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Article

Improving Students' Speaking Ability Through the Integration of Information and Communication Technology in English as a Foreign Language Classrooms in Higher Education Institutions

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Abstract

Students who are quiet in English as a foreign language (EFL) classrooms are often not quiet because they have few or poor-quality ideas in response to the lectures; rather, they are quiet because one of the most difficult learning aspects for them is speaking. Petty (1993) states that perfect speaking outcome results from perfect practice; therefore, issues with speaking are the result of a lack of practice and/or practicing the wrong way. Integrating ICT into classrooms could go beyond traditional teaching and provide new ways to practice and practice correctly. Therefore, this paper examines the differences in students' performance in speaking before and after the implementation of ICT in an EFL classroom in a higher education institution. In addition to this, useful ICT tools and online learning platforms for effective learning and the difficulties students faced with the implementation are also analyzed. This paper uses surveys as a research design. One class of year 2 students was studied for a semester. Each participant was tested and filled out a questionnaire both before and after the implementation. Semi-structured interviews were held with three students – one outstanding, one of average performance and one of low performance. The research found that ICT implementation had a positive impact on most areas of the study. Therefore, this study shows that ICT

should be implemented in Cambodia at the university level to improve speaking in English. In addition to this, ICT support should be provided to both lecturers and students.

Introduction

Sydney J. Harris states: "The whole purpose of education is to turn mirrors into windows" (1994, p. 2). Education plays a vital role in allowing people to experience today's world and provides opportunities for further exploration. Before the Internet era, conventional methods for teaching English as a foreign language (EFL) included direct method, audio-lingual method, suggestopedia and community language learning (Schmit, 2002). In recent years, EFL lecturers have turned to a new method: information and communication technology (ICT) pedagogical integration (Kullberg, 2011). ICT represents the boosting tool to enhance only economy (Kamal & Qureshi, 2009) while ICT implementation can help to develop a nation's economy, education, culture and politics (Albirini, 2008).

After encountering various obstacles, Malaysia has used ICT in education to make positive changes in laboratories, resource centers and administrative offices (UNESCO, 2004). Moreover, Dudeney and Hockly (2008) argue that using technology in speaking can be beneficial as it exposes learners to authentic tasks and materials and provides opportunities for collaboration and communication, even across large distances. These uses are innovative ways to practice language and assess performance. After having observed for more a decade that the majority of EFL students complain that they about their speaking skills, Petty (1993) stated that the perfect speaking outcome results from perfect practice. From this, it can be understood that issues occur because students do not have enough speaking practice or they do not practice in the right way; therefore, to improve their language skills they needed better strategies to enhance their speaking ability. Recognizing the importance of technology

in the education system, Kituyi and Tusubira (2013) developed a framework that ensures the effectiveness of the implementation of e-learning in higher education institutions in developing countries such as Uganda, Kenya and Zimbabwe. These researchers identified audio and video projection and other technology as crucial tools for learning that should be combined with the existing course content. The framework also identifies the stakeholders, such as universities, who would ensure the successful implementation of the ICT program. Similarly, Wagner, Hassanein and Head (2008) propose that satisfying the needs and concerns of every stakeholder is necessary in order to successfully implement an e-learning program. However, different stakeholders, such as the students, instructors, institutions, content providers and technology providers, all have different needs, motivations and concerns in relation to virtual learning.

Concerned about the quality of education in Cambodia, in 2002 the United Nations Educational, Scientific and Cultural Organization (UNESCO) introduced a program entitled ICT in Education for Asia-Pacific Countries, which had the main aim of using ICT to help Asia-Pacific countries to enhance their educational quality in order to meet the demands of understanding and sharing information in education (UNESCO, 2007). Funded by Japanese Funds-in-Trust (JFIT), the ICT in Education program focused on the interrelated areas of education policy (i.e., the rules of ICT usage in educational systems), teacher education (i.e., the training and professional development of teachers and ICT effectiveness in learning and teaching), teaching and learning (i.e., the best use of ICT in school and UNESCO SchoolNet in the ASEAN context), non-formal education (i.e., ICT usage in community using non-formal teaching), monitoring and measuring change (i.e., ICT performance indicators), and research and knowledge-sharing (i.e., ICT practices, ICT infrastructure and ICT knowledge) (UNESCO, 2007). In addition to this, VVOB (the Flemish Association for Development Cooperation and Technical Assistance) provided a series of workshops for ICT pedagogical development, using multimedia to upgrade teachers' professional capacity, to teach teachers to use materials effectively and efficiently and to shrink the gap between students and teachers (Dionys, 2012). Thus, Dionys (2012) reports that national digital content has been introduced in higher education in the training with over 300 educational videos chosen and translated into Khmer language. Of these 300 videos, around 200 were filmed during class subject experiments, while over 100 clips were taken from existing sources, as required by VVOB for quality control.

ICT is the key for helping Cambodia to move forward in all aspects. The Association of Southeast Asian Nations (ASEAN) has launched the ASEAN ICT Master Plan 2015 with the purpose of encouraging social and economic growth (KOICA, 2014). Today, the development of ICT in Cambodia is focused on four areas: to embolden people through ICT human resource development and e-awareness; to strengthen connectivity through frameworks and infrastructure; to use ICT to improve the capabilities of industry, research and development; and to implement e-services in the government, public, economic and educational sectors (KOICA, 2014).

The 2014–2018 strategic plan of the Royal University of Phnom Penh (RUPP) outlines the future strategic plans of the university. The second and third missions of the plan are to become a center of excellence for language learning and information and communication technology (ICT) and to become a leading institution for social science, humanities and science, technology, engineering and mathematics (STEM) education (p.4). RUPP thus aims to be the core and leading center of ICT and STEM in educational systems at the higher institutional level in Cambodia and to equip students with academic, macro and employment skills as well as innovation, cross-cultural competence, values and attitude. At the same time that RUPP were establishing their aims for teaching and ICT, the Ministry of Education, Youth and Sport (MOEYS) developed a Master Plan for ICT in Education. From 2009 to 2013, they aimed to increase access to basic education, tertiary education and life-long learning, both formal and non-formal, by using ICT as alternative education delivery media; to improve the relevance and effectiveness of basic education by harnessing the potential of ICT as a major tool to enhance the quality of teaching and learning; to develop the ICT-based professional skills needed by graduates for employment in a knowledge-based society in order to ensure that Cambodia can compete and cooperate in an increasingly interconnected world; and to increase the effectiveness and efficiency of the Ministry and school management (MOEYS, 2013).

Therefore, the aim of this study is to examine the bridge between the traditional teaching of speaking and ICT integration, emphasizing pronunciation, intonation, stress, ending sounds, discourse markers, confidence, presentation, debate, manner, matter and method in public speaking. In this paper, we examine the importance of ICT application and integration at RUPP. Some of the biggest problems students have faced at RUPP is access to facilities and equipment, for example Wi-Fi on campus,

since the university cannot afford to supply those for free. Moreover, the majority of faculty members (mainly lecturers) need to receive ICT training, as most of them are not familiar with ICT. Both lecturers and students are in need of smart devices such as smartphones, tablets, laptops and projectors because not all lecturers and students can afford these devices and RUPP's budget is very limited and they cannot buy these devices for everyone at the university.

Conceptualizing ICT at Higher Education Institutions

ICT is primarily defined as the practice of using technology to send, store, display, share or exchange information via electronic devices such as radios, televisions, videos, DVDs, telephones, satellite systems and computers and the Internet services associated with websites, videoconferencing, emails and blogs (UNESCO, 2007, p.1). According to UNESCO (2010), ICT represents the practice of sending, sharing, expressing and changing information through devices, while Gokhe (2012) states that ICT includes the supporting activities involved with the interaction of information and communication with each other. Moreover, Kugemann (2002) defines ICT as the certain areas that allow for the updating of information and communication. This paper defines ICT as the educational program used to upgrade students' performance, mainly in speaking English, through particular tools, resulting in score enhancement, better speaking skills and reducing learning difficulties. The integration of ICT in EFL teaching should start at the university level, since most university students are mature enough to become involved with technology, able to pay to access ICT tools and the Internet, and prepared to deal with ICT implementation problems. Moreover, Balanskat, Blamire and Kefala (2006) state that among the four macro skills of EFL – speaking, writing, reading and listening – many students are scared of speaking and have approached their lecturer for help. Therefore, ICT integration in speaking provides positive impacts for learners in many areas like motivation skills, concentration, cognitive processing, independent learning, critical thinking and teamwork. Similarly, Rahimi and Yadollahi (2011) agree that ICT helps students at a university to be more creative and have better presentation and public speaking English skills, so they tend to be more confident during their presentations. As such, ICT becomes a potential communication and collaboration tool on the Internet through emails, chat groups, news groups, discussion groups and other activities (Krajka, 2002).

However, integrating ICT into curricula is not easy, as lecturers need to take a pivotal role in incorporating this method into the curriculum and students must be equipped with ICT facilities (UNESCO, 2004). As noted by Selwyn (2008), Web 2.0 can help with this through applications called "social software" that allow people to share, create and communicate information. Google, LinkedIn and Facebook are some of the most common tools that help ICT facility. Similarly, Kullberg (2011) finds that while Swedish lecturers and students have an positive attitude towards the use of ICT inside and outside the classroom, they have been most successful using four particular tools: Kahoot, Prezi, Project Libre and Wikis (such as Wikipedia, Wikinews, Wikianswers and Wikisource). Likewise, Wichadee and Pattanapichet (2018) state that students engage in learning much better when Kahoot is introduced, since Kahoot is easy for lecturers and students to use and assists with competitiveness at all levels.

Chhem, Khieng and Madhur (2015) state that in order to be successful in employment, students should have three dimensions of skills: cognitive, social and behavioral, and technical skills. The same study continues that technical skills can be developed from doing manual work such as using tools with expertise and from doing tasks in both social science and real science. With those skills, both employers and employees can perform better in most tasks. However, the study recommends introducing those skills, primarily the technological skills, at an early age at school since younger people are better able to acquire the related-to-technology skills more quickly and easily and, with ICT as the first step, they can acquire many technological skills. In contrast, Robert (2008) reports that while ICT in education is good, some universities in the South Pacific area have had problems using ICT tools like technology training, capacity-building, curriculum development, infrastructure (i.e., electricity, transport and basic services), financing and ICT updated policy initiatives. Muilenberg (2001) identified eight barriers students had in learning online: administrative and instructor issues, limitations of social interactions, limited academic skills, limited technical skills, learner motivation, time and support for studies, the high cost of and limited access to the Internet, and technical problems. Pearson (2015) states that Thailand has practiced a "one tablet per student" policy, which means each student is given a tablet with the aim of stimulating students by exposing them to technology and speeding up their thinking capacities. This program has had mixed results. First, they had positive results in relation to general cognitive skills, verbal skills, skills with coping with problems, and speaking and

listening skills. However, the facilities, commitment of students and faculty, and the roles of lecturers had negative outcomes, as, since most schools could not supply free Internet access, students gave up because they feel e-learning is more complicated than traditional teaching, which was exacerbated because not many lecturers were trained in the uses of ICT.

Study Areas and Methodology

RUPP, which opened on 13 January 1960, is the oldest and largest public university in Cambodia. It was completely closed during the Khmer Rouge period (1975–1979) but reopened on 13 May 1980 and, over the last three decades, the university has continued to grow and expand. Today, RUPP provides both undergraduate and postgraduate degrees under five faculties and one institute in many areas: sciences, social sciences and humanities, development studies, education, engineering and foreign languages. The university has been a full member of the ASEAN University Network (AUN) since 1999 and a member of Greater Mekong Sub-region (GMS) from 2015 and promotes international cooperation, joint research, student mobility and academic exchanges. The university's Quality Assurance Center fosters a culture of quality throughout the university in academic areas, research and community service. To realize its strategic plans (2014–2018), RUPP provided research grants to its staff and lecturers in three categories: USD 1000, USD 3000 and USD 5000 seed grants. The present study employs a mixed-method approach through integrating quantitative and qualitative methods within a single study to obtain a better understanding of the complexity of research inquiry for ICT implementation in EFL classrooms. A mixed-method approach was chosen as neither quantitative or qualitative methods alone were adequate for providing an in-depth understanding into the complexities of students who play truant and the use of mixed methods complemented the strengths and weaknesses of quantitative and qualitative methods (Creswell, 2005).

The purpose of this study is to examine whether the integration of ICT helps to improve the English-speaking ability of the students in EFL classrooms and also if it is suitable for large classes, like classes at RUPP. The study focused on three primary objectives: to encourage the use of ICT in EFL classrooms, to improve the teaching and learning environment in the classroom by using a variety of ICT materials, and to help English lecturers improve their pedagogies in teaching speaking to students in EFL classrooms. These aims corresponded with three research questions: what

speaking skills does ICT implementation help to improve, what are the most effective ICT tools used to improve speaking in English, and what are the major challenges in ICT implementation? The research was conducted as a survey design at a private English class of sophomores of a program at RUPP. There were 28 male and 27 female students from six departments (mathematics, biology, physics, engineering, environment and chemistry) and the class lecturer (as shown in Table 1). A convenient sample was chosen for this study. This group of students was purposefully selected as a sample because there were various majors within classes with an equivalent number of male and female students. All students were at an elementary level of English, which was a very common level of English proficiency among learners.

In order to track changes in the speaking ability of the selected students, researchers conducted tests both before and after the assessment. The test primarily looked at students' fluency, pronunciation, vocabulary, grammar, detail, gestures and eye contact. In both pre- and post-test assessments, students were asked to do a speaking task individually, and they were assessed against the above-mentioned criteria by the class lecturer. The students were also given a pre-test questionnaire at the same time so that the researchers could gather information related to the students' educational background, the devices they were using for ICT, frequency of surfing the Internet, devices and online tools used for ICT, and their speaking skills before ICT implementation. The students were also asked to rate any challenges they may have experienced before ICT implementation.

Table 1. Sample characteristics

Attribute	Male (N=28)	Female (N=27)	Overall (N=55)
Mathematics department	7	6	13
Biology department	5	7	12
Physics department	6	1	7
Engineering department	12	4	16
Environment department	3	2	5
Chemistry department	1	1	2

The last two sections were measured using a four-point importance scale. After the implementation of ICT, the students were given a post-test

assessment and questionnaire. Then, semi-structured interviews were held with three students based on GPA and teacher's observation: the poorest performing student, a medium-performing student, and the best performing outstanding student. The interview questions concerned smart devices, Internet connection, online platforms, speaking ability rating before and after ICT implementation, the challenges they faced and how, how much and how often they used ICT. As previously mentioned, the last two sections were measured using a four-point importance scale. The class lecturer was also interviewed to see how they implemented the ICT into their classroom and the challenges that emerged during the implementation stage.

For quantitative data, we used SPSS for data analysisfrequency (i.e., percentage, mean scores) and statistical analysis (e.g., t-test and Chi-square). The students' scores obtained from pre- and post-test assessments were analyzed by using a paired-sample t-test in order to see if there was any significant improvement in their competency in English speaking. In addition to this, the qualitative data was analyzed using both descriptive and narrative approaches by means of dividing them into themes and characteristics to establish the contextual factors that could be related to explaining the challenges in using ICT materials. In sum, these data were discussed to draw an interactive framework for policy and practice, particularly for further research on ICT implementation in English as foreign language (EFL) classrooms in Cambodia.

Findings and Results

Overall Traits of Students' Speaking Test Score Before and After ICT Implementation

Since all of the participants were sophomores studying English at an elementary level, their English speaking was tested both before and after the implementation to assess their speaking skills. For the pre-test, they were given topics from the *Touchstone* textbook to prepare a week in advance. The topics given were randomly selected through a lucky draw and there were six topics in total – three topics before and three topics after ICT implementation. The assessments mainly focused on pronunciation, accuracy, fluency, eye contact, gestures or body language, pauses, ending sounds, word emphasis and native accent (Cambridge English, 2011). For the post-test, students were given the same procedure and assessment, but the topics for presentation were different. Referring to Table 2, more than half of the 55 students received a positive output from ICT implementation

when comparing the results from before and after the intervention. In the pair-sample t-test results, there was a significant different between the pre- and post-intervention scores (P-*value* = 0.000). The same analysis also pointed out that the significance of P-*value* (P-*value* = 0.012 < 1.000). Additionally, a one-sample t-test was applied. Out of 25 (the total score), the students' scores increased from an average of 10.9 before to 13.6 after the ICT implementation. Therefore, given the average score was 12.5 out of 25, a majority of students initially did not score higher than 12.5 but, after the ICT integration, they mostly scored over 12.5. A student described the effectiveness of ICT implementation as follows:

> *I did it! Well, I was like going to hell in that first speaking test, which had nowhere to start, and I just went with my speaking for the sake of the score, and the result was like what I thought, and I failed. However, I was enlightened after beating the fear of using ICT because ICT was completely new to me. At the end, my second speaking test score was more than I expected though the topic was harder. . . . In short, I passed with big smile, and I did it – speaking and ICT.* (Pers. Comm. P1)

Table 2. Pre-test and post-test of English speaking before and after ICT implementation
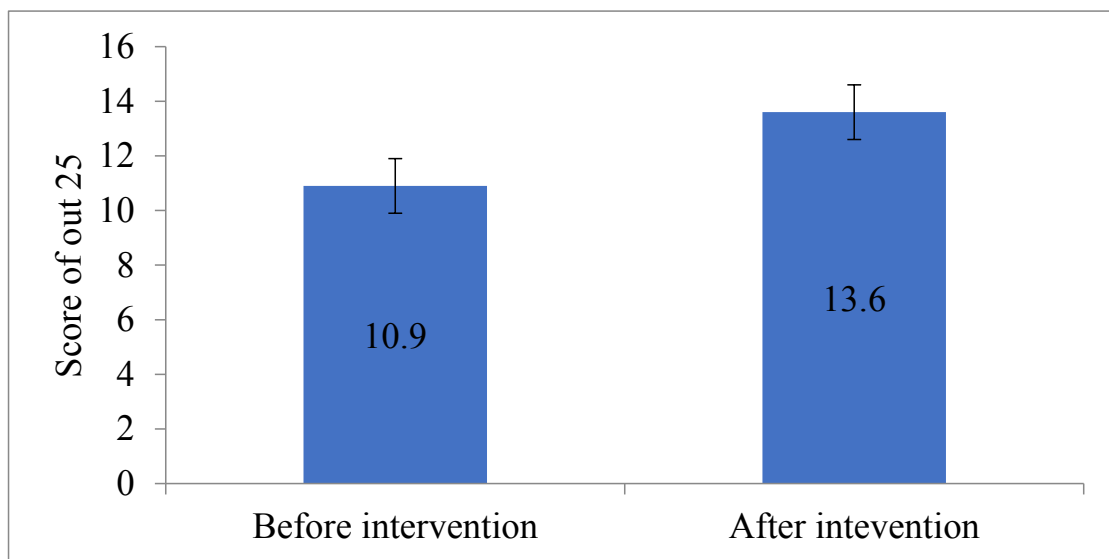
Note: 1. Pair-sample t-test was applied to investigate the difference/similarities between before and after intervention (P-*value* = 0.000)

2. One-sample t-test was applied to test if the average score of students was higher than the overall average score (12.5 out of 25 marks). Before intervention, P-*value* = 0.001; after intervention (P-*value* = 0.012).

The lecturer stated:

> *As their lecturer, I was very concerned about their speaking, since they made lots of mistakes and some were not confident to even speak in English. I would not ask anymore when I saw my students grow better with their speaking abilities. Maybe because we fought hard together, and maybe because of the TED-Ed and the YouTube ad videos I asked my students to upload on Facebook to overcome their fear and learn from their in-class and online friends' feedback.* (Pers. Comm. P4)

Pers. Comm. P1 explained that they were initially uncertain about speaking and they just used with whatever techniques they could think of based on their perception and experience in the test. However, they found that ICT was more than just technology to engage students' learning and it led them to the right path in learning and, although the topic was complicated and the ICT tools were not easy to use, they found they could speak better after the implementation of ICT. Another student reported a similar experience *ICT like using Emodo, Canvas, YouTube or email was not easy and I got confused a lot. When I pressed this thing, it popped another thing I did not want; nonetheless, after a while ICT tools were not as hard as they were, and I started to notice I felt cool about using them, and they were the silent bridge that meant my second speaking test score went up.* (Pers. Comm. P2)

Pers. Comm. P2 reported that they felt that they looked professional when they were able to use the ICT tools. They had some problems using the tools initially, but then they worked out how those tools assisted in speaking.

The lecturer, P4, expressed satisfaction, since there was an improvement in their students' ability to speak in English. These results show that while ICT made students feel nervous and they found it complicated to use initially, they overcame these barriers and found ICT was an effective tool to provide autonomous learning for students.

The Most Effective ICT Tools Used to Improve Speaking Skills

Since school support was limited, participants were asked to use their own available ICT tools, which were mainly smartphones, laptops, tablets,

LCDs (projectors) and desktops, both inside and outside the classroom. As shown in Table 3, among all of the ICT tools used, the four used the most were smart phones, laptops, tablets and desktops. Smartphones were the tools most students had and most students had possessed one since the beginning of the class. The male students possessed more ICT tools except for laptops than female students due to the portability of the tools. P1 stated that:

> *I thought a smartphone is not for learning purposes. Even my parents – when they saw me using my phone, they thought I was playing a game and scrolling Facebook, and I was doing what they thought, but then, my lecturer said smartphones can be for more than entertainment. [The lecturer] asked me and others to try [to use our smartphones] for academic purpose and yes, it is like what [they] said. I do not need to turn to only my desktop at home for learning.* (Pers. Comm. P1).

> *Ladies had limitations with smartphones because most of their parents said that ladies could do more on laptops rather than with phones for academic purposes like my experience and my friends.* (Pers. Comm. P1)

Table 3 also shows that the number of tools did not change before and after the ICT implementation. This is because, since lecturers could not afford to buy tools for students, students used their own tools for studying and they did not buy more tools. Instead, the lecturer encouraged the students to use the tools they already had for academic learning purposes. The lecturer explained further:

> *I could not ask my workplace to implement a One Child One Smart Device policy like the other countries, so I could only ask students to make the best use to what they had had, and ICT could only help bettering tools they had but not to make them buy more.*

Table 3. The most effective ICT devices

Attribute	Male (n=28)	Female (n=27)	Overall (n=110)	Pre-test (n=55)	Post-test (n=55)	Overall (n=110)
Smartphone	45	43	88	44	44	88
Laptop	40	46	86	43	43	86
Tablet	14	4	18	9	9	18
Desktop	12	10	22	11	11	22

P4 added that students from science departments tended to possess more ICT tools and be more familiar with technology than students from non-science departments. However, everyone who participated in this research owned at least one smart device. The lecturer also noted that the students from the engineering department used their smart devices most frequently followed by students from mathematics, physics and biology. Chemistry and environment students used their devices the least.

The Frequency of Use of Smart Devices and the Internet

Most of the students involved in this study were from the provinces, which meant they were not exposed to an environment where technology was used for English speaking and learning. Before the study, they did not commonly use technology for education, instead using their smart devices for entertainment and communication. Table 4 shows the frequency of use of smart devices before and after the intervention. The frequency of laptop use did not change, because students already used their laptops for learning purposes. Therefore, the Wright average index (WAI) remained similar both pre- and post-test. However, there was a notable increase in the use of other tools such as desktops, smartphones, tablets, LCDs (projectors) and the Internet. Students were more active in surfing the Internet after the test (WAI pre-test = 0.545 < WAI post-test = 0.589 and P-*value* = 1.000), since the implementation involved using online platforms and required the students to keep in touch with lecturers no matter what time and where the lecturers and students were. Interestingly, there was not a high change in surfing the Internet because they had to pay for the Internet access on their own. This is because, although RUPP provided free Internet access, it was not reliable and students could often not connect to the Internet. As reported by P3: "*Well, I liked to surf the Internet, but I needed to pay via*

my cellular or sometimes I asked for personal hotspot sharing from other students."

Desktops (WAI pre-test = 0.650 < WAI = 0.796 and P-*value* = 1.000) and LCDs (WAI pre-test = 0.632 < WAI post-test = 0.770 and P-*value* = 0.907) had a frequent-use change, although there was no significance change as expected. These results show that students used this type of ICT more often. The lecturer's usage changed also. They reported that they had previously sometimes used the LCD for presenting, but after implementing ICT, they engaged their students to talk and learn more. The lecturer stated:

> *It was easy to teach without a LCD and laptop because I did not have to carry heavy items, but the students' outcome was not as good as I wanted, so I decided to change. I used the LCD to teach to make them more familiar with it and then I used my laptop and talked about the lesson briefly, I could see they initially did not know how to use it, but after a few times the students knew how to speak using it.*

Table 4. Frequency uses of devices and the Internet before and after ICT implementation

Attribute	Pre-test (n=55)		Post-test (n=55)		Overall (n=110)	
	WAI	OA	AI	OA	*P-value*	
Laptops	0.269	L	0.269	L	1.000	L
Desktop	0.650	H	0.796	H	1.000	H
Smart Phones	0.258	L	0.261	L	0.000	L
Tablets	0.200	CL	0.200	CL	0.000	CL
LCD	0.632	H	0.770	H	0.907	H
Internet	0.545	M	0.589	M	0.907	M

Notes: WAI= Weight average index measured on a five-point scale [Considerably Less (CL) = 0.00-0.20, Less (L) = 0.21-0.40, Moderate (M) = 0.41-0.60, High (H) = 0.61-0.80, Very High (VH) = 0.81-1.00]; OA = Overall Assessment; *Significance at the 0.05 level; **Significance at the 0.01 level.

Smartphone use changed significantly in the post-test (P-*value* = 0.000). That shows that students increased with smartphones use for the purpose of learning. P4 stated:

> *I talked to my students, and one from environment replied that before she did not want to spend much time on the Internet since she thought that the Internet surfing was more about entertaining, but she then learned that the Internet was beyond that. And I remembered a student from the engineering department told me smartphones and laptops were good when he was out reach of a desktop, but that a desktop still could not be replaced for things like designing slides for presenting in English for my class. He noticed that he started to love his desktop more after the ICT implementation since he was with it more and more. Another student from the chemistry department was very scared of speaking in English with the LCD, and she said it was too professional, but she changed her mind at the end and said that she was going to be professional like her friends.*

Therefore, the frequency of use of devices and the Internet increased as study participants' trust in the ICT implementation increased.

The Most Effective Online Learning Platforms

ICT integration cannot be successful without online learning platforms. The pre-test questionnaire asked if students were familiar with 12 online platforms: Facebook, Canvas, Google Drive, YouTube, email, Dropbox, blogs, Khan Academy, Edmodo, Wikipedia and Blackboard. Only three of the platforms (Facebook, YouTube, and email) were popular among students and had little gender disparity (shown in Table 5). During implementation stage, the class lecturer took some time to introduce all 12 of these online platforms to students, showing them how to use all of the platforms for learning and to practice speaking.

The two most commonly used networks were Facebook and YouTube. Students reported that they used them for different purposes. For example, P1 stated that they used to only use YouTube to watch music videos, comedies and dramas, but during the implementation, they started to watch things related to the themes of the lessons such as TED-Ed. TED-Ed was defined as an educational program for youths that uses original animated videos in order to demonstrate ideas and concepts to teachers and students (TED-Ed, n.d.). Interestingly, although all students had a Facebook account, many were not active in using email. Out of the total of 55 students, only 10 male students and nine female students used email.

After the implementation, there was an increase in the use of email (Mean = 1 to Mean = 18). The lecturer explained to the students that email was a vital part of working life. In the semi-structured interview, P4 said:

> *I informed my students that email was not just about sending and receiving emails, but it was also about security for work, because it had features like particular dates, time, cc, and others. When my students sent emails, everything would be recorded as the evidence. In the end, one student from the environment department said he thought Facebook was faster for sending messages but, in terms of work, email was better.*

Therefore, the students did not need to be able to use all online platforms but at least they could some more effectively. According to P4, most students felt that YouTube was the most effective online learning platform, followed by Facebook. For YouTube, they shifted from using it for entertainment purposes to an effective learning purpose by watching videos to improve their pronunciation, fluency, gestures/body language and ending sounds. An effective way to use Facebook was when students were asked to post videos of themselves presenting a given topic weekly. As explained:

> *My classmates from my physics class told me that they used Facebook to message their lecturer, but they had never used Facebook as their video platform. They and I felt like, "Oh my, God! Uploading speaking in English videos?" But we did it! We felt we learned and we talked better in English after a while.* (Pers. Comm. P3)

> *I loved a story about lightning, thunderstorms and raining the most in TED-Ed because there was nice storytelling added on the theories taught about weather phenomenon in the environment department. I am not a kid, and the characters were drawn too cute, but they spoke in English by native speakers. Those made me want to watch and talk more like them more.* (Pers. Comm. P4)

Therefore, students could watch various videos, practice their speaking via those videos, and could use animations to keep them engaged in speaking; therefore, they had more opportunities to express themselves while practicing English speaking, which surely improved their speaking ability.

Table 5. The most effective online learning platforms

Attribute	Male (n=28)	Female (n=27)	Overall (n=110)	Pre (n=55)	Post (n=55)	Overall (n=110)
Facebook	56	54	110	55	55	110
YouTube	56	54	110	55	55	110
Email	10	9	19	1	18	19

The Speaking Skills Students Had Before and After the ICT Implementation

As noted previously, one of student's biggest fears in English language classes was the speaking exam. Students reported feeling annoyed, nervous, lost and confused when they did the presentation. They did not follow any set rule or routine and ended up shaking and getting stuck while presenting. Most of them believed that they would fail when it came to speaking English. At the beginning of the semester, students had problems with pronunciation, phonetic symbols, accuracy, fluency, eye contact, gesture/body language, pauses, ending sounds, word emphasis, slide presentation and native accent. There were significance changes in seven skills (pronunciation, accuracy, fluency, eye contact, gesture/body language, ending sounds and slide presentation) in the WAI pre- and post-tests; for example, pronunciation in the WAI pre-test was 0.459 and in the WAI post-test it was 0.781. This means students had improved on the seven skills tested (P-*value* = 0.000) (Table 6).

P2 described their experience as follows: "*I did not dare to talk and I did not deserve more than five out of 10 for speaking before ICT, but now I dare.*" Thus, the student was not initially confident in their speaking skills but, after the ICT implementation, they performed better when speaking in English. In particular, P2 reported: "*The best improvements were that I pronounced better, I spoke smoothly, got manner in speaking for not yet accent after ICT.*" This shows that students learned how to deal better with three methods in speaking – matter, manner, and method. The lecturer reported: "*Now I am confident to rate their speaking skills – pronunciation, accuracy, fluency . . . yes . . . also eye contact up from 6.5/10 . . . Thanks to LCD and YouTube.*" The lecturer noticed a significant improvement in students' speaking ability in these four main skills.

However, there was no improvement in phonetic symbols, pauses, word emphasis and native accent, as the WAI pre- and post-test score remained the same (P-*value* = 1.000). Students found it hard to improve those skills because those skills represented native speaking and the students' ability had limitations during the implementation period since they were not exposed to an English-speaking environment until they were at the university. Thus, students may have needed more time to work on those skills. They may have also required dictionary skills, since phonetic symbols, pauses, word emphasis and native accent can be learned from an English dictionary, and dictionary skills were not integrated into the online learning platforms mentioned earlier. Additionally, the lecturer may not have directed students where to go to study those areas.

Table 6. The speaking skills students had before and after ICT implementation

Attribute	Pre-test (n=55)		Post-test (n=55)		Overall (n=110)	
	WAI	OA	WAI	OA	P-*value*	
Pronunciation	0.459	M	0.781	H	0.000	L
Phonetic symbols	0.663	H	0.663	VH	1.000	L
Accuracy	0.377	L	0.772	H	0.000	L
Fluency	0.450	M	0.880	VH	0.000	L
Eye contact	0.700	H	0854	H	0.000	L
Gesture/body language	0.457	M	0.783	H	0.000	L
Pauses	0.836	VH	0.836	VH	1.000	CL
Ending sound	0.835	VH	0.845	VH	0.000	CL
Word emphasis	0.754	H	0.754	H	1.000	CL
Slide presentation	0.823	VH	0841	VH	0.000	CL
Native accent	0.750	H	0.750	H	1.000	CL

The Difficulties Students Experienced Before and After ICT Implementation

Some students experienced difficulties before and after the implementation of ICT. The students from provinces and whose majors were not sciences were not very familiar with technology, so they encountered some

difficulties with the ICT implementation. These problems included Internet access, access to smart devices and paying for Internet access. There was no change of WAI pre- and post-test (P-*value* = 0.000), which means that these difficulties were not overcome. ICT requires students to learn online most of the time, so students could not avoid spending money on Internet access. For example, in the semi-structured interview, P3 said that because the university's Wi-Fi was free but not workable, they needed to pay for Internet access themselves. In addition to that, the also had to use their own smart devices, since the school could not afford to buy them for the students and non-science students had no access to a lab or computer room.

However, students had better results in coping with difficulties such as technology knowledge, English knowledge, using speaking with online flat forms and smart devices, and using slide presentations. This is demonstrated in the large difference in pre -and post-test WAI (P-*value* = 0.000), which showed significance. The four interviewees discussed their challenges as follows:

> *Speaking as video? God! Wish me luck. But then, I did it.* (Pers. Comm. P3)

> *I loved ICT, but I was too poor to get access just to learn ICT.* (Pers. Comm. P1)

> *I did not know why to commit in that class, or what motivation was, but the slide PowerPoint presentation (PPT) made me want to learn more.* (Pers. Comm. P2)

Students noted that they had some challenges in using videos, accessing and paying for the Internet, motivation, and commitment to keep going on in ICT integration class; however, one of them had positive attitude towards using slide presentations.

ICT implementation was a great way to motivate and encourage students to commit to learn. It also reduced the gap between lecturer and students because they were able to get in touch with the lecturer whenever they had problems. This is evident because there is a difference between pre- and post-test WAI (P-*value* = 0.000), which showed significance. As explained by P4:

> *Before my students were so scared of me, and I did not know why and maybe it was because I was their lecturer. However, they talked to me more openly and regularly through Facebook*

> *messenger and emails, and it was more about their weaknesses in speaking and how to improve.*

Hence, the lecturer reported that they had more chances to understand their students through ICT implemenation.

In addition to this, P4 added that students from the engineering department spoke better English and made better PowerPoint slides as they were more familiar with smart devices and technology. Students from the biology and physics departments reported that ICT brought them closer to their lecturer than they had been before and that increased their commitment and motivation as they felt more able to approach their lecturer. Interestingly, all of them had some problems with using speaking with online flat forms; however, they overcame these once they got used to uploading their videos weekly. Having access to the Internet and paying for the access caused problems, as there was no budget given to students to pay for Internet access and, as mentioned earlier, not all students could get free Internet access from the university.

Table 7. The difficulties students encountered before and after ICT implementation

Attribute	Pre-test (n=55)		Post-test (n=55)		Overall (n=110)	
	WAI	OA	WAI	OA	P-value	
Internet access	0.263	L	0.263	L	1.000	CL
Smart devices	0.500	M	0.500	M	1.000	CL
Technology knowledge	0.268	L	0.681	H	0.000	CL
English knowledge	0.477	M	0.763	H	0.000	CL
Payment for Internet access	0.250	L	0.250	L	1.000	CL
Cooperation (teachers and students)	0.750	H	0.959	VH	0.000	CL
Motivation to learn with ICT	0.486	M	0.827	VH	0.000	CL
Commitment	0.431	M	0.781	H	0.000	CL
Using speaking with online flat forms	0.250	L	0.718	L	0.000	CL
Using speaking with smart devices	0.377	M	0.791	L	0.000	CL
Using slide presentations	0.818	VH	0.112	L	0.000	CL

Discussion and Conclusion

Reasons the Score Increased Before and After the Test

Before implementing ICT, students were not clearly guided in how to speak in English, so they spoke using what they believed was the right way based on their experience and what they had learnt from their former teachers. Thus, there was no particular technique and practice they could use and rely on. In addition to this, they had only been exposed to non-authentic speaking materials. Moreover, they spoke English mostly only in English class and with their lecturer, so they did not have enough exposure to English-speaking environments to allow them to speak like native speakers. As shown in in Table 2, after the implementation of ICT into English teaching, the scores of students for speaking in English increased due to the practical uses of ICT tools, the commitment of the lecturer and students, the exploration of authentic materials from TED-Ed videos and YouTube, and ability for students to contact the lecturer and other students no matter where they were via the Internet. Even though the topics covered in class and requirements of the lecturer were difficult in the speaking in English test, after going through ICT training, students managed to perform better than they had previously in their learning. This output supports Petty's (1993) claims that the best thing students could do improve their English speaking was to have perfect practice. These results are also in alignment with Kamal and Qureshi (2009), Alirini (2008) and UNESCO (2004), who argued that ICT implementation could develop a nation's skills in economics, education, culture and politics. In addition to this, MOEYS had a Master Plan for ICT Implementation in Education (2009-2013), with that plan's aims matching the aims of this study. Therefore, the results of this study demonstrate clearly the usefulness of ICT in education. The results support the implementation of ICT at a higher education level, since the students were mature enough to use the ICT tools, take part in the program and experience its benefits.

The Most Influential Tool for ICT Learning

This study found that students who accessed the Internet did develop more key components of speaking skills. The skills that improved the most after the integration period were pronunciation, accuracy, fluency, eye contact and body language. Skills which had a smaller improvement were PowerPoint presentation slides, pauses, ending sounds and word emphasis. There was no improvement in phonetics and native-speaking accent. Thus, ICT had a greater influence on speaking components than speaking

content. Balanskat, Blamire and Kefala (2006) and Rahimi and Yadollahi (2011) emphasized that ICT has the biggest effect on areas like motivation skills, concentration, cognitive processing, independent learning, critical thinking, teamwork, controllable skills and creative presentation skills. In this study, ICT did more good than harm in higher education. Both students and the lecturer ranked smartphones and laptop devices as the most used to access the ICT program, while the only online platforms used were Facebook, YouTube and email. This supports Selwyn (2008), who found that Web 2.0 is used to share, create, communicate and collaborate information.

Challenges and Problems Faced by ICT Usage

Finally, referring to Tables 6 and 7, students and the lecturer reported having more confidence with their technological knowledge, English knowledge, motivation, commitment, using speaking with an online platform, using speaking with smart devices, and using PowerPoint slides. This occurred because students were given training and they could practice what they had learned anywhere and at any time after class. These problems experienced by the students in this program, such as speaking skills, technology knowledge and experience, and commitment, also occurred in universities in South Pacific areas, and Robert (2008) reported that the barriers were with technology training, capacity-building, curriculum development, infrastructure, financing and ICT updated policy initiatives. This study could not solve the problems with Internet access, access to smart devices and paying for Internet access, because there was no support budget to pay for these three things.

Other issues faced not just by Cambodia but in all general learning online were administrative and instructor issues, limitations of social interactions, limited academic skills, limited technical skills, learner motivation, time and support for studies, high cost and limited access to the Internet and technical problems (Muilenberg, 2001). Given the improvement in the spoken English of students after the ICT implementation, implementing ICT across the university would assist students with academic skills, macro skills, employment skills, innovation skills, cross-cultural competence, values and attitude, thus helping to meet RUPP's strategic plan 2014–2018.

ICT implementation was not easy for either the students or the lecturer; however, they successfully completed the semester using ICT and the students' scores improved in comparison to the period before the ICT

implementation. In addition to this, ICT tools like Facebook, YouTube and email played vital roles in students performing better in speaking English. They improved their pronunciation, accuracy, fluency, eye contact, gestures/body language, pauses and PowerPoint slide presentation skills. The students and lecturer overcame their initial issues with ICT and achieved better technological knowledge, English knowledge, motivation, cooperation, commitment and speaking activities with smart devices.

Acknowledgements

Brief Biographies

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