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A Quantitative Case Study of Digital Competency in an Educational Setting

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Abstract

The purpose of this study is to identify the perception of the senior students at the Faculty of Technical and Vocational Education at a public Malaysian university based on the 21st century model of digital competence which includes skills such as information processing, communication, content creation, security, interactivity, virtual compatibility, hypertextuality, social media and cyber ethics. To this end, 75 Malaysian students participated in this study and a five-point likert scale on digital competency was used to obtain the empirical data. The questionnaire included 55 items and was validated by a number of experts in the field. The descriptive statistical analysis of digital competency found that the value of the virtuality was the highest, while the value obtained for the cyber ethical domain was the least. The participants held that they had mastered digital competencies especially in the aspects of virtuality and interactivity. However, they are rather weak in terms of cyber ethics and hypertextuality. Mastery of digital skills is of overriding importance in the 21st century and digital competency in technology is unimpeachably important in education as it can positively impact different aspects of academic life.

Keywords: *Digital Competency; Digital Technology; Malaysian Students; Quantitative Study*

Introduction

Digital competency are those skills which characterize the ability to localize, organize, evaluate and analyze information using digital technology. The Internet phenomenon promotes web-based multimedia tools for teaching, and these tools include images, video and audio files, as well as text. Moreover, digital competency has become an integral part in teacher training around the world. Digital technologies are beginning to move into education and students have the potential to instantly and simultaneously connect and work with their peers from computing math equations, analyzing a work of

art or literature to even constructing a chemistry lab report. Such possibilities afforded by the new technologies encourage students to enter into a participatory discourse that extends far beyond the classroom walls. This extension between the classroom and real world provides teachers an array of opportunities in bridging the gap between knowledge learned inside the classroom with what is learned outside. In the 21st century, social activity has been mediated through digital facilities such as e-mail, newsgroups, message boards, internet telephony, chat rooms, instant messaging, and digital video conferencing, making digitally enabled communities a way of life. Not only have social communities grown, the internet has also offered limitless information. Digital competency enables some institutions to offer flexible and blended learning approaches (Mohamad, & Abd Rahman, 2023) and it is more than mastering specific knowledge and skills (Martin, 2006).

The new era of globalization emphasizes a broad spectrum of skills. Proper skills, knowledge and attitude are viewed as essential elements to thrive in the knowledge society. Digital competence covers information management, collaboration, communication, creation of content and cyber ethics (Ferrari, 2012). Digital technologies will transform traditional learning and mobilize those skills that are necessary in an emerging environment in digital world. According to Lorenz, et al. (2018), the development of digital competencies has become a major task in the education system as various technologies and internet have become a staple feature in classroom. Safety, both in the physical and digital world, is supposed to keep pace with these developments. In the area of informatics, the curriculum topics must also include safe use of mobile devices on how to change one's password how to turn in location service for one's phone to look it up when it gets lost. Social media tools should be used to report inappropriate content or remove inaccurate results from a search engine.

In addition, new digital competencies have distinctive characteristics such as digitality, convergency, interactivity, hypertextuality, and virtuality (Chen & Zhang, 2010). Digital technologies also make it possible for a large amount of information to be retrieved, manipulated, and stored in a very limited space. According to Bagdasaryan (2011, cited in Chen, 2012), most of transformation and innovations in human society are produced by digital technologies. Youths need to understand what it means to be digitally competent in order to cope with the enormous changes of a technological and knowledge driven culture (Shariman et al., 2012). In this context, the exchange of information has been accelerated by the emergence of digital modes of information (Janks, 2010). According to Coiro, et al. (2008), digital competency has evolved from having the competence to access, evaluate and understand static printed texts to being able access, locate, evaluate, understand and utilize a dynamically rich variety of digital texts available via the internet; however, extensive use of the internet beyond a time limit is according to Barboutidis and Stiakakis (2023), inversely proportional with enhanced digital competencies.

Digital competence has become a key concept in the discussion of what kind of skills and understanding citizens must have in the knowledge society. Although the term encompasses digital, the digital aspect is often seen as a discrete skill implying that the 21st-century skills are not necessarily under-pinned by digital technologies. Digital competence covers information management, collaboration, communication and sharing, creation of content and knowledge, ethics and responsibility, evaluation and problem solving and technical operations (Ferrari, 2012).

Digital competence not only includes knowledge and skills, but it also incorporates attitudes such as being confident and critical. It is about being competent to use technology in different situations (e.g. work, leisure) and for different purposes (e.g. learning, communicating, solving problems, online collaboration, building knowledge, creating and sharing); all fundamentally underpinned by basic digital skills (Riel, Christian & Hinson, 2012). Literate competencies reflect a broad range of factors including the forms of oral discourse that children have mastered before they ever enter schools, the mastery of a particular form of discourse for talking about text, sets of assumptions about the fixidity and interpretability of texts, metalinguistic terms for referring to texts and their structures and habits of using texts for a variety of purposes (Beale, 2012).

Instructors should improve their skills and knowledge in digital technology in this era of digital revolution, however, some of them are not presently competent in digital and multimedia in the teaching and learning process. For example, Romero-Rodríguez et al. (2019), in their exploratory and comparative work, analyzed the level of media competence among 1,676 university students and 524 professors in Brazil, Spain, Portugal and Venezuela. and found that the general level of media competence is no better than medium to low when considering language, technology, interaction, production and dissemination, ideology and values, and aesthetics. Moreover, Basilotta-Gómez-Pablos et al. (2022) reported that teachers recognize that they have a low or medium–low digital competence, together with the absence of certain competencies, especially those which are connected with the evaluation of educational practice. It is recommended that educational institutes update their curricula to expand students' digital competencies (Delcker, 2022) and improve digital competence for their graduates by introducing updated educational practices and learning paths (Barboutidis and Stiakakis, 2023).

According to Ferrari (2012), digital competence is the set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using digital competencies. Moreover, the application of digital technology in education has many advantages. A new digital technology-based curriculum could enhance teaching and learning process so it is more relevant and interesting. However, there are still some constraints and problems in Malaysia in terms of nurturing competency to the students. Thus, it is critical to examine the specific problems related to digital competency of the students. In this study, digital competency includes information processing, communication, content creation, safety, interactivity, virtuality, hypertextuality, social media and cyber ethics.

The purpose of the present study is to identify digital competency among senior students in one of the public universities in Malaysia. The following question is to be answered in this work:

What are the perceptions of senior students at the Faculty of Technical and Vocational Education regarding their digital competencies?

Methodology

Participants

75 Malaysian students participated in this study. They were all recruited from one level of education referred to here as Bachelor's (BA) level. They were seniors who were studying in different majors and a sample of them were randomly taken to be involved in the study.

Instrument

A Five-point likert scale on digital competency was used to obtain the empirical data. The questionnaire included 55 items and was validated by a number of experts. Table 1 shows the distribution of items in the questionnaire. There were nine subconstructs such as information processing, communication, content creation, safety, interactivity, virtuality, hypertextuality, social media and cyber ethics in this section. Table 2 illustrates the reliability indices for the subsconstructs of the questionnaire.

Procedure

The participants were assured that stringent confidentiality would be observed considering the information and the data collected would be only used for research purposes. They were asked to answer the 55-item questionnaire which dealt with digital competence carefully. Table 1 and the analytic method used is illustrated in Table 2.

Table 1. Distribution of the questionnaire items

No.	Competencies Digital	No. Item	Total Item
1	Information processing	1,2,3,4,5,6,7	7
2	Communication	8,9,10,11,12,13,14,15	8
3	Content Creation	16,17,18,19,20	5
4	Safety	21,22,23,24,25,26	6
5	Interactivity	27,28,29,30,31,32	6
6	Virtuality	33,34,35,36,37,38	6
7	Hypertextuality	39,40,41,42,43,44	6
8	Social Media	45,46,47,48,49	5
9	Cyber Ethics	50,51,52,53,54,55	6
	Total	**55**	**55**

Table 2. Reliability index for digital competency subconstructs

Digital Competencies	Cronbach Alpha
Information processing	0.84
Communication	0.80
Content Creation	0.82
Safety	0.81
Interactivity	0.81
Virtuality	0.83
Hypertextuality	0.82
Social Media	0.82
Cyber Ethics	0.84
Overall	**0.82**

Results

This section deals with the results of the study. Table 3 shows the perceptions of senior students from the Faculty of Technical and Vocational on their digital competencies. Digital competencies included nine factors: information processing, communication, content creation, safety, interactivity, virtuality, hypertextuality, social media and cyber ethics. Each factor consisted of several items that have been built. The overall mean score for digital competencies subscale yields a mean of 4.23 with standard deviation of 0.51. This shows that, in general, the students believed that they are digitally competent. Specifically, the respondents strongly agreed that they possessed information processing skill (M = 4.24, SD = 0.56), digital communication skill (M = 4.45, SD = 0.49) and content creation skill (M = 4.41, SD = 0.51). They were also confident about their computer safety skill (M = 4.38, SD = 0.51), interactivity (M = 4.49, SD = 0.44), virtuality (M = 4.50, SD = 0.49) and social media skill (M = 4.37, SD = 0.52). However, the students only agreed (M = 3.90, SD = 0.55) that they were competent in hypertextuality and they were uncertain (M = 3.35, SD = 0.52) regarding their cyber ethics.

Table 3. Mean and standard deviation of the respondents' digital competencies

Category	Mean	Std. Deviation	Interpretation
Information processing	4.24	0.56	Strongly agree
Communication	4.45	0.49	Strongly agree
Content creation	4.41	0.51	Strongly agree
Cyber security	4.38	0.51	Strongly agree
Interactivity	4.49	0.44	Strongly agree
Virtuality	4.50	0.49	Strongly agree
Hypertextuality	3.90	0.55	Agree
Social media	4.37	0.52	Strongly agree
Cyber ethics	3.35	0.52	Uncertain
Total	**4.23**	**0.51**	**Strongly agree**

The first construct for digital competencies was information processing. Information processing was measured by seven items. In general, the students believed (M = 4.24, SD = 0.58) that they were competent in information processing. Item 1 shows that the students strongly agreed (M = 4.54, SD = 0.50) that they searched information online using a search engine. They also preferred (M = 4.54, SD = 0.50) to use different search engines to find critical information (item 2).

While items 3 and 4 show that the students agreed that they classified the information in a systematic way using folders (M = 4.11, SD = 0.57) and they knew how to backups of information or files into computer (M = 3.89, SD = 0.60). Next, for items 5 and 6, the respondents agreed that they assessed the validity and credibility of information using a range of criteria (M = 4.02, SD = 0.63) and they knew how save important information found on the internet in different formats (M = 4.17, SD 0.58). For information storage services (item 7), the students strongly agreed (M = 4.38, SD = 0.58) that they used cloud services (see Table 4).

Table 4. Mean and standard deviation of the respondents' information processing skill

No.	Item	Mean	Std. Deviation	Interpretation
1.	I look for information online using a search engine	4.54	0.50	Strongly agree
2.	I use different search engines to find information.	4.54	0.50	Strongly agree
3.	I classify the information in a methodical way using folders	4.11	0.57	Agree
4.	I backups of information or files I have stored	3.98	0.60	Agree
5.	I assess the validity and credibility of information using a range of criteria.	4.02	0.63	Agree
6.	I save important information found on the internet in different formats (e.g, use cloud internet storage services)	4.17	0.58	Agree
7.	I use cloud information storage services	4.38	0.58	Strongly agree
	Total average	**4.24**	**0.58**	**Strongly agree**

Table 5 clarifies the mean and standard deviation regarding the students' digital communication skill. It is encouraging to note that the overall mean score in this category shows that the respondents were competent (M = 4.45, SD = 0.49) in using digital communication tools. For items 8 and 9, the students were very confident (M = 4.48, SD = 0.50) they communicated with others using Skype or other chat platforms and they also used advanced features of varied communication tools (M = 4.56, SD = 0.50).

Furthermore, item 10 shows that the respondents were actively using a wide range of communication tools (M = 4.49, SD = 0.50). Students also strongly agreed (M = 4.51, SD = 0.50) that they shared video, files and contents using digital communication tools (item 11). In terms of content, item 12 shows that the students strongly agreed (M = 4.40, SD = 0.49) that they created and managed contents with proper tools. The students also admitted (M = 4.35, SD = 0.48) that they used features of online services such as online shopping, e-banking and so on (item 13). For items 14 and 15, the students were actively participated in online chat rooms (M = 4.37, SD = 0.48), and they also used social networking sites and online chats (M = 4.49, SD = 0.50).

Table 5. Mean and standard deviation of the respondents' communication skill

No.	Item	Mean	Std. Deviation	Interpretation
8.	I communicate with others using Skype or chat – using basic features	4.48	0.50	Strongly agree
9.	I use advanced features of several communication tools	4.56	0.50	Strongly agree
10.	I actively use a wide range of communication tools	4.49	0.50	Strongly agree
11.	I share video, files and content using communication tools	4.51	0.50	Strongly agree
12.	I create and manage content with collaboration tools	4.40	0.49	Strongly agree
13.	I use features of online services (eg, online shopping, e-banking)	4.35	0.48	Strongly agree
14.	I actively participate in online chat tools	4.37	0.48	Strongly agree
15.	I use social networking sites and online collaboration tools	4.49	0.50	Strongly agree
	Total average	**4.45**	**0.49**	**Strongly agree**

Table 6 illustrates that students were competent (M = 4.44, SD 0.50) in using basic editing for contents produced by others (item 16). In terms of formatting, items 17 shows that students agreed (M = 4.11, SD = 0.62) that they felt competent in applying basic formatting such as inserting footnotes, charts and tables into the contents which they or others have produced.

Next, item 18 illuminates the highest mean of 4.78 and standard deviation of 0.4. It means that the students were fully aware that if they violated copyright such as selling music or video illegally that they would be fined. For item 19, students strongly agreed (M = 4.70, SD = 0.46) that they knew how to make reference and reuse content covered by the copyright. For the last item, students agreed (M = 4.03, SD = 0.59) that they knew how to design, create and modify database with a computer tool (item 20). It can be concluded that the students were competent (M = 4.41, SD = 0.51) with their content creation skill.

Table 6. Mean and standard deviation of the respondents' content creation skills

No.	Item	Mean	Std. Deviation	Interpretation
16.	I make basic editing to content produced by others (e.g, adding, deleting).	4.44	0.50	Strongly agree
17.	I apply basic formatting (e.g, insert footnotes, charts, tables) to the content which I or others have produced	4.11	0.62	Agree
18.	I know that I will be penalty (law) if I violated copyright (e.g, music & video)	4.78	0.41	Strongly agree
19.	I know how to reference and reuse content covered by copyright	4.70	0.46	Strongly agree
20.	I know how to design, create and modify databases with a computer tool	4.03	0.59	Agree
	Total average	**4.41**	**0.51**	**Strongly agree**

Table 7 discusses the respondents' cyber security skill. Item 21 shows that the students strongly agreed (M = 4.54, SD = 0.50) that they knew how to take basic steps to protect their devices such as installing anti-virus or change password and they were competent (M = 4.17, SD = 0.58) to install security programs on their devices to access the internet as in item 22. Next, for item 23, students believed (M = 4.57, SD = 0.49) that using digital technology too extensively can affect their health.

In addition, the students also agreed (M = 4.08, SD = 0.51) that they take a basic measures and actions to save energy (item 24). For item 25, students strongly agreed (M = 4.37, SD = 0.51) that they understood the impact of technology on the environment. Item 26 denoted that the respondents were confident (M = 4.60, SD = 0.49) that their online activities are safe and secure. In general, the students have demonstrated competency in cyber security (M = 4.38, SD = 0.51).

Table 7. Mean and standard deviation of respondents' cyber security skill

No.	Item	Mean	Std. Deviation	Interpretation
21.	I can take basic steps to protect my devices such as anti-virus or change password	4.54	0.50	Strongly agree
22.	I have installed security programmes on the devices that I use to access the Internet	4.17	0.58	Agree
23.	I know that using digital technology too extensively can affect my health	4.57	0.49	Strongly agree
24.	I take basic measures and actions to save energy	4.08	0.51	Agree
25.	I understand the positive and negative impact of technology on the environment	4.37	0.51	Strongly agree
26.	I make sure my online activities are safe and secure	4.60	0.49	Strongly agree
	Total average	**4.38**	**0.51**	**Strongly agree**

Table 8 illustrates the mean and the standard deviation for item 27 to 32 to measure the students' interactivity skill. For items 27 and 28, students were very confident in using digital devices to interact with other students (M = 4.57, SD = 0.49) and in using social media to increase their interactivity (M = 4.40, SD = 0.49). In addition, the students strongly agreed (M = 4.52, SD = 0.50) that they used digital devices to interact with teachers and supervisors (item 29).

Next, items 30 and 31 showed that the students were very proficient to used digital presentation tools (M = 4.46, SD = 0.50) and also they have early exposure to digital technologies before going to university (M = 4.41, SD = 0.49). Lastly, for item 32, the students were very confident (M = 4.62, SD = 0.49) that they participated in online communities. In general, the students believed (M = 4.49, SD = 0.44) that they were active in using digital devices for interactivity.

Table 8. Mean and standard deviation of the respondents' interactivity

No.	Item	Mean	Std. Deviation	Interpretation
27.	I use digital devices to interact with other students	4.57	0.49	Strongly agree
28.	I use social media to increase my interactivity	4.40	0.49	Strongly agree
29.	I use digital devices to interact with teachers and supervisors	4.52	0.50	Strongly agree
30.	I am proficient to used digital presentation tools	4.46	0.50	Strongly agree
31.	I have early exposure to digital technologies before going to university	4.41	0.49	Strongly agree
32.	I participate in online communities	4.62	0.49	Strongly agree
	Total average	**4.49**	**0.44**	**Strongly agree**

Table 9 discusses the result for construct virtuality. In items 33 and 34, the students strongly agreed (M = 4.48, SD = 0.50) that they were active in using the internet and email in the learning process. Next, the students strongly agreed (M = 4.63, SD = 0.48) that they were competent in using digital technology as an online demonstration tool (item 35). For item 36, the students were also competent (M = 4.57, SD = 0.49) in getting information about a course through the web. In addition, the students strongly agreed (M = 4.38, SD = 0.49) that they used animation or graphics when creating presentations. For item 38, the students believed (M = 4.51, SD = 0.50) that they used social media to enhance their image. In general, the students have demonstrated active participation (M = 4.50, SD = 0.49) in the virtual world.

Table 9. Mean and standard deviation of the respondents' virtuality

No.	Item	Mean	Std. Deviation	Interpretation
33.	I use the internet in the learning process	4.48	0.50	Strongly agree
34.	I use the E-mail in the learning process	4.48	0.50	Strongly agree
35.	I am proficient using digital as online demonstration tool	4.63	0.48	Strongly agree
36.	I obtain information about a course through web	4.57	0.49	Strongly agree
37.	I use animation or graphics when creating presentations	4.38	0.49	Strongly agree
38.	I enhance my image generating by using virtual / social media	4.51	0.50	Strongly agree
	Total average	**4.50**	**0.49**	**Strongly agree**

Table 10 illustrates the mean score and the standard deviation for items 39 to 44. Item 39 shows that the students were uncertain (M = 3.35, SD = 0.60) whether they created and updated their web pages. Next, for item 40, the students strongly agreed (M = 4.46, SD = 0.50) that they knew how to edit digital photos. Items 41 and 42 show that the students agreed that they could record and edit digital sound (M = 3.67, SD = 0.56) as well as to record and edit digital videos (M = 3.63, SD = 0.51). In terms of apps, the students strongly agreed (M = 4.56, SD = 0.50) that they downloaded apps on their digital devices (item 43). For the last item (item 44), the students agreed (M = 3.90, SD = 0.55) that often use video conferences. In general, the students agreed (M = 3.90, SD = 0.55) that they were skilled in hypertextuality.

Table 10. Mean and standard deviation of respondents' hypertextuality

No.	Item	Mean	Std. Deviation	Interpretation
39.	I create and update web pages	3.35	0.69	Uncertain
40.	I take and edit digital photos	4.46	0.50	Strongly agree
41.	I record and edit digital sounds	3.67	0.56	Agree
42.	I record and edit digital videos	3.63	0.51	Agree
43.	I download and use apps on digital devices	4.56	0.50	Strongly agree
44.	I often use the video conferencing in study	3.87	0.58	Agree
	Total average	**3.90**	**0.55**	**Agree**

Table 11 manifests the results for social media skill of the respondents. Most of the students admitted (M = 4.65, SD = 0.48) that they were using social media (items 45). For item 46, students strongly agreed (M = 4.59, SD = 0.49) that they spent more time on social networking. Next, for item 47,

students agreed (M = 4.13, SD 0.60) that they preferred to interact with people and rather than by face to face. The respondents also admitted (M = 3.94, SD = 0.56) that they have more friends in social networking sites rather than in real life (item 48). Finally, the students preferred (M = 4.57, SD = 0.49) to receive information on new products or services via advertisements on social networking websites. It can be concluded that, in general, the students strongly agreed (M = 4.37, SD = 0.52) that they were active in social media.

Table 11. Mean and standard deviation of the respondents' social media skill

No.	Item	Mean	Std. Deviation	Interpretation
45.	I have joined social media sites	4.65	0.48	Strongly agree
46.	I spend more time on social networking sites	4.59	0.49	Strongly agree
47.	I prefer to interact with people on social networking sites rather than face to face	4.13	0.60	Agree
48.	I have more friends on social networking sites than in real life	3.94	0.56	Agree
49.	I like to receive information on new products offers services via advertisements on social networking websites	4.57	0.49	Strongly agree
	Total average	**4.37**	**0.52**	**Strongly agree**

The final domain of digital competencies was cyber ethics. Table 12 illustrates the respondents' ethics in cyberspace. For item 50, the students were uncertain (M = 3.22, SD = 0.52) whether they downloaded and watched illicit materials on the internet. Next, surprisingly, the students admitted (M = 3.46, SD = 0.50) that they condemned and said nasty things to other people online (item 51).

For item 52, the students were unsure (M = 3.30, SD = 0.52) whether they sent explicit photo online. Next, the respondents were also uncertain (M = 3.21, SD = 0.54) whether they imitated other people online (item 53). For item 54, the students slightly agreed (M = 3.43, SD = 0.53) that they copied material from internet without permission from the authors. Lastly, item 55 shows the students slightly agreed (M = 3.49, SD = 0.50) that they may hack other people website/facebook/etc. In general, in this section, the students agreed (M = 3.90, SD = 0.52) that they were aware of the cyber ethics.

Table 12. Mean and standard deviation of respondents' cyber ethics

No.	Item	Mean	Std. Deviation	Interpretation
50.	I download and watch illicit materials on internet (pornography)	3.22	0.58	Uncertain
51.	I condemn and say nasty things to other people online	3.46	0.50	Agree
52.	I send explicit photos online	3.30	0.52	Uncertain
53.	I imitate other people online	3.21	0.54	Uncertain
54.	I copy material from internet without permission from the authors	3.43	0.53	Agree
55.	I hack other people website/facebook/etc	3.49	0.50	Agree
	Total average	**3.90**	**0.52**	**Agree**

Discussion

The results of the study showed the digital competencies of senior students who were involved in this study. The subsconstructs of digital competencies include information processing, communication, content creation, safety, interactivity, virtuality, hypertextuality, social media and cyber ethics. In general, senior students are convinced that they have mastered digital competencies well. This is because the average mean of digital competencies is high (M=4.23). There are nine factors involved in digital competency construct such as information processing, communication, content creation, cyber security, interactivity, virtuality, hypertextuality, social media and cyber ethics. The average means for the subsconstructs were 4.24 (information processing), 4.45 (communication), 4.41 (content creation), 4.38 (cyber security), 4.49 (interactivity), 4.50 (virtuality), 3.90 (hypertextuality), 4.37 (social media), and 3.35 (cyber ethics).

The highest mean for respondents' digital competency is virtuality. Students believe that they are active in using the internet and email in the learning process. Next, students also strongly agree that they are competent in using digital technology as an online demonstration tool. The students also claim that they are competent in getting information about a course through the web. In addition, the students believe that they used animation or graphics when creating presentations. In general, the students believed that they used social media to enhance their image and have demonstrated active participation in the virtual world. The finding of this study is almost similar to the result of Gibbs (2017) research in which he found that students are active in virtual world such as using conferencing, social media and email. They also use smartphones and other mobile devices to communicate, study and play.

Based on the results from digital competency, students have recognised that digital competency is indeed a powerful and useful tool that they should learn at university. Students believe that they have strong virtual competency that it enables them to be active in virtual world. This finding confirms the importance of virtuality in digital learning. This finding is in line with a study done by Steinmetz (2017) who found that virtuality is important in educational system. Competency in virtuality will help the students to find relevant information in the cyber space. Hence, virtual skill is important in the educational sector and other fields. Students learning in university must include digital and technological resources to ensure students are competent to use digital devices and advanced software. Additionally, students must be prepared to apply digital competencies to enhance their learning while contributing to their development of social, communicative and other 21st century skills. Ramlee Mustapha (2017) also asserts that students who are creative and innovative are critical for nation building and economic progress.

Next, the second highest mean for digital competency is interactivity. The students claim that they are proficient in using digital devices to interact with other students to increase their interactivity. In addition, students agreed that they use digital devices to interact with their teachers and supervisors. Students also maintained that they were competent in using digital presentation tools and that they also admit they have early exposure to digital technologies before going to the university. Students also very confident that they participated in online communities. In general, the students believe that they are active in using digital devices for interactivity.

However, the study found that students have lower mean score in hypertextuality and cyber ethics. In terms of hypertetxtuality, the students are unsure whether they can create and updated their web pages but some of them knew how to edit digital photos. They were also uncertain whether they can record and edit digital sound as well as to record and edit digital videos. Likewise, Oblak (2005) found that creating and maintaining a successful and sophisticated website is difficult because networks of interconnected computer technologies clearly invite more graphic, expressive and monological means of expression, and open different ways of interaction and service. In terms of apps, students claim that they downloaded apps on their digital devices. According to Oblok (2005), hypertextuality is a complex concept since some students have difficulty to apply it especially in online communication.

Lastly, students were also rather weak at cyber ethics when using internet and social media. Some students were uncertain whether they downloaded and watched illicit materials on internet but, surprisingly, some of them admitted that they condemned and wrote negative words to other people online. Next, students were unsure whether they sent explicit photo online and imitated others. Other than that, students to some extent agreed that they copied material from internet without permission from the authors and a few admitted that they hacked other people website or facebook. Empirical data show that students are not clear about cyber ethics; thus, it causes some of students to violate the cyber ethics at times. Therefore, the aforementioned ethics should be explicated to them in different educational settings.

Conclusion

Digital technology which is the ability to gain the digital information and knowledge contributes to the students' use of the cyberspace. Mastery of digital skills is of overriding importance in the 21st century and digital competency in technology is unquestionably important in education as it can positively impact different aspects of academic life making it more interactive and enjoyable. Digital competency is a multi-faceted moving target, covering many areas and literacies and rapidly evolving as new technologies appear.

The findings of the study showed that students were weak at hypertextuality and cyber ethics. Therefore, they need to attend workshops or courses related to hypertextuality and cyber ethics. students suggested that digital competency be enhanced and that faculty or the university offer relevant courses on digital technology and digital competency. Moreover, they deemed it necessary that experts from other settings be invited to provide interesting and instructive workshops for students. Likewise, it is important for prospective teachers to prepare in terms knowledge and skills to use technology-based teaching techniques. Thence, the university should ensure that all physical infrastructure in each faculty is adequate and contemporary. Additionally, the university can initiate in-service training to their lecturers so that they can update their digital competencies and train students in artificial intelligence, robotics, autonomous vehicles and intelligence systems.

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