E-learning in higher education

A qualitative field study examining Bolivian teachers’ beliefs about e-learning in higher education

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ABSTRACT

E-learning is a form of education that is increasingly being used in higher education in the developed world. However, the take-up and use of e-learning in developing countries is at a preliminary stage. This thesis deals with e-learning in the context of a developing country. The aim of the study was to describe and understand teachers’ beliefs about e-learning in higher education at UMSA. Qualitative semi-structured interviews and observations were used to identify 10 teachers’ beliefs about e-learning. The Technological Pedagogical Content Knowledge framework was used for analysing the interviews and observations. Teachers’ showed varying levels of knowledge about technology, pedagogy and content, as well as varying knowledge levels about different combinations of these three knowledge domains. Despite the limited educational resources at Universidad Mayor de San Andrés (UMSA), most teachers’ believed e-learning is beneficial for themselves and their students.

Keywords: Bolivia, developing country, e-learning, higher education, teachers’ beliefs.
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INTRODUCTION

In the first section of the thesis, main topics are presented. In addition, background concerning the importance of education in the context of developing countries is provided.

Background

The British philosopher Francis Bacon stated, already in the 1600s, “Knowledge is power”. The one who has knowledge thereby has power – the unskilled is powerless. But power is also knowledge. The one that has power also has power over the knowledge – power over what knowledge that is to be developed and power over how this knowledge should be used. It concerns power over nature, power over people and their thoughts, power over what is believed to be knowledge (Thurén, 2007, p. 147, translation ours).

Regardless if it is e-learning or traditional on-campus education, education has a large and vital role to play for people living in developing countries. As Säljö (2000) has pointed out, learning and knowledge are important factors, linked to people’s perceptions of economic as well as social development. Groups of people who are categorised as highly educated have a higher competitiveness in relation to receiving skilled jobs and therefore, better possibilities to improve their lives (Säljö, 2000). The importance of education in developing countries has a more profound implication on people’s lives. Andersson (2010) referred to Sen (1999), who discussed the two topics of equal right to education and freedom. Sen believed that education is an enabler for individuals to live the life chosen by them. Furthermore, he argued that education also makes people capable of developing their full potential as well as leading creative, productive lives.

It is of great importance for countries worldwide to maintain a stable level of human capital. From an educational perspective, this can be said to be important because education leads to higher growth and improvement for the country as a whole (The World Bank, 2000). This is particularly the case for developing countries, where growth by means of education often is considered the key to development. For example, Bada and Madon (2006) argued that economical growth and a strong human capital is a fundamental prerequisite for any country. An
increase concerning the capacities of the people in a society and promotion of their wellbeing through economic growth and development is a central goal in human resource development. As such, growth and development processes education is a key player.

In recent decades, a technological revolution has taken place in large parts of the modern world. Society has moved from a society characterised by the living conditions of industrialism to the present knowledge society where creativity and ingenuity stimulates and drives the society (Hargreaves, 2003). Hargreaves writes that: “a knowledge society is really a learning society… knowledge societies process information and knowledge in ways that maximize learning, stimulate ingenuity and invention, and develop the capacity to initiate and cope with change” (p. 3). Earlier societies were characterised almost exclusively by an educational system where teachers and students physically interacted in the classroom. Major technological developments characterising society – especially during the last 20 years and mostly because of the Internet (Castells, 2001) – have changed our view of education. Today, for example, we are talking about concepts such as “the flipped classroom” (Knewton, n.d.). This concept refers, among other things, to the way that teachers and students in today’s educational systems use different information and communication technologies (ICTs) for teaching and learning activities in classrooms.

Another concept that has emerged during the last 15 to 20 years is “e-learning”. According to Laurillard (2004), e-learning describes the interaction in which students use different types of ICTs in their learning process. Education in a knowledge society context is given a key role for developing new ideas in learning and teaching through e-learning (Kahiigi, Ekenberg, Danielson, & Hansson, 2007).

Many research studies demonstrate that ICTs and e-learning are important for teachers and students in higher education\(^1\) (Bhuasiri, Ciganek, Rho, Xaymoungkhoun, & Zo, 2012; Kirkwood, 2009). One reason is that utilisation of such technologies creates more flexible solutions for students (Sanderson, 2002; Anderson, 2008; Laurillard, 2004) that mainly have the opportunity to study online – irregardless of the student’s geographical location. Current research also suggests that another important change that ICT and e-learning brings is increased flexibility, making it possible for universities around the world to enrol an increased number of students (Grönlund & Andersson, 2009; Hrastinski, 2007; Andersson, 2010), an aspect beneficial to the universities

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\(^1\) In this thesis, the term “higher education” describes educational activities at universities and colleges.
from an economic point of view. However, another element of e-learning to be mentioned here is that its implementation in teaching – at the shift between traditional teaching and e-learning based teaching – has also proven relatively expensive (The World Bank, 2000). There seems though to be a common understanding among researchers that the use of e-learning in higher education, in the long run, is far more cost effective compared to education being conducted in a more traditional way (Sanderson, 2002; The World Bank, 2000). For example, Sanderson (2002) explained that this cost decrease is a result of reductions in various operational costs. One reason traditional teaching costs more than e-learning is because it involves more staff expenses (Sanderson, 2002).

Changes in how higher education is carried out through the use of e-learning are particularly apparent in developed countries in Europe and North America (Bates, 2001). The Nordic countries have invested in various IT tools in education and are regarded as world leaders in this area (Myndigheten för skolutveckling, 2006). However, what is the situation in areas categorised as developing countries? Many developing countries’ efforts to take up e-learning in higher education are, according to Sife, Lwoga, and Sanga (2007), still at a preliminary stage compared to developed countries. Even those developing countries wanting to implement e-learning as a tool in higher education often encounter various obstacles; for example, poor infrastructure and information access, lack of support from institutions, necessary resources or Internet access, poor technological skills, and so on (Sife et al., 2007). Denis (2010) believed that, in practice, the implementation of e-learning relies on the fact that the university is forced to train or hire staff to work with the technological aspects as well as changing teaching strategies.

For a university to be able to adopt and use e-learning in educational activities, it is preferable that sufficient resources and conditions within the organisation already exist. For example, Gulati (2008) explained that the lack of different types of resources is a common problem in the take-up of e-learning. Developing countries spend more money on higher education, based on their assets and income, compared to more developed countries (The World Bank, 2000). Despite that, developing countries spend considerably less resources per student compared with developed countries and, thus, the fact remains that the quality of higher education, to a large extent, is dependent on government grants (The World Bank, 2000).

In the following section, the authors of this thesis explain the context of the field study as well as its focus. This part of the thesis also presents the aim and research questions. Thereafter, in the section titled Previous Research, research findings are addressed about various benefits and
challenges that need to be considered to effectively take up e-learning in higher education. In addition, previous research about teachers’ beliefs regarding e-learning is described.
CONTEXT AND AIM OF THE FIELD STUDY

This section presents the specific context and aim of the field study, followed by the question formulations.

The context of the field study

This thesis was conducted as a field study at the Universidad Mayor de San Andrés (UMSA) in La Paz, Bolivia’s third-largest city. To a large extent, Bolivia is considered a developing country and, according to the Government Offices of Sweden (2012), Bolivia is one of the poorest nations in South America. According to Internetworldstats.com, 19.6% (1,985,970 people) of Bolivia’s population were users of the Internet at year-end 2011. This is a low number compared to neighbouring country Brazil, where the same examination showed that 67% of the population (28 million people) had access to the Internet.

In Bolivia, there is a clear division between rural and urban areas in terms of general use of formal education (Virtual Campuses, 2012). This division has resulted in people in the cities becoming more literate, while illiteracy in rural areas is increasing. In addition, young people from rural areas are often forced to contribute financially to the family household. This means they are more likely to look for work instead of going to school (Virtual Campuses, 2012). It seems to be the case that development in Bolivia’s educational system is a necessity to offset the current educational gaps. In 1998, a survey was conducted in Bolivia to examine the extent to which 761 respondents agreed with the statement “Education is fundamental in order to exit poverty” (Latinobarometer, 1998). The result (Figure 1) shows that the majority of respondents believe that education is essential in order to improve the living conditions of Bolivians.
Focus of the thesis

Given the rather extensive body of research that shows how students benefit in different ways from e-learning (e.g. Laurillard, 2004), this field study has instead focused on teachers’ beliefs about e-learning in higher education and ways in which teachers’ beliefs can be understood to affect their teaching by means of e-learning at UMSA. In this thesis, the concept teachers’ beliefs refers to (a) an individual’s (e.g. teacher’s) view or understanding about teaching and learning, and (b) an individual’s (e.g. teacher’s) understanding about teaching and learning that is carried out with support from various technological tools along with the meaning they attach to it (Kirkwood & Price, 2012; Kember, 1997). Concepts such as views, attitudes and opinions shall be understood exclusively as part of teachers’ beliefs. The term experience more describes the length of time a teacher has been teaching through e-learning or other technological tools. Teachers’ beliefs have been investigated with the assistance of the Technological Pedagogical Content Knowledge (TPCK) framework (Mishra & Koehler, 2006). The intention was that the framework would provide a sufficient base to study and analyse the relationships and connections between (a) teachers’ beliefs about e-learning in higher education, and (b) technological, pedagogical, and content knowledge viewpoints. To get fairly broad insight in the e-learning teaching activities at UMSA, interviews were conducted with teachers who represented different scientific disciplines and subjects. In addition to interviews, observation focused on teaching in this context was also performed. This was done with the purpose of get a broader insight into the context of UMSA and to prepare the interview guide. The reason for combining two different methods for data
collection was to receive more variation in the total body of data (Holme & Solvang, 1997).

The aim of the field study

The aim with this field study is to describe and understand teachers’ beliefs about e-learning in higher education at UMSA in La Paz, Bolivia.

Research questions

In order to answer the aim of the field study the following research questions have been formulated:

• What are the teachers’ beliefs towards e-learning in higher education carried out in a developing country?
• In what ways is e-learning understood as being of importance in the educational practice?
• What levels of knowledge do teachers’ have in technology, pedagogy and content?
• What is the relationship between the teachers’ pedagogical views, knowledge of content and technology?
• How can teachers impact the way they teach when teaching through e-learning?
PREVIOUS RESEARCH

In this section, previous research on e-learning is presented. Relevant theories and topics have been chosen to discuss and analyse the purpose of the study.

Today there is a great deal of research on teaching through the use of e-learning. What can be said to characterise e-learning is that it does not require the teacher and student to be in the same physical environment, in a so-called face-to-face situation (Hiltz & Turoff, 2005; Sife et al., 2007). The concept of e-learning has many forms, which means that there exist many different descriptions, terms, and definitions of the concept. What unites them all is that they depend on ICT. According to Clark and Mayer (2011) e-learning is defined as: “... instruction delivered on a digital device such as a computer or mobile device that is intended to support learning” (p. 8). Anderson (2008) believed that there are several terminologies, all aimed at describing learning that is being practiced online; they include; distance learning, virtual learning, e-learning, Internet learning, and others. Independent of which terms being used, they have commonalities:

1. The learner is at a distance from the tutor or instructor.
2. The learner uses some form of technology (usually a computer) to access the learning materials.
3. The learner uses technology to interact with the tutor or instructor and with other learners.
4. Some form of support is provided to learners. (Anderson, 2008, p. 16)

Research on Teachers’ Beliefs and Conceptions about e-learning

According to González (2009), a relatively small number of researchers have focused on the relationship between higher education teachers’ beliefs about teaching and learning with technological tools. It is especially difficult to find studies about teachers’ beliefs and conceptions about e-learning in the context of developing countries. However, some studies have been carried out to describe teachers’ beliefs about e-learning in different settings.

For example, a study that was carried out at Lancaster University, UK, and the school of Network Learning in Beijing, McConnell, Banks, and Bowskill (2008) investigated how teachers’
conceptions of e-learning differ in the two cultural contexts. The study was based on a phenomenographical approach as well as a grounded theory method. 24 interviews were conducted with higher education teachers at the School of Network Learning and 15 at the Lancaster University. The main purpose of the study was to investigate how each higher education teacher understood the concept of e-learning in relation to the cultural context in which they were teaching. The collected data showed a large contrast regarding teachers’ beliefs about e-learning, depending on the cultural context in which they were active. As an example, teachers working in Beijing preferred to use the traditional form of lecturing. The focuspoint in this method is that education occurs through hour-long lessons where the teacher and student are interacting face-to-face. McConnell et al. wrote that they believe Chinese teachers always advocated this method before any other teaching method, much due to a historical perspective, that it had been the method of choice for a very long time. At Lancaster University, on the other hand, results showed that the teachers emphasised collaboration between students and teachers. Here, the attempt was to create a sense of community; something that the UK teachers argued was supported by the introduction of e-learning.

McConnell et al. (2008) also found that the UK teachers believed that e-learning meant that students were in a better position to reflect on how the group was collaborating and, as a consequence, this reflection “had beneficial effects on the learning process itself” (p. 724). This belief contrasts with Chinese informants, who were doubtful on the degree to which e-learning could improve teaching. Because the lecture method is used to such a large degree, the teachers from School of Network Learning expressed uncertainty as to whether or not students were capable of more autonomous learning.

Furthermore McConnell et al. (2008) explained that the conditions of technological infrastructure have large impacts on teachers’ beliefs about e-learning. In many places in China, technological infrastructure is decent. However, support measures are not always as well developed compared to ones in the UK. The result of this is that Chinese higher education teachers experience more difficulty with the adoption of e-learning in higher educational systems in comparison with UK teachers. “E-learning in both countries is dynamic and developing, and its practice is clearly influenced by culture, values, beliefs and context”, McConnell et al. concluded, suggesting that the model “Lecture plus Online Work”, based on the informants’ answers, is the future way for the Chinese university to use e-learning for homework and traditional lectures for theoretical teaching (p. 726).
Another important research result for this thesis can be found in González (2009). In this article, González discussed the results from a study conducted at two Australian universities. The study applied a phenomenographical approach, and 18 interviews were held with teachers with different experience in e-learning teaching. The aim of the study was to examine “… what university teachers think eLearning is good for in their teaching” (González, 2009, p. 61). González explained that the teachers experienced the concept of e-learning as a “medium”. The different teacher beliefs about e-learning as a medium, made visible in the interviews, were then put together in four sets of categories:

1. Provide information to students.
2. “Occasional” online communication.
3. Engaging students in online discussions.
4. Support knowledge-building tasks (González, 2009, p. 66)

Both category 1 and 2 concern what teachers are actually doing. For example, the informants believed that the first category refers to how a tutor uses his or her knowledge as a point of departure to deliver relevant information to students. Similarly, the following category (category 2) represents how teachers are constructing technological environments for students to correspond with each other as well as the teacher. In category 3, the main focus is to make it possible for students to acquire a more advanced level of knowledge. Providing students with different online discussion forums where they are able to study a particular subject also gives students the opportunity to broaden their knowledge. In the last category, category 4, the teachers’ roles are characterised by assisting students in constructing knowledge. According to González (2009), the last category:

[R]epresents an understanding of the online environment as a space for having a large amount of interaction between course participants. Interaction is seen to occur in multiple ways: between students and/or teachers; sharing ideas and information; co-creating reports or conceptual artefacts and other products of learning, etc. (p. 70)
González (2009) argued that further research within this field needs to be conducted to link teachers’ perceptions with specific e-learning technologies. However it is clear that the teachers who participated in González’s study held similar beliefs towards teaching with e-learning.

**Affordances of e-learning**

As stated above, e-learning can be understood as the use of different types of ICTs for educational purposes. The concept further describes instructional content as well as learning experiences that are delivered or enabled by digital technologies. E-learning incorporates a broad variety of learning technologies and strategies (Sife et al., 2007). Kahiigi et al. (2007) described the concept of e-learning as a new evolution, whose existence arises in connection with the ongoing development of the information society. The many features of e-learning are – for teachers as well as students – are a beneficial way to teach and learn (Kruse, 2002). Laurillard (2004) gives a description of what the positive aspects of e-learning could mean in higher education:

> E-learning has been used very effectively in university teaching for enhancing the traditional forms of teaching and administration. Students on many courses in many universities now find they have web access to the lecture notes and selected digital resources in support of their study, they have personalised web environments in which they can join discussion forums with their class or group, and this new kind of access gives them much greater flexibility of study. Part time students can more easily access the course and this in turn supports the objectives of wider participation, removing the traditional barriers to HE study. (p. 10)

**Asynchronous and synchronous modes of communication**

E-learning involves asynchronous as well as synchronous modes of communication (Hrastinski, 2008; Anderson, 2008; Kirkwood & Price, 2012). The *asynchronous mode* refers to online learning situations where students interact with each other, over a time gap, with the help of tools such as discussion forums, e-mail, and bulletin boards (Oye, Salleh & Iahad, 2012). Hrastinski (2007) argued, “Asynchronous communication better supports cognitive participation because of increased reflection and ability to exchange complex information” (p. 102). A rather common and recurring description of the benefits of e-learning is the quantitative increase in numbers of students. The reason for the increase is said to be that teaching is not tied to a physical location, something that enables students to study almost regardless of their geographical location (Andersson & Grönlund, 2009; Anderson, 2008). The asynchronous teaching mode is, according
to Hrastinski (2008), appealing for students because it makes it easy for them to both study and take care of other undertakings; students contextualise the learning (Anderson, 2008). Singh et al. (2005) referred to Holley (2002), who claims that the asynchronous way of learning has enabled all people in the world the opportunity to access lifelong learning.

The *synchronous learning* mode, on the other hand, is more similar to traditional teaching because communication in this mode is carried out in real time (Hrastinski, 2007; Rydberg Fähræus, 2008). Synchronous communication enables students to watch teachers’ presentations and verbally interact with the teachers during learning sessions (Keegan et al., 2005). Because the synchronous communication mode is carried out in real time, discussions become more dynamic compared to using solely asynchronous communication (Niehues, 2007). The synchronous communication mode is appropriate to use in large groups when the aim is to broadcast different types of sessions (Tiong & Sim, 2005).

Asynchronous and synchronous e-learning are both beneficial for students and teachers. In Table 1 Hrastinski (2008) has presented an overview of the two teaching modes, explaining “when”, “why” and “how” asynchronous and synchronous teaching are most suitable to be used in e-learning.

Table 1

*When, Why and How to Use Asynchronous vs. Synchronous E-learning*

<table>
<thead>
<tr>
<th></th>
<th>Asynchronous E-Learning</th>
<th>Synchronous E-Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When?</strong></td>
<td>• Reflecting on complex issues</td>
<td>• Discussing less complex issues</td>
</tr>
<tr>
<td></td>
<td>• When synchronous meeting cannot be scheduled because of work, family and other commitments</td>
<td>• Getting acquainted</td>
</tr>
<tr>
<td><strong>Why?</strong></td>
<td>• Students have more time to reflect because the sender does not expect an immediate answer</td>
<td>• Students become more committed and motivated because a quick response is expected.</td>
</tr>
<tr>
<td><strong>How?</strong></td>
<td>• Use asynchronous means such as e-mail, discussion boards, and blogs.</td>
<td>• Use synchronous means such as videoconferencing, instant messaging and chat, and complement with face-to-face meetings.</td>
</tr>
</tbody>
</table>
Examples

- Students expected to reflect individually on course topics may be asked to maintain a blog.
- Students expected to share reflections regarding course topics and critically assess their peers’ ideas may be asked to participate in online discussions on a discussion board.
- Students expected to work in groups may be advised to use instant messaging as support for getting to know each other, exchanging ideas, and planning tasks.
- A teacher who wants to present concepts from the literature in a simplified way might give an online lecture by videoconferencing.

Source: Hrastinski (2008)

The different ways that language teaching is carried out through the use of Skype is discussed in Eaton’s article from 2010. According to Eaton, one of the advantages for teachers’ using Skype is that groups of students can be educated at the same time. Because Skype is easier to use compared to other synchronous communication modes, it serves as a good alternative for teachers who do not believe that they have mastered technological tools in education. When teachers’ interact with a simple program such as Skype, they might also – as their general skill level increases – develop a greater desire to work with more advanced programs (Eaton, 2010). In addition to the fact that Skype is easy for the user to work with, Eaton believes that Skype is a very powerful tool in education as it combines file- and screensharing, conference calls, chat, and instant messaging.

Ajayi carried out an interesting study in 2009 concerning pre-service teachers’ conceptions of discussion boards (an asynchronous communication method) in their teacher education. Thirty-three pre-service teachers participated in the study that lasted for a period of 16 weeks. The outcome of the study showed that the majority of the teachers had positive beliefs about asynchronous discussion boards in education. The results showed, for example, that the discussion boards led to increased knowledge among most of the participants, especially because the discussion boards enabled collective learning. Another group of participants explained that the use of the discussion boards as a tool had made it possible for them to share information and ideas with each other and be aware of each other’s perspectives and thoughts on specific topics.

Challenges with e-learning

One problem identified by both teachers and students is the lack of knowledge and skills of how to use the technological tools with which they are equipped in their educational practices. Many
researchers are determined that training – for example, through computer courses – is fundamental and has to be provided if e-learning are going to be fully advantageous for both teachers and students in higher education (Bates, 2001; Bhuasiri et al., 2011; Cohen & Nycz, 2006; Galusha, 1997; Mapuva & Muyengwa, 2009). Bates explained that changing to such new work patterns and learning to use the technology is both time and cost consuming. However, according to Bates, such measures are a necessity to take advantage of the values of e-learning.

Galusha (1997) clarified that institutions in developing countries do not believe that highly developed technological tools (computers, etc.) are reliable enough to consider them efficient tools to adopt in education. The common conception among these institutions is said to be that such tools presents problems and could lead to many unnecessary costs. This is identified as the main reason these institutions and teachers in developing countries still use technological tools such as cassettes and prints when delivering educational content and information (Galusha, 1997).

In an article by Forsyth, Pizzica, Laxton, and Mahony (2010), results from a survey at Sydney University in Australia shows that the majority (39%) of staff and students believed that poor technological infrastructure was the main reason distance education is problematic to adopt in education. Some of these problems included access to printing and various copies of literature. Forsyth et al. refers to one of the informants, who believed that “centralised coordination of distance education is completely absent” (p. 20). The second-highest reason, totalling 24% of the respondents, was that the problem with applying distance learning was a poor understanding between distance education and education conducted on campus. In this category, respondents expressed concerns, among others, about feeling isolated from their fellow students.

Hiltz and Turoff (2005) believed that learning conducted online (e.g. e-learning) can be seen as a substitute for traditional teaching. When a substitution process such as that occurs, there will always be some form of disruption. Thus, a challenge for universities that are using old forms of technology is to conform and take up newly developed technologies that are to be introduced in the educational practices. If universities are unable to take up new technologies during such substitution processeses, they will face the danger of falling behind in technological development or being damaged in other ways (Hiltz & Turoff).

Eklund, Kay, and Lynch (2003) further argued that there exist a number of barriers for schools and other educational organisations to adopt e-learning within the workplace. In many schools,
learning is still taking place within physical classrooms, and the learning is based on delivery methods such as “same-time and same-place”. In these situations, Eklund et al. argued, teacher-centred approaches are the norm. Because the teachers work towards strict assessment requirements they have a strict curriculum that needs to be followed in a step-by-step fashion. As a consequence, teachers have little or no time to develop the ICT skills necessary to implement new kinds of teaching methods.

Mapuva and Muyengwa (2009) explained that there are certain obstacles that come with the decision to apply e-learning in higher education. They have especially pointed to the changed work pattern that affects teachers. From a developing country perspective, Stödberg and Orre (2010) also indicated that there are several factors to consider before e-learning can be implemented in education:

Staff development is crucial, especially in times when new approaches to teaching and learning in higher education are introduced. Training and dialogue about these new approaches should not be taken lightly. They are matters to be recognised and taken seriously. The introduction of e-learning in traditional educational settings is likely to affect the organisational landscape and its practices on many levels. (p. 111)

Another challenge that has to be identified when it comes to apply e-learning for higher educational purposes is that a large number of institutions in developing countries are experiencing inadequacy in the three areas most important for their success; access to a high-quality faculty, committed and well-prepared students, and sufficient resources (e.g. The World Bank, 2000). In some developing countries, teachers have insufficient knowledge about the subject in which they teach. In addition, students do not get the opportunity to use creative or flexible digital learning tools. In some developing countries politicisation has resulted in the improvement of higher education in terms of addressing various injustices and contributing in the progress of democracy; however, this is not always the case. As stated in the quote following, there are clear indications that some developing countries are already struggling with problems within institutions. Such problems are probably not in favour of universities in their desire to implement or extend e-learning in the educational system. According to The World Bank (2000):

Higher education institutions rely on the commitment of their faculty. Their consistent presence and availability to students and colleagues have an enormous influence in creating an atmosphere that encourages learning. Yet few institutions in
developing countries have strictures against moonlighting and excessive absenteeism. Many faculty work part time at several institutions, devote little attention to research or to improving their teaching, and play little or no role in the life of the institutions employing them. Faculty members are often more interested in teaching another course often at an unaccredited school than in increasing their presence and commitment to the main institution with which they are affiliated. With wages so low, it is difficult to condemn such behaviour. (p. 24)

Some e-learning challenges that have been discussed earlier in this section are also dealt with in research produced by Mashhour and Saleh (2010). In their research, Mashhour and Saleh described and gave examples of how these challenges impact higher education. They used questionnaires to investigate how teachers and students at several Jordanian universities face different obstacles in fully taking up e-learning in the educational practice. One of the issues in Jordan is that the benefits of e-learning have not been utilised successfully, although there is a great interest for applying e-learning in higher education (Mashhour & Saleh, 2010). The majority of the 120 teachers who participated in the study believed that one of the challenges of applying e-learning in educational practices was lack of sufficient resources. Although the government is supporting the take-up of e-learning in higher education (for example, by attempting to provide university students with computers and better access to technology), this support is not sufficient. Another issue the teachers expressed was a shortage of people with the right competence in applying e-learning systems. Mashhour and Saleh also found that some teachers did not comprehend how e-learning would be of use to their own teaching. As a consequence, teachers did not adopt e-learning in their teaching. Mashhour and Saleh proposed that teachers and universities, to a larger degree, are required to promote the use of e-learning to make students fully utilise it in their education.

**Changes in Teaching Methods when Introducing e-learning**

The “transferring method” is a traditional teaching method (Jaldemark, 2010). This method describes the process where the teacher sends small packages of knowledge to the students (Granberg, 2009). This approach gives students the knowledge, which most appropriately can be controlled (quantitatively) through examination tests (Granberg, 2009). In this traditional perspective, the teacher acts as the central source of information with the primary responsibility to transfer knowledge to students. Granberg has insisted that this traditional view of knowledge
is not shaped in conjunction with today’s reality. Instead, Granberg believed that information can be transmitted among different parties. However, it is the learners themselves who, with their own abilities, are responsible for developing this information into knowledge. The conditions required for an individual to develop knowledge are primarily a high level of motivation (Granberg, 2009). Implementing e-learning in teaching involves a variety of restructuring that must be performed in educational activities. Moving from a traditional learning environment to an e-learning environment means a change in teachers and students roles (Cohen & Nycz, 2006).

The implementation of e-learning in higher education has led to a shift in students’ roles. Instead of being passive recipients of knowledge transmitted by the teacher, students are expected to be active participants with the main task of acquiring and processing knowledge (Cohen & Nycz, 2006). Furthermore, Cohen and Nycz (2006) described that this knowledge is usually obtained from various online platforms and sources for which the teacher is responsible to provide to students. According to Anderson (2005), ICT has changed the teacher’s role from being “sages on stage” to “guides on the side” (p. 3). It is apparent that teachers have moved from serving as active transmitters of knowledge to instead – in an online-based teaching situation – acting as tutors to guide, support, motivate, and introduce the technological tools that the students need to learn. The principles that ICT and e-learning consists of have contributed in, as Cohen and Nycz (2006) have explained, replace the teacher as the key element of learning and, as a result, the teacher does not have a monopoly on the knowledge (Hård af Segerstad, Klasson, & Tebelius, 2007). Table 2, derived from Cohen, Manion and Morrison (2004), shows and compares the teacher’s traditional and new roles.

Table 2

<table>
<thead>
<tr>
<th>Traditional Roles</th>
<th>Newer Roles with ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-transmission to passive learners who obey and receive</td>
<td>Process-based curricula with learners who question and analyse</td>
</tr>
<tr>
<td>Teacher oriented</td>
<td>Learner oriented</td>
</tr>
<tr>
<td>Teacher as task setters for individual learning</td>
<td>Teachers as managers of collaborative learning</td>
</tr>
<tr>
<td>An organiser of learning activities</td>
<td>An enabler of quality learning experiences</td>
</tr>
<tr>
<td>Dictating the learning</td>
<td>Creating enabling structures for learning</td>
</tr>
<tr>
<td>Technology as a tutor</td>
<td>Technology to support creativity</td>
</tr>
<tr>
<td>Didactic teaching</td>
<td>Active learning</td>
</tr>
<tr>
<td>Low order retention and recall</td>
<td>High order thinking</td>
</tr>
<tr>
<td>Teachers as providers of information and experts in all knowledge</td>
<td>Teachers as advisors, managers and facilitators of learning</td>
</tr>
<tr>
<td>Teachers as suppliers of knowledge</td>
<td>Teachers as developers of skills</td>
</tr>
<tr>
<td>Teacher as a distant authority</td>
<td>Developed student–teacher relationships</td>
</tr>
</tbody>
</table>
• Teacher control of learning – its timing, pacing and contents
• Teachers standing back to let learning happen and children to solve problems
• Prescriptions for what, when and how students will be taught
• Responsiveness to students’ cognitive needs and development
• Teacher in narrow and unchanging range of roles
• Teacher in many roles as required: designer, director–actor, facilitator, manager


Summary

The research reported on above shows that the flexible modes of learning enabled through e-learning could provide more people (compared to traditional classroom learning) the opportunity to access education. Furthermore, in the context of developing countries, e-learning could have a huge impact on people’s lives because it can remove the geographical boundaries that often prevent people from accessing universities and other higher educational institutions. According to research, e-learning also makes it possible to provide students with new tools and resources for learning that, in turn, enable students, in a larger extent, to study in their own preferred way. Students have significant responsibility for their own educational progress. In addition, they are no longer in need of the teacher as the main source of knowledge in the same way as before.

Due to e-learning incorporating both synchronous and asynchronous modes of communication, education can be delivered in a traditional manner as well as solely using technology in, for example, online education. Research informs us that teachers and students benefit from this because they are not forced to use only one particular teaching method or learning style. Synchronous communication is said to make it easier for teachers to organise and plan their teaching because they are not tied to a specific time or place. The asynchronous mode is said to make it possible for students to use cognitive participation in their learning processes.

However, there seem to be certain factors that influence the extent to which universities can adopt and use e-learning for educational purposes. Teachers’ and students’ prior experience and their knowledge of technology have a huge impact on whether or not e-learning is possible in higher education. The desire to use e-learning is high in developing countries. Although, higher education in developing countries, although higher education in developing countries face major challenges, such as the lack of sufficient technological resources, technological infrastructure, economical support, and so on. Another important lesson learnt is that there exist cultural differences regarding how e-learning should be used in higher educational systems. These differences depend on the view of how learning should be conducted in an effective way.
The cultural context in which teachers operate, according to research, has a significant impact on their beliefs and conceptions about the use of technological tools in education. In accordance with the studies presented above, teachers in one specific cultural setting might view the adoption of e-learning in higher educational optimistically while teachers in other cultural contexts will question whether or not e-learning generates positive effects in teaching.

As presented in the section of Previous Research, it seems to be important for developing countries to strive to use new technologies to develop and qualitatively strengthen the country’s higher education. However, one of the largest dilemmas for developing countries seems to be that they need to invest in new technologies and, at the same time, not get too dependent on these technologies. This balancing act is hard to perform because technology is changing and developing at a high pace.

As shown in the previous section, research has been conducted on teachers’ beliefs about higher education as well as teachers’ beliefs about the use of technology in higher education. However, there seems to be a knowledge gap regarding teachers’ beliefs about e-learning in the context of developing countries. The authors of this thesis believe that such knowledge is rather important to improve and develop education in developing countries. The aim of this thesis – to describe and understand teachers’ beliefs about e-learning in higher education at the UMSA – has been designed with the intention to help reduce this knowledge gap.
ANALYTICAL FRAMEWORK

This section presents the Technological Pedagogical Content Knowledge (TPCK) framework (Mishra & Koehler, 2006). The aim with the framework is to provide a basis for the field study’s analysis.

In a 2006 article, Mishra and Koehler provided an overview of the so-called Technological Pedagogical Content Knowledge (TPCK) framework. The article is a compilation of a design experiment aiming at “helping us understand teachers’ development toward rich uses of technology while simultaneously helping teachers – both K–12 teachers and university faculty – develop their teaching with technology” (Mishra & Koehler, 2006, p. 1019). They argued that some of the benefits of using a framework are that it “goes beyond merely identifying problems with current approaches; it offers new ways of looking at and perceiving phenomena and offers information on which to base sound, pragmatic decision-making” (p. 1019).

The foundation of the framework is that teaching should be understood as a rather complex activity that is dependent on different kinds of knowledge. TPCK is used to show the complex and nuanced relationships between content, pedagogical, and technological knowledge (Mishra & Koehler, 2006), each illustrated through separate circles below.

Figure 2 symbolises the specific knowledge of a topic that students are expected to learn or teachers are expected to teach. Within the content knowledge domain, one investigates if the teacher has (or does not have) sufficient competence about the actual subject that they teach. Another interest is whether or not teachers understand the particular subject. Mishra and Koehler (2006) also point out another important focus of this domain: “Teachers must also understand the nature of knowledge and inquiry in different fields. For example, how is a proof in mathematics different from a historical explanation or a literary interpretation” (p. 1026) In the context of this field study, the focus will be on evaluating the competence that teachers express in the subject(s) they

Figure 1. Illustration of the Content knowledge domain.
teach. In addition, this field study will focus on investigating if teachers think that their competence is sufficient to enable the students to develop a broader understanding of a specific subject.

Pedagogical knowledge (PK) “is deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims” (Mishra & Koehler, 2006, p. 1026). Pedagogical knowledge represents the knowledge necessary for effective student learning, and it also involves the types of methods teachers use to achieve this. The pedagogical knowledge in this field study focuses on the extent to which teachers relate to the different ways students acquire knowledge as well as how well the teachers succeeded in furnishing it.

Technology knowledge (TK) “is knowledge about standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital video” (Mishra & Koehler, 2006, p. 1026). This section focuses on what capabilities individuals possess in order to utilise such technologies. This field study will primarily focus on which kinds of technological skills teachers have when it comes to operating such standard and advanced technologies and whether or not these skills are adequate in relation to the teachers teaching through an e-learning mode.

Mishra and Koehler’s (2006) TPCK-approach is characterised by their focus on the connections and relationships between TK, PK, and CK. They have argued that this approach contrasts with other researchers’ views on the domains as independent:

“In practical terms, this means that apart from looking at each of these components in isolation, we also need to look at them in pairs: pedagogical content knowledge
(PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and all three taken together as technological pedagogical content knowledge (TPCK). (Mishra & Koehler, 2006, p. 1026)

By observing Figure 5, one can identify a joint sphere (PCK) between pedagogical knowledge and content knowledge. Mishra and Koehler (2006) put forth that their intention with the pedagogical content knowledge is to show the relationship between (a) how teachers’ knowledge about the subject they teach interrelates and is affected by (b) their knowledge about how students learn in the most effective way and the teaching methods that enable this effective learning. “It is valued as an epistemological concept that usefully blends the traditionally separated knowledge bases of content and pedagogy” (Mishra & Koehler, 2006, p. 1022).

![Figure 5. Illustration of the Pedagogical Content Knowledge.](image)

As discussed in the above section, Challenges with e-learning, the take-up of technologies in higher education is not always free of problems. In the context of TPCK, introducing technology into teachers tutoring can have both positive and negative influences on teachers’ content as well as pedagogical knowledge. For example, teachers’ take-up of technology in a course might make it difficult for them to integrate the contents they believe are necessary for students. The technology might also make it harder for teachers to utilise their pedagogical knowledge on which they believe students are dependent in order to learn in the most effective way. The technological difficulties that teachers might encounter in their teaching are represented in TPCK by combining all three circles in a final framework (Figure 6). The final framework takes all the knowledge spheres into consideration as well as the relationships among them. The separate
relations among CK, PK, and TK are made visible, and a central domain is constructed: It shows the very complex relationships among all the content in the framework.

Figure 6. Illustration of the Technological Pedagogical Content Knowledge.
METHODOLOGY

This part of the thesis presents context in which the study takes place. The scientific approach and methodology used is presented.

Context

This study will be conducted in Bolivia, a nation surrounded by Chile, Argentina, Peru, Brazil, and Paraguay. The country has approximately 10 million inhabitants and is located in central South America. It has 35 different ethnic groups, and the largest are Quechuas and Aymara (Wikipedia, 2012). Bolivia is regarded as one of the poorest country on the continent. Many inhabitants, particularly indigenous people, have been marginalised because of the skewed wealth and income distribution, and social and cultural gaps (Government Offices of Sweden, 2012). In Bolivia, it is not unusual to see young children working, although, according to domestic law, child labour is prohibited. Many families have between 6 to 8 children, and the fact that they are forced to work because of poverty is a clear sign that a crisis exists within the country (Utbildning för biståndsverksamhet, 1992).

In 1994, the Law of Educational Reform was approved. The introduction of this resulted in large structural and educational reforms. Foremost, the law introduced the generalisation of intercultural billing education as well as a system that enabled small organisations to participate in the design and education of the reform (Albó, 2002). According to Contreras and Simoni (2003), some of the most significant effects from the educational reform were that it provided a wide variety of school supplies, books, pedagogical advisors, school education councils, and – although to a smaller degree – improvements regarding infrastructural issues. This law acted as a precursor for the global approach of the Law of Popular Participation (also established in 1994). The latter made it possible for poor Bolivian areas to benefit, to a larger extent, from public investment (Albó, 2002).

In the last decade, Bolivia has extended the scope of the country’s educational system. In 1992, the average years of schooling was 6.1 compared to 7.4 in 2001. In todays Bolivia, 95% of children (between the ages of 7–14) are currently enrolled in school (Fretes-Cibils, Giugale, & Luff, 2006).
Context of UMSA

UMSA show great interest in developing its already existing e-learning programme in higher education. For example, the university has launched a project where the main goal is to “provide UMSA with a modern ICT infrastructure in order to strengthen its research capacity and support UMSA’s important role for the whole country development” (Spider Center, 2012).

Notes about Method Used

Because the aim of the field study is to describe and understand teachers’ beliefs of e-learning in higher education, it was decided to use a qualitative method. Both quantitative and qualitative methods were considered, but, in the end, it is the existing research question that should determine which of the methods should be used (Kvale, 1997). The main goal of qualitative methods and quantitative methods are often said to be the same – namely, to find the causes and relations of what is studied – but it is the actual means to realising the main goal that are different (Watts Bolsen, 2007). However, the qualitative analysis is appropriate to rely on to detect phenomena’s different structures, properties, meanings, and variations (Starrin & Svensson, 1994). Merriam (1995) led a similar argument:

Qualitative research is ideal for the following: clarifying and understanding phenomena and situations when operative variables cannot be identified ahead of time; finding creative or fresh approaches to looking at over-familiar problems; understanding how participants perceive their roles or tasks in an organisation; determining the history of a situation; and building theory, hypotheses, or generalisations. (p. 52)

The reason we found the qualitative method an appropriate approach for this field study, among others, is because qualitative methods enable a rich amount of detailed and valuable information (Kvale, 1997) about people’s conceptions, thoughts, and experiences regarding certain topics or circumstances of life (in this case, teachers beliefs about e-learning). Our intention using a qualitative method is not, as Kvale described, to “quantify objective data” but instead to “interpret meaningful relationships” (p. 17).
Interviews and Observations

To answer the aim of the thesis, interviews were conducted with teachers from different faculties and educational units. To obtain a clear idea of UMSA’s e-learning teaching practice – enabling analysis of the data generated and draw conclusions – semi-structured interviews were used (Dalen, 2007; Kvale, 1997). The open questions that semi-structured interviews enabled (Whiting, 2008) made it possible to identify teachers’ attitudes, views and understandings about e-learning in their educational practices. This interview form was most appropriate – compared to structured or non-structured interviews – because the purpose of the study was to investigate teachers’ beliefs about e-learning in higher education at UMSA. The interviews, which were constructed from observations and field notes, contributed to that TPCK (Mishra & Koehler, 2006), as a theoretical model, made it possible to capture the different teachers’ beliefs about learning and teaching with technological tools.

Another method used in this thesis was observation. The reason for using observation was to gain better insight on how teachers at UMSA are using technological equipment in their educational practices. The intention was to explore teachers’ natural work environment for a view of how the technology is integrated in their work and how they are interacting with it. Observations were not used as a main method for collecting empirical data for the thesis. They should rather be understood as a method for gaining important understandings and knowledge about the context of the field study as well as to enable field notes that could support and guide the building of the interview guide. Thus, the observations have served as a central pillar for designing of the interviews. The empirical material was collected using the interviews. However, observation as a method has been beneficial for this thesis because they have improved the authors’ understanding of the e-learning practices at UMSA.

We were aware that these choices of methods lead to occasional, but surmountable, challenges such as cultural clashes. Since the majority of the Bolivian people who live in La Paz speak Spanish, we were compelled to use an interpreter during most interviews. The consequences of using an interpreter as well as critical discussions about the method used are provided below in the Discussion section.
Data Collection and Data Analysis

The interviews were conducted at each teacher’s office at UMSA and lasted between half an hour and one hour. During each interview, one of the authors of this thesis asked questions and the other took notes. Each interview was recorded and literally transcribed. The data was analysed through reviews of each transcript where the most important aspects were identified and selected for further analysis. The TPCK framework (Mishra & Koehler, 2006) was used as a theoretical model for analysing the data. To categorise and analyse the informants responses, it was decided that responses concerning technological comments fell within the technology domain, responses concerning various teaching strategies fell within the pedagogical domain and responses concerning a specific subject matter fell within the content domain. Responses involving two different fields were subsequently divided to each category respectively (e.g. TPK, TCK, PCK, TPCK). Further, comments that showed a clear correlation (even though they concerned different fields) were divided into these domains. This step by step method made it possible to divide different statements into different knowledge domains.

Interviewees

Interviews were conducted with 10 teachers and professors from 7 of UMSA’s faculties and other educational units. To get variation in data, efforts were made to find informants that represented different faculties and various subject fields. Following, we point out some examples of the diversity of informants.

All informants who were interviewed have degrees from a university or college. One professor had a rather long experience of working at one of UMSA’s faculties. Most of his work involved giving lectures and presentations for students that he taught. This teacher was also involved in a few side projects where his expertise was used for different undertakings at different companies and corporations in La Paz. A fair amount of his teaching involved e-learning since he mainly uploaded different learning contents for his students to access on different platforms. Another teacher worked mainly with teaching and preparing students for a specific profession. His work primarily consisted of teaching students different skills and approaches which did not include e-learning to any large extent. One of the informants was also deeply involved with a Catholic university in La Paz. This teacher alternated between teaching two subjects, where e-learning was included to a large extent in one of these. Another informant used e-learning almost exclusively in his teaching. In the courses for which he was responsible, some kind of online platform formed the base of communication between him and his students.
In general, the interviewed teachers had various experiences of classroom teaching as well as teaching through e-learning in higher education. Furthermore, the interviewees reflected a broad group of teachers at UMSA and a range of age groups. For different reasons, two of the interviews were conducted via e-mail. The remaining eight were conducted face to face. In this field study, the real name of each interviewed teacher or professor was replaced by a fictional name. Since there was no formal decision or policy stating that 100% e-learning courses should be conducted at UMSA, the majority of informants are or have been using blended learning as their main point of departure for teaching. One informant used solely e-learning for teaching purposes.

Table 3

Summary of Teachers Interviewed

<table>
<thead>
<tr>
<th>Pseudonym of teacher/professor</th>
<th>Gender</th>
<th>Interview type</th>
<th>Experience at Each Faculty (blended learning)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberto</td>
<td>Male</td>
<td>Physical</td>
<td>10</td>
</tr>
<tr>
<td>Alvaro</td>
<td>Male</td>
<td>Electronic</td>
<td>12</td>
</tr>
<tr>
<td>Andrés</td>
<td>Male</td>
<td>Physical</td>
<td>25</td>
</tr>
<tr>
<td>Antonio</td>
<td>Male</td>
<td>Physical</td>
<td>10</td>
</tr>
<tr>
<td>Carlos</td>
<td>Male</td>
<td>Physical</td>
<td>10</td>
</tr>
<tr>
<td>Daniel</td>
<td>Male</td>
<td>Physical</td>
<td>30</td>
</tr>
<tr>
<td>David</td>
<td>Male</td>
<td>Physical</td>
<td>6</td>
</tr>
<tr>
<td>Enrique</td>
<td>Male</td>
<td>Physical</td>
<td>4</td>
</tr>
<tr>
<td>José</td>
<td>Male</td>
<td>Physical</td>
<td>12</td>
</tr>
<tr>
<td>Ricardo</td>
<td>Male</td>
<td>Electronic</td>
<td>12</td>
</tr>
</tbody>
</table>

* Approximate number of years.

Ethical considerations

The Swedish Research Council (2002) has founded the so-called requirement of individual protection. This requirement is, according to The Swedish Research Council, the most important standpoint for researchers. The main aim is to protect members of society from different forms of physical and mental harm. The requirement of individual protection can be divided into four main sections:

1. Requirement of information.
2. Requirement of consent.
4. Requirement of use.

Prior to all interviews – in accordance with the requirement of information and consent – the participating informants in this field study were told the aim of the study as well as their own role in the study. They were also informed that partaking in interviews was completely voluntary and that they had the right to both stop the interview and drop out of the study at any time and for any reason. All informants voluntarily agreed to participate in the study.

Following the confidentiality requirement, all informants were given a fictional name to protect their real identity. In addition, the facility where each informant is employed cannot be traced. Finally, the main aim with the collected material has been to use it exclusively to finish the work with this thesis. Therefore, the requirement of use has been taken into account.

Trustworthiness

Credibility and reliability are two common terms used to determine the quality of a study. A study that has been thoroughly and systematically performed is said to be of high quality (Fejes & Thornberg, 2009). A qualitative approach has been used due to the decision that such an approach could make it possible to answer the aim and research questions of this thesis in a productive way. In the study, the researchers have tried to carry out both data gathering and the analysis as thoroughly and systematically as possible. The analysis of the recorded and transcribed interviews was done using the TPCK framework (Mishra & Koehler, 2006). By making the theoretical framework for analysis explicit to the readers, it is hoped that the results and conclusions are cogent and judged as reasonable. In addition, appropriate literature has been reviewed, and the analysis and discussion sections are deeply rooted in this empirical material.
RESULTS

This part of the thesis presents the results from the observations and interviews with teachers and professors who represented different faculties and educational units at UMSA.

Based on the results of the interviews, there seems to be a growing interest and optimism among most informants to combine – to a larger extent than before – traditional classroom teaching with the use of different technologies in their educational practices at UMSA. This was especially apparent among the informants who had previously used technology in their teaching. However, teachers with little or no previous technological experience were less willing and more hesitant towards the introduction of technologies in their teaching. In general, most informants tended to talk about what they understood as major challenges and problems that comes with e-learning. They described a variety of complications for the uptake of e-learning at UMSA and, in addition, were unanimous about most of the advantages and benefits that e-learning can bring. The presentation of the results is divided into three main themes, presented below.

Teachers’ Positive Beliefs Towards e-learning at UMSA

Geographical and time aspects

The most positive aspect of e-learning among the informants was that e-learning courses are not tied to a certain physical place or time. Alberto clarified that this is beneficial for both teachers and students. He explained:

We are avoiding physical spaces. We don’t have to be in the same place, we are online in the same places. (Alberto)

Alberto, who has a master’s degree in e-learning, argued that this is an advantage for him as a teacher because of the possibility to teach students from different parts of the country. He further explained that e-learning courses help students get an education without the demand of being located in a specific physical place. Another positive aspect came from Ricardo. He argued, from an economical point of view, that a lot of money could be saved by using e-learning, since both teachers and students are not forced to transport themselves to a certain geographical...
location for education. He further believed that teaching stretching over geographical boundaries would not have been possible without the use of e-learning. Carlos and Andrés also believed that time and geographical aspects are two of the key benefits of e-learning. E-learning, according to Enrique, is a great educational tool for the students he teaches. This is especially the case when providing students with the most appropriate contents for their courses.

**Resources**

According to Enrique, positive effects of using e-learning in UMSA can be found by looking at private universities in La Paz. He explained that the private universities have extensive resources, such as lab areas and technical equipment for educational purposes. This is not the case in public universities such as UMSA. With such resources, the students are able to interact immediately with the computers. He also stated that the majority of teachers and students in private universities have computers and home connection to the Internet, which is very beneficial for them. This provides better preconditions and learning opportunities for students, Enrique asserted.

Despite the fact that bandwidth at UMSA and in Bolivia, in general, is very poor, Antonio believed that the mere existence of computers and other technological equipment is an advantage in itself. Because UMSA recently established a free wireless network for students and staff, Daniel was sure that UMSA education through e-learning will continue to grow and develop. The introduction of a wireless network is a pre-condition and a first step for achieving 100% e-learning courses at UMSA, Daniel explained.

Furthermore, Enrique believed that there would probably be an increase in the general uptake of e-learning in La Paz in the future since most of his students are interested in new technology. He clarified that it is of significant importance that other teachers and professors at UMSA discover the advantages of using technological tools in their teaching;

> The new generation is trying to introduce new methods…. New methods obviously involve technology. And most of them have the ability [to use technological tools], and they like it. They adore it! And as they like it, they learn. Because it’s motivating for them. (Enrique)
Training and optimism

Enrique, who has a computer expert degree and is in charge of a technological training programme for teachers at UMSA, described that the great interest towards technology among his students makes it easier for him to develop and organise technology-based lectures, especially since most of them have computers and access to the Internet at home. He also explained his desire to help the students learn as much as possible about new technologies; however, he also respects students who do not like it or prefer to use technology in their learning together with the ones who do not have computers at home. Enrique said that it is a positive challenge for him to learn how to create and deliver content for those students who have little or no knowledge in how to handle and use technological tools. Another positive challenge, according to Enrique and Daniel, is to meet their students’ different learning styles and to provide contents in different ways.

A common belief of all of the informants was that they preferred to have more experience and professional training in how to use technological tools for educational purposes. There was a positive attitude towards more training. Antonio argued that teachers and professors continuously must be educated in how to use technology in education:

It’s part of what they have to do, keep on learning all the time. (Antonio)

Andrés explained;

It is important for us as teachers to receive or access teaching techniques and learning about technology. (Andrés)

Carlos also explained that it is rather important for teachers to receive more training to use technology in the most effective way. According to Enrique, there are many professionals from Bolivia’s surrounding countries that come to La Paz and UMSA to offer technology training for teachers and professors. Enrique believes this is a positive situation for the future since teachers are in need of more technological training.
Teachers’ Perceived Obstacles for Entirely Integrating e-learning at UMSA

Resources

Several of the informants complained about the lack of good and updated educational materials, such as books (physical and electronic), articles, computers, and so on. One of the informants described the situation in Bolivia 15 years ago:

It was quite difficult [to use technology] at the beginning. (Enrique)

Enrique further explained that the main technological issue was that public access to the Internet was very limited as well as very expensive in Bolivia. At that time, few people owned a private computer. In fact, the results of this study show that these issues still are a noticeable problem today. All informants stated that poor Internet connection and general access to the Internet are the largest problems for taking up e-learning at UMSA. José – who has experience from teaching technological subjects in different countries – described that the technological infrastructure at UMSA is extremely poor and that the university, in this regard, is lagging 25 years behind compared to universities in developed countries. José also described how the slow Internet connection is affecting today’s students at UMSA:

Bandwidth here in UMSA, and in general in Bolivia, makes it difficult for them [the students] to work on digital contents. (José)

Teachers’ misconceptions and critical views towards the lack of knowledge of other colleagues

The informants who were well experienced in using technology for teaching purposes often expressed negative beliefs about teachers and professors in higher education who have poor knowledge in using technological tools. One of the informants argued that only a few of the entire faculty at UMSA are capable of using e-learning. According to Enrique, the reason large numbers of teachers do not have the skills for e-learning is that these teachers are not interested in being taught and prepared to use e-learning in their own subjects. Enrique believes that this lack of interest is a result of teachers not understanding the potential benefits that e-learning might have in their subject. Enrique also stated:
Most teachers are old – old fashioned we can say – close minded, they don’t want to update. They say ‘No, I’m going to use this [other teaching method] because I know that it works for me’. (Enrique)

A few teachers believed that the problem of taking up e-learning at UMSA is that some students misinterpret the amount of work teachers are devoting to organise e-learning courses. For example, Daniel argued;

Some students think that doing the e-learning is to reduce the workload of the teachers, yeah. That they [the teachers] put everything there and then he will work less time, but in reality, it is the opposite because they don’t have any previous experience about doing e-learning or learning so they have a lot of misconceptions. (Daniel)

As seen, Daniel sees this as a misconception. José, on the other hand, takes a view similar to that of the students. He argued that one of the largest problems at UMSA is that teachers who use e-learning platforms, in particular Moodle,² often uses the platform merely to upload content for the students and do not provide any additional support or guidance for the students. José, along with Carlos, Enrique and Andrés showed a higher level of knowledge, compared to the other informants, in how to use Moodle.

They just put their materials, they upload to the web or Moodle, and they provide the contents to the students, that’s all. (José)

Lack of technological knowledge

A rather common, recurring statement from many of the informants was that teachers and students at UMSA lack technological knowledge. Students’ lack of such knowledge, especially, is believed to be a large problem for teachers who are running e-learning courses. Alberto, for example, explained that one of the most frustrating aspects of a previously completed e-learning course (of which he was in charge) was that he needed to teach and demonstrate for the students.

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² Moodle is an online platform for e-learning.
how they were supposed to interact and use different web-based contents before the actual course could begin.

Enrique believed that students’ lack of technological skills is based on economical circumstances. Students are often brought up under poor family relationships and, because of this, computers and other technological tools do not exist in the household. As students do not always know how to use computers effectively, a large amount of time for the teacher is spent educating and instructing students how to interact with the computer. For the teacher, this means that teaching becomes very time consuming. In addition, Daniel expressed concerns about how the extra time burden is a problematic for teachers. He explained that teachers often prepare and organise different types of learning materials for the students. However, these materials are not always suitable for the students, as their technological skills are insufficient to handle them. Daniel explained that, on a regular basis, it takes more time than originally planned to give certain students more suitable learning material as well as instruct them how to use the technology when interacting with the material. Daniel also explained another issue for teachers at UMSA; namely that most of them are forced to take up a new subject during the school year.

Enrique presented yet another problem: He argued that teachers might not want to use technology at UMSA because they know that their own students know more about technology than they, as teachers, know. He pointed out that teachers should always “be a step in front of their students”, implying that teachers must have more knowledge about the subject that they teach as well as the technologies used for teaching purposes (Enrique). The fact that teachers are aware that they know less about technology than their students creates a situation where teachers get frustrated and upset. In addition, Enrique thought there exists a dilemma because teachers at UMSA want to instruct and teach their students, for example, in how to use computers in education. However, he questions whether or not this is possible because of teachers’ own poor technological knowledge (Enrique).

Older and newer perspectives of teaching

David pointed out another issue for the integration and use e-learning at UMSA. He believed that most students who register at various educational programs at UMSA generally like the idea of using e-learning for educational purposes. The reason is that students, to a larger extent and compared to UMSA’s teachers and professors, appreciate “these new ways” (David) of teaching
and learning that e-learning offers. The teachers, on the other hand, according to David, are more in favour of teaching conducted in physical classrooms. Antonio shared a similar view:

The traditional education given in UMSA and most of Latin America is a way where the teacher is the centre of the class and the students are passive elements. But what I do, a lot of workshops and a lot of practice, they have to do a lot of practice and be active members of the class. (Antonio)

Enrique talked about the fact that Bolivia is a developing country, and he identifies a connection between this and preferred ways of teaching and learning:

Well, we can say not developed country at all. We still have that mentality that we have to learn by memorising, yes. And some teachers follow those concepts that students should memorise. (Enrique)

David explained that he believed the general adult population of Bolivia is in favour of this traditional classroom-based teaching method. David, who largely emphasizes a horizontal teacher-student relationship, has distanced himself from the use of e-learning. This is mainly due to his belief that e-learning, to a large extent, reminds him of karaoke; where the students are only expected to repeat a certain message or a text, not think and critically reflect upon a topic. He cannot see the real benefits of e-learning for students or how teaching, through e-learning, can achieve every department’s pre-written learning objectives (David). David further argues:

Topics that require dialog and reflection between students and professor are not appropriate for e-learning. (David)

According to Antonio, teachers themselves have the ability to choose how they want to teach: either through the use of e-learning or by means of traditional classroom-based teaching. Some teachers are motivated to teach with new technologies and, if they find it suitable, will most likely continue to use e-learning. However, others will fail and go back to traditional teaching. Antonio explained this by illustrating that some teachers will “move forwards to the new paradigm”, teaching through the means of e-learning (Antonio). However, if teachers do not have the
adquate skills or do not succeed in teaching with the new technologies, they will fall back to the old paradigm where teaching is conducted in traditional classrooms.

According to Daniel, there are only a few teachers and professors who create e-learning platforms of good quality. Of all e-learning platforms at UMSA, Daniel estimates that 20% of these platforms are developed in a good way while the rest of them are of low quality, “hanging material” (Daniel). The main reason for this is because the teachers and professors are left alone to develop e-learning courses. He further explained:

There’s not a team of people working to create a course for e-learning, so individual professors have to do everything. (Daniel)

Daniel argued that the absence of an educational technologist team makes it much more time consuming for professors to develop and fill the e-learning platforms with appropriate course material (although most teachers have the necessary technological skills). He is convinced that the teachers at UMSA need more support and professional training for developing better e-learning platforms. Daniel himself is currently in charge of an ongoing project aiming at improving e-learning courses at UMSA.

Reading and writing difficulties

Some teachers expressed worries about the fact that many students in Bolivia have difficulties reading, writing, or are even illiterate. Particularly David, Daniel, and José believed that students’ different types of reading and writing difficulties were rather negative for education in general and for e-learning in particular. David felt that reading is a fundamental element for students to learn and explained that when he realized the extent to which students do not read, he became very worried. Because of this, he has now started a project to make students read more often as well as reduce the number of illiterate students. José also expressed concerns about students, in general, who have difficulties in communicating with teachers. For example, he explained although he welcomes his students to contact him (in person or through e-mail), if they face any difficulties, many students consider teachers to be at a higher level in the hierarchy. Because of this, José argued, both teachers and students encounter difficulties in communicating in e-learning. Like José, Daniel brought up the issue of the lack of reading and communication skills:
I think a big problem with our students is that they don’t know really how to read. They read, but sometimes they don’t understand or they don’t read too much, they don’t make the effort to read too much. (Daniel)

He also spoke about the importance of communication abilities in the modern world:

Most of the students don’t know how to communicate with others, so I think that’s a very important thing that they should learn for this new era [online learning], where communications are important. They should know how to write and have asynchronous communication with others. (Daniel)

According to Daniel, the fact that most students use the call-function on their mobile devices, instead of the sms-function, is a clear indicator that young people do not have sufficient reading and writing skills (Daniel). Countries that surround Bolivia do not have the same reading and writing problems because students use the sms-function to a larger extent, Daniel explained.

Antonio and Enrique both stated that some students use computers for unintended purposes. Those students who have the ability to read, write and interact with a computer often visit social networks and other Internet sites during educational sessions, Antonio explained. He further believed that a consequence is that students cannot focus on the actual subject (Antonio).

Basic Pedagogical Viewpoints of Teachers at UMSA

**Beliefs about synchronous and asynchronous communication modes**

Nearly all informants considered both synchronous and asynchronous communication modes important when using e-learning at UMSA. For example, Alberto stated that synchronous and asynchronous communication must be combined for an online course to be effective. There are no obstacles for using either form of communication at UMSA, he added (Alberto). Alberto’s view contrasted greatly from David’s idea; namely, that it is impossible to achieve synchronous communication when using e-learning. David argued that his students are interested only in surface learning. He feels, therefore, that synchronous communication is unsuitable to use. Instead, only asynchronous is possible to achieve in online learning. Alvaro expressed another
belief, saying that he understands both modes of communication as central in e-learning and added:

I think that both are important, and maybe asynchronous communication will be more efficient in Bolivia because we don’t have a very good or faster Internet yet for make an efficient synchronous communication. (Alvaro)

When teaching through the use of e-learning, Carlos strives to avoid using synchronous communication because his impression of the synchronous communication mode has been that it is equivalent to students attending lessons in the physical classroom. The main advantage, according to Andrés, is that e-learning is not synchronous, only asynchronous (Andrés). Carlos held a similar belief, adding that the asynchronous communication mode is the “prime model” (Carlos) of e-learning because the interaction between student and teacher is not determined by a specific time. Ricardo also stated this reason as central for why he exclusively uses asynchronous communication (Ricardo). Daniel, on the other hand, explained that he is forced to only use asynchronous communication – even though he would like to combine both modes – because synchronous communication cannot be used with the poor bandwidth (Daniel). Alberto, Andrés, Carlos, Daniel, Enrique, and José all made various statements indicating they believe that they have sufficient technological skills for using both asynchronous and synchronous communication.

Different needs
Whether or not students are using e-learning or traditional education, Alberto thought that the students themselves are responsible for their own learning process (Alberto). The fact that students want a diploma or certificate in a certain subject is a sign that they also are motivated to learn, he argued. Because of this, Alberto stated that teachers should support students and make sure they are responsible for their own learning process. Alberto also underlined the importance of teachers being flexible and changing their teaching when required to meet students’ different needs (Alberto). This is something that Alvaro agreed with. Alvaro, just like Ricardo, mostly uses non advanced technologies in his teaching, such as e-mail, blackboards, and PDFs. This content is provided to the students through an e-learning platform. Alvaros basic pedagogical view is that education, to the largest extent possible, should involve the use of computers. Alvaro also
believed that it is important for teachers to try new approaches to teaching and experiment with different course materials (Alvaro).

Alberto described how he had to change course materials because his students thought the content was designed in a “too childish” manner. Similarly, he had to adjust the content of another course because the students did not have sufficient technological skills (Alberto). José had a similar pedagogic viewpoint, yet he recognised that various obstacles prevent students from learning in the most efficient way:

In my ideal world students learn better if they read a lot, if they practice a lot and of course if they have enough materials to read and to work with. (José)

Antonio believed that students have their own preferred learning style. He therefore prepares a number of different contents. The students can then choose the content most suitable for his or her learning style (Antonio). Enrique, on the other hand, highlighted the use of group work. The power of group work, according to him, is that the students get immediate feedback compared to if they are working individually. However, Enrique added that when students are working individually it is important that they “suffer” (Enrique). He meant that they should suffer in a good way, being more active in the acquisition of knowledge and not relying on the teacher as the central source of information. Enrique was the only informant who explicitly stated that he conformed to a pedagogical viewpoint (connectivism). Interaction and communication are, according to Enrique and Daniel, two central elements for students’ learning. Alvaro and Ricardo focused less on communication and more on simulations. Carlos and Andrés favored individual student learning as opposed to collaboration between students.

Daniel believed that teachers and professors could change the ways in which they teach, to meet the various educational needs among their students (Daniel). He underlined that some of the teachers, during the last five years, have been changing their teaching methods. Instead of having teacher-centred lectures, some teachers are now focusing on creating student-centred lectures (Daniel). The aim with the student-centred lectures is to allow students to interact (both with various objects and other students) instead of only being passive listeners (Daniel).

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3 According to Siemens (2005), connectivism is a learning theory focusing on the idea that individual’s acquire knowledge from the surrounding environment.
This section consists of an analysis of the results from the field study using the TPCK.

The results will be analysed using the TPCK framework (Mishra & Koehler, 2006) as described in the Analytical Framework section. Analysis of the results is divided into the seven different knowledge domains inherent in the framework. Every section examines a specific knowledge domain. Compilation of the levels of knowledge that informants hold in every domain is presented at the end of each section.

Technological Knowledge (TK)

Teachers who had been using technology for educational purposes and those who felt very comfortable using technology were also the informants who recognised the most benefits from using e-learning. Most of all the informants were highly educated in their fields of expertise; but, in general, as shown in Table 4, the TK among the informants varied. However, all but one teacher had rather extensive experience in using technological tools in higher education. Informants also expressed a great interest in the use of different technological tools that enable e-learning.

Among the informants, Alberto, Enrique, Daniel, José, Andrés, and Carlos can be said to be the most educated and experienced teachers in using e-learning for educational purposes. However, it was, obvious that Alberto had been working with e-learning courses to a larger extent than the other five. As shown above, Alberto has a master’s degree in e-learning and is now in charge of providing virtual courses (complete distance courses) at UMSA. He has also been continuously involved in providing the students with more advanced technological training. Enrique also has great experience in teaching through technology. This is not surprising since he has a computer expert degree and is in charge of educating different teachers and professors in using technology in higher education. It is apparent that Carlos, Enrique, Andrés, and José hold the highest level of knowledge in how to use Moodle. José has great experience in educating students – both at UMSA and other international universities overseas – in more advanced technological subjects. Daniel is in charge of technological projects, and one of these projects’ aims at improving e-
learning courses at UMSA.

Judging from Alberto’s, Enrique’s, Daniel’s, Jose’s, Andrés’ and Carlos’ large technological experiences, it seems these teachers are capable of using the advanced technologies. Using advanced technologies is a factor that Mishra and Koehler (2006) argued characterises teachers with high TK. Another confirmation that the TK among these teachers are high is that all of them have been teaching technological-centered subjects and have been using technological tools in education for a long time.

When analysing Alvaro’s TK, it is evident that he does not have education that is largely influenced by technology. Compared to the level of TK held by many of the other teachers, it is apparent that Alvaro is not using several advanced technologies in his teaching. Apart from using standard technologies, such as blackboards and articles, Alvaro uses an e-learning platform that contains prepared digital content. Furthermore, that Alvaro uses a mix of both standard and advanced technologies in his teaching, which points at a medium level TK. The same applies to Ricardo, whose previous education is similar to Alvaro’s. Ricardo mostly uses the standard technologies in his teaching as does Alvaro, but sometimes he combines these standard technologies with advanced ones, such as video materials. Therefore, Ricardo’s TK is understood as being on a medium level.

David is the only one of the informants who has basically no experience in technological tools. He took a few e-learning courses in the past and integrates only a small number of standard technologies in his teaching (physical blackboard, etc.) – but only when necessary. David does not have the skills or the interest in using more advanced technology for teaching. Consequently David’s TK is at a low level compared to the other informants.

<table>
<thead>
<tr>
<th>Teacher/Professor</th>
<th>Level of TK</th>
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<tbody>
<tr>
<td>Alberto</td>
<td>High</td>
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<td>Alvaro</td>
<td>Medium</td>
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<tr>
<td>Andrés</td>
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<td>Antonio</td>
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<td>Daniel</td>
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<td>David</td>
<td>Low</td>
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<td>Enrique</td>
<td>High</td>
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Table 4. Compilation of Informants’ Levels of TK
There is a clear relationship between the informants’ technological skills and their ideal communication modes when using e-learning. For example, all teachers and professors who have a high level of TK (and thus are able to use advanced technological tools) are those who strive to use a combination of synchronous as well as asynchronous communication. These teachers did not express that either mode of communication was hard to achieve because of personal inadequacy or competence. On the contrary, they were all confident and had the competence to use both modes of communication. However, in analysing David and Ricardo (the informants’ with the lowest technological knowledge), it is clear that their lack of technological competence is a key factor for not using synchronous communication. They believed that they could not use synchronous communication because it was too hard for them.

**Pedagogical Knowledge (PK)**

Enrique described, in a rather explicit way, that his basic pedagogic view was almost exclusively based on connectivism, mostly because he tends to use fewer traditional learning materials (such as books and articles) and instead focus on different types of interaction among students. In addition, Enrique used video and audio materials so that students could learn regardless of their geographical location. It is understood that Enrique’s PK is at a high level because he has a concrete pedagogical viewpoint to which he conforms. Furthermore, Enrique is following this pedagogical viewpoint because he believes that communication (apart from the subject he teaches) is fundamental for students in today’s modern society. It seems that another informant, David, has a modern form of PK because of his understanding that teaching and learning should be horizontal, not vertical (where the teacher has the authority). Therefore, Enrique and David’s level of pedagogical knowledge can be labelled as high because both teachers’ pedagogical viewpoints make it possible for their students (no matter their preferred learning styles) to acquire knowledge.

Enrique teaches on the basis of a distinct pedagogical viewpoint, implying that he distinguishes himself from the rest of the informants who, in contrast, do not have a clear pedagogical viewpoint. The remaining nine teachers did not explicitly state that they followed a specific pedagogical viewpoint; on the contrary, these teachers tended to describe certain learning
techniques or pedagogical methods as the most central in their teaching. Daniel, for example, was certain that problem-based learning (PBL) is important for his students’ learning process. In line with Enrique, Daniel strongly expressed that communicative competence is essential for students to learn. Alvaro and Ricardo, on the other hand, believed that students learn most efficiently by doing simulations as well as using multiple teaching modes. Alberto and Antonio did not have a defined pedagogical strategy; however, both believed that it is important that students are genuinely involved in the learning process; the students take large responsibility for what to be learned. They also expressed their belief that students learn most efficiently through practical, instead of theoretical, homework. This points at an analytical conclusion that both Alberto and Antonio strive for a learning environment where the students are active learners, as opposed to passive listeners.

José had similar beliefs as Alberto and Antonio about delivering practical work for the students but pointed especially to the importance of providing students with appropriate and sufficient work materials. He believed that students learn most efficiently if they have access to proper, and sufficient materials for learning. This is clearly an important statement because providing students with updated and varying learning materials is understood as important for their learning processes. Still, Alberto and Antonio have higher level of PK than José, due to their more modern pedagogical view of student-centered courses where the students are active participants. Carlos and Andrés had similar beliefs about mixing theoretical and practical learning for students. However, they assured that every student should learn individually without any formal collaboration. It seems to be the case – even though Carlos and Andrés are aware that students have different learning styles – they only strive for individual student learning when planning their courses. To meet students’ different educational needs and learning styles, it would probably be more reasonable to mix individual and collaborative learning. If this had been the case, Carlos and Andrés would have reached a higher level of PK.

Following a fixed pedagogical viewpoint (such as Enrique’s) or using different learning techniques and pedagogical methods, it could both mean that the teacher has a high or low level of PK. In Enrique’s case, it seems clear that his PK is high because his students learn effectively through connectivism. However, this might not have been the case if he taught a different subject. For example, to use connectivism in a subject such as mathematics (where students work more independently, focusing less on communication skills) might not have been appropriate. Hence, every teacher must shape his or her pedagogical viewpoint along with the subject taught to obtain a high level of PK. The informants’ PK levels are presented in Table 5.
Table 5: Compilation of Informants’ Levels of PK

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<th>Teacher/Professor</th>
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<td>Alvaro</td>
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<td>Andrés</td>
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<td>David</td>
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<td>Enrique</td>
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<td>José</td>
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<td>Ricardo</td>
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Content Knowledge (CK)

To analyse the teachers’ levels of CK, it is first important to study their individual academical backgrounds. José, Ricardo, Alvaro, Daniel, Carlos and Andrés have higher degrees in the field of Science. David, Enrique, Antonio, and Alberto have studied different subjects in Humanities. The fact that all teachers and professors have a previous higher education is a positive factor since higher education provides students with expert knowledge. Because the teachers are well educated, the risk for misinterpreting subjects to their students is reduced.

As most teachers are required to change one of their subjects during the school year, it could result in teachers developing new knowledge in many related subjects. This means that teachers will broaden their competence and extend their teaching opportunities. In doing so, teachers are strengthening their existing levels of CK. However, this arrangement – that one subject needs to be replaced by a new one – might also lead to the total opposite, namely that teachers develop only surface knowledge in new and different fields and topics. Such a situation would be negative for teachers and students because teachers might find they are able to deliver only a limited amount of knowledge, compared to teachers with expert content knowledge. A consequence of teachers limited, or insufficient, level of CK is that students might be at risk of gaining only a surface understanding of the subject that is being studied.
Although the authors of this thesis have a limited insight into the informants’ teaching practices, it seems every teacher and professor, apart from their extensive previous education, had a large interest and dedication about their subject(s) of expertise. This suggests that all informants who participated in this field study had a high level of CK (see Table 6).

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<th>Teacher/Professor</th>
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**Technological Pedagogical Knowledge (TPK)**

As shown in the section of results, most of the informants’ believed that, for example, poor bandwidth and other technological infrastructure issues are making it difficult to use all the advantages of e-learning at UMSA. Despite this, there are examples of how the teachers take advantage of how different technologies can be used to make their teaching effective. For example, in Alberto’s classes, modes of teaching modes are often mixed. Because Alberto is teaching a subject reliant on both asynchronous and synchronous communication for effective student learning, he is alternating the two modes. When teaching, he uses an online platform for students to send in their homework along with video graphics to support students in gaining a broader understanding of the subject that is being taught. In a similar way, Alvaro believes that students learn in the most effective manner, for example, when interacting with reproductions, such as various video and audio materials. Therefore, he is using digital technology to provide students with different simulations. As Antonio’s main pedagogical argument is that students learn in different ways, he is also using technology to provide his students with different learning contents. Hereby, it becomes visible how these three teachers have grasped the idea that technology might act as a valuable tool for teaching. Alberto, Alvaro, and Antonio are applying
different types of technological tools and are not using traditional methods of teaching. This is a strong indicator that these teachers have a high level TPK because they succeed in combining their personal pedagogical views while integrating them with digital technology resources. Since José strives for practical learning activities among his students, his TPK is considered at a medium level because he uses the Moodle platform and uploads material that his students can access.

However, from the interviews, there are some examples of informants’ who have a lower level TPK (see Table 7). One example can be found when studying Antonio’s statement that students in some classes have trouble focusing on their school assignments because they are going online in different social networks. Although Antonio’s pedagogical views are well linked with the particular technological tools used, the problem is that the course itself might become too monotonous or boring for students. From this perspective, Antonio’s TPK can be said to be at a medium or low level. The same low level of TPK can be found for David. He believed that synchronous communication is not realistic for him because his students are interested in only shallow learning. As previously stated, David has a fixed pedagogical view, although he does not favour e-learning. The reason David has a lower level TPK is that he is quite narrow-minded when it comes to combining his pedagogical views with different technologies. His unwillingness to use technology – although he probably is not aware of its advantages – is particularly noticeable since he said that e-learning is just like karaoke. To improve his TPK, he should be more open towards the combination of technology and his pedagogical beliefs.

Enrique is using technologies that are supporting his pedagogical viewpoint; that is, largely based on connectivism. He has good knowledge about how various technologies can be used to meet his pedagogical viewpoints. This is manifested in particular by his use of podcasts, mp3 files, and other tools that make it possible for his students to interact with different contents. This concerns Daniel, who showed signs of knowing how different technologies change his way of teaching. For example, he uses an interactive projector that makes it possible for his students to interact and learn through the means of technology instead of merely being passive listeners and recipients of information in the classroom. For such reasons, Daniel and Enrique can be said to express a high level of TPK.

Carlos and Andrés both stated that students, in general, learn in different ways and that it is important for teachers to modify their teaching to meet students’ various needs. However, when
asked how both of them accomplish this adaptive form of teaching, no clear strategies were presented. Instead, Carlos and Andrés agreed that they used technologies such as PowerPoint presentations, digital articles, and PDFs. Ricardo did not give a variety of suggestions about how to meet students’ different needs; he recommended only the use of various videos as a complement to other learning contents. Carlos, Andrés, and Ricardo’s use of these few technologies to carry out their teaching differs quite a lot from Alvaro’s and Alberto’s, who combine a larger diversity of technologies with their pedagogical beliefs. This suggests that Alvaro and Alberto have a higher level of TPK.

Table 7: Compilation of Informants’ Levels of TPK

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<td>Daniel</td>
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<td>David</td>
<td>Low</td>
</tr>
<tr>
<td>Enrique</td>
<td>High</td>
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<tr>
<td>José</td>
<td>Medium</td>
</tr>
<tr>
<td>Ricardo</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Technological Content Knowledge (TCK)**

Many of the informants presented their own ways of how to provide the contents for students through the existing technology. As mentioned earlier, Enrique is one of the informants who can be said to express the highest TK and is clearly one with a high level of TCK. The argument for this is that he is well aware of the fact that students have different learning styles, and, second, that he is creative and knows how he can provide his students with content using different technological tools. He provides podcasts for those students who do not have computers and Internet connection at home, as well as PowerPoint presentations, videos, and PDFs for those who are able to access the learning platform through computers.

Daniel is another informant with a high level of TCK. He is also aware of the fact that students do not all share the same learning styles and that the content, therefore, has to be provided in different ways to satisfy the educational needs among the students. As mentioned, the quality of
the Internet connection in La Paz and the rest of Bolivia is poor. However, to overcome this problem (which certainly causes trouble for the students), Daniel placed the content from the web-based platform on CD-ROMs that he hands out to his students to avoid various obstacles caused by the poor Internet connection. Daniel also takes advantage of students’ increased use of mobile phones and mp3s when providing content, which is beneficial since mobile phones and mp3s work as a complement for those without a computer at home. For example, he provides them with e-books and information in mp3 formats that can easily be transferred to students’ own mobile and mp3 devices. As seen in Table 8, Daniel has a high level of TCK. In addition, Alberto represents a high level of TCK since he is using technology in different ways to provide learning content to students. When it comes to Alvaro and Ricardo, they are using suitable and appropriate learning technologies; however, the fact that both teachers use only few technologies (Alvaro uses various digital simulations, and Ricardo uses video simulations) means that their students do not get a rich variation of learning technologies compared with students taught by teachers with a high level of TCK.

José, Carlos, and Andrés are those informants who express a medium level TCK. José, for example, mainly uses Moodle for e-learning purposes. Carlos and Andrés, as stated before, focus on using PowerPoint presentations and various digital articles for their students. These three teachers have not yet understood the ways in which technology might enhance their students’ learning processes. José, for example, could use different computer programs to make his students learn in a more exciting, different manner. The same applies to Carlos and Andrés, who most likely could trade their presentations and PDFs for more interactive technologies. Judging by José’s, Carlos’, and Andrés’ choice of learning technologies, it seems they could be using more appropriate technologies to present content for their students. Antonio’s TCK is placed at a medium/low level because he does not utilise the most appropriate technologies in his educational practice. Instead of only using different workshops, he should aim at using technologies more suitable for the content matter he teaches. Although David has a high level of CK, the fact remains that he has no technological skills. Therefore, David’s level of TCK must be regarded as low.

Table 8: Compilation of Informants’ Levels of TCK

<table>
<thead>
<tr>
<th>Teacher/Professor</th>
<th>Level of TCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberto</td>
<td>High</td>
</tr>
<tr>
<td>Alvaro</td>
<td>High/Medium</td>
</tr>
</tbody>
</table>
Alvaro was one teacher who taught in a way that indicated that he possessed a high level of PCK. He teaches a subject in which he needs to present students with various two- and three-dimensional figures and symbols for his students to thoroughly understand the subject. Alvaro mainly uses computer simulations (and not textbook materials), which points out that he also has a high level of PCK. The reason is that Alvaro is aware that his subject cannot be taught, for example, through the use of textbooks and homework. Because of this, he adapts his pedagogical techniques to meet the teaching requirements of his specific subject. As seen in Table 9, the same relates to Ricardo, who teaches a similar subject. Much like Alvaro, he uses various pedagogical techniques – simulations, video simulations, and ordinary lectures – as a means for students to understand the specific subject. Similarly, David uses a teaching approach that is adapted to the actual subject taught. From a traditional teaching perspective, David’s PCK is at a high level (even though he does not use technology to a large extent). Another important reason David’s PCK is high is because his pedagogical technique has been developed over a long period of time. Enrique also has a high level of PCK because he uses different pedagogical techniques, strongly based on the connectivism which his subject requires, such as online and physical interaction.

As explained in the PK section, Andrés and Carlos alternate between theoretical and practical teaching. Furthermore, both of them organise their subjects in a way that predominantly makes students learn individually. The fact that their students mostly work by themselves is not optimal because the subject being taught is dependent on both individual and collaborative work. Therefore, Andrés’s, and Carlos’s levels of PCK are at a medium level. José, Daniel, and Antonio can be placed at the same level of PCK because they strive for practical, highly interactive learning activities. However, the subject that these three teachers teach is a highly technical one, dependent mostly on practical tasks but also theoretical elements. To improve their PCK José,
Daniel, and Antonio should consciously integrate more theoretical features in their teaching practices. Also explained in the PK section, Alberto (whose subject mostly centers on linguistics) attempts to give his students practical homework. The fact that his students receive various homework assignments – and thereby learn in a practical manner at home – is a strong indicator that Alberto has a high level of PCK. However, Alberto’s courses are mainly conducted online in the form of e-learning. This might have negative implications on his teaching. The very reason for this is poor bandwidth in Bolivia. If there were not an issue with the bandwidth, Alberto would have the opportunity to interact with his students synchronously to follow their learning progress. The current situation prevents him for doing so and, therefore, his PCK must be valued as being on a medium level. Daniel teaches a technical subject. He strives to combine both teaching the subject itself and teaching his students about the importance of asynchronous communication. To actually learn the subject, Daniel makes student interact with the computer in different ways.

**Table 9: Compilation of Informants’ Levels of PCK**

<table>
<thead>
<tr>
<th>Teacher/Professor</th>
<th>Level of PCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberto</td>
<td>Medium</td>
</tr>
<tr>
<td>Alvaro</td>
<td>High</td>
</tr>
<tr>
<td>Andrés</td>
<td>Medium</td>
</tr>
<tr>
<td>Antonio</td>
<td>Medium</td>
</tr>
<tr>
<td>Carlos</td>
<td>Medium</td>
</tr>
<tr>
<td>Daniel</td>
<td>Medium</td>
</tr>
<tr>
<td>David</td>
<td>High</td>
</tr>
<tr>
<td>Enrique</td>
<td>High</td>
</tr>
<tr>
<td>José</td>
<td>Medium</td>
</tr>
<tr>
<td>Ricardo</td>
<td>High</td>
</tr>
</tbody>
</table>

**Technological Pedagogical Content Knowledge (TPCK)**

In this section, there are some informants who clearly distinguish themselves from the others (Table 10). These teachers are Alberto, Daniel, and Enrique. All these teachers showed a high level of knowledge in most domains. In accordance with Mishra and Koehler (2006), these three teachers showed that they have a good foundation for teaching by using technology. It is also clear that Alberto, Daniel, and Enrique have the ability to use different technological tools in combination with their preferred pedagogical views and specific subject contents. These teachers
have shown that they can use, and completely trust, technology to make students learn more efficiently.

In close connection to these three teachers are José and Alvaro, whose TPCKs are at a high/medium level. José and Alvaro have rather extensive knowledge about integrating technology in their teaching practices. However, they do not demonstrate knowledge results as high as the three abovementioned teachers in using technology to support teaching in their core subjects. Andrés, Ricardo, and Carlos showed average levels of knowledge in most domains and are regarded as having a medium TPCK level. The same concerns Antonio because his level of knowledge varied throughout the domains. Because the TPCK framework is dependent on teachers’ technological knowledge, David’s TPCK must be regarded at a medium/low level, even although he showed signs of higher pedagogical and content-related knowledge domains.

Table 10: Compilation of Informants’ Levels of TPCK

<table>
<thead>
<tr>
<th>Teacher/Professor</th>
<th>Level of TPCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberto</td>
<td>High</td>
</tr>
<tr>
<td>Alvaro</td>
<td>High/Medium</td>
</tr>
<tr>
<td>Andrés</td>
<td>Medium</td>
</tr>
<tr>
<td>Antonio</td>
<td>Medium</td>
</tr>
<tr>
<td>Carlos</td>
<td>Medium</td>
</tr>
<tr>
<td>Daniel</td>
<td>High</td>
</tr>
<tr>
<td>David</td>
<td>Medium/Low</td>
</tr>
<tr>
<td>Enrique</td>
<td>High</td>
</tr>
<tr>
<td>José</td>
<td>High/Medium</td>
</tr>
<tr>
<td>Ricardo</td>
<td>Medium</td>
</tr>
</tbody>
</table>
DISCUSSION

This section studies comparisons between previous research and the results from the field study.

A discussion will be carried out with the intent to answer the aim of the study - to describe and understand teachers’ beliefs about e-learning in higher education at the UMSA in La Paz, Bolivia. Furthermore, the discussion will center around the previously stated research questions: (a) teachers’ beliefs towards e-learning in a developing country such as Bolivia; (b) ways that e-learning is understood to be of importance in educational practice; (c) what levels of knowledge teachers’ have in technology, pedagogy and content; (d) the relationships between teachers’ pedagogical views, content, and technological tools that e-learning enables; and (e) how teachers can impact their teaching by using e-learning. Firstly, a short discussion of the analyses will be provided, followed by a discussion that compares the findings from the study with previous research. In the last part of the discussion, some implications for the study will be presented together with suggestions for future research.

Discussion about the Analysis

By looking at the analysis of knowledge domains (see Table 11), it becomes apparent that teaching through e-learning at UMSA is a rather complex, and complicated activity (compare Mishra & Koehler, 2006). One teacher might have a high level of knowledge, for example, in the TK domain is not an assurance that the same teacher also will have a high level knowledge in the PK or CK domains.

One of the most positive results from this field study was that a large number of teachers had a high level of TK as well as PK. The reasons for this seem many. With regards to the high level of TK almost all teachers had a large degree of previous higher education associated with technology. Teachers also showed a great interest and understanding about the potential future benefits of using technology in their educational practices. Another positive aspect of their high TK is that they understood the importance of, and were able to use, not only one but various learning technologies. Whether or not teachers conformed to a specific pedagogical viewpoint, they all expressed strong beliefs about what pedagogical strategies are most effective to use when
teaching their subject. The pedagogical strategies the teachers believed in have clear connections with modern views of education where the students are active participants. They interact, collaborate, and communicate together to learn. To determine if certain informants were lacking CK, it would have been necessary to examine (at a detailed level) every teacher’s core understanding of their fields of expertise. This would have been especially important in the case of those informants who are required to stop teaching certain subjects and take up new ones. However, because of this field study’s limited time aspect, such an examination was deemed not possible to carry out.

When studying teachers’ levels of TPK, TCK, and PCK, it seems apparent that these knowledge levels are generally at a lower level compared with teachers’ TK, PK, and CK. A reasonable logic for this can be that the relationships among TPK, TCK, and PCK are more complex and involve more knowledge connections compared with the independent forms of TK, PK, and CK. Hereby, it also becomes visible that teachers’ knowledge levels tend to get lower when moving to the right side of the table (Table 11). In the last column, TPCK, only two teachers are evaluated as having a solely high knowledge level. This suggests that it is harder for teachers to maintain higher knowledge levels as more knowledge domains that are combined.

Table 11: Compilation of Informants’ Levels of Knowledge in Every Knowledge Domain

<table>
<thead>
<tr>
<th>Teacher/Professor</th>
<th>TK</th>
<th>PK</th>
<th>CK</th>
<th>TPK</th>
<th>TCK</th>
<th>PCK</th>
<th>TPCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberto</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Alvaro</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium/High</td>
</tr>
<tr>
<td>Andrés</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High/Medium</td>
</tr>
<tr>
<td>Antonio</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High/Low</td>
<td>Medium/Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Carlos</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Daniel</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Medium/Low</td>
</tr>
<tr>
<td>David</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Enrique</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>José</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High/Medium</td>
</tr>
<tr>
<td>Ricardo</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>High/Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Determining Knowledge Domain Levels

The compilation of TPCK is based on teachers’ skill levels in, first and foremost, each basic knowledge domain (TK, PK and CK). Each of these three domains is equally important when determining each teacher’s level of TPCK. However, the final TPCK grade cannot be determined by only analysing the basic knowledge domains. It is the overall assessment of TK, PK, CK, TPK, TCK, and PCK that provide the basis for each teacher’s level TPCK. By studying, for example, Carlos basic knowledge domains one would assume he has a high level of TPCK. But, taken together all his domains, it becomes clear he has a medium level TPCK.

Different Teachers’ Beliefs towards e-learning

Strive for synchronous communication

As can be seen in the Result section, the lack of technological infrastructure – such as bandwidth at UMSA – causes a variety of obstacles for teachers and students in striving for e-learning. The primary mode of communication at UMSA is almost exclusively asynchronous communication (e.g. discussion forums, e-mail, etc.). Furthermore, informants’ use of the asynchronous communication mode is shaped in accordance with Hrastinski’s (2008) proposal about most appropriate use for this mode of communication (see Table 1). However, at the same time, the continuously present issue of poor bandwidth makes it difficult for teachers to follow an idea like Hrastinski’s wherein the synchronous communication mode is to be used most efficiently. Further, a combination of both asynchronous and synchronous communication modes seems impossible to achieve due to the poor Internet connection. This is the case despite the fact that many teachers are certain that a combination of these two communication modes is a necessity for effective e-learning at UMSA. It has also been acknowledged in this field study that illiteracy is a problem that encompasses both central and rural areas of Bolivia. The reality that only asynchronous communication can be used at UMSA (and not synchronous communication) is probably not positive for e-learning at UMSA. However, the asynchronous communication mode can be seen as a tool for educating and improving students’ reading and writing skills to overcome the illiteracy issues.

Traditional versus modern forms of education

Teachers who believed that e-learning is a valuable tool in their teaching practice often based their beliefs on personal experiences. Most of them had been using e-learning for a significant
amount of time and had experienced the many ways in which e-learning contrasts from traditional classroom teaching. However, the informants who expressed more sceptical beliefs about some aspects of e-learning (or the whole concept of e-learning) also had a clear mindset that traditional classroom learning – where teacher-centred lessons serve as the dominant part – is the most preferable way of teaching. Such a belief has a number of common denominators with previous research. In particular, one can see that David is leaning towards the teaching strategies in the left side of Cohen et al.’s (2004) table (Table 2). David, who was clearly against the use of e-learning, agreed more with the teaching strategy where the teacher serves as a planner and coordinator of learning activities (traditional teaching roles) and less with the teaching strategy that the teacher should facilitate learning experiences for the students (modern teaching roles). In contrast, teachers who associated e-learning with positive teaching more often tended to choose their preferred teaching mode from the right side of Table 2. Enrique and Daniel (teachers with a high level of TPCK), for example, were more interested in active student learning and higher order thinking rather than teacher-oriented education. In short, teachers who leaned towards the right side of Cohen et al.’s table were the ones with a preference for e-learning, and the ones who did not advocate e-learning tended to favour the views on the left side. Further, it appears obvious that David is teaching by using methods such as “same time and same place” (compare Eklund, Kay, & Lynch, 2003). The reason is mainly that he seems to favour traditional learning where the teacher and students are present in the same classroom. However, in this teaching environment, it seems very hard to start take up and use e-learning because it does not conform to delivery methods such as “same time and same place”. One of the core principles of e-learning is that teaching is not bound to a specific place or a specific time (Anderson, 2008; Andersson & Grönlund, 2009; Hrastinski, 2008). This contrasts quite a bit from David’s pedagogical arguments and, as a consequence, he is sceptical about the uptake of e-learning.

Most of the teachers who were interviewed showed a great interest in e-learning. However, some seemed to be succeeding better in using technologies compared with their fellow colleagues. Alvaro, Daniel, and Enrique are distinct examples of teachers who all displayed a high level of TK due to their high degree of uptake and use of technologies in their teaching. Although, most interesting here, is that all three teachers’ successful e-learning practices seem to be a result of their modification, from traditional teacher role to the teacher role that e-learning brings about. One of the most apparent aspects of Alvaro’s, Daniel’s and Enrique’s teaching – and similar to thoughts expressed by Cohen and Nycz (2006) – is that they seem to comprehend that teachers
and students must change their roles for the transition from traditional learning to e-learning to take place. In addition, Daniel commented that some teachers are focusing more on student-centered teaching than before, which can be seen to support Andersons’ (2005) idea that teachers, in the context of online education, are not regarded as profoundly wise educators but teachers who are assisting students when needed.

Various disruption processes

As mentioned in the Previous Research section, Hiltz and Turoff (2005) argued that when there is a substitution process (such as going from traditional teaching to e-learning), it is impossible to escape some form of disruption. It seems to be clear that a large number of such disruptions can be detected from the results of this field study. One of the most noticeable disruptions in UMSA’s desire to extend its current take-up of e-learning concerns the TK of staff and students in Bolivia. All informants believed that both teachers and students at UMSA often lack the technological skills necessary for the take-up of e-learning. An interesting aspect here is that a few teachers that were interviewed did not see the benefits of using technologies compared to traditional teaching. Hereby, another disruption process is made visible; namely, additional time is needed on teacher professional development related to e-learning in educational practices. Additionally, there is a clear connection between sceptical teachers’ beliefs about e-learning at UMSA and the argument put forward by Galusha (1997) that some institutions in developing countries do not consider various technological tools (compared with other educational forms) reliable the education. At the same time, in accordance, for example, with Bates (2001), informants believed that various forms of teacher professional development are necessary if teachers are to fully adopt e-learning in their educational practice.

Discussion from a Developing Country Perspective

Importance of technological education

All teachers who took part in this study had various previous experience of teaching with technology. Most of the teachers also explained that they felt comfortable using technology. Regardless of the teacher interviewed, all informants said they required more professional training in using technological tools for educational purposes. There seem to be two main reasons for this: Firstly, there seems to be a common understanding among the teachers and professors at UMSA that technology is continuously changing and developing. Because of this,
teachers feel (independent of how much they actually practiced e-learning) that it is of great importance for them to always be informed and able to use the latest learning technologies. Secondly, teachers’ desires to develop new skills in the field of technology can be found in many of the informants’ beliefs that Bolivia is a developing country. There is an initial assumption among the informants’ that TK, from an international perspective, is a vital factor in strengthening Bolivian teachers’ competences and viability.

**Poor condition of technology at UMSA**

Many of the teachers expressed concerns that e-learning at UMSA might encounter expanding difficulties since sufficient resources, in terms of Internet bandwidth and other technological infrastructure, are missing. Poor infrastructure is a factor that, according to Sife et al. (2007), distinguishes the well-established use of e-learning in developed countries from less-established e-learning in developing countries. In addition, Forsyth et al.’s (2010) research shows that poor technological infrastructure is a significant factor for the difficulty in take-up and use of e-learning. Such a belief, expressed by most of the informants, is also present in the research carried out by Mashhour and Saleh (2010). In their research, most of the 120 interviewees complained about insufficient resources for taking up e-learning. A fundamental requirement for the uptake and use of e-learning is that students use some form of technology in interaction with teachers and other students (Anderson, 2008). However, following Anderson’s (2008) argument, e-learning at UMSA can be said to be in a preliminary stage because this fundamental requirement is unmet due to the poor Internet bandwidth, complicating teachers’ and students’ uptake of e-learning. The teachers who did not advocate e-learning could not understand how e-learning would be beneficial for them in their teaching practices. Mashhour and Saleh found similar results in their study of teachers at the Jordan University.

**Distrust towards technology**

Galusha (1997) emphasises that some educational institutions in developing countries are sceptical of, and do not rely on highly developed technological tools used in their educational practices. This scepticism can also be found in David’s discomfort and doubts about the use of e-learning in higher education. David’s uncertainty about using technological tools for teaching seems to be the result of many years’ use of, and security in, traditional teaching methods. He seems not to put trust in the potential advantages e-learning could bring, which seems to be the main reason he is still focusing on holding lectures in physical classrooms with only the help of a
traditional blackboard. This resistance to the use of learning technologies among teachers is undoubtedly an obstacle that complicates the e-learning development at UMSA. Bhuasiri et al. (2012), Anderson (2008), and Bates (2001) stated that e-learning (and its advantages) cannot be fully used unless teachers are provided with technological training courses.

**Teachers’ involvement and dedication for learning technologies**

All of the informants had a number of ideas and explanations about what has to be changed or reached to improve e-learning at UMSA. They all shared a deep interest in this specific topic, and it is obvious they have genuine motivation to improve their current educational situation. Daniel, for example, was convinced that e-learning at UMSA could be more effective if they developed educational content adapted for and suitable with mobile devices, since use of mobile phones (smartphones) are more common today among Bolivian students and younger people compared to only a few years ago. Daniel identified this as one aspect that has to be recognised, because it is important that teachers provide their students with better educational conditions and give them multiple possibilities to study. However, from a practice-oriented point of view, teachers at UMSA are rather limited in what they actually can accomplish to improve certain areas in the educational organisation. The results in this field study show that the informants believe it is the Bolivian government, in most cases, that has the final decision on whether any organisation should be provided more financial resources. According to the informants, this also concerned UMSA. In accordance with Mashhour and Saleh’s (2010) research, UMSA receiving insufficient resources from the government is a strong indication that Bolivia is regarded as a developing country and that more resources should be distributed to UMSA to further develop its existing educational practices in general and e-learning practices in particular.

**Cultural influences on teachers beliefs**

The findings in this field study support the reviewed research about teachers’ beliefs regarding e-learning. For example, in research from McConnell et al. (2008), it was found that various cultural settings impact teachers’ beliefs of e-learning. Although there were obvious inconsistencies between the Chinese and UK universities in how higher education most preferably should be carried out, both cultural views can be found from the informants’ statements in this field study. For example, the belief of the Chinese teachers – who strived for traditional forms of teaching and, at the same time, were unenthusiastic towards e-learning – complies with beliefs about e-learning present among some of the teachers at UMSA. The more positive views on e-learning –
highlighting collaboration between students and teachers – were found at the UK university. These positive views about e-learning were found among several of the informants, such as Enrique, Daniel, and José. It is possible to identify different teachers’ beliefs about e-learning from both the Chinese and the UK cultural settings implies that e-learning is understood in a unique way depending on the cultural context in which learning activities occur. There seems to be the case that the cultural context of UMSA affects teachers’ understandings of the concept of e-learning. For example, those informants who favoured e-learning did so largely because they understood that different learning technologies would be more beneficial for them compared to traditional classroom learning. On the other hand, those informants who did not advocate the use of e-learning seemed to believe just the opposite – that traditional learning would be more beneficial because they are accustomed to traditional teaching, and they did not think they had enough knowledge to use the technology. McConnell’s suggested model “Lecture plus Online Work” was proposed as a future model for the Chinese teachers. On the basis of UMSA’s teachers’ general optimism for and interest in e-learning a similar future model for teachers at UMSA could be formulated in the following way: “Online Work plus Lecture”, where the aim is to use technology to a larger extent and use traditional teaching to a lesser extent. Further, the aim should be to develop the bandwidth and technological infrastructure in Bolivia as well as invest in training teachers in the use of learning technologies.

**Methodological Discussion**

As previously mentioned, all informants in this study represented different fields of expertise and taught different subjects. These teachers and professors did clearly not represent all staff involved in e-learning at UMSA; on the contrary, they represented only some of the e-learning teachers at UMSA. However, because the aim of the study was to describe and understand teachers’ beliefs about e-learning in higher education at UMSA (and not draw general conclusions from all teachers’ beliefs about e-learning at UMSA), this selection of teachers was appropriate as a base because they represented several fields of expertise. As mentioned in the section Interviews and Observations, the semi-structured interviews made it possible for teachers to talk, more openly, about their personal understandings of e-learning at UMSA. The teachers were given the opportunity to make comments about what they felt were the most important aspects of e-learning at UMSA. As a consequence, it most likely made it less difficult to identify teachers’ beliefs about e-learning, compared to the use of structured or non structured interviews. Further, it is possible that the absence of female informants have resulted in less multifaceted results.
However, the authors believe that the chosen informants played a significant role in the study, and that sufficient information was collected in order to answer the actual aim of the thesis. A study, such as this one, that uses an interpreter faces the risk that the informants’ statements being translated in the wrong way (Kapborg & Berterö, 2002). During the study, this risk was minimised because the translator expressed that he continuously strived for objectivity in his translation. The use of alternative data-gathering methods, such as group interviews or surveys, would also have been possible to use in this field study. However, these methods might have made it more difficult to investigate teachers’ core understandings and beliefs about e-learning, compared to qualitative semi-structured interviews used.

Implications

The authors of this thesis believe that this field study has contributed to raise awareness about the concept of e-learning in the context of developing countries. The thesis hopefully acts as a valuable resource to recognise the various problems and issues hindering UMSA from using e-learning to the same degree as in many developed countries. The analysis shows how many teachers have adequate levels of technological, pedagogical, and content knowledge that are essential for the take-up of e-learning at UMSA. It also demonstrates that teachers’ levels of knowledge tend to decrease when the knowledge domains are combined into more complex knowledge spheres. In their quest for more effective e-learning, UMSA need to be aware that teachers’ knowledge levels might decrease as a result of joint knowledge domains. Additionally, the thesis has revealed that poor bandwidth, deficient technological infrastructure, and high illiteracy rates among both teachers and students are the main problems that UMSA must to deal with to increase the quality of and the general use of e-learning.

Conclusions

In this thesis, the following aim was formulated: describe and understand teachers’ beliefs about e-learning in higher education at the UMSA in La Paz, Bolivia. A total of 10 teachers were interviewed, using semi-structured interviews. The majority of the teachers believe that e-learning is a concept that enables new and effective teaching approaches. Judging from teachers’ technological, pedagogical, and content knowledge levels, they are well prepared for using e-learning to a larger extent in their educational practices. Almost all teachers had previous experience and knowledge about learning technologies. They also showed high knowledge about
pedagogy and content in the subjects they taught. However, this field study also shows that teachers believe there exist large obstacles for complete take-up of e-learning at UMSA. The results show that the main problems of implementing e-learning at UMSA seem to be rooted in the believe that Bolivia is regarded as a developing country with limited educational resources. A large problem at UMSA is that teachers and students do not have access to a sufficient number of computers and other forms of technology on which e-learning depends. The issue of poor bandwidth means that teachers almost exclusively use asynchronous communication and therefore cannot access the benefits of the synchronous communication mode. Further, the results showed that teachers believe that the level of TK among teachers and students at UMSA differ. Some are very familiar and educated in working with technological tools. However, many teachers and students do not have sufficient technological knowledge and cannot take up and use e-learning. Another significant problem for teachers is that illiteracy is common among some students at UMSA. To extend the use of e-learning, this study’s authors believe that the beneficial aspects of e-learning must be promoted to those teachers who are sceptical towards and do not have enough knowledge or experience in working with learning technologies. It is also crucial to improve the Internet connection, provide students with their own laptops, and establish a formal e-learning policy at UMSA. For these listed reasons, the authors of this thesis believe that the full take-up and usage of e-learning at UMSA has a long way to go. However, teachers' general interest towards learning technologies is no doubt a positive sign for the future of e-learning at UMSA.

Suggestions for Further Research

This thesis shows that teachers at UMSA have varying technological, pedagogical, and content knowledge levels. One grand challenge for UMSA in its quest for fully taking up e-learning is to improve the current bandwidth issues. However, most teachers expressed a large interested about the use of learning technologies in their educational practices and viewed e-learning as a future element in education at UMSA. Against this background, it would be appropriate to conduct studies that focus on the existing technological infrastructure at UMSA and identify difficulties that causes slow Internet connections, as well as give suggestions about how these issues can be solved. To improve the use of e-learning, it is also important to study the beliefs held by other individuals at UMSA. For example, an investigation of students’ beliefs about the concept of e-learning would be beneficial for UMSA because teachers and other staff might become more aware of how students themselves understand that e-learning can be beneficial to their studies.
REFERENCES


Niehues, J. (2007). The use of (a)synchronous communication tools in e-learning. GRIN Verlag oHG.


ATTACHMENT 1: INTERVIEW GUIDE (ENGLISH)

1. At which faculty are you employed?

2. For how long have you been working at this faculty?

3. What subject (-s) do you teach?

4. What is your formal higher education exam (-s)?

5. In your field of expertise, what content do you think is/are the most important for students to learn?

6. In what ways do you think students’ learn most efficiently, what is your basic pedagogical view?

7. Could you change the ways in which you are teaching in order to make students learning more effective?

8. How do you plan and organize your lectures?

9. How do you adapt your teaching in order to meet students various educational needs?

10. What do you identify as advantages and challenges in relation to technological tools used for teaching purposes at UMSA? Both concerning teaching your subject through the use of e-learning and the specific technologies used for e-learning.

11. Would you like more professional training in using technological tools in education?

12. Do you think that e-learning involves specific advantages and/or disadvantages?

13. Are you using asynchronous/synchronous modes of communication in your e-learning teaching?

14. Do you think that there are any obstacles for using asynchronous/synchronous communication in teaching?

15. Would you like to add anything else to this interview?
ATTACHMENT 2: INTERVIEW GUIDE (SPANISH)

1. ¿En qué facultad trabaja?
2. ¿Cuántos años es docente de esta facultad?
3. ¿Qué materias dicta?
4. ¿Cuál es su grado académico?
5. ¿En su área cuáles temas, contenidos, piensa que son los más importantes que los estudiantes deben aprender?
6. ¿De manera piensa que sus estudiantes aprenden de forma más efectiva? ¿Cuál es punto de vista pedagógico?
7. ¿Puede cambiar la forma en la que enseña para hacer el aprendizaje de los estudiantes más efectivo?
8. ¿Cómo organiza sus clases?
9. ¿Cómo adapta su enseñanza a fin de satisfacer diversas necesidades educativas de los estudiantes?
10. ¿Qué es lo que identifica como ventajas y los desafíos en relación a las herramientas tecnológicas utilizadas para la enseñanza en la UMSA? En cuanto a enseñar su tema a través del uso del e-learning y las tecnologías específicas utilizadas para el e-learning?
11. ¿Desearia más formación para utilizar herramientas tecnológica en la educación?
12. ¿Usted piensa que el e-learning involucra ventajas y/o desventajas específicas?
13. ¿Utiliza medios sincrónicos o asincrónicos en su enseñanza por e-learning?
14. ¿Cree que hay obstáculos para utilizar comunicación sincrónica/asincrónica en la enseñanza?
15. ¿Quiere agregar algo más a esta entrevista?