



**THE
TURKISH ONLINE
JOURNAL
OF
EDUCATIONAL
TECHNOLOGY**

November, 2017
Special Issue for IETC 2017

Prof. Dr. Aytekin İşman
Editor-in-Chief

Editors

Prof. Dr. Jerry Willis
Prof. Dr. J. Ana Donaldson

Associate Editor

Assist. Prof. Dr. Fahme Dabaj

Assistant Editor

Assoc. Prof. Dr. Eric Zhi - Feng Liu

ISSN: 2146 - 7242

Indexed by

Education Resources Information Center – **ERIC**
SCOPUS - ELSEVIER

Copyright © THE TURKISH ONLINE JOURNAL OF EDUCATIONAL TECHNOLOGY

All rights reserved. No part of TOJET's articles may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

Published in TURKEY

Contact Address:
Prof. Dr. Aytekin İŞMAN
TOJET, Editor in Chief
Sakarya-Turkey

Message from the Editor-in-Chief

Dear Colleagues,

We are very pleased to publish Special Issue for IETC-2017 conference. This issue covers the papers presented at International Educational Technology Conference and International Teacher Education Conference which were held in Harvard University, Manchester, USA. These papers are about different research scopes and approaches of new developments and innovation in teacher education and educational technology.

Call for Papers

TOJET invites you article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English. TOJET is guided by its editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your CV to tojet.editor@gmail.com.

November, 2017

Prof. Dr. Aytekin ISMAN

Sakarya University

Strategies Adopted by Esp Students to Perform Oral Presentations Through Videos

Sandy T. SOTO

*ELT Innovators Research Group
Universidad Técnica de Machala, Ecuador
<http://orcid.org/0000-0003-2314-654X>
stsoto@utmachala.edu.ec*

Estefanía VARGAS CAICEDO

*ELT Innovators Research Group
Universidad de Guayaquil, Ecuador
vargasnestefania@gmail.com*

Maricela CAJAMARCA ILLESCAS

*ELT Innovators Research Group
Universidad Nacional de Educación – UNAE, Ecuador
cajamarcam1@gmail.com
Ecuador*

Ligia Fernanda ESPINOSA

*ELT Innovators Research Group
IKIAM Regional University, Ecuador
ligia.espinosa@ikiam.edu.ec*

Ketty HONORES

*ELT Innovators Research Group
Colegio de Bachillerato Simón de Bolívar, Ecuador
kittyhonores2013@gmail.com*

Tomás FONTAINES-RUIZ

*Universidad Técnica de Machala, Ecuador
tfontaines@utmachala.edu.ec
Venezuela*

ABSTRACT

This work aims at identifying the strategies that generate major differentiation in use among students enrolled in Technical English I and Technical English II, before, during, and after the development of video-based oral presentations. Sixty-nine students took part in the study. They recorded one video per week for over ten weeks. Those students who had recorded at least seven videos were considered for the study. The participants completed a questionnaire that was composed of forty-six Likert Scale items indicating strategies that students could apply before (24 items), during (14 items), and after (8) the recording of the videos. In the questionnaire, students reported the frequency with which they used those strategies. The data was analyzed by conducting an analysis of variance. The results show that the strategies for the recording of videos with significant differentiation in the population under study are the following. Before: the elaboration of storyboards, detailed review of the content, content rehearsal, memorization, and pronunciation of words practice. During: utilization of examples to illustrate ideas, use of mother tongue, repetition strategies, circumlocution, and recording the presentation several times. After: Comparison of their performance in the videos with their performance in previous videos. Students enrolled in Technical English I used more strategies than the ones enrolled in Technical English II. Keywords: ESP students, videos, strategies, self-regulation, oral presentations.

INTRODUCTION

The most difficult skill to master in a foreign language context is the speaking ability due to the lack of exposure that English as a Foreign Language (EFL) students have to a fluent English speaking setting (Allen, 2016; Sarwar, Alam, Hussain, Shah, & Jabeen, 2014). No matter what a wonderful learning environment a teacher creates in their EFL class, whenever students listen to the word: Speaking, they panic. Their anxiety levels rise and they start to hesitate about their abilities (Fahim, 2016). Due to this fact, instructors seek different strategies to enhance students' speaking skills, among the most commonly used ones are video-making and small group projects. Besides improving learners' speaking skills, these activities help teachers reduce learners' stress level since they have an opportunity to practice several times before presenting an oral assessment (Nazhnur, 2016).

Similarly, language learners use different strategies for the development of activities assigned by their teachers or when they are learning the language by themselves. The application of such strategies can be done consciously or unconsciously. For the purpose of this study, the authors have classified the strategies reported in existing literature into two main categories: Speaking strategies used before, during and after the development of oral activities and summarizing and analyzing content strategies.

Speaking strategies

Regarding speaking skills, there have been plenty of studies (Gallagher-Brett, 2007; Zhang & Goh, 2006; Allen, 2016; Fahim, 2016; Nazhnur, 2016) that analyze the strategies selected by students to improve this ability. For instance, it has been reported the use of the following strategies *before* the performance of speaking activities: 1) write prompts as a guide, 2) double check their pronunciation, 3) ask for the help of more knowledgeable people, for example, their family, friends or teacher. 4) say words out aloud before a presentation, 5) imitate spoken materials, 6) spend time working on grammar, 7) speak aloud, 8) speak in their heads, 9) read or watch videos 10) use mind maps as a preparation for their speaking performance, 11) rehearse, 12) repeat, 13) ask questions, 14) draft, 15) use video recordings, and 16) memorize.

The studies conducted by Zhang and Goh (2006), Nazhnur (2016), Yen, Hou, & Chang (2013), Fahim (2016), Karbalaei and Taji (2014), Salehi, Ebrahimi, Sattar & Shojaee (2015), and Rabab'ah (2013) show evidence of the following speaking strategies used by success-oriented students *during* speaking activities: 1) mentally correct verbal errors, 2) pay attention to their grammar, 3) use words with similar meanings in English, 4) use of examples to explain an idea, 5) read from a script, 6) watch themselves speaking English, 7) peer-to-peer correction to enhance their pronunciation and word choice, 8) self-monitoring, 9) switch to the mother tongue, 10) use mimes or gestures, 11) use a circumlocution -an indirect way of saying something, 12) coin words by participants adjusting or approximating the message, 13) word reduction, 14) use of definitions to describe an unknown word, 15) pronunciation awareness, 16) self-repair, and 17) repetition strategies.

In regard to strategies applied *after* students' speaking activities, research indicates that EFL students apply a few strategies. Findings in Fahim (2016) and Yen, et al. (2013) suggest the use of the following strategies in this stage: 1) compare their first and last performance, 2) learn from their mistakes, 3) self-evaluate, and 4) reflect on their speaking experience.

To exemplify the use of strategies for the development of oral performance in language learners in depth, we cite Rabab'ah (2013) and Yen, et al.'s (2013) works. Rabab'ah's (2013) found self-repair and repetition strategies in the oral discourse of German and Jordanian EFL learners who had to retell a story after reading it for an hour. Students used repetition as a resource to obtain a bit more time while retrieving a specific word to carry on with their stories. The participants also applied self-repair strategies when they realized they had made a mistake by adopting a different manner to explain their ideas, yet they were not always successful due to the lack of linguistic resources.

Yen, et al. (2013), on their hand, conducted a study with 42 university students from Taiwan attending to an English conversation course. These learners did a role-play task using Skype where they had to create a business scenario. The procedure was divided into 3 stages: the teacher preparing students for their role-play; practicing the conversation in class small groups; and, a Skype session between classmates performing the activity (role-play). As part of the qualitative results, the researchers noticed the existence of a common theme: peer-to-peer correction. The students helped each other by correcting the pronunciation or eliciting a missing word in their discourse. As a consequence, students learned from their mistakes and helped others notice theirs. The overall result showed this strategy as a meaningful experience that was also supported by the quantitative data which showed a significant improvement in the reduction of speaking errors from the pre-stage to the post-stage.

Summarizing and analyzing content strategies

After reviewing the strategies used by EFL students before, during and after their speaking performance, it is important to present their approaches regarding summarizing and analyzing content. Throughout the analysis of the literature, the following strategies emerged from the research works conducted by Gallagher-Brett (2007), Grünewald, Yang, and Meinel (2013), Marzuki, Prayogo, and Wahyudi (2016): 1) Students go back to their book annotations, but also other media formats, like images, or even links; 2) they interpret, weight and reflect on the content; 3) they participate in discussions and forums; 4) they ask referential questions; 5) explain their reasons and or ideas; 6) answer their friends' questions, and 7) help or ask for help from each other.

The aforementioned sections include a list of commonly used strategies reported by students and registered by researchers in the field when developing speaking activities. In this work, we intend to identify which strategies generated major differentiation in use among students enrolled in two ESP courses (Technical English I and Technical English II), before, during, and after the development of weekly video-based oral presentations. Specifically, the study intends to discover which strategies were significantly preferred inside each group of learners and which learners, whether those enrolled Technical English I or the ones enrolled in Technical English II, used more strategies for the accomplishment of the speaking task assigned week after week.

METHODOLOGY

Setting, Participants, and intervention process

The study was conducted at a public university in Ecuador, during the first academic semester (May-September) of the 2017-2018 school year. The participants of the study were 69 out of 94 students enrolled in the Technical English I (42 students) and Technical English II (27 students) courses offered in the Business Management major. 40 were female and 29 were male. The participants' average age was 22.10, ranging from 20 to 30 years old. The students participated in the study voluntarily.

The participants developed one video per week for over ten weeks, between May and part of July 2017. In the videos, which were the outcome of their autonomous work, the participants recorded themselves performing an oral presentation of the content they studied in class in the previous week. The content of the video-based oral presentations consisted of the description of key concepts studied in class. Students who had developed at least seven videos up to when the data was collected we asked to volunteer for the study. This was the first time that both groups of learners developed this task.

Data collection period, Instrument, and analysis procedure

Data were collected between the last week of July and the first week of August 2017. A structured questionnaire was developed to identify the strategies that generated major differentiation in use among the participants of the study, before, during, and after the recording of the video-based oral presentations. The questionnaire was composed of items that asked about participants' age and gender and three Likert scales (see Tables 1, 2, and 3).

The three Likert scales contained items that required participants to indicate how often (*always, sometimes, rarely, or never*) they applied a set of strategies of self-regulatory nature before (24 strategies), during (14 strategies), and after (8 strategies) the recording of their video-based oral presentations. The participants completed the questionnaire via Google forms. Three external researchers validated the instrument. They revised it and reported the effectiveness of each item. Items were removed or restated, depending on the suggestions of the experts. The data were analyzed by conducting an Analysis of Variance using the IBM statistical software SPSS 22.0.

Ethical considerations

Informed consent was taken from the participants to assure the compliance with ethical protocols. Anonymity of participants' identity was guaranteed by having students complete the instruments without including their names on them.

Table 1: Pre-video recording strategies

N	To do the oral presentations through the videos:	Always	Sometimes	Rarely	Never
1	I pay attention to the way my teacher or other good speakers of English express themselves.				
2	I take notes about what is being explained in class.				
3	I make sure that my notes are clear and correct.				
4	I question my teacher about the material presented in class.				
5	I identify key ideas of the content studied in class.				
6	I review the content studied in class meticulously.				
7	I investigate about the topics studied in class in sources other than the ones provided in class.				
8	I organize the ideas of the content I am going to explain in the videos.				
9	I create a storyboard (outline in pictures) of my presentation.				
10	I ask for the help of more knowledgeable people (peers, family, friends, teacher, etc.) to organize the material/content of my presentation.				
11	I do a benchmark of what I am going to present with other classmates.				
12	I present a draft of what I am going to present to the teacher before recording my video presentation.				
13	I write scripts about what I am going to say in the video directly in English.				
14	I write scripts about what I am going to say in the video in Spanish and then translate them into English.				
15	I plan my performance in the video.				

- 16 I rehearse what I am going to explain in the presentation.
- 17 I memorize part of what I am going to say in the video.
- 18 I memorize everything I am going to say in the video.
- 19 I practice the pronunciation of words.
- 20 I double check the pronunciation of words.
- 21 I ask more knowledgeable peers to evaluate my presentation before I record it.
- 22 I simulate presentations to control timing.
- 23 I run simulation presentations to evaluate my speech and the clarity on my subject.
- 24 I make changes based on the simulated presentations.

Table 2. During-video recording strategies

N	While I video record the oral presentations:	Always	Sometimes	Rarely	Never
1	I mentally correct grammar, vocabulary, or pronunciation errors.				
2	I monitor (ask myself whether what I am doing is correct or not, whether it makes sense or not, whether I am reaching the objective of my presentation, whether I need to change something) the progress of my presentation.				
3	I have other people to monitor my presentation.				
4	I use examples to illustrate my ideas.				
5	I use definitions to describe words.				
6	I use mimes and gestures to make myself clear.				
7	I use self-repair to make ideas clear.				
8	I read from a script.				
9	I use synonyms when I forget some words.				
10	I switch to my mother tongue when I forget something.				
11	I improvise when I forget certain ideas.				
12	I use repetition strategies when I forget something.				
13	I use circumlocution to explain things.				
14	I record my presentation several times until I feel it is				

ready.

Table 3. Post-video recording strategies

N	After I video record the oral presentations:	Always	Sometimes	Rarely	Never
1	I self-evaluate my presentations.				
2	I have more knowledgeable people (peers, friends, family, etc.) to evaluate my performance in the presentations.				
3	I list the pronunciation mistakes I have made in the videos.				
4	I list the vocabulary mistakes I have made in the videos.				
5	I list the grammar mistakes I have made in the videos.				
6	I compare my performance in the videos with my performance in previous videos.				
7	I compare my performance in my videos with the performance of my peers in their videos.				
8	I reflect on my speaking experience through the video presentations.				

RESULTS

We performed an analysis of variance to a set of forty-six self-regulatory strategies that students used before, during, and after the production of their video-based oral presentations. The ANOVA enabled the identification of those strategies that produced a significant difference for the two groups of participants as reported in the F values and Degree of Significance for each group of strategies (see Tables 4, 5, and 6).

Table 4. ANOVA of pre-video recording strategies

Groups	Strategies	Sum of squares	df	Mean square	F	Sig.
Technical English I	Reviewing the content studied in class meticulously.	6,117	6	1,019	3,404	,010
	Rehearsing what is going to be explained in the presentation.	2,792	6	,465	2,483	,043
	Memorizing of part of what is going to be said in the video.	9,500	6	1,583	3,507	,009
	Practicing the pronunciation of words.	4,950	6	,825	2,486	,043
Technical English II	Creating of a storyboard (outline in pictures) of the presentation.	11,744	5	2,349	2,915	,038

From the set of twenty-four pre-video recording strategies, we could identify that the strategies that caused higher differentiation in the learners enrolled in Technical English I are associated with the detailed revision of the content that students learned in class; rehearsal of what is going to be explained in the video; memorization of certain parts that will be discussed; and, practice the correct way to say words. On the other hand, the responses of students enrolled in Technical English II showed an important tendency of this group towards the creation of storyboards (outline in pictures) of their presentations before developing their task.

We can clearly see that students enrolled in the beginning course (Technical English I) required more preparation prior to producing the task, therefore, resorting to more self-regulation strategies; this confirms the findings of Gallagher-Brett (2007) and Zhang & Goh (2006). The need for more strategies is acceptable as students have a low command of the language, implying that they need more practice before their final outcome is produced, and even requiring memorization. On the contrary, students with a higher command of English used fewer strategies (one in this case). This is in tune with Griffiths' (2003) findings, who determined that New Zealand language learners with a low proficiency level used more social, cognitive, compensation, and metacognitive learning strategies than those learners who held a higher English proficiency level. A possible explanation for this event can be the learners' level of confidence in regards to their English knowledge, command of the content, and capability to do the task.

Table 5. ANOVA of during-video recording strategies

Groups	Strategies	Sum of squares	df	Mean square	F	Sig.
Technical English I	Recording the presentation several times until feeling it is ready.	9,292	6	1,549	2,735	,029
	Using examples to illustrate ideas.	7,467	5	1,493	2,977	,035
Technical English II	Reading from a script.	19,467	5	3,893	7,300	,000
	Switching to one's mother tongue when something is forgotten.	8,374	5	1,675	3,800	,013
	Using repetition strategies when something is forgotten.	8,207	5	1,641	2,611	,055
	Using circumlocution to explain things.	8,411	5	1,682	3,684	,015

Regarding the strategies used by the learners during the recording of their video-based oral presentations, we found that out of the fourteen self-regulation strategies selected for this study, recording the presentation several times until feeling it is ready is the strategy that caused a significant differentiation in students enrolled in Technical English I. We believe that students have a high inclination towards this strategy due to their English proficiency level. Since they have a poor knowledge of English, they need more time to develop the task appropriately and the tiniest mistakes or knowledge gaps can cause them to repeat it. Another possible explanation for this finding could be, as reported by Zhang & Goh (2006), student lack of knowledge about how to use strategies in this phase.

Using examples to illustrate ideas; reading from a script; switching to their mother tongue and using repetition strategies when they forget something, and using circumlocution to explain things are the strategies that according to the statistical analysis of the students' responses generated a significant differentiation in students enrolled in the Technical English II course. Conversely to the results reported for this group of students in the pre-video recording strategies, in this stage of the development of the task we notice that students use a higher number of strategies. Again, we attribute part of this outcome to the English proficiency knowledge of students. Due to they have more command of the language, they have more linguistic resources to illustrate or explain their ideas. In this case, we see students' recurrence in use of supporting materials (scripts) which is certain sense is negative. It denotes students need for pre-video recording strategies more consistently.

Table 6. ANOVA of post-video recording strategies

Groups	Strategies	Sum of squares	df	Mean square	F	Sig.
Technical English I	Comparing one's performance in the videos with his/her performance in previous videos.	15,008	6	2,501	2,952	,020

Similar to Fahim (2016) and Yen, et al.'s (2013) findings, after the development of their tasks, language learners who participated in this study showed the fewer use of self-regulation strategies. However, as seen in Table 6, the responses of learners enrolled in the Technical English course indicated a high level of significance in regards to the comparison of their performance in the videos with their performance in previous videos. We believe that this group of students tend to compare their performance as they need to self-evaluate their outcomes to develop the task appropriately. Their need for comparing their production is closely connected to the tendency of this group to recording their presentations several times until feeling they are ready, which was reported as a highly significant strategy during the recording of their video-based oral presentations. The responses of students enrolled in the Technical English II course showed no relevant differentiation in the strategies evaluated.

CONCLUSIONS

The purpose of this study was to identify the strategies that generated major differentiation in use among students enrolled in Technical English I and Technical English II, before, during, and after the development of video-based oral presentations. The results of the study bring us to conclude that the strategies that generated major differentiation in use in both groups of language learners depend on their command of the learners.

Students with a higher level of English (Technical English II) strive less to prepare for the oral presentations. But, they apply more strategies while recording the video. This result illustrates that students feel more confident to perform the oral presentations, therefore, they mainly create storyboards to follow their presentations. On the opposite, students with a lower level of English (Technical English I) struggle more to prepare for the oral presentations. Their English level forces them to do more things (apply more self-regulated strategies) to perform well in the task.

Regarding the strategies applied during the recording of the videos, low proficiency level learners take more time to submit their final product as they repeat their videos many times. This, in turn, prompts these learners to develop a sense of self-evaluation as they feel the need to compare the progression of their performance in their own videos. Foreign language teachers should consider these findings in order to support the learning process of their students. They should also reflect upon whether learners do not use certain learning strategies with high concurrence due to their lack of knowledge about how to use them or not. If the answer is yes, then they should seek for ways to teach students to use those strategies, therefore, inducing them to take ownership of their learning process and become autonomous learners.

REFERENCES

- Allen, D. (2016). Investigating washback to the learner from the IELTS test in the Japanese tertiary context. *Language Testing in Asia*, 6(7), 1-20. doi: 10.1186/s40468-016-0030-z
- Fahim, S. (2016). Self-Regulated Strategy Instruction for Developing Speaking Proficiency and Reducing Speaking Anxiety of Egyptian University Students. *English Language Teaching*, 9(12), 22-33. doi:10.5539/elt.v9n12p22
- Gallagher-Brett, A. (2007) What do learners' beliefs about speaking reveal about their awareness of learning strategies?. *The Language Learning Journal*, 35(1), 37-49. doi: 10.1080/09571730701315675
- Griffiths, C. (2003). *Language learning strategy use and proficiency: The relationship between patterns of reported language learning strategy (LLS) use by speakers of other languages (SOS) and proficiency with implications for the teaching/learning situation* (Unpublished doctoral dissertation). University of Auckland, New Zealand.
- Grünwald, F., Yang, H., & Meinel, C. (2013). Evaluating the digital manuscript functionality – User testing for lecture video annotation features. In JF. Wang & R. Lau (Eds.), *Lecture Notes in Computer Science: Vol 8167. Advances in Web-Based Learning – ICWL 2013 (pp.214-223)*. doi: https://doi.org/10.1007/978-3-642-41175-5_22
- Karbalaei, A. & Taji, T. (2014). Compensation strategies: Tracking movement in EFL learners' speaking skills. *Gist Education and Learning Research Journal*, 9(2), pp. 88-102.
- Marzuki, Prayogo, J. & Wahyudi, A. (2016). Improving the EFL learners' speaking ability through interactive storytelling. *DINAMIKA ILMU*, 16(1), 15-34.
- Nazhnur, G. (2016). Examining the effectiveness of digital video recordings on oral performance of EFL learners. *Teaching English with Technology*, 16(2), 71-96. Retrieved from <http://www.tewtjournal.org>

- Rabab'ah, G., (2013). Strategies of repair in EFL learners' oral discourse. *English Language Teaching*, 6(6), 123-131. doi:10.5539/elt.v6n6p123
- Salehi, H., Ebrahimi, M., Sattar, S., & Shojaee, M. (2015). Relationship between EFL learners' autonomy and speaking strategies they use in conversation classes. *Advances in Language and Literary Studies*; 6(2), 37-43. doi:10.7575/aiac.all.v.6n.2p.37
- Sarwar, M., Alam, M., Hussain, S., Shah, A., & Jabeen, M. (2014). Assessing English speaking skills of prospective teachers at entry and graduation level in teacher education program. *Language Testing in Asia*, 4(5), 1-9.
- Yen, Y.C., Hou, H.T., & Chang, K.E. (2013). Applying skype in English as a foreign language instruction: Effect on students' speaking errors. In JF. Wang & R. Lau (Eds.), *Lecture Notes in Computer Science: Vol 8167. Advances in Web-Based Learning – ICWL 2013* (pp. 312-319). doi: https://doi.org/10.1007/978-3-642-41175-5_32
- Zhang, D. & Goh, C. (2006). Strategy knowledge and perceived strategy use: Singaporean students' awareness of listening and speaking strategies. *Language Awareness*, 15(3), 199-119. doi: 10.2167/la342.0

Study on the Capacity and Readiness to Implement Information Technology of Personnel in Higher Educational Institutions to Drive Thailand's Education Reform 4.0

Sasichai TANAMAI

*Educational Technology Department,
Faculty of Education,
Kasetsart University, Thailand.
Sasichai.t@ku.ac.th*

ABSTRACT

Capacity and readiness to implement Information and Communication Technology (ICT) of personnel of higher educational institutions is a mixed methods research of documentary research. This study, also covering the trends of capacity, readiness, obstacles, challenges, and development potentials of the personnel in such matter to drive Thailand's education reform in 4.0, employed a sample of 100 academic support staff of higher educational institutions. The findings are: 1. The trend of ICT applications in daily operations of personnel of higher education institutions was at a moderate level ($\bar{x} = 2.71$), of which software package applications being the highest, followed by information search on the Internet; 2. Personnel of higher education institutions was at a moderate capacity and readiness ($\bar{x} = 3.43$), high in information literacy, and moderate in ICT literacy and Internet media awareness. The obstacles and challenges presented in the implementation of ICT among the personnel were low ($\bar{x} = 2.41$), and 3. ICT capacity and readiness development guidelines for personnel of higher education institutions to drive Thailand's education 4.0 are conception of ICT master plans, provision of ICT equipment, funding, and personnel. Personnel should be educated for proficient utilization of ICT.

INTRODUCTION

At present, information and communication technology (ICT) plays a vital role in all aspects of people's lives and at all levels, affecting individuals, public and private organizations and nations. ICT contributes to creating better quality of life and greater convenience, as well as being an instrument of all kinds of development. ICT also generates a country's wealth and improves its competitive edges over other countries. Therefore, countries around the world, whether developing or developed, need to be capable of effective ICT management in order to have the capability and capacity to use ICT to compete against other countries. Porter (1985) stated that in order to increase the capacity and capability of a country, importance must be placed on ICT as one of the factors affecting competition.

Therefore, it cannot be denied that modern ICT is considerably essential for the development of a country and it tends to become more and more crucial in the future as the world becomes smaller thanks to the advancement in communication technology. The world has become borderless and people around the world are able to communicate swiftly, leading to development and changes to the economy, society, politics and culture, as well as the application of ICT to modern educational system. ICT is also the driving force behind the country becoming a knowledge-based society and economy. Thus, ICT literacy is an important trend for future changes and individuals must possess ICT knowledge and understanding so that they can effectively use it in practice to increase the country's competitiveness.

In order to achieve Education Reform 4.0, it is important that new skill sets are developed to prepare personnel for the dynamics of the 21st century. Skills that have gain more importance in the 21st century are cognitive abilities, systems skills, complex problem solving, content skills and process skills.

While setting the direction toward the achievement of Education Reform 4.0, apart from considering the capacity and readiness of students and instructors, higher educational institutions must consider whether their personnel, especially academic support personnel, have the capacity and readiness to implement ICT in performing their work or providing support for teaching and classes in order to drive Education Reform 4.0.