

Barriers to e-Learning in a Developing Country: An Explorative Study

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Abstract

Education in the context of Information and Communications Technology for Development (ICT4D) and particularly in South Africa is in a critical state and has been known to be dysfunctional. The problems of education in South Africa are predominantly evident in the science and technology subjects. There has been a paradigm shift in the delivery of education with the introduction of e-learning. The need to realise the barriers to e-learning faced by end-users has become apparent. There are numerous factors that can negatively or positively affect the success of e-learning in developing countries. The purpose of this study is to propose a barrier framework for e-learning in corporations derived from a synthesis of literature. A case study research strategy was used to verify the framework in a real world context and to understand the problems in more detail. The case used was a South African software development company. The findings of the study revealed that the most prominently perceived barriers to e-learning include the personal sacrifice of time required, Internet speed and the lack of on-demand assistance available when learning through the use of electronic media in isolation. The contribution of this study is knowledge regarding the barriers to e-learning software training success and the intention of trainees to use e-learning as an alternative to F2F training.

Keywords

Corporate training, e-learning barriers, ICT4D, exploratory research method, F2F training, developing countries

1. Introduction

Despite the changes made in the field of education in South Africa since the 1994 democratic elections, major challenges still exist in terms of access to and delivery of quality education (Collins & Millard, 2012; Kanjee & Sayed, 2013). It was predicted in 1997 that technology-enhanced education would be the future of the education system of South Africa (Pistorius & Van Harmelen, 1997). Education and training research in developing countries is key to developing insights into the Information and Communications Technology for Development (ICT4D) domain (Van Biljon & Alexander, 2014). Organisations in developing countries are being compelled to adopt strategies that enable more flexibility in order to cope with the fluctuating environment of technology-enhanced education. The training methods of

organisations have evolved from traditional face-to-face (F2F) lessons to the use of the Internet for learning content delivery (Akaslan, Law & Taşkin, 2012). Various types of organisations such as companies, schools and universities are making use of e-learning as a training, learning and professional development tool (Berkani & Chikh, 2010). The increasing adoption of e-learning in such organisations is due to the Internet offering new opportunities to restructure the learning and knowledge transfer environment (Abbad, 2012). e-Learning also offers such organisations the opportunity to leverage the various advantages that this approach provides (Hani, Hooshmand & Mirafzal, 2013).

Innovation is fostered with the implementation of e-learning because organisations can offer new educational and training programs (Cui, Fu, Li, Wen & Zhang, 2010). e-Learning is considered an attractive complement or even an alternative to traditional training methods for companies (Bergeron, Gauvin, Raymond & Uwizeyemungu, 2012). It is a fundamental need for companies to increase the level of training and knowledge amongst employees because it is evident that education increases the capacity to innovate and fosters the adoption of new technologies (Gallié & Legros, 2012). Employees can contribute to sustained competitive advantages for companies in terms of the skills, expertise and readiness to work (Hart, Lenihan & McGuirk, 2014).

Although organisations that implement e-learning systems have the ability to benefit from e-learning, there may also be barriers that affect the use thereof (Hani et al., 2013). Several factors have been reported to impact the ability for learners to gain value from e-learning and can cause more damage to the learning process in an already eroded education system (Dimitracopoulou, Fessakis, George & May, 2012). Limited research has been conducted regarding the barriers to e-learning in developing countries that can result in the delay of e-learning adoption (Mirza & Al-Abdulkareem, 2011). The majority of existing studies surrounding the adoption of e-learning are conducted in university contexts and not in the corporate context within the ICT4D domain (Baelden & Van Audenhove, 2015; Cui et al., 2010; Haron & Suriyani, 2010; Islam, 2013). The availability of new technologies, such as e-learning, remains unequally distributed between developing and developed countries and can affect the growth of a country (Baelden & Van Audenhove, 2015). There is therefore a need to investigate e-learning in the ICT4D research domain.

This paper contributes to the ICT4D body of knowledge by:

- Analysing related literature in order to present a barrier framework for developing countries, specifically for the corporate context, and
- Adopting an exploratory research method to analyse rich qualitative data gathered from a focus group conducted in a developing country.

The structure of this paper involves describing the important concepts relevant to the study as well as the barriers to e-learning in the ICT4D context and proposes an e-learning barrier framework for developing countries. The research methodology adopted in this study is conveyed and is followed by a discussion of the results of the study. The paper is then concluded with a suggestion for future research.

2. Barriers to e-Learning

The corporate environment is increasingly recognising the benefits of implementing e-learning systems to provide cost-effective training for employees and customers (Chen, 2010). The corporate e-learning field was predicted several years ago to undergo a paradigm shift from an emerging market with substantial potential to an established industry (Barron, 2002). There is a changing perception of e-learning in companies in that it was once seen as a recurring cost and is now seen as an investment. It is imperative that the factors affecting the possible failure of e-learning initiatives be identified before embarking on such implementations. The excessive costs associated with e-learning failures and education system processes including time wasted may be eliminated by being aware of the factors of success or failure of e-learning (Akaslan et al., 2012). By explicitly making the factors influencing the success or failure of e-learning systems known, a more advanced e-learning environment can be provided for the users (Hani et al., 2013). An advanced e-learning environment according to Hani et al. (2013) is one that maximises the efficiency of the education system, reduces student dropout rates, increases student pass rates, enhances the success of the students, increases learning outputs of students and reduces the costs associated with education system processes.

Organisations need to be aware of the barriers to e-learning and need to develop a coherent strategy that will address these barriers. There is a strong correlation between a lack of e-learning user adoption research by the implementing organisation and failure of such e-learning initiatives (Akaslan et al., 2012). Organisations must consider the structure of e-learning initiatives to avoid some of the issues. An educational environment can be conceptualised as comprising of three dimensions: content, pedagogy and technology (Braz, Melo & Siqueira, 2007). By structuring e-learning according to the environment proposed by Braz et al. (2007), organisations can improve the management of e-learning initiatives and the information relating to learning courses.

It has been argued that there are more dropout rates in e-learning courses compared to traditional learning courses. The effectiveness of e-learning has been questioned and sometimes fails to meet learning objectives (Xu & Wang, 2006). A substantial number of e-learning initiatives still suffer from a lack of perceived future success, however, when the systems are designed and implemented effectively, they may have similar outcomes to those achieved in F2F settings (D'Agustino, 2012). A gap in research related to barriers to e-learning experienced by learners may hinder the use of e-learning to its full potential (Akaslan et al., 2012). One of the problems is that it is not clear as to whether e-learning has the ability to develop and improve learners' hands-on skills.

There are a variety of barriers that can hinder the success of e-learning initiatives. Implementing organisations in developing countries may have a lack of implementation expertise, a one-directional technology focus and once-off funding with limited continued support (Gewald & Jacob, 2013). Dimitracopoulou et al. (2012) identified that the use of technology causes security and privacy concerns for learners. Due to the fact that e-learning systems need to track learners' activities and outputs, there is the opportunity that the information can be exploited and used for

purposes other than what the learners intended it to be used for. Learners that have doubt about the security and privacy of their information may be deterred from using the e-learning system. Organisations should ensure that learners are informed of any tracking process when accessing e-learning platforms and that learners should approve of such tracking on the system.

The development costs of e-learning material, insufficient infrastructure and a lack of social and cultural interaction are seen as barriers to the success of e-learning initiatives and may hamper the ability for organisations to benefit from e-learning (Akaslan et al., 2012). It has also been noted that learners feel isolated and disheartened about their studies without F2F interaction. Alzahrani and Ghinea (2012) stress the importance of prompt feedback for learners due to the fact that e-learning can prevent learners from having access to tutors, academic staff, career advisors and technical help.

The study of Ahlan and Atanda (2014) focused on the barriers affecting the success of e-learning in developing countries from a Nigerian perspective. The results of the study showed that infrastructure issues are prominent in developing countries. One issue is the prominence of the Digital Divide where there is one group of people with access to technology and another group with no access to technology. Other factors affecting e-learning success in developing countries are fluctuating and unreliable electricity supply; computer ownership and availability; Internet access and Internet experience in terms of the frequency of Internet usage by the learner as well as the computer competency of the learner.

Stoffregen, Pawlowski and Pirkkalainen (2015) developed a barrier framework for open e-learning in public administrations. The barriers to e-learning were classified into three dimensions, namely context, social and technical barriers. The context barriers are a lack of resources; management coordination or policy; managerial culture which include practices and structure; and the perceived technology fit. The social barriers dimension involved values on a national level; values on an organisational level and individual concerns including communication, collaboration and language issues. The social barriers dimension consists of the value of information and knowledge; the quality of information; ICT skills; lack of knowledge in open e-learning; and cognitive personal backgrounds. The technical barriers incorporate availability; interoperability; technical conceptual differences; and concerns about privacy and security. The technical barriers are perceived functionality; usability and system quality; and the Digital Divide.

After a detailed literature review of e-learning barriers, an extended e-learning barrier framework for developing countries was derived by the authors (Table 1). The e-learning barrier framework was adapted from the framework designed by Stoffregen et al. (2015) by replacing the context dimension with three of the sub-categories namely Lack of Resources, Infrastructure and Organisation Management. These three new dimensions were considered significantly relevant in developing countries. The framework can be used by organisations in order to plan for e-learning initiatives and improve the chances of a successful project. The authors of studies identifying barriers specific to developing countries have been indicated using an asterisks.

Barrier dimension	Barrier category	Authors
Lack of resources	Lack of financial support (initial and continued funding)	Akaslan et al. (2012)*; Bere, Silvestri and Nemes (2013); Gewald and Jacob (2013); Gunn (2010); Klobas, McGill and Renzi (2014); Mridha, Nihlen, Erlandsson, Khan and Islam et al. (2013)*; Omidinia, Masrom and Harihuudin (2011)*
	e-Learning content development costs	Akaslan et al. (2012)*; Klobas et al. (2014)
	Computer ownership and availability	Ahlan and Atanda (2014)*; Klobas et al. (2014); Mridha, Nihlen and Erlandsson et al. (2013)*
	Internet access	Ahlan and Atanda (2014)*; Bhuasiri, Ciganeck, Rho, Xaymoungkhoun, and Zo (2012)*; Klobas et al. (2014); Mridha, Nihlen and Erlandsson et al. (2013)*; Stefanick and LeSage (2005); Witdono (2013)*
	Computer competency	Ahlan and Atanda (2014)*; Bere et al. (2013); Bhuasiri et al. (2012)*; Butler, Feller, Pope, Emerson and Murphy (2008); Mridha, Nihlen and Erlandsson et al. (2013)*
	Fluctuating and unreliable electricity supply	Ahlan and Atanda (2014)*; Mridha, Nihlen and Erlandsson et al. (2013)*
Infrastructure issues	Digital Divide	Ahlan and Atanda (2014)*; Mridha, Nihlen and Erlandsson et al. (2013)*
	Insufficient infrastructure support	Akaslan et al. (2012)*; Bhuasiri et al. (2012)*; Mridha, Nihlen and Erlandsson et al. (2013)*
Technical issues	Security and privacy concerns	Ahmed, Buragga and Ramani (2011)*; Alias, Aziz, Ismail and Zakariah (2012)*; Dimitracopoulou et al. (2012)
Organisation management	Lack of implementation expertise	Gewald and Jacob (2013)*; Mridha, Nihlen and Erlandsson et al. (2013)*, Omidinia et al. (2011)*; Talbot (2009)
	Exclusive technology focus	Gewald and Jacob (2013)*; Omidinia et al. (2011)*
	Limited continued managerial support	Ercoli, Leo and Sannia (2009); Gewald and Jacob (2013)*; Talbot (2009)
Social interaction	Lack of social interaction	Akaslan et al. (2012)*; Alzahrani and Ghinea (2012)*; Bere et al. (2013); Ercoli et al. (2009)
	Lack of cultural interaction	Alzahrani and Ghinea (2012)*; Akaslan et al. (2012)*; Bramati and Conci (2007); Talbot (2009)
	Isolation and decreased motivation	Akaslan et al. (2012)*; Alzahrani and Ghinea (2012)*; Bhuasiri et al. (2012)*

Table 1. Barriers to e-learning in developing countries

The framework is divided into five dimensions of barriers which are: lack of resources, infrastructure issues, technical issues, organisation management and

social interaction (Figure 1). The barriers have further been sub-categorised and the lack of resources category comprises of a lack of financial support; e-learning content development costs; computer ownership and availability; Internet access; computer competency of learners; and the fluctuating and unreliable electricity supply. The dimension of infrastructure issues consists of the Digital Divide which is more relevant in developing countries than developed ones; and insufficient infrastructure support. The dimension of technical issues consists of security and privacy concerns. The organisation management dimension has four categories which are the lack of implementation expertise; a one-directional technology focus; and limited continued managerial support. Lastly, the social barrier category consists of the lack of social interaction, the lack of cultural interaction and the isolation and decreased motivation of learners.

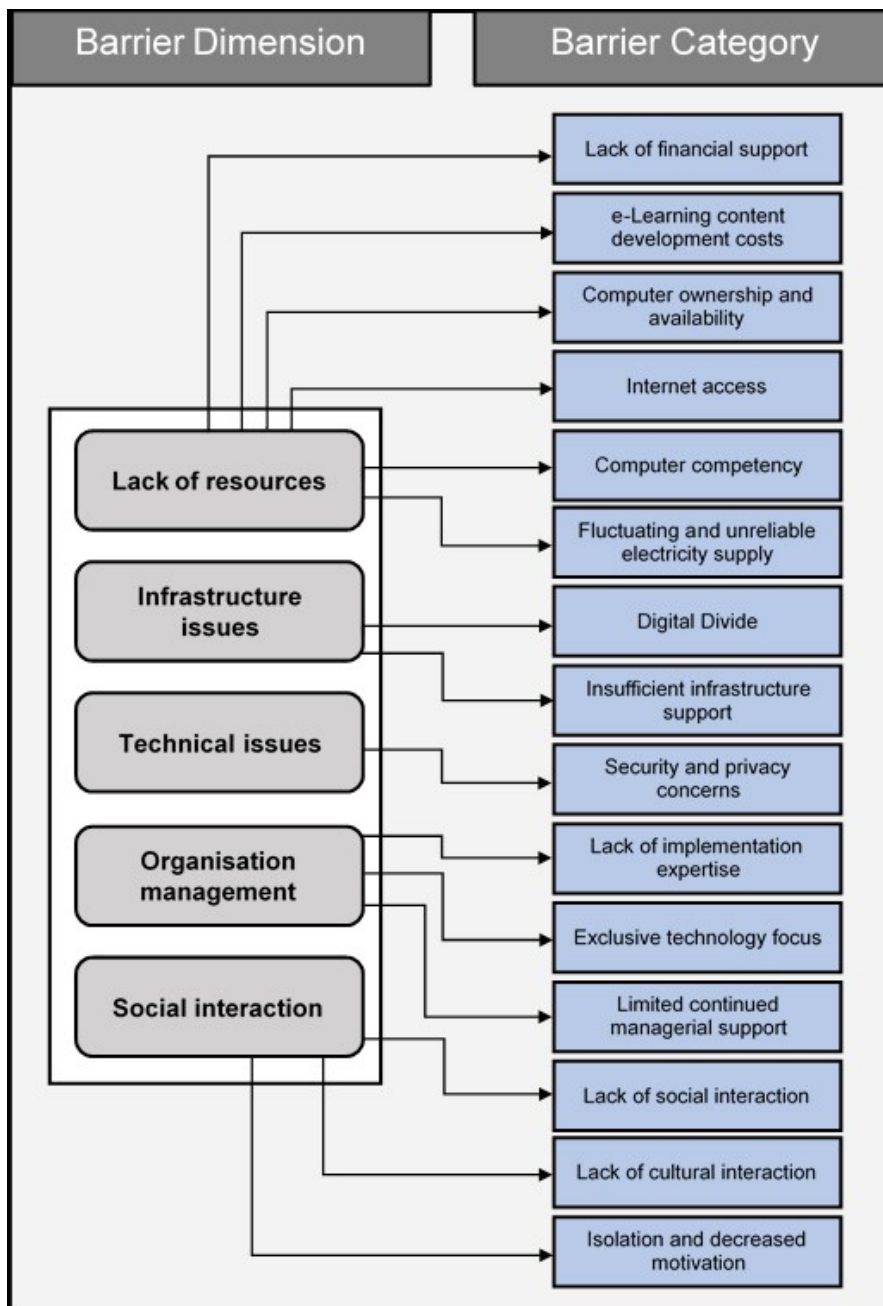


Figure 1. Barrier framework for e-learning

3. Research Methodology

The purpose of this paper is to investigate and report on the barriers to e-learning in a developing country in the context of ICT4D. The main research question of this paper is “*What are the current barriers to e-learning faced by organisations in developing countries?*”. In order to address the main research question, three research objectives need to be realised, namely:

- RO1:** Identify barriers to e-learning in organisations particularly in developing countries; and
- RO2:** Analyse the existing problems of F2F training.

An in-depth literature review of studies related to the barriers for e-learning was undertaken and a framework of barriers to e-learning was derived (Table 1). Therefore RO1 has been met. In order to empirically validate the framework by providing a link between literature and practice, a qualitative exploratory research study was deemed appropriate to provide additional clarification of the research questions. Exploratory research is conducted from a broad perspective initially and as it progresses, results are manifested (Adams & Schvaneveldt, 1991). A case study research strategy was used and the case is a South African software development company. For purposes of anonymity, the company will be referred to as DevCo. The sample for the study was drawn from participants attending a corporate F2F software training course at DevCo. Qualitative data analysis was used since it is able to provide more detailed and nuanced understanding of occurrences (Hargittai, Fullerton, Menchen-Trevino & Thomas, 2010).

DevCo has a management strategy of converting their training provisions from traditional F2F training to an e-learning environment. However, some of the e-learning components in their existing e-learning system are not obtaining the success that was expected. The statistics of the usage of the e-learning system at DevCo is not satisfactory for management and shows that the e-learning system is not being used frequently by customers and employees. The e-learning system at DevCo is currently underutilised and it is being used as mostly as a content management system where training documents are made available to trainees instead of a learning management system, which is ideal. A focus group was conducted at DevCo and eight participants took part, all of whom were clients of DevCo that needed training on the company's software products. The study was described to the participants prior to their involvement and all participants provided informed consent prior to participating in the focus group. The participants were encouraged to express their opinions and contribute aspects that they considered important and applicable to the study. Data were collected from participants through the use of a semi-structured audio-recorded focus group guided by a series of open-ended questions. Audio recordings were transcribed verbatim and themes were identified from the responses by employing thematic analysis techniques (Adams & Schvaneveldt, 1991). The aim of the focus group was to obtain rich data concerning F2F training and to obtain insights into the barriers to e-learning. None of the participants had ever used an e-learning system prior to the study. Therefore, a formal definition of e-learning was conveyed to the participants so that they could contribute to the study based on their perceptions surrounding the idea of e-learning. A more accurate response was ensured because participants were not required to be aware of or understand e-learning.

The focus group was opportunistic as the participants were unaware that a focus group had been planned for the day's activities. There are advantages and limitations of spontaneous focus groups. A shallow understanding may be obtained due to participants being unprepared for the activity, yet if participants were prepared for the focus group, the risk that effort would be made to access an e-learning system prior to the focus group would be evident and this could skew the data collected and a learning curve would be evident (Hrastinski & Aghaee, 2012).

Summaries of the main responses were made in order to remove the noise present in the focus group such as discussions of topics unrelated to the study. The summaries enabled the researcher to focus on the key points and themes that emulated from the focus group (Saunders, Lewis & Thornhill, 2009). According to Braun & Clarke (2006), there are six phases of thematic analysis. The first phase involves the familiarisation of data whilst the second phase entails the initial coding of the data collected. In this study, the familiarisation of data was achieved by transcribing the focus group recording to text by listening to the recording and reading the data several times to ensure accuracy. The data was then organised into preliminary groups of codes. The search for potential themes and the revision thereof are the steps of the third and fourth phases. The analysis of the data entailed organising the initial codes under broader themes and these themes were verified against the complete data set. The last two phases of thematic analysis involve the identification and reporting of themes.

4. Results and Discussion

The thematic analysis resulted in identifying four principle themes, namely: assistance, social interaction, personal and external factors (Figure 3). The responses that were related to the advantages of and barriers to F2F training will be described in this section. The suggested changes to be made to F2F training by participants will be discussed based on the results. The intention of participants to use e-learning will be discussed and the perceived barriers to e-learning will be conveyed in the findings of the study.

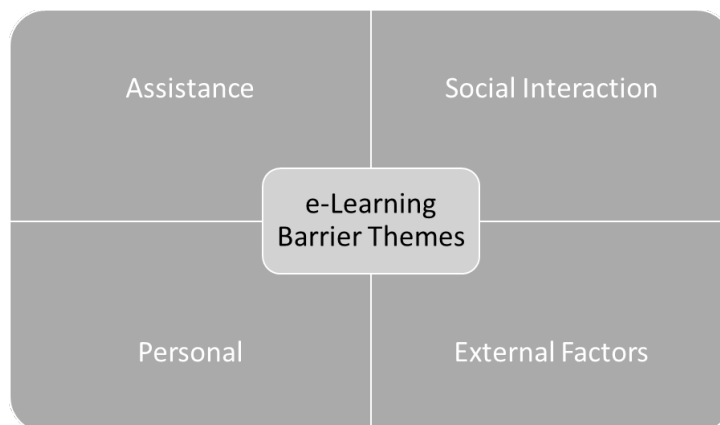


Figure 3. e-Learning barrier themes

4.1 Assistance

The participants agreed that a prominent advantage of F2F training is the ability to ask questions when in the presence of a trainer where answers may be given immediately. It is also to the advantage of the participants that tasks may be demonstrated for learners on the computer. A suggestion for the improvement of F2F training would be to have an assistant at the office after training has been conducted to help with the advancement of tasks when users cannot proceed. One of the participants stated that,

"It is a factor of frustration if you are stuck and you try and try and struggle all the time, whereas if there is someone there, you can get help immediately and move on,

otherwise you are going to sit there with the same problem, time wasting, counter-productive.”

4.2 Social Interaction

Participants stated that they like the ability to learn from the problems that other learners had in a F2F training environment. With regards to suggestions to improve F2F training, participants stated that they enjoy interacting with the trainer and would prefer not to have the F2F courses modified. One barrier to the intended use of e-learning identified related to social interaction. It was stated that at home there are interruptions and demands and this is typically where learners would utilise an e-learning system. Participants also mentioned that they would feel isolated. This feeling of isolation relates to the social interaction barrier dimension (Figure 1) of the barrier framework for e-learning and confirms the studies of Akaslan et al. (2012) and Hajli, Bugshan, Lin and Featherman (2013).

4.3 Personal

Several personal barriers to F2F training were identified such as parking, time sacrifice and being forced to attend training. However, on the other hand, participants realised the benefits of F2F training. One participant stated that *“Barriers are external factors, as with training there is always a positive outcome. You come to get information. Yes there are obstacles, parking issues, time issues, time away from the office which is a bad thing, your boss is forcing you to be here, you don’t want to be here but at end of day there is always a positive outcome. So you overcome the barriers to better yourself at the end of the day.”*

The perceived barriers to e-learning were that there is a lack of time during office hours to dedicate to e-learning. It was mentioned that if e-learning assists participants in becoming more productive in their careers, then time dedication to e-learning is strongly motivated. However, participants agreed that if sessions were short and manageable, the likelihood of them participating in e-learning is increased. One participant who is an older female made the comment, *“I prefer e-learning, I like being tech-savvy, being technologically oriented, not good at making notes in face-to-face training.”* On the other hand another middle-aged female participant stated that, *“At school, we are accustomed to traditional learning, and a change of mind is necessary to go electronic because for us, this is easier. Today’s youth have the Internet, they have Whatsapp, Skype and they are used to technology and it is the way forward. We have to adapt, some are slower to adapt than others.”* This can be associated with the lack of resources barrier dimension of the barrier framework for e-learning (Figure 1), specifically with the computer competency barrier category.

4.4 External Factors

Participants agreed that having a day away from the office is an advantage of F2F training. However, a barrier to F2F is commuting to the training session and having to wake up earlier than usual if the venue is further away than work would normally be. With regards to the intention to use e-learning, the factor of not having to travel makes e-learning sound appealing to participants. Barriers to e-learning related to external factors such as Internet speed. A statement made by one participant was that he/she felt frustrated by *“Working on a very slow server where content just keeps loading and loading, frustrating.”* This confirms the studies on barriers to e-learning in

developing countries identified by Ahlan and Atanda (2014), Bhuasiri et al. (2012) and Stefanick and LeSage (2005) as well as the barrier categories of fluctuating and unreliable electricity supply and Internet access in the barrier framework for e-learning (Figure 1). A link is therefore established between the literature researched and the results of the study regarding Internet access and the Internet experience of participants in developing countries.

5. Conclusions and Future Research

This study primarily aimed to report on the current barriers to e-learning faced by developing countries. An in depth literature review was used to develop an e-learning barrier framework for developing countries. Once the literature review was completed an explorative research method in the form of a focus group was used to verify the theory and answer the research question. Whilst the focus group was undertaken with only a small sample of participants at a F2F training course, the results are still very useful in providing an in depth understanding of the barriers to e-learning faced by users in the ICT4D realm. From the empirical findings, it is clear that participants can identify potential barriers to e-learning despite not having used e-learning before. Depending on the severity of the barrier to the user, it is clear that barriers have the ability to discourage users from using e-learning and this can in turn affect the success thereof. The infrastructure of organisations in developing countries needs to improve in order to support e-learning initiatives and improve the chances of success. The barriers to e-learning, especially those that affect the intention to use, must be addressed if the success of the initiative is valued.

The study contributes valuable insights into the barriers of e-learning such as the lack of resources (for example Internet speed) and the lack of social interaction that may limit users from utilising e-learning in developing countries. Nonetheless, further research needs to be conducted on the implementation of the e-learning barrier framework in a real-world setting within an ICT4D environment. This study forms part of a larger research study where additional focus groups and surveys will be undertaken. Additional empirical research could extend this study by investigating the adoption of e-learning in developing countries using other case studies and investigating how the barriers identified in this study could be overcome.

References

- Abbad, M. (2012). Proposed model of e-learning acceptance. *2012 International Conference on Education and E-learning Innovations*, 1–9.
- Adams, G. R. & Schvaneveldt, J. D. (1991). *Understanding Research Methods* (2nd ed.). New York: Longman.
- Ahlan, A. R. & Atanda, B. N. (2014). Issues of E-learning in Developing Countries: A Nigerian Perspective. In *Information and Communication Technology for The Muslim World* (pp. 1–4).
- Ahmed, S., Buragga, K. & Ramani, A. K. (2011). Security issues concern for E-learning by Saudi universities. *13th International Conference on Advanced Communication Technology (ICACT2011)*, 1579–1582.
- Akaslan, D., Law, E. L. C. & Taşkin, S. (2012). Analysis of issues for implementing e-learning: The student perspective. *IEEE Global Engineering Education Conference*.

- Alias, N., Aziz, M. N. A., Ismail, N. Z. & Zakariah, Z. (2012). E-learning Successful Elements for Higher Learning Institution in Malaysia. *Procedia - Social and Behavioral Sciences*, 67, 484–489.
- Alzahrani, J. G. & Ghinea, G. (2012). Evaluating the impact of interactivity issues on e-learning effectiveness. In *Information Technology Based Higher Education and Training (ITHET)* (pp.1-5).
- Baelden, D. & Van Audenhove, L. (2015). Participative ICT4D and living lab research: The case study of a mobile social media application in a rural Tanzanian University setting. *Telematics and Informatics*, 32(4), 842–852.
- Barron, T. (2002). *Trends in Corporate E-learning*. Gabler Verlag.
- Bere, R., Silvestri, C. & Nemes, L. (2013). E-learning platform for public administration-case study. In *eLearning and Software for Education* (pp. 486–492).
- Bergeron, F., Gauvin, S., Raymond, L. & Uwizeyemungu, S. (2012). E-learning adoption and assimilation in SMEs: A research framework. In *2012 IEEE RIVF International Conference on Computing and Communication Technologies, Research, Innovation, and Vision for the Future* (pp. 1–4).
- Berkani, L. & Chikh, A. (2010). Communities of practice of e-learning, an innovative learning space for e-learning actors. *Procedia - Social and Behavioral Sciences*, 2(2), 5022–5027.
- Bhuasiri, W., Ciganek, A. P., Rho, J. J., Xaymoungkhoun, O. & Zo, H. (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers and Education*, 58(2), 843–855.
- Van Biljon, J. & Alexander, P. T. M. (2014). Information and Communication Technology for the quest for a shared conceptual framework continues. In *8th IDIA Conference Proceedings* (pp. 361–371).
- Bramati, C. & Conci, A. (2007). E-learning in public administration. *SLOOP: Sharing Learning Objects in an Open Perspective*, 81–85.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Braz, M. H. L. B., Melo, R. N. & Siqueira, S. W. M. (2007). Modeling e-learning content. *International Journal of Web Information Systems*, 3(1/2), 140–152.
- Butler, T., Feller, J., Pope, A., Emerson, B. & Murphy, C. (2008). Designing a core IT artefact for knowledge management systems using participatory action research in a government and a non-government organisation. *The Journal of Strategic Information Systems*, 17(4), 249–267.
- Chen, H. J. (2010). Linking employees' e-learning system use to their overall job outcomes: An empirical study based on the IS success model. *Computers and Education*, 55(4), 1628–1639.
- Collins, K. & Millard, M. (2012). Transforming education in South Africa: comparative perceptions of a South African social work learning experience. *Educational Review*, (June 2015), 1–15.
- Cui, S., Fu, Z., Li, D., Wen, H. & Zhang, L. (2010). E-learning adoption intention and its key influence factors based on innovation adoption theory. *Mathematical and Computer Modelling*, 51, 1428–1432.
- D'Agustino, S. (2012). Toward a course conversion model for distance learning: a review of best practices. *Journal of International Education in Business*, 5(2), 145–162.
- Dimitracopoulou, A., Fessakis, G., George, S. & May, M. (2012). A study on user's perception in E-learning security and privacy issues. *Proceedings of the 12th IEEE International Conference on Advanced Learning Technologies*, 88–89.
- Ercoli, G., Leo, T. & Sannia, M. (2009). Evaluation of virtual learning environment for the professional training in public administration. *International Journal of Advanced Corporate Learning*, 2(1), 50–55.

- Gallié, E. P. & Legros, D. (2012). Firms' human capital, R&D and innovation: A study on French firms. *Empirical Economics*, 43, 581–596.
- Gewald, H. & Jacob, O. (2013). Pre-Adoption Motives for Successful eLearning. In *AFRICON* (pp. 1–5).
- Gunn, C. (2010). Sustainability factors for e-learning initiatives. *ALT-J, Research in Learning Technology*, 18(2), 89–103.
- Hajli, M., Bugshan, H., Lin, X. & Featherman, M. (2013). From e-learning to social learning - a health care study. *European Journal of Training and Development*, 37(9), 851–863.
- Hani, H., Hooshmand, H. & Mirafzal, S. (2013). Identifying the factors affecting the success and failure of e-learning students using cluster analysis. In *e-Commerce in Developing Countries: With Focus on e-Security (ECDC)* (pp. 1–12).
- Hargittai, E., Fullerton, L., Menchen-Trevino, E. & Thomas, K. Y. (2010). Trust Online: Young Adults' Evaluation of Web Content°. *International Journal of Communication*, 4, 468–494.
- Haron, H. & Suriyani, S. (2010). An investigation on predictors of E-learning adoption among Malaysian E-learners. In *2010 International Conference on Science and Social Research* (pp. 927–932).
- Hart, M., Lenihan, H. & McGuirk, H. (2014). Measuring the impact of innovative human capital on small firms' propensity to innovate. *Research Policy*.
- Hrastinski, S. & Aghaee, N. M. (2012). How are campus students using social media to support their studies? An explorative interview study. *Education and Information Technologies*, 17(4), 451–464.
- Islam, A. (2013). Investigating e-learning system usage outcomes in the university context. *Computers & Education*, 69, 387–399.
- Kanjee, A. & Sayed, Y. (2013). Assessment policy in post-apartheid South Africa: challenges for improving education quality and learning. *Assessment in Education: Principles, Policy & Practice*, 20(4), 442–469.
- Klobas, J. E., McGill, T. J. & Renzi, S. (2014). Critical success factors for the continuation of e-learning initiatives. *The Internet and Higher Education*, 22, 24–36.
- Mirza, A. & Al-Abdulkareem, M. (2011). Models of e-learning adopted in the Middle East. *Applied Computing and Informatics*, 9(2), 83–93.
- Mridha, M., Nihlen, G., Erlandsson, B., Khan, A., Islam, M., Sultana, N., Reza, S. & Srinivas, M. (2013). E-learning for empowering the rural people in Bangladesh: opportunities and challenges. In *e-Learning and e-Technologies in Education (ICEEE)* (pp. 323–328).
- Omidinia, S., Masrom, M. & Harihuddin, S. (2011). Review of E-learning and ICT Infrastructure in Developing Countries (Case Study of Iran). *American Journal of Economics and Business Administration*, 3(1), 120–125.
- Pistorius, C. & Van Harmelen, T. (1997). The Impact of Technology Enhanced Education on a Developing Country: A South African Perspective. *IEEE International Symposium on Technology and Society*, 306–312.
- Saunders, M., Lewis, P. & Thornhill, A. (2009). *Research Methods for Business Students (5th ed.)*. Harlow: Pearson Education Limited.
- Stefanick, L. & LeSage, E. (2005). Limitations to developing virtual communities in the public sector: A local government case study. *Canadian Public Administration*, 48(2), 231–250.
- Stoffregen, J., Pawlowski, J. M. & Pirkkalainen, H. (2015). (in press) A Barrier Framework for open E-learning in public administrations. *Computers in Human Behavior*.
- Talbot, J. (2009). Delivering distance education for the civil service in the UK: The university of chester's foundation for government programme. In S. Marshall, W. Kinuthia & W. Taylor (Eds.), *Bridging the knowledge divide: Educational technology for development* (pp. 77–96). North Carolina: Information Age Publishing.
- Witdono, M. K. (2013). Utilization of e-learning at Universitas Siswa Bangsa International: Issues and Challenges. In *IEEE 63rd Annual Conference International Council for Educational Media (ICEM)* (pp. 1–6).

Xu, D. & Wang, H. (2006). Intelligent agent supported personalization for virtual learning environments. *Decision Support Systems*, 42(2), 825–843.