E Cases of digitizing higher education – a global perspective

Research

E.1   EdTec Implementation in a global higher education network. Empirical data from a field study in South Asia.

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This paper examines the appropriateness of using educational technologies toward increasing flexibility of learning in a global higher education in South Asia. The integration of information and communication technology (ICT) into education is widely perceived as an essential aspect of teaching and learning in contemporary society and therefore embodied in education policies across many countries, Cambodia and Sri Lanka included. Authors consider the argument that while interactive educational technologies may be appropriate in countries in which self-directed study and student autonomy are emphasised, a similar use of educational technologies may be found appropriate. Yet, in South Asian countries, education has traditionally been more tightly structured and teacher-directed that is why this paper does examine government policies toward the use of educational technologies in higher education in Cambodia and Sri Lanka. Qualitative analyses of both needs and challenges of introducing and implementing ICT in these particular cultural contexts are considered as preconditions for an effective implementation of Higher Education (HE) skill development. Subsequently, a plan is concluded of how to implement EdTec in that HE network to trigger awareness about further steps of the recent measure.

Keywords: education technology, 21st century skills, online learning environment, ICT implementation, global higher education

1   Introduction

The corona pandemic has changed the world dramatically over the first decade of 2020 and affected almost every aspect our lives. The world's digital behaviours have been clearly transformed and radically changed, especially as billions of world population turn to connected devices to help them cope with life and work under lockdown. The governments give high priority for development of e-learning projects. Establishment of adequate Information and Communication Technology (ICT) infrastructure becomes an integral part of the modern society. More than a decade ago research has predicted new educational patterns (Köhler & Kahnwald, 2005). Meanwhile profound technological transformation in both developed and developing countries has made widespread impacts on different sectors. As many developing countries Cambodia and Sri Lanka are facing with similar digital challenges and understand urgency to transform their traditional face-to-face education into tech-based education (Jamel, 2020; UNESCO, 2020). "Therefore, it is not surprising to find an exponential growth in the use of ICT in education all over the world. Some impressive evidence on the effectiveness of ICT in education reveals that it has greater impact than any other innovation" (Fluck, 2003).

EdTec is abbreviation of the term Education Technology (Kennedy, 2019) and defined as the combined use of computer hardware, software, and educational theory and practice to facilitate learning (Watters, 2012). Education technology creates and manages technological processes and educational resources to help improve user academic performance (Robinson, Molenda, & Rezabek, 2008) and connects learners, teacher, and technicians with each other in an effective way (Mangal & Mangal, 2009). 21st century skills[1] are a relatively young concept in education. Usually there is a direct linkage to EdTec development for both, the skills itself but as well for the skill training. The recent study intends to identify pre conditions of implementing respective programmes in a global context with focus on South Asia and Europe. Basically authors employ the CONTESSA project [Contemporary Skills for South Asia, cf. https://contessa-project.eu/], whose aim is to establish a teacher education program that supports current teachers, future teachers and teacher educators developing a wide range of contemporary teaching and learning skills which, in turns, help engaging, empowering and educating their students. The project thus contributes to high-quality schooling in primary education in the project partner countries Austria, Germany, Cambodia and Sri Lanka.

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[1]   21st century skills comprise skills, abilities, and learning dispositions that have been identified as being required for success in 21st century society and workplaces by educators, business leaders, academics, and governmental agencies. https://en.wikipedia.org/wiki/21st_century_skills

In this study, a focus group was set up with professors, lecturers and students in the early pre-implementation stage of the education programme. Focus group discussions were conducted in this phase as part of the context and needs analysis of the project (see Fig.1). The focus group looked at needs and context from the lecturer'' and students' perspective. Choosing this procedure was to get to know the faculty and students, and to identify their intentions about ICT introduction and online learning environments. Core findings are suitable to develop a deeper understanding of categories, status and needs for ICT infrastructures and online learning environments in the respective universities, which are the preconditions for an effective implementation of the skill development. Subsequently, a plan is concluded of how to implement EdTec in that Higher Education (HE) network and give an awareness about further steps of the recent project.

2   Literature review

2.1   ICT in the Cambodian Education

The goals of Cambodian government are to create qualified workers and to modernise the education system, based on the recent needs of the global labour market. In the mid-20th century, the concept of education modernization in Cambodia revolved around creating a formal schooling system (Dy, 2004). With support of international organisations, education in Cambodia focused on education for all and the implementation of modern technologies to the education reforms. Using ICT in educational institutions for improving teaching and learning practices and the quality of education (Pors, 2016; Buenafe R. A., 2007).

In 2004 the Ministry of Education, Youth, and Sport (MoEYS) in partnership with the Japanese Funds-in-Trust and UNESCO adopt the first policy on "ICT in Education" (MoEYS, 2004). This policy focused on "improving teachers' and students' access to ICT to narrow Cambodia's digital gap, using ICT for communication and access to new knowledge, using ICT to promote education for all, and using ICT for productivity improvement" (Pors, 2016).

In 2010, the MoEYS together with the Open Institute, UNESCO, and other international organizations developed a Master Plan for Information Communication Technology in Education (MoEYS, 2010). In the Master Plan shows the objectives and results of ICT implementation in education at different levels from primary to higher education. This document reviewed as more outcome-oriented than previous policy documents and the four general goals of accessibility, skill development, education for all, and efficiency and efficacy are also considered (ibid).

The Master Plan (ibid) specified five objectives for the HE sector: improve lecturers' pedagogical skills; improve students' ICT-based professional skills; provide mechanisms for managing open and distance learning programs; improve interuniversity telecommunication; and standardize electronic documents. Yet, despite the important role of ICT in Cambodian education and development, government allocated only 0.12% funding on it (UNESCO report, 2013). With the development of the economy in Cambodia, many private companies show great interest in the implementation of ICT in the field of education, for the development of infrastructure of schools and universities. As mentioned in UNESCO report (2013) private telecommunication companies such as Metfone and Ezecom in cooperation with the MoEYS installed computers and provided internet in schools and universities across the country.

Next would be in addition to the political landscape, as mentioned above, to talk about social landscape. It should be noted that the statistics on this subject are very limited and only a brief overview can be captured. Despite the fact that Internet connectivity is limited in Cambodian educational institutions (MoEYS, 2014a), the trend of mobile devices and the mobile Internet is developing very rapidly. (Adler, 2014). As of January 2019, the number of mobile connections in Cambodia is 153% of the total population and had a growth rate of 20% in the past year. These figures suggest that Cambodians have still more than one mobile phone and mobile internet connection. About 76% of the Cambodian population has active Internet connection and in the period from January 2018 to January 2019, this number has been increased to 56%. Youth between the ages of 18 and 24 use Facebook and Twitter as the primary social media channel (Kemp S., 2019a). Current web traffic data compared to 2015 (Kemp S., 2015) clearly shows that surfing the Internet is popular via desktops and laptops (56%) among Cambodians than mobile phones and tablets. (Kemp S. , 2018a)

2.2 ICT in the Sri Lankan Education

Sri Lankan government also aims to provide free education to all students all the way up to the University and the latest technologies as a tool to make changes and modernization in education system. Through the Higher Education for Twenty first Century (HETC), project Sri Lankan government gives highest priority for technology base education in universities. Large government investments for purchasing and development of technology infrastructures at not only university level but school level too, is the evidence of this (Rashida, 2017). With 9790 schools and up to 4 million students and 20000 teachers in the school education system has the government set up over 200 computer laboratories and 2500 basic computing facilities in 4500 schools (Pasqual, 2011).

Integration of ICT in the education as a national policy was initiated since 1980s. Ministry of Education of Sri Lanka (MoE) approved in 2001 a national policy to improve ICT in secondary education with the aim of filling the gaps in this area. MoE (2007) added ICT as a subject in the education plan and presented it at the GCE O/L[2] in 2001. Many international funded projects are supporting ICT integration in Sri Lankan education. In 2001–2004, the World Bank funded General Education Project II (GEP II) established 400 ICT Centers in schools. The Asian Development Bank (ADB) funded Secondary Education Modernization Project (SEMP) established 1006 Computer Learning Centers (CLCs) by 2006 and at present SEMP II expanding activities further. Modernization of education in Sri Lanka by foreign funded projects will cover up to one million secondary students (ADB, 2008; MoE, 2007).

Several initiatives, such as *IntelTeach* program, which trained more than 22500 teachers, 2500 school administrative staff and touched over 1500 schools and up to 1 million students with pedagogical approaches had been completed. In any case teachers where supported in order to make use of ICT in the teaching and learning process (Pasqual, 2011). For example the *SchoolNet* service connects more than 100 schools and 120 educational institutions via centralized web portals and internet access. Moreover the establishment of multimedia rooms for using respective learning materials in key subjects does provide learning and information management. Hardware and network support teams at school are reported to organize annual education software competitions supports for ICT skills improvement and do effectively enhance teaching and learning through ICT in the Sri Lankan education system (Palagolla & Wickramarachchi, 2019; MoE, 2013).

The software and telecom sectors of Sri Lanka's ICT industry faces a number of significant problems: lack of transparency in government acquisitions (the largest prospective client) and support, lack of moderately priced international bandwidth, lack of trained ICT professionals, a management-class knowledgeable about ICT (Gunawardana, 2005). Factors that exhibiting the integration of ICT education are traditional mind-set, poor infrastructure for online learning, negative thinking of academics, lack of material resources etc. (Karunanayaka & Naidu, 2014). Few percentages of Sri Lankans have access to the internet and the main ICT activity is concentrated in Colombo, Galle and Kandy areas. The reason of these problems are the regions outside of the urban areas are served with poor electricity and inadequate telecommunication infrastructure. Expect of the largest internet service provider (ISP) *Sri Lanka Telecom* (SLT), are the most of ISPs are quite small and offering low speed internet (Gunawardana, 2005).

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[2]   General Certificate of Education (GCE) Ordinary Level, so-called the O-level, is a
       subject-based academic qualification
       www.wikipedia.org/wiki/GCE_Ordinary_Level_(United_Kingdom)

After the political landscape, it will be very important to describe the social landscape. Despite the fact that many authors noted low internet connectivity in Sri Lanka and only small percentage of population, mostly in urban areas, has the access to the internet (Gunawardana, 2005; Andersson, 2008), the number of internet and mobile social media users growing very rapidly. With over 28 million mobile subscription and majority (63%), accessing via high-speed internet proves the development in this area. As of January 2019, the number of mobile connections in Sri Lanka is 137% of the total population and had a growth rate of one, 6% in the past year. These figures suggest that majority of Sri Lankans as Cambodians have more than one mobile phone and mobile Internet connection. About 34% of the Sri Lankan population has active Internet connection and in the period from January 2018 to January 2019 this number has been increased to 6,2%. Youth between the ages of 18 and 24 use Instagram and Twitter as the primary social media channel (Kemp S. , 2019b). Web traffic data in 2018 makes clear that the internet usage is popular via mobile phones (76%) as compared to Cambodians (mostly via desktops and laptops) among Sri Lankans than desktops or laptops and tablets (Kemp S. , 2018b).

3   Research design and Framework

The study is based on qualitative and structural data collected in four separate focus group discussions with representatives from the four partnering HEIs in South Asia. Effective planning and design are very crucial components of e-learning projects. Well-planned and designed e-learning courses and course components can be reused and delivered to different learners, in different context many times. For this reason, the authors have decided to use the instructional design model - ADDIE by Florida State University (Branson, et al., 1975) in combination with study framework by Pors (2016) can be used to define the project activities that will guide and systematically develop e-learning development projects (Ghirardini, 2011). In this study, a focus group was conducted with the professors, lecturers and students in the pre-implementation stage (Figure 1). Bannan-Ritland (2003) and McKenney and Reeves (2012) advice to seek the information through a needs and context analysis, because they can provide design-based researchers define legitimate problems and design interventions that address any problems which are identified. Focus group discussions were conducted in the pre-implementation phase as part of the context and needs analysis of the project.

The focus group looked at needs and context from the professors, lecturers' and student's perspective. Those were invited to participate in the focus groups discussions, which were conducted in an informal, participatory, and interactive environment with the aim of exploring the needs and issues surrounding the context of the study. Questions asked during these focus group meetings included inquiring about the professors', lecturers' and students experience in using web-based technologies for teaching and learning purposes, what they thought were the challenges in their teaching and learning, and how the use of technology could help address these challenges.

As a result, researchers are able to address current issues not only from discussions with researchers, but also through interaction between participants (Liamputtong, 2011).
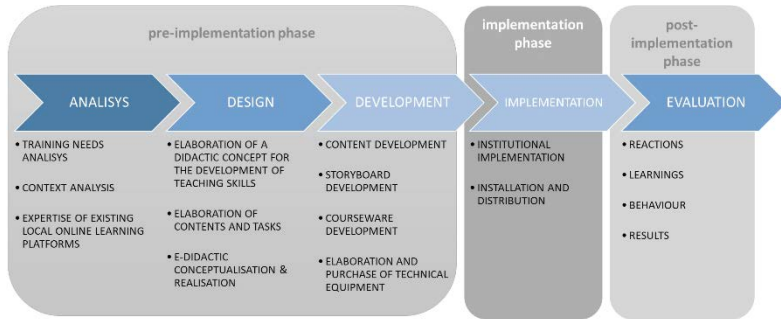

Figure 1. Model of CONTESSA E-Learning

4   Findings

This chapter examines the initiation of the design-based research project and the online learning environment in its pre-implementation stage. It looks into the actions, perceptions, and challenges behind the context and needs analysis prior to its implementation. Through examining design-based research in action, the chapter serves the purpose of presenting how the online learning environment is initiated and introduced to the participants in this study.

4.1   Participants' Expectations toward Online Learning Environment

The data collected from respective focus group discussions with teachers and students of four universities were analysed to clarify the expectations and intended uses of the online learning environment, and provide some contextual background of the participants in the study. The data revealed six common expectations of the online learning environment shared among the participants:

- Using ICT to working with clouds, apps in the classroom and learning platforms
- Using ICT and E-Learning for personal development
- Using ICT for classroom management and lesson planning
- Using ICT for developing English language skills
- Using ICT for learning and teaching
- Using ICT for increasing the motivation and self-learning

Majority of the students interviewed wanted the online learning environment to be more attractive to use and contains itself some of fun elements to activate and motivate the learning process. They expected to improve their English reading and writing skills through E-Learning courses. Students suggested that the online learning environment should be contains face-to-face contact elements, because they feel unsecure to use E-Learning alone without the support. The lecturers in the focus group also noted these characteristics as they agreed that they would consider adopting the online learning environment for their classes if it assisted them with classroom preparation and management, personal development. The lecturers' responses show that their confidence and competence of ICT linked their expectations of what ICT could be used for and how that might benefit or improve their teaching pedagogy.

In the focus group meetings were mentioned that the without electricity supply in the schools it is hard to use E-Learning and introduce ICT in teaching. E-Learning is not common education art in the Cambodian and Sri Lankan schools. The concept of *new generation schools (NGS)* (Bohlinger, 2019) in Cambodia was introduced by the government only in some schools as a pilot project in which selected teachers have the opportunity to use modern technology for teaching.

This section presented the analysis of student and lecturer perceptions of their needs in relation to an online learning environment. The following section analyses the local context at the micro level, as opposed to the macro analysis of the Cambodian and Sri Lankan context that was provided in section 2.

4.2   Understanding the Local Context

Context is important to understand the introduction of the online learning environment in this setting and at the same time, it is an essential part of the design-based research methodology framework of the study. While section 2 shows the context at the macro-level, the contextual analysis in this section focuses on the detailed scope of context relevant to the participants of the study such as ICT infrastructure and internet access, the participants' ICT proficiency and experience, students' self –learning and lecturer-student communication.

4.2.1 ICT Infrastructure and Internet Access

An important issue discussed among the students, lecturers and professionals in the focus group related to concerns about the ICT infrastructure within the institution and internet access for lecturers and students. Many researchers (Abrahams, 2010; Bates, 2000; Bingimlas, 2009; Tearle, 2003) mentioned this as important enabling factor for ICT introduction and implementation in an institutional setting. Adequate access to computer devices and the internet by the lectures and students must be taken in attention when introducing the online learning environment in this setting.

According to the information provided by the participants, most of students and lectures had their own laptops or mobile devices, but they had no free Wi-Fi access neither in the university, nor at home.

Students reported that they used the internet in their daily life for communication and social networking. Most popular internet access points among the students were from a mobile phone. The popularity of mobile phone connection might be due the fact the average number of mobile subscriptions per person in Cambodia and Sri Lanka is approx. 1,5 (Kemp S. , 2018a; 2018b), so that they are more accessible than computers. The reason for this, the students have shown the absence of technology in the classrooms. These figures relating to students' internet usage show that many students had regular access to the internet from their mobile phones and laptops outside of the campus. Yet the lack of Wi-Fi on campus might have caused inconvenience for some students. The lack of Wi-Fi and electricity on campus is unlikely to be a substantial issue. Lectures and students were still able to access the internet using other sources (mobile internet or 3G modem), and from other places off campus.

4.2.2 Participants' ICT Proficiency and Experience

In the discussions, lectures and students were asked to about their computer and generic internet skills in order to provide some information relating to their ICT proficiency and to ascertain how much training they might need prior to implementing the online learning environment.

Most of students and lecturers except OUSL reported that they have no experience with E-Learning and have insufficient ICT skills. The common internet activities reported by students included:
  - file storage or clouds such as Google Drive and Dropbox
  - social networking such as Facebook
  - software and applications such as Microsoft Office programs
  - search engine such as Google

These results suggest that most of the students' internet activities are linked to communication, social, and leisure purposes. In relation to using ICT for academic purposes, lecturers who participated in the focus group claimed that they also had some low knowledge and experience in using computers and the internet to support their teaching.

4.2.3 Students' Self-Learning

As graduates, students were expected to spend some time engaging in self-learning activities beyond simply attending their normal classes.

The teacher educator and lecturers who hoped that the introduction of the online learning environment would enhance lecturer-student communication and encourage students to engage in more learning-related activities outside of their normal classes also emphasized the importance of self-learning. The focus group discussions result show that some of students spent their time engaging in self-learning. Lecturers and teacher educators considered that either many students also worked full-time or part-time in addition to studying, it is understandable that time constraints could be a significant issue for them.

The different types of self-learning activities that were reported by students in the discussions included: Preparing to classes with searching information on Google and in internet, working in groups, reading study materials, books, and research articles (mostly in paper form). For example, the students and lecturers (except OUSL) are in common opinion, that face-to-face contact in the study is more preferable than E-Learning only: "they and/or their colleagues/peer students feel non yet confident enough with using e-learning only and would thus be more motivated to participate in the courses if they could benefit from both, online and 'offline' (face-to-face) courses" (Bohlinger, 2019, p. 5)

Literature related to teaching and learning approaches in the Cambodian and Sri Lankan contexts (Ahrens & McNamara, 2013; Howes & Ford, 2011; Ngo, 2013; Pellini, 2005; Suraweera, Chern, & Cranfield, 2012) as the results of recent study have addressed the predominance of teacher-centred approaches in the education system and has suggested a need to introduce some emphasis on a student-centred approach into the system.

4.2.4 Lecturer-Student Communication
The discussion results also show that mobile phone, email, and social networking were popular types of communication medium with the lecturers and classmates outside of class hours. Mobile phones were reported as the most commonly used point of internet access, so it is logical that students prefer to use them for everyday communication as well. The popularity of mobile phones in Cambodia and Sri Lanka explains students' preference to use them for both communication and internet access. However, although the majority preferred using mobile phone for long-distance communication, a few students mentioned that they preferred using Facebook for communicating with lectures and classmates. This shows that in addition to having access to different communication mediums, some students are also selective of the medium depending upon with whom they intend to communicate.

5   Conclusions

The Cambodian and Sri Lankan ICT in education policies highlight key constraints of the ICT integration in the respective context: the lack of ICT infrastructure in universities and schools; and the limitation of human resources. Current study analysed the participants' expectations of the online learning environment in the pre-implementation stage and how they reflected their needs and the situational context. Subsequently authors analysed the local context and provide a snapshot of the ICT infrastructure on campus, the participants' ICT proficiency and experience, and the communication medium between the lecturers and students in the academic program.

These findings demonstrate that the complexity of ICT implementation goes beyond infrastructure and accessibility. The provision of ICT infrastructure and purchase of technical equipment and as well as technical training may have been important in the early stage of the implementation. The findings of the current study show an introductory gap in the Cambodian and Sri Lankan ICT in education policies in addressing the interdependence between the academic uses of ICT within education settings and the progressing online social experience outside of education settings, which actually are perceived as mutually exclusive. It should be noted that while majority of Cambodian and Sri Lankan academics and students have limited or no experience in using ICT for academic purposes, but they have sufficient skills to use of ICT for social purposes. Therefore, it is important considering background and experience of local academics and students as well as how they use ICT in their social lives as well as their academic lives. This knowledge will help with the development and implementation of future policies and professional training programs that range with the background, experiences, needs, and expectations of academics and students.

The current study has identified the fact of exponential growth of mobile internet connection and number mobile phone users, which demonstrates of their potential use e-learning projects. Predominance of teacher-centred approaches in the education system is a one of the common hindering factor of the self-learning among the students, that which requires to implement of the student-centred approach into the system. Further research is needed to expertise and use behaviours of existing local e-learning platforms of collaborating universities in the corona pandemic period; and development of didactic concept and content for online learning environment to finish the pre-implementation process.

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