualitatively different ways of experiencing the phenomenon of teachers' experiences of using learning technology. Adopting an interpretivist paradigm, phenomenography seeks to study the qualitative variations of how people understand, conceptualize and perceive a phenomenon. Marton (1981) states there are a limited number of different qualitative ways in which a phenomenon under analysis can be viewed or experienced. As Cousin (2009, p. 184) states, it "is underpinned by the constructivist principle that we construct meanings of phenomena from an array of social and personal influences". Sjostrom & Dahlgren (2002) further state that 'Phenomenography ... rests on a nondualistic ontology', which is the assumption that the world that we communicate and perceive is the world we experience. The associated epistemological assumption of phenomenography is the way we perceive or experience our world would differ from others, and these different worlds can be understood, portrayed and communicated to others. This stance on experience as non-dualistic implies that an individual while describing their experiences are telling something about themselves and the phenomenon (Marton & Booth, 1997); suggesting that the person and the object of experience are fused or interrelated to one another through experience. For this research, phenomenographic interviews of 32 teachers of both genders, different disciplines, with varying teaching experience and lengths of employment, were conducted. All the interviews were audio-recorded and transcribed for the analysis. Steps taken for this phenomenographic analysis are presented in the figure below.

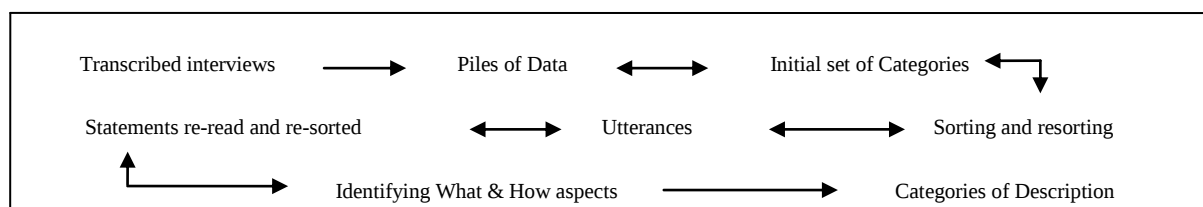


Figure 1: Data Analysis Process

Analysis

The transcriptions provided interviewees' description of their experiences of use of learning technology. From the phenomenographic analysis, five qualitatively different ways of experiencing learning technology at HU are identified below, in increasing order of complexity with omnipotent conception as relatively most complex:

- Retaining attention
- Professional skills development
- Information enrichment
- Connectivity
- Omnipotent

Retaining Attention category represents the least complex experience as teachers' use learning technology in a relatively less complex manner for the preparation and presentation of their lectures within classroom settings. This category relates the presentation of the lecture content in ways that are interesting and are likely to retain students' attention and involvement during the lecture.

Professional Skills Development category highlights the teachers' view on the influence of the use of learning technology on students to be better practitioners in their respective fields. Teachers have described such experience of the use of learning technology as essential to provide necessary skills to their students for better employment and to possibly meet the expectations and requirements of organizations.

Information Enrichment category relates to experiences of teachers' use of learning technology as a resource to provide multi-dimensional and multiple sourced information to add value to their pedagogical practices. Such use of learning technology is described with reference to academic literature and/or other sources needed for their preparation of teaching material as well as their individual research. Teachers with substantial teaching background also continue to find the use of learning technology necessary to update their teaching material with recently published research papers and other sources of information related to the lecture topic.

Connectivity category highlights the communicational aspect of learning technology where the teachers experience it as a source to connect and collaborate with other knowledge islands that may include other academics, universities, research organizations or government's education departments. In such experiences, teachers use and see learning technology as the platform to share academic material and knowledge with other academics. Furthermore, such descriptions of experiences suggest that the teacher appreciate and view these connections with other academics as social capital.

Omnipotential is relatively the most complex conception where teachers see the use of learning technology as means and tool for numerous possibilities and opportunities that may be difficult otherwise. They viewed it to influence their pedagogical practices on many levels and experienced it as necessary in achieving their teaching or research or career objectives. The 'omnipotential' experience represents the more sophisticated and inclusive experience where teachers use learning technology in multiple ways ranging from its real-time use in classrooms to information collection and research activities to collaboration with academics and institutions outside HU. The essence and meanings associated with each category of description can be better understood by illuminating the structure of these conceptions i.e. through the *how* aspects, or as Marton and Booth (1997) describe them as 'structural' aspects of experience. The *how* aspects were identified as: *Prior exposure of technology*, *Research-informed teaching* and *Perceived scope of technological use*.

'Prior exposure of technology' highlights the teachers' previous use and experiences of technology as student or at earlier employment. The descriptions of experiences suggest that the teachers' earlier exposure of technology (ranging from dimensions of less sophisticated to sophisticated exposure) influenced their use of learning technology at HU. The variation of 'research-informed teaching' relates to the consideration given to include research publications when preparing lecture material. Teaching content that is relatively less research-informed may rely on existing teaching material which is modified largely through a 'peripheral' literature review. However, research-informed lecture material is when academic literature review becomes an integral aspect of their pedagogical practices. The third variation i.e. 'Perceived scope of technological use' describes how teachers view the role and use of technology within pedagogical practices. If the perceived scope of use is limited, the teachers were seen to utilize learning technology at HU in less complex manner such as retaining attention category. Whereas when the perceived scope is broad, the teachers described the use of learning technology in more complex manner as in omnipotential experience. These variations and their relationships with the conceptions of the use of learning technology are presented in the table below.

Table1: What and How aspects of teachers' experiences of using learning technology

Category	What aspect	How aspects		
		Prior Exposure of technology	Research-informed teaching	Perceived Scope of technological use
Retaining Attention	To retain the attention of students during lectures	Less Sophisticated ↓ Sophisticated	Less Informed ↓ Informed	Limited ↓ Broad
Professional Skills Development	To allow students to be better practitioners			
Information Enrichment	To access multi-dimensional and multiple sourced information			
Connectivity	To connect and collaborate with other knowledge islands			
Omnipotential	As means and tool for numerous possibilities and opportunities			

As mentioned earlier, in this paper we will only analyze the conception of omnipotential use of learning technology in further depth using the theoretical framework of intentionality. This framework allows representation of conceptions into smaller parts of *what* aspects that elaborates the meanings associated with the conception, and the *how* aspects which illuminate the conceptualization of the acts that facilitate these meanings (Marton & Booth, 1997). *What* aspect is further linked with a direct object which represents the primary goal of that category of description. In this research, the direct object of the described experiences is reflected in the meanings of the conception and so we shall elaborate the meanings of the category only. The theoretical framework of intentionality states that the *how* aspect comprises of two interrelated parts, *act and indirect object* (Marton & Booth, 1997). The act would refer to the action/object of the experience of using learning technology. Whereas, indirect object describes the intents behind these act. In the following sections, what and how aspects of omnipotential conception are discussed and illustrated through quotations from the interviews to highlight the essence and meanings associated with an omnipotential conception of the use of learning technology.

OmniPotential - What

The teachers perceived the use of learning technology as a means and tool for numerous possibilities and opportunities. In such an experience, teachers see the role and involvement of learning technology as essential and necessary, and one that influences their pedagogical practices on many levels in achieving their objectives which may vary from preparation of teaching material to individual research to career progression as is suggested below.

Technology is the need of the day and has to be tightly linked with the teaching. At this time, you cannot go without technology, cannot prosper, succeed or be fruitful or efficient in your teaching without technology. (E1)

The above elaborates the influence of learning technology on pedagogical practices where the teacher relates the meaning to her use of technology as means or tool for prosperity, success and efficiency in teaching practices. Teachers, who experienced the use of technology omnipotentially, have acknowledged the increasing rate of the change in terms of academic research, innovations, global market. They realize the importance of considering and understanding of these changes to include in the teaching material as suggested below.

If you are studying or teaching management or business related things, in that there are almost innovations on daily basis; new innovations, inventions, new marketing tools, new customer complaints and reactions and others; these keep on being updated. Technology is the sole means that keeps us updated with these innovations or developments...also you know, make international contacts with people...if you keep aside books, latest situations on markets and products, technology can provide us with these situations easily. (M2)

Teachers, experiencing learning technology omnipotentially, see learning technology as a primary source to keep updated with recent developments. Furthermore, the teacher above mentions establishing of international contacts with other people through technology. This suggests that with the use of learning technology he was able to build his social capital in terms of developing contacts with people in different countries possibly to update him with information and/or the other academic sources. This aspect of omnipotential experience of using learning technology relates to the conception of 'connectivity'. The teacher is able to benefit from such use on multiple levels to affect his teaching content to include recent developments of the field to provide exposure to his students and himself. Another teacher views the inclusion of learning technology to have revolutionized the practices to introduce possibilities and opportunities for individuals as highlighted below.

The revolution brought by the internet is amazing – I think it has the whole world squeezed – squeezed in one hand, the world is in my hand in my mobile phone which has internet. With this, I can talk to anyone in any corner of this world but I can use it in a wrong way. It depends on me – if my consciousness is not awake, I would use it negatively. (J3)

The above extract elaborates the meanings associated by the teacher to the use of learning technology as means or tool for opportunities. While appreciating the various possibilities, ethical use of technology and self-accountability was also considered necessary and important. Furthermore, another teacher elaborates on the omnipotential use of learning technology by relating to the success of the institution as mentioned below.

You should know that our university is ranked 25th nationally from among the 95 degree awarding institutes. If the technology wasn't here, it would not be this soon – would have taken much time. (S9)

This above illustration illuminates the importance and meanings associated with the omnipotential use of learning technology to influence the ranking of the university, seen as a measure of their collective performance. This implies that individuals who experience the omnipotential use of learning technology view learning technology as the potential to introduce opportunities and possibilities not only at an individual level but also on a collective manner. In order to better understand how these meanings ascribed to omnipotential conception are facilitated, the three variations or *how* aspects would be elaborated in the following sections to illuminate how the acts are conceptualized and the underpinning intent of these acts. These aspects, prior exposure of technology, research-informed teaching and perceived scope of technological use, shall be elaborated further in separate sections. The following section discusses variation of prior exposure of technology.

How aspect of prior exposure of technology

As highlighted earlier, omnipotential conception is relatively most complex and is inclusive of other conceptions. This implies that while describing such experiences of using learning technology teachers may relate to other conceptions to illuminate their meanings attached to omnipotential conception, as is described below.

The role of technology from now onwards would increase tremendously. There are reasons behind it – if you remember things in the last 10 years, if a professor wanted a paper – first there was no option of subscribing and so would continue to search for places from where he could get a volume of a journal and request or write to others for the volume... now the technology does it! (Use of learning technology) starts from browsing, sifting, analyzing, and bringing to the multimedia – in all these you need to use technology. (M1)

The above excerpt illuminates the teacher's prior exposure to technology in describing the difficulties faced in accessing academic journal. This is further related with how technology is used and its role in present pedagogical practices that allows the teacher to foresee the influence of learning technology by stating 'role of technology from now onwards would increase tremendously'. This statement describes indirect object or the intent to use learning technology which is related to three different acts mentioned in the passage; these are the manner in which literature was searched earlier, teacher's existing approach towards searching and analyzing literature and lastly, presentation of the teaching material. Collectively, these acts and intent interplay to allow 'sophisticated' dimension of variation to further facilitate the meanings associated with the omnipotential conception. Furthermore, the teacher's description of such use of learning technology includes aspects of the conception of 'Information enrichment' when the teacher states '(use of learning technology) starts from browsing, sifting, analyzing', suggesting that learning technology is used to gather information from various sources and to analyze the collected data. Also, this description further relates to the conception of 'retaining attention' with the phrase 'bringing to the multimedia' when presenting during the lecture. However, the meaning associated to such experience distinguishes it from other categories of descriptions.

How aspect of research-informed teaching

The dimension of variation of 'research-informed' teaching is linked with descriptions of teaching practices where literature review and/or research component become essential aspect of the pedagogical practices; making it likely for teachers to experience the use of learning technology omnipotentially, as is suggested below.

If we teaching students about what was done 100 years, then the students wouldn't get the latest knowledge. But if we are using computer and internet, we can get latest information. I will give you an example that Mender had introduced a theory in Genetics and it is only now the theory is able to be tested. Another example would be our own research where we determined three pairing in chromosomes and so if a teacher hasn't downloaded this journal, he would still be teaching the old concepts i.e. there is only one pairing. So this is very important to use learning technologies as then we can give latest information to students, about what is happening in the world, about the different methods of detecting diseases, about finding cure for cancer but through authentic sources. (S6)

The teacher above provides his story of the use of learning technology and its meaning to him. He describes the act of his individual research in the field of genetics and the act of using internet for literature review, along with the indirect object of providing his students with latest developments in the field of science that may likely lead to the possibility to detect different diseases and finding their cures, and in relation to this he speaks of possible cures for cancer. This interrelation of act and indirect object influence his meanings to his omnipotential understanding of the use of learning technology as means for opportunities and possibilities.

How aspect of Perceived scope of technological use

As the described experiences of the use of learning technology grow in complexity like the omnipotential use of learning technology, dimension of variation of perceived scope of technological use is seen as ‘broad’ in relative terms. To elaborate this dimension of variation, teachers’ descriptions of their experiences would be further analyzed to highlight the interrelated acts and indirect objects that constitute the *how* aspect of perceived scope of technological use. The following description illuminates how the teacher views on learning technology.

I think, if we look from research point of view, the gap in science between west and east is almost finished. Things that are done in US, Canada or Japan are exactly the same in the lab of Hazara University. The same PCR machine which is used abroad is used here in our lab. See, the books I had with me which I thought were an asset, today they may not be assets anymore and are part of the archives. I have a library and it is becoming a burden especially when I have to move them around. This is because the knowledge is upgraded day to day basis. This is why the young people and the new universities are moving forward with good pace because people in those universities are accustomed to the new technologies and are benefitting from them. (S9)

In this described experience, one of the acts is the use of PCR machine in the laboratory of HU and the other act is the use of books in his personal library. These acts have with several associated indirect objects. First is to keep updated with recent research developments, second is to stay tuned with sophisticated research instruments and benefit from them, third is the development and progress of universities at good pace (suggesting that there is a competition) and lastly, on a larger scale, to further reduce the ‘gap in science between west and east’. Such complexity of intents is associated the ‘broad’ dimension of variation of perceived scope of technological use. It can be implied from the above description that the teacher may not value his collection of book as much as he may had done before and possibly sees the awareness of technological development and comfort or ease in the use of learning technology to be an asset. Furthermore, the above acts appear to be related with the ‘information enrichment’ category. However, the indirect objects provide a different, richer meaning for the teacher experience use of learning technology omnipotentially. This illuminates the complex nature of omnipotential conception that is most elaborate and is inclusive of other conceptions of use of learning technology. The following figure illustrates the relationship of omnipotential *what* and *how* aspects.

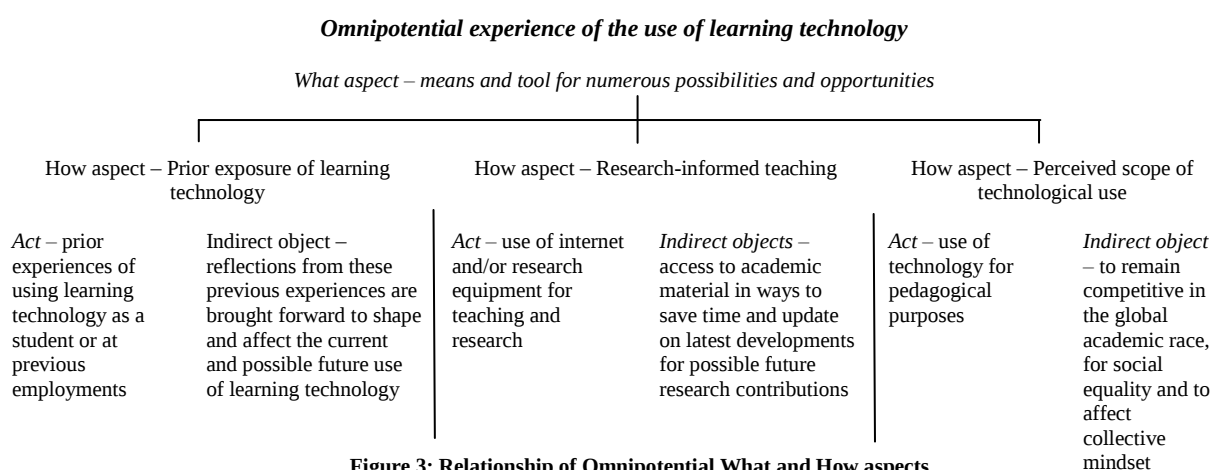


Figure 3: Relationship of Omnipotential What and How aspects

Conclusions

The analysis highlights the ubiquitous nature of learning technology as teachers at HU attempt to digitalize aspects of their pedagogical practices in more or less complex ways. We identified three variations that could influence the use of learning technology from the less complex conception of 'retaining attention' to more complex 'omnipotential' conception where use of learning technology is viewed as a means and tool for numerous possibilities and opportunities. We would argue that the conceptualization of the acts and the interrelated complexity and sophistication of intentions associated with omnipotential category, suggests that such experiences may contribute to academics being better prepared to 'overcome the alienation and otherness of online spaces' (Boon & Sinclair, 2012) to allow a possibly smoother transition into networked learning environments. This is potentially an area for future research. Furthermore, Creanor & Walker (2012) comment suggests a better understanding of the 'relationship of people, technology and pedagogy in learning technology environments'. We find that the framework of intentionality allows highlighting the social contexts of the use of learning technology which is essential to examine the role technology plays in learning (Hodgson et al. 2012). In relation to existing research, there are certain similarities in terms of conceptions of using learning technology as source of information and also for individual, independent self-learning (Roberts, 2003). However, conceptions of 'retaining attention' or 'omnipotentially' have not been reported before. The findings contribute to the extant literature and provide different ways of looking at learning technology which may prove insightful for further exploration. This research offers new conceptions of learning technology within face-to-face pedagogical practices that may help guide the design of networked learning programmes and also course designs.

References

- Barnes, F. B., Preziosi, R. C. & Gooden, D. J. (2004), "An examination of the learning styles of online MBA students and their preferred course delivery methods", *New Horizons in Adult Education*, Vol. 18, No. 2, pp. 19-30
- Boon, S. & Sinclair, C. (2012), 'Life behind the Screen: Taking the Academic Online'. In Dirckinck-Holmfeld, L., Hodgson, V. & McConnell, D., (eds.) *Exploring the Theory, Pedagogy and Practice of Networked Learning*.
- Brower, H. H. (2003), "On Emulating Classroom Discussion in a Distance-delivered OBHR Course: Creating an On-line Community", *Academy of Management Learning and Education*, Vol. 2, No. 1, pp. 22–36.
- Creanor, L. & Walker, S. (2012), 'Learning Technology in Context: A Case for the Sociotechnical Interaction Framework as an Analytical Lens for Networked Learning Research'. In Dirckinck-Holmfeld, L., Hodgson, V. & McConnell, D., (eds.) *Exploring the Theory, Pedagogy and Practice of Networked Learning*.
- Cousin, G. (2009), *Researching Learning in Higher Education : an Introduction to Contemporary Methods and Approaches* Staff and Educational Development Series. Taylor & Francis Routledge.
- Deepwell, F. & Malik, S., (2008), "On campus, but out of class: an investigation into students' experiences of learning technologies in their self-directed study", *ALT-J*, Vol. 16, No. 1, pp. 5–14
- Goodyear, P., Jones, C., Asensio, M., Hodgson, V. & Steeples, C., (2005), "Networked Learning in Higher Education: Students' expectations and experiences", *Higher Education*, Vol. 50, p 473-508
- González, C. (2010), "What do university teachers think eLearning is good for in their teaching?", *Studies in Higher Education*, Vol. 35, No. 1, pp.61-78
- Hartley, R. (2010), "The evolution and redefining of 'CAL': a reflection on the interplay of theory and practice", *Journal of Computer Assisted Learning*, Vol. 26, Special Edition, 4-17
- Hodgson, V. & Watland, P. (2004), "Researching Networked Management Learning", *Management Learning*, Vol. 35, No. 2, p. 99-116
- Hodgson, V., McConnell, D & Dirckinck-Holmfeld, L., (2012), 'The Theory, Practice and Pedagogy of Networked Learning'. In Dirckinck-Holmfeld, L., Hodgson, V. & McConnell, D., (eds.) *Exploring the Theory, Pedagogy and Practice of Networked Learning*.
- Malik, S. & Shabbir, M. S., (2008), "Perception of University Students on Self-Directed Learning through Learning Technology", *European Journal of Scientific Research*, Vol.24 No.4, pp.567-574
- Marton, F. (1981), "Phenomenography - describing conceptions of the world around us", *Instructional Science*, Vol. 10, pp. 177-200.
- Marton, F. & Booth, S. (1997). *Learning & Awareness*. Mahwah, N.J: L. Erlbaum and Associates.
- Marton, F., Dall'Alba, G. and Beaty, E. (1993), "Conceptions of learning", *International Journal of Educational Research*, Vol. 19, pp. 277–300.

- McConnell, D., and J. Zhao. 2006. Chinese higher education teachers' conceptions of e-learning: Preliminary outcomes. Paper presented at the Australasian Society for Computers in Learning in Tertiary Education Conference, December 2–5, in Sydney, Australia.
- Roberts, G. (2003), "Teaching using the Web: Conceptions and approaches from a phenomenographic perspective", *Instructional Science*, Vol. 31, No. 1-2, pp. 127 - 150
- Rumble, G. (2001), "Re-inventing distance education, 1971-2001", *International Journal of Lifelong Learning*, Vol. 20, No. 1/2, p. 31-43
- Saljo, R. (2010), "Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning", *Journal of Computer Assisted Learning*, Vol. 26, No. 1, 53–64
- Sjostrom, B. & Dahlgren, L. O. (2002), "Applying phenomenography in nursing research", *Journal of Advanced Nursing*, Vol. 40, No. 3, pp. 339–345
- Turvery, K. (2010), "Pedagogical-research designs to capture the symbiotic nature of professional knowledge and learning about e-learning in initial teacher education in the UK", *Computers and Education*, Vol. 54, pp. 783-790
- Vrasidas, C. and McIsaac, M. S. (2000), "Principles of pedagogy and evaluation for web-based learning", *Education Media International*, 37, No. 2, p.105–111.