An Investigation into Best Practices for e-learning Implementation in Higher Education

Latefa Bin Fryan[1,], Lampros Stergioulas[1]

[1] School of Information System, Computing and Mathematics Brunel University, West London UK

`{latefa.fryan,lampros.stergioulas}@brunel.ac.uk`

Abstract. e-Learning has become an inevitable part of the modern education system, which deserves attention and investigation. This research aims to build a framework for best practice-in-context in the use and implementation of e-learning tools, technology and systems in higher education (HE). The main contribution of this research is to provide a comprehensive framework that will potentially lead to the successful implementations of e-learning in HE. This paper reports on the limitations of existing frameworks and provides an overview of the research.

Keywords: e-learning implementation, best practice, framework, higher education

1   Introduction

With computers and Internet becoming an integral part of HE [11], the importance of e-learning cannot be denied as it enables a connected environment that supports learning and provides many opportunities for diverse ways of learning, for example, through emerging social learning approaches [23]. Due to the potential that e-learning has, a growing trend in the number of publications in this area has been observed in the literature. Noticeably, there has been a growing trend in the appearance of e-learning publications from 2000 to 2008 [14]. Literature indicates a shift from e-learning adoption to e-learning implementation [14]. Further research is needed on investigating the processes that enable integration of various elements of e-learning and on identifying aspects of good practice [27]. These elements may involve various tools, technologies and methods adopted by e-learning in general or best practice [22], Critical Success Factors (CSFs) and methodological steps that can lead to a framework or process model for a successful e-learning implementation. For this PhD thesis, a 'methodological step' is a task that is needed to be performed in a specific phase of the e-learning implementation process. Moreover, the need and importance of developing a practical framework for identifying, evaluating, highlighting and promoting best practices in e-learning [35- 11] is highlighted by the failure rate in e-learning

experiments worldwide [35]. It is imperative to investigate the best practice of e-learning implementation and develop a framework that serves as a process model. This will facilitate the process of implementation e-learning tools, technologies and systems. .

2   Research Question and Aim

In consideration of the above-mentioned challenges, our research question is defined as follows: What are the main phases, methodological steps and factors in the successful implementation of e-learning tools, technologies and systems in HE?

In addressing this research question, the aim of this research is to 'build a framework for the best-practice-in-context in the use and implementation of e-learning tools, technologies and systems in HE' considering two perspectives: firstly, the student's perspective (i.e. the student's approach to the implementation of e-learning, such as learner's usage of new technology and learner's technical competency); and secondly, the education provider's or teaching staff's perspective (i.e. the instructor's approach to the implementation of e-learning such as instructor's usage of an e-learning system and sharing practices).The proposed framework will cover different levels of e-learning implementation, including technological, pedagogical and organizational. For this purpose, this research investigates the strategic planning process of e-learning implementation and proposes a framework with multiple phases and methodological steps where each step or phase of implementation is detailed through considering various CSFs, tools and technologies that are important in forming a comprehensive framework for the entire process of the implementation. This research has included a broad range of university types, encompassing open universities and more traditional ones. The proposed framework aims to help improve the planning of implementation, the application of planning, and the platforms and tools being chosen; therefore, it can be considered as a guideline for HE institutions seeking to implement e-learning system successfully.

3   Backgrounds and State-of-the-Art

A wide range of conceptualizations is included in term Electronic Learning or e-learning [26]; therefore, several definitions of e-learning occur in the literature. We choose this simple definition: e-learning is learning that is facilitated and supported through the use of information and communications technology [28-9-1]. With computers and the Internet becoming an integral part of HE [11], the importance of e-learning cannot be denied. It enables connectivity between people and information, and creates opportunities for various social learning approaches [29-23]. In 2000, it was estimated that globally there were 79.3 million students in HE. By 2012, this had reached over 150 million and some predictions are that this will reach 300 million students by 2025 [19]. This inflation in student numbers in HE needs a system that is able to accommodate such huge numbers with different needs. It is technology that

will ultimately be the most radical change for HE [29-6]. The world needs greater access to quality HE [19], and a good e-learning system can facilitate this.

A strategic planning process (or framework) is an integral part of implementing an e-learning system successfully [20-11-9]. In order to fully benefit from an e-learning system, the education providers have to face the challenge of building new strategies for learning and teaching while considering the requirements from all stakeholders in the education sector [2-23-9]. The importance of a framework to ensure successful e-learning implementation is well recognized.

Literature reports that several studies have been conducted for the implementation of e-learning listing many CSFs and frameworks. More than fourteen frameworks and models for e-learning have been investigated and critically analysed as part of this research [20-7-15-24-36-17-12-21-13-34-33-18]. However, existing frameworks are not comprehensive. This study also reports on the limitations of existing frameworks, such as considering a few CSFs at the design and implementation phases [7], with some other Model trying to consider the entire online learning environment [24], while some frameworks focus more on Learning Methodology [17]. Moreover, some models focus on only one or on limited phases of the entire implementation process, such as Course Design [31]. Furthermore, the EU ICOPER project developed an IRM (ICOPER Reference Model) for HE based on outcomes. This sought to ameliorate the inter-adaptability of education models at various levels. This model describes the main areas of development for HE learning based on outcomes against the background of Shareable Educational Resources or Open Education Resources (OER) [32]. Some institution such as the Department for Education set a common inspection framework with seven questions related to e-learning management, e-learning teaching, learning and training and e-learning supporting learning. However, detailed guidelines or practical frameworks for the implementation process of an e-learning system are still missing, although this kind of question or checklist could be helpful. Due to the lack of research into this area, further research is needed for investigating best practices for e-learning tools, technologies and systems implementation. Identifying such elements would lead to the successful implementation. The research conducted in this thesis focuses on identifying all the important elements of such a comprehensive framework, including CSFs from the stakeholders' perspectives (including students and education providers), methodological steps, tools, technologies and methods.

In order to formalize a framework for e-learning implementation, it is useful to look into the best practices that are already in place. Bruck [3] suggests that best practices are outstanding examples of how ICT can nurture lifelong learning, integrate new learning methods in traditional education and facilitate the participation of citizens in information society applications by moving beyond past limitations. The literature shows some of the best practices in e-learning [3-35]. For this research, 18 of the best e-learning projects globally in the category of education were analyzed, highlighting their key features. E-learning system designers must decide which of the numerous available features should be implemented to suit specific target groups and assist them and maintain their satisfaction level [16].

4   Research Methodologies

The research gap is identified in order to highlight the importance of this research introducing the need for developing an intensive framework, which can work as a guideline for HE. In order to build this framework, it is imperative to conduct an in-depth investigation into current state-of-the art tools, technologies and methods used in various types of e-learning systems as well as look into the best practices of e-learning systems, highlighting their features and benefits. Consequently, using all these, it is possible to build a framework for the best-practice-in-context in the use and implementation of e-learning tools, technologies and systems in HE. Extensive research is conducted on the literature through article-by-article investigations in a number of academic journals, conference proceedings and other publications. Computer databases are also used to identify additional article, books and book chapters relevant to the topic. Articles published from 2000 to the end of 2012 are included in the search. Moreover, considering best-practice projects will help to make the proposed framework more robust.

The chosen research methodology approach is 'qualitative positivism'. The research methodology is Case Study research. For the purpose of this research, the researcher conducted a number of different case studies: European universities – EU level (first case study); UK universities – national level (second case study) – both in association with the TEL-Map Project – as well as a third case study at local institution level on the implementation/adoption of the new Learning Management System (LMS). These locality scales for the case studies adopted in this research provides more confidence, and a kind of cross-validation across different scales, which will further corroborate and strengthen the results of this research. Multiple case studies enable the researcher to relate differences in context to constants in processes and outcomes [4]. According to Miles and Huberman [25], multiple case studies can enhance generalizability and deepen understanding and explanation.

The data collection method was multi-method qualitative studies (as shown in the research design – see Appendix A, Figure 2), the data was collected using various methods; interviews, questionnaires, observation and document analysis as shown in Figure 1.

| Case Study (1) EU Level | Case Study (2) UK Level | Case Study (3) Local Level |

Fig. 1. Data Collection Methods Used for this Research

The use of multiple data collection methods makes triangulation possible, and this provides stronger substantiation of theory [10]. Triangulation is a process that aims at corroborating the same phenomenon by using different data sources. Thus, any finding or conclusion made from the case studies is likely to be more convincing and accurate if it is based on several different sources of information [37].

4.1 Case Study 1 (EU Level)

This case study is an online questionnaire examines 26 e-learning EU collaborative projects lead by universities. The reason for choosing this case study is that it is a typical instance of providing an overview of the current state of the art of e-learning projects in universities across the EU. They are large-scale and important examples of the implementation of e-learning in HE in a the greatest international level possible. We sought participation from coordinators of these projects or people working directly in coordination-related tasks.

4.2 Case Study 2 (UK Level)

This provided the researcher with in-depth detail of the research topic and helped narrow its scope. Six interviewees from different UK universities were interviewed. The interviewees were decision makers, technical support staff and instructors (academics). All were universities that are known to be engaged with e-learning activities and applying e-learning technologies. The reason for choosing this case study is that

it was an effective way to provide an overview of the current state of the art of e-learning projects in UK universities at a national level.

4.3   Case Study 3 (Local Level, London)

It was conducted with a London university, which was in the process of upgrading its LMS to a new system. The aim was to obtain a rich, detailed insight into the implementation of the new LMS with complex relationships and processes. The reason for choosing this case study is that it was a unique opportunity for the researcher to observe and investigate the entire process of implementation/adoption of a new LMS system. This case study targeted the staff and the students (covering two crucial perspectives of e-learning), as well as the LMS implementation team members.

All the qualitative data collected (via questionnaires, interviews and observations) will be analysed qualitatively – it will be summarised, and grouped (categorised) or restructured as a narrative to support meaningful analysis [30]. Qualitative data can be analysed through the creation of a conceptual framework that can be formulated before, during or after data collection, as suggested by Saunders et al. [30]. We follow the same approach by creating a conceptual framework for e-learning implementation in HE. Coffey and Atkinson [5] suggest that coding makes it possible for the data to be analysed by creating categories, and for ideas and theories to be developed. In this study, we analysed responses from interviews and questionnaires in order to identify key themes, and performed data clustering in order to identify similar or contrasting patterns.

5   Progresses and Results Achieved

The research conducted in this thesis focuses on identifying all the salient elements of such a comprehensive framework, including CSFs from multiple perspectives (including students and education providers), phases of implementation or methodological steps, tools, technologies and methods. The purpose was to identify apparent relationships among phases, methodological steps and CSFs. The literature review analysis contains the mapping of e-learning implementation phases with respective methodological steps and CSFs, which can be used as a basis for the proposed framework, and this is one of the main contributions of the literature review analysis. The analysis results have been sorted and mapped. Furthermore, it is worth mentioning that the two terms (methodological steps and phases) are ambiguously used in the literature and are not clearly distinguished. Moreover, some implementation phases are not explicitly identified in the literature and, thus, were added by the researcher as a contribution of this research. An initial generic structure framework for e-learning system implementation was built based on this analysis.

For Case Study 1 (EU Level), online survey questionnaires were analysed. Findings from the case study illustrate that 87.5 % of the 26 projects are focusing on the education sector, and universities are the target adopters for 41.7% of projects. Results of this case study will feed into our framework by contributing to the key elements

(phases, methodological step, methods, technologies, Obstructive and supportive factors). These results led the researcher to the second phase of this research through narrowing the scope only to universities, and to only one EU country, which is the UK.

For Case Study 2 (UK Level) and Case Study 3 (Local Level), the data were transcribed in preparation for analysed.

Currently, the researcher is in the process of analysing the data collected from all three case studies and results will be published in the near future. The data will be analysed, and a method will be devised to link all these datasets to eventually build our proposed framework.

6   Conclusion

This research has considered multiple stakeholder perspectives and has collected a complete set of data using different techniques. The main research contribution is a framework that is comprehensive enough to be used for improving the planning and execution of e-learning implementation. Thus, the research aims to cover a broad range of e-learning applications in the HE sector.

References

1. Al-Jaghoub, S., Al-yaseen, H., Hourani, M., Al-Haddadeh, R. & Salim, M.: e-learning adoption in higher education in Jordon: vision, reality and change. European and Mediterranean Conference on Information Systems, Izmir (2009)
2. Alexander, S.: E-learning developments and experiences. Education and Training, Bradford. 43(4-5): pp.240-248 (2001)
3. Bruck, P.: World's Best Practice in e-learning: knowledge management and capacity-building. WSIS Forum May, Geneva (2010)
4. Cavaye, A.: Case Study Research: A Multi-faceted Research Approach for IS. Information Systems Journal, 6(3), 227-242 (1996)
5. Coffey, A., and Atkinson, P.: Making Sense of Qualitative Data. Sage,Thousand Oaks, CA, 215 (1996)
6. Coiffail, L.: (R)evolution in higher education?in: l. Coiffait (ed.) Blue Skies: New thinking about the future of higher education. A collection of short articles by leading commentators, uk 2012 edition. london: Pearson. Chapter 1. (2012)
7. Collis, B & Moonen, J.: Flexible learning in a digital world: experiences and expectations. London: Kogan Page (2001)
8. Department for Education (DfE): Relating e-learning to inspections (2004). https://www.education.gov.uk/publications/eOrderingDownload/15107.pdf.

9. Department for Education and Skills (DfES): Towards a Unified E-Learning Strategy: Executive Summary.(2003) DfES Reference Number: DfES/0455/2003 http://www.education.gov.uk/publications/eOrderingDownload/DfES-0455-2003.pdf

10. Eisenhardt, K. M.: Building theories from case study research. Academy of management review. 14(4), 532-550 (1989)

11. Engelbrecht, E.: A look at e-learning models: investigating their value for developing an e-learning strategy. 25(2): 38-47 (2003)

12. Garrison, D R & Anderson, T.: E-learning in the 21st century: a framework for research and practice. London: RoutledgeFalmer (2003)

13. Ghaleb, F., et al.: E-learning Model Based on Semantic Web Technology. International Journal of Computing &information science, 4 (2) 63-71(2006)

14. Hung, J.: Trends of e-learning research from 2000 to 2008: Use of text mining and biblio-metrics. British Journal of Educational Technology. 43 (1) 5–16. (2012)

15. Ismail, J.:The design of an e-learning system beyond the hype. Internet and Higher Education.4 , 329-36 (2002)

16. Kastner, Margit, Stangl, Brigitte.. (Dis-) Satisfiers for e-Learning User Interfaces. In Proceedings of the International Conference on Information Systems (ICIS 2011), Hrsg. ICIS, 1-19. Shanghai, China: AIS Association for Information Systems (2011)

17. Khoja, S., Rahman, A.,and Shaikh, Z.: Dynamic Distance Learning Framework Using Problem Based Assessment. International Conference on Use of Information Technology in Teaching of Science,, Islamabad, Pakistan, 12 - 14 Mar. (2002)

18. Lin, J., Wang, P., and Lin, I.: Pedagogy technology: A two-dimensional model for teachers ICT integration', British Journal of Education Technology, 43 (1) 97-108 (2012)

19. Lygo, C.: A private education in times of austerity? in: l. Coiffait (ed.) Blue Skies: New thinking about the future of higher education. A collection of short articles by leading commentators, uk 2012 edition. london: Pearson. Chapter 5. (2012)

20. MacDonald, C J, Stodel, E J, Farres, L G, Breithaupt, K, Gabriel, M A.: The demand-driven learning model: a framework for web-based learning. The Inernet and Higher Education, (4) 9-30 (2001)

21. MacLean, P., and Scott, B.: Competencies for learning design: A review of the literature and a proposed framework',British Journal of Educational Technology, 42 (2), 557–572 (2011)

22. Mascitti, I.& Funghi, F.: A MULTIBLENDED SOLUTION FOR EFFECTIVE LEARNING: THE EXPERIENCE OF CONSORZIO FOR.COM. ilearning forum Paris 2007 Conference 30th to 31st January 2007 Paris, France (2007)

23. Meredith, S., & Newton, B.: Models of e-learning: Technology promise vs learner needs literature review. The International Journal of Management Education. 4(1), 43–56 (2004)

24. Mishra, S.: A design framework for online learning environments, British Journal of Educational Technology. Vol 33 No 4. pp 493-496 (2002)

25. Miles, M. B., and Huberman, A. M.: Qualitative Data Analysis: An Expanded Sourcebook, Sage publications. Newbury Park, CA. (1994).

26. Morris, H. & Rippin, A.: E-Learning in Business and Management: The Current State of Play. Presented at BEST 2002 Conference, Supporting the Teacher, Challenging the Learner, Edinburg (2002)

27. Mostefaoui, S., Ferreira, G., Williams, J., and Herman, C.: Using Creative Multimedia in Teaching and Learning ICT: A Case Study. European Journal of Open, Distance and E-Learning (2012)

28. NZCER.: Critical Success Factors and Effective Pedagogy for e-learning in Tertiary Education. New Zealand Council for Educational Research (NZCER), Background paper for ITP New Zealand (2004)
29. Piccoli, G., R. Ahmad, et al.: Web-based Virtual Learning Environments: A Research Framework and a Preliminary Assessment of Effectiveness in Basic IT Skills Training. MIS Quarterly 25(4): 401-426 (2001)
30. Saunders, M., Lewis, P. and Thornhill, A.: Research methods for business students, Financial Times/Prentice Hall (2009)
31. Scott, B.: The Online Learning Knowledge Garden: A Pedagogic Planning Tool for e-Learning. Proceedings of International Workshop in Learning Networks for Lifelong Competence Development, TENCompetence Conference. March 30th-31st, Sofia, Bulgaria: TENCompetence. (2006) from http://dspace.learningnetworks.org.
32. Simon, B., Pulkkinen, M., Totschnig, M., Kozlov, D.: The ICOPER Reference Model for Outcome-based Higher Education. (2011) available at: http://www.icoper.org/results/deliverables/D7-3b
33. Smyth, R.: Enhancing learner–learner interaction using video communications in higher education: Implications from theorising about a new mode',British Journal of Educational Technology, 42 (1), pp:113–127 (2011)
34. Snae, C., Brueckner, M., and Hirata, E.: Distance Online Learning and Evaluation Framework. Journal POLIBITS: Computer science and computer engineering with applications. (2008)
35. Stansfield, M. et al.: The Identification of Key Issues in the Development of Sustainable e-Learning and Virtual Campus Initiatives. European Commission Education, Audiovisual and Culture Executive Agency (EACEA) grant, number 2006-4808/001 - 001 ELE ELEB12 ©Academic Conferences Ltd. (2009)
36. Wild, R., Griggs, K., and Downing, T.: A framework for e-learning as a tool for knowledge management. Industrial Management & Data Systems. 102(7) pp:371-380 (2002)
37. Yin, R. K.: Case Study Research, Design and Methods. Sage publications, Newbury Park, CA. (1994).

Appendix A

Fig. 2. Research Design