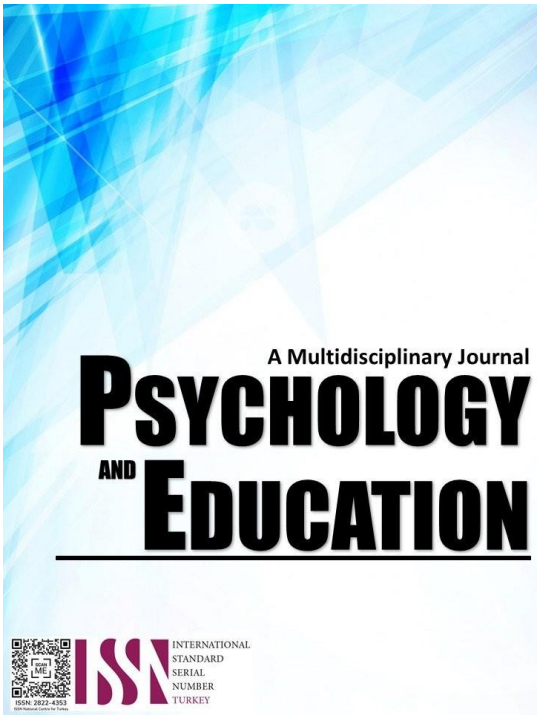
IMPACTS OF TECHNOLOGY ACCESS TO THE LEARNING SKILLS OF SELECTED SENIOR HIGH SCHOOL STUDENTS IN A PUBLIC SECONDARY SCHOOL IN GUMACA, QUEZON



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Research Article

Impacts of Technology Access to the Learning Skills of Selected Senior High School Students in a Public Secondary School in Gumaca, Quezon

Aira C. Clores*, Melchor B. Espiritu, Maria Celerina D. Oreta, Gil T. Segui
For affiliations and correspondence, see the last page.

Abstract

This study aimed to determine the impacts of technology access on the learning skills of selected senior high school students in a public secondary school in Gumaca, Quezon. The study involved 90 senior high school students from Camohaguin National High School located in Camohaguin Gumaca, Quezon. The researcher used questionnaires to gather reliable data to be answered by the target respondents. The proportionate random sampling was used to gather the data needed to determine the impacts of technology access to the learning skills. Most respondents were female (51%) while the remaining are male with (49%). The majority of the respondents are in the age range of 16 years old (24%) and the lowest age group (6%) of the population consists of people who are 20 years old. The results indicate that, in terms of critical thinking skills, the most significant impact of technology access to the learning skills with a mean score of 4.22. While on creative thinking skills, the most significant impact of technology is access to learning skills with a mean score of 4.20. for collaboration skills, the most significant impact of technology access to the learning skills with a mean score of 4.33. and for communication skills, the most significant impact of technology is access to the learning skills with a mean score of 4.44. The findings suggest that most of the students use technology to improve their learning skills. It implies that there is no significant difference in the perceived Impacts of technology access to the learning skills when respondents are grouped into profiles.

Keywords: *creative thinking skills, critical thinking skills, collaboration skills, communication skills, impacts, technology*

Introduction

Nowadays, technology is already part of our daily lives. It enhances and grows over time, and it helps us digest the information that we need. Also, students and teachers already base their learning and teaching on the use of technology. Since you have enough privilege to access technology, it is easy for you to explore more without thinking you cannot afford something due to your lack of equipment. You need to improve communication and collaboration skills, engage yourself in learning opportunities, and adjust easily to the technological advancements that are evolving around the world. According to AI-Masri & Curran (2019), using mobile devices as an extra tool gives pupils the chance to actively engage in the educational process seeking more educational resources, and participating in internet discussions inspires and supports students to take a deep learning stance that will improve their academic performance.

As stated by Harris (2016) Technology is starting to play a bigger role in education these days. Teachers strive to integrate technology into their regular lessons to help students connect their enthusiasm for learning with the rapidly evolving field of technology. Fisher et al. (2014) states that Students' lives involve a lot of technology. Using technology to improve the Although it has some disadvantages, the classroom has shown itself to be beneficial. With the use of technology, student involvement and willingness have increased, and learning can be improved.

Research Questions

This study will determine the “Impacts of Technology Access to the Learning Skills of Selected Senior High School Students in a Public Secondary School in Gumaca, Quezon." Specifically, this sought to answer the following questions:

1. What is the profile of the respondents in terms of:
   1.1 age,
   1.2 sex,
   1.3 grade level, and
   1.4 types of technology?
2. What are the impacts of technology access to the learning skills of the selected students in a public secondary school in terms of:
   2.1 critical thinking skills
   2.2 creative thinking skills
   2.3 collaboration skills, and
   2.4 communication skills?
3. Is there a significant difference in the perceived impacts of technology access to the learning skills when the respondents are grouped according to profile?

Methodology

Research Design

This study used descriptive survey methods to collect data to identify the impacts of technology access on the learning skills of selected students in a public school in Gumaca, Quezon. The researcher used a survey questionnaire as an instrument. Based on the survey results, the researcher was able to determine the details of the study. According to Alberto (2010), the descriptive method is also known as statistical research; it Describes data and characteristics of the population or phenomenon being studied.

Participants

The study was conducted at Camohaguin National High School in Gumaca Quezon, the respondents of this study were grade 11 and grade 12 students. The study focused on the impacts of technology access on the learning skills of the selected students in a public school in Gumaca, Quezon S.Y. 2023-2024, and the researcher selected 90 senior high school students composed of 50 from grade 11 and 40 from grade 12.

Research Instrument

The researcher prepared a research-made questionnaire which was validated by two experts.

Part I. of the questionnaire included the profile of the respondents. Part II of the questionnaire consisted of a Likert scale of; 5- strongly agree, 4- agree, 3- fairly agree, 2- disagree, and 1- strongly disagree, as perceived by selected senior high school students in a local secondary school in Gumaca, Quezon.

To test the internal consistency of the questionnaire using Cronbach's Alpha, pilot testing was conducted at Panikihan National High School with 12 senior high school respondents.

After the computation the result was 0.91 which is interpreted as acceptable. This means that the questionnaire used was reliable and there is an internal consistency in the research instrument used.

Procedure

Prior to the conduct of the study, the researcher sent a letter to the school's Principal and Adviser. Upon approval, the researcher administered the instrument to the target respondents.

In administering the questionnaire, the researcher used the time allotted for vacant time to avoid the distraction of class discussion. The student response was given enough time to answer the questions. After data gathering, the researcher collected them to tally the scores and to apply the statistical treatment to be used in the study.

The descriptive research design method using a Likert scale was used to know the impact of technology access to the learning skills of selected senior high school students. Data were gathered through "Proportionate Sampling" Both males and females officially enrolled in the public in Gumaca, Quezon were selected to fill the questionnaire. Data was collected through face-to-face surveys following the safety health protocols to prevent the spread of the virus.

Data Analysis

In this study, the researcher used statistical measures to treat the collected data. All the data were carefully read and examined for analysis. They were tallied and entered into a master list of the data collection sheet. To test the significant difference of three or more means, the researcher will use the Kruskal-Wallis for non -parametric test.

Results and Discussion

This section presents the analysis, and interpretation of data. All the data gathered were presented here in tabulated form with corresponding interpretations. The first part described the profile of the respondents in terms of age, sex, grade level, and types of technology. The second part is the impacts of technology access to the learning skills of senior high school students at Camohaguin National High School.

Table 1. *Frequency and Percentage Distribution of the Respondents According to Age.*

Age	*Frequency*	*Percentage (%)*
16	22	24
17	43	18
18	11	12
19	9	10
20	5	6
Total	90	100%

Table 1 shows that most of the respondents in the age range 16 years old contributed (24%) to the total population. Another (18%) of the respondents whose age are within 17 years old. Third, (12%) of the respondents are 18 years old. Fourth is from 19 years old. The last age group (6%) of the population consists of people who are 20 years old. The majority of the respondents appear to contribute to the population between the ages of 16 and 18 years old according to the data and results. Guillén-Gámez, F. D., & Mayorga-Fernández, M. J. (2020). The effect of age on higher education teachers' ICT use. This analysis found that age was an influential variable and a predictor of the overall attitude toward ICT use among Spanish higher education teachers.

Table 2. *Frequency and Percentage Distribution of the Respondents According to Sex*

Gender	*Frequency*	*Percentage (%)*
Male	44	49
Female	46	51
Total	90	100%

Table 2 shows the frequency and percentage distribution of the respondents according to sex. (49%) of them are male, and (51%) are female. Which describes that the majority of the students who responded are female. Mumporeze & Prieler (2017), Lee et al. (2019), and Tam et al. (2020) suggest that females have limited access to ICT compared to males and that a significant number of students (particularly boys) have a more positive view of ICT and utilize it to improve their learning. This seemingly contradicts the statistical evidence suggesting that females have a higher impact from technology access on learning skills.

Table 3. *Frequency and Percentage Distribution of the Respondents According to Grade Level*

Gender	*Frequency*	*Percentage (%)*
Grade 11	50	56
Grade 12	40	45
Total	90	100%

Table 3 presents the frequency and distribution of the respondents according to grade in which indicate that 56% are grade 11 students and 45% are grade 12 students which describes that most of the respondents are grade 11 students. According to a study by Atanacio and De Guzman (2020), the use of technology in K-12 education in the Philippines has been found to have a positive impact on student learning outcomes. The study found that the use of educational technology, such as tablets and online resources, can improve student engagement and motivation, as well as enhance their critical thinking and problem-solving skills.

Table 4. *Frequency and Percentage Distribution of the Respondents According to types of Technology.*

Types of Technology	*Frequency*	*Percentage (%)*
Mobile Phones	77	86
Mobile Phones/	1	1
Laptops/Tablet	10	11
Mobile Phones/	2	2
Total	90	100%

Table 4 presents the frequency and percentage of the respondents according to types of technology in which indicates that 86% of the respondents use mobile phones. 1% of the respondents use Mobile phones with Laptops and tablets. 11% use Mobile Phones with Laptops. And 2% Mobile Phones with Tablets. Which describes that most of the respondents use mobile phones. Technology integration, according to Rathore and Sonawat (2015), is the availability of a range of digital tools that enable students to use their technological know-how to interact with material for a deeper comprehension and to solve problems.

Table 5. *Impacts of Technology Access to the Learning Skills of Senior High School Students in terms of Critical Thinking Skills.*

Indicators	*Mean*	*Verbal Interpretation*
1. Technology access improves my access to information that is reliable.	4.33	Strongly Agree
2. Technology access Improve my understanding of how to determine the truth.	4.15	Agree
3. Technology access Improve my understanding of how to determine the truth.	4.12	Agree
4. Technology access makes it easier to express my ideas innovatively, by helping me develop critical thinking skills.	4.12	Agree
5. Technology access helps me to enjoy finding out things that are new to me.	4.17	Agree
Grand Mean:	4.22	Strongly Agree

Legend; *"Strongly disagree (1.0-1.80)", "Disagree (1.81-2.60)", Fairly Agree (2.61-3.40)", "Agree (3.41-4.20)", "Strongly agree (4.21-5.0)".*

Table 5 shows the impacts of technology access to the learning skills in terms of critical thinking skills. The highest indicator is indicator number 1 with a mean score of 4.33 (strongly agree), while the lowest indicator is indicator numbers 4 and 5 with a mean score of 4.5 (agree). Overall, the total mean is 4.22, which means strongly agree. According to Brown, Roediger, & McDaniel (2014), Critical thinking requires the ability to solve problems, handle information, make well-informed decisions, and analyze huge amounts of data. Critical thinking abilities must be developed by authentic learning experiences that provide real-world context.

Table 6. *Impacts of Technology Access to the Learning Skills of Senior High School Students in terms of Creative Thinking Skills.*

Indicators	*Mean*	*Verbal Interpretation*
1. As a result of technology access enhances my imagination and develops different ideas.	4.2	Strongly Agree
2. As a result of technology access it helps me to enhance my problem-solving.	3.97	Agree
3. As a result of technology access it lead to create new things.	4.14	Agree
4. As a result of technology access it sharpens and widens my horizons to visualize creative projects.	4.33	Strongly Agree
5. As a result of technology access it helps me to find different ideas, experience, and enhance my creativity.	4.37	Strongly Agree
Grand Mean:	4.20	Agree

Legend; *"Strongly disagree (1.0-1.80)", "Disagree (1.81-2.60)", Fairly Agree (2.61-3.40)", "Agree (3.41-4.20)", "Strongly agree (4.21-5.0)".*

Table 6 presents the impacts of technology access to the learning skills in terms of creative thinking skills. The highest indicator is indicator number 5, with a mean score of 4.37 (strongly agree), while the lowest is indicator 2, with a mean score of 3.97 (agree). It revealed that the average mean of the total respondents is 4.20, which means agree. Danah Henriksen, Edwin Creely, Michael Henderson & Punya Mishra (2021). "Creativity and technology in teaching and learning: a literature review of the uneasy space of implementation." This article provides a critical thematic review of international literature on creativity and technology in the context of educational practice.

Table 7. *Impacts of Technology Access to the Learning Skills of Senior High School Students in terms of Collaboration Skills.*

Indicators	*Mean*	*Verbal Interpretation*
1. As a result of technology access, it helps me to encourage skill sharing and allows everyone to learn from each other.	4.51	Strongly Agree
2. As a result of technology access, it become my tool for connection and communication process.	4.42	Strongly Agree
3.As a result of technology access, it helps me to connect with other people anytime.	4.29	Strongly Agree
4. As a result of technology access, it made my works easier outside the classroom with other people.	4.24	Strongly Agree
5. As a result of technology access, it helps me build good teamwork with others around me.	4.21	Strongly Agree
Grand Mean:	4.33	Strongly Agree

Legend; *"Strongly disagree (1.0-1.80)", "Disagree (1.81-2.60)", Fairly Agree (2.61-3.40)", "Agree (3.41-4.20)", "Strongly agree (4.21-5.0)".*

Table 7 presents the impacts of technology access to the learning skills in terms of collaboration skills. The highest indicator is 1 with a mean score of 4.51 (strongly agree), while the lowest indicator is 5 with a mean score of 4.21 (strongly agree). It revealed that the average mean of the total respondents is 4.33, which means strongly agree. Ilie Vali (2023). "The Impact of Technology on Collaborative Learning." This research analyzes the impact that technology has on collaborative learning in students, focusing on performance and attitudes towards technology in learning.

Table 8. *Impacts of Technology Access to the Learning Skills of Senior High School Students in terms of Communication Skills.*

Indicators	*Mean*	*Verbal Interpretation*
1. As a result of technology access helps me to communicate easily with others.	4.51	Strongly Agree
2. As a result of technology access becomes fast and efficient way to communicate with other people.	4.42	Strongly Agree
3. As a result of technology access can easily receive responses and feedback anytime.	4.36	Strongly Agree
4. As a result of technology access improves my ability to communicate with others.	4.4	Strongly Agree
5. As a result of technology access helps me in sending information through different online platforms.	4.53	Strongly Agree
Grand Mean:	4.44	Strongly Agree

Legend; *"Strongly disagree (1.0-1.80)", "Disagree (1.81-2.60)", Fairly Agree (2.61-3.40)", "Agree (3.41-4.20)", "Strongly agree (4.21-5.0)".*

Table 8 shows the impacts of technology access to the learning skills in terms of communication skills. The highest indicator is indicator number 5, with a mean score of 4.53 (strongly agree), while the lowest indicator is 4.36 (strongly agree). It also revealed that the average mean of the total respondents is 4.44, which means strongly agree. According to Kulidtod & Pasagui,(2017), The main source of communication between individuals around the world is social networking media, which is why the term cyberworld is used. Other sites that are included are Facebook, Twitter, MySpace, Instagram, Flicker, Friendster, blog, Podcast, Tumblr, YouTube, and Skype among others, Technology devices such as mobile phones, tablets, laptops, desktops, and e-readers have been exploited by users of these forms of media. Researchers all over the world has Various findings on the effects of these forms of media on the academic performance of students. The academic results of these students who use the media in an appropriate manner have improved.

Table 9. *Summary Table on the Perceived Impacts of Technology Access to the Learning Skills*

Impacts Of Technology Access	*Average Mean*	*Verbal Interpretation*
Critical Thinking Skills	4.22	Strongly Agree
Creative thinking skills	4.20	Agree
Collaboration skills	4.33	Strongly Agree
Communication skills	4.44	Strongly Agree
Grand Mean	4.30	Strongly Agree

Legend; *"Strongly Disagree (1.0-1.80)", "Disagree (1.81-2.60)", Fairly Agree (2.61-3.40)", "Agree (3.41-4.20)", "Strongly Agree (4.21-5.0)".*

The summary table shows the average mean and verbal interpretation of critical thinking skills with a mean of 4.22, which means strongly agree, creative thinking skills with a mean of 4.20, which means strongly agree, and collaboration skills with a 4.33 weighted mean, which means strongly agree. And communication skills with a 4.44 mean, which means strongly agree. This implies that learning skills gained a lot from the impacts of technology access in senior high school in Gumaca, Quezon.

Technology is being embraced by students. In an effort to support students in realizing their full academic potential, schools are also adopting and modifying the concept of e-learning through the use of various devices. The advantages of using these gadgets in the classroom are acknowledged by educators and administrators. It is a useful tool that many people can use. Additionally, teachers claim that when kids have this technological advantage, their study habits improve. Cabrera (2014), posted the following:

Independence and gathering information. The Internet is a tool that allows one to instantly access information from around the world. Students use search engines with a wealth of online material to conduct independent research after connecting to the Internet. This helps the student gather group information in order to complete tasks or requirements at school. It helps students develop their independence and confidence.

Students who cross-reference current and historical Web content from many sources are encouraged to think critically by virtue of the abundance of information available to them. They gain knowledge about fact-checking and how it relates to the topic they are working on at the moment. under the supervision of their technician to encourage critical thinking.

Collaboration and communication. Data and ideas may be exchanged quickly and easily. Through email-disseminated group accounts, social media, and personal accounts, teachers and students can collaborate quickly. This enables prompt confirmation, assessment, and comprehension of the message or topic to be conveyed.

Table 10. *Significant differences on the perceived impacts of technology access to the learning skills when respondents are grouped according to age.*

Groups	*N*	*Median*	*df*	*P - value*	*Significant Level*	*Decision*
16	22	4.23				
17	43	4.32				
18	11	4.32	4	0.00354	0.05	Reject Null
19	9	4.33				
20 and above	5	4.00				
H	*15.644*					

Table 10 illustrates that there are statistically significant differences in the perceived impacts of technology access on learning skills among different age groups. The results obtained the P-value (0.00354) which is less than the significance level (0.05), This led the researcher to reject the null hypothesis. There is a significant relationship in the perceived impacts of technology access on learning skills in terms of age. The 'H' value of 15.644 further supports the rejection of the null hypothesis, indicating a high degree of difference between the groups.

In line with this, Higgins et al. (2012) found consistent but small positive associations between the use of technology and learning outcomes of school-age learners (5–18-year-olds) in studies linking the provision and use of technology with attainment.

Table 11. *Significant differences on the perceived impacts of technology access to the learning skills when respondents are grouped according to sex.*

Groups	*N*	*Median*	*df*	*P - value*	*Significant Level*	*Decision*
Male	46	4.40	1	0.00036	0.05	Reject Null
Female	41	4.15				
H-value	*12.7493*					

The table above shows the p-value is 0.00036, which is less than the significance level of 0.05. It implies that there are statistically significant differences between the male and female groups in terms of their perceived impacts of technology access to the learning skills.

Several studies have examined the use of ICT by students and the connection between ICT usage and academic achievement.

However, the studies by Mumporeze & Prieler (2017), Lee et al. (2019), and Tam et al. (2020) suggest that females have limited access to ICT compared to males and that a significant number of students (particularly boys) have a more positive view of ICT and utilize it to improve their learning. This seemingly contradicts the statistical evidence suggesting that females have a higher impact from technology access on learning skills.

Adding to the complexity, the studies by Siddiq & Scherer (2019a, 2019b) present differing results on gender differences in ICT use, with some claiming benefits for females and others for males.

Moreover, the research aligns with findings from Fabac et al. (2011), who investigated the differences in learning, Information and Communication Technology (ICT), and communication attitudes based on gender and academic achievement were statistically significant in the majority of cases. Furthermore, (Fabac et al., 2011) found that all subconstructs had significant levels of digital-age literacy proficiency.

In conclusion, while there are some nuances and apparent contradictions, the overall results clearly indicate that there are indeed gender differences in ICT use and literacy.

Table 12. *Significant differences on the perceived impacts of technology access to the learning skills when respondents are grouped according to grade level.*

Groups	*N*	*Median*	*df*	*P - value*	*Significant Level*	*Decision*
Grade 11	51	4.25	1	0.04986	0.05	Reject Null
Grade 12	39	4.37				
H-value	*12.7493*					

In examining the perceived impacts of technology access on learning skills among students, significant differences were observed when respondents were grouped according to grade level. The study involved a total of 51 Grade 11 students and 39 Grade 12 students. The median perception score for Grade 11 students was 4.25, while for Grade 12 students, it was slightly higher at 4.37.

A non-parametric statistical test was conducted to compare the two groups. The test yielded an H-value of 12.7493 and a P-value of 0.04986. It suggests that there is a significant difference in perceived impacts of technology access on learning skills between Grade 11 and Grade 12 students.

According to a study by Atanacio and De Guzman (2020), the use of technology in K-12 education in the Philippines has been found to have a positive impact on student learning outcomes. The study found that the use of educational technology, such as tablets and online resources, can improve student engagement and motivation, as well as enhance their critical thinking and problem-solving skills.

Additionally, Chauhan (2017) reported a medium positive effect of technology on the learning effectiveness of primary school students compared to students who followed traditional learning instruction.

Table 13. *Significant differences on the perceived impacts of technology access to the learning skills when respondents are grouped according to types of technology.*

Groups	*N*	*Median*	*df*	*P - value*	*Significant Level*	*Decision*
Mobile Phones	77	4.31	4	0.00001	0.05	Reject Null
Mobile Phones /	1	5.00				

Laptops/Tablet		
Mobile Phones / Laptops	10	4.20
Mobile Phones / Laptops/Tablet	2	4.00
H = 35.6694		

The study into the perceived impacts of technology access on learning skills among students, as presented in Table 12, revealed significant differences when respondents were grouped according to the types of technology they use. Specifically, the study involved a diverse group of students: 77 students who use mobile phones, 1 student who uses mobile phones in combination with laptops and tablets, 10 students who use mobile phones and laptops, and 2 students who use mobile phones and tablets.

Interestingly, the median perception score varied among these groups. Students using mobile phones had a median score of 4.31, while those using mobile phones in combination with laptops and tablets had a slightly higher score of 5.00. On the other hand, students using mobile phones and laptops had a median score of 4.20, and those using mobile phones and tablets had a score of 4.00.

To compare these groups, a non-parametric statistical test was conducted. Remarkably, the test yielded an H-value of 35.6694 and a P-value of 0.00001. Given that the P-value is less than the predetermined significance level of 0.05, the null hypothesis was rejected. This suggests that there is a statistically significant difference in the perceived impacts of technology access on learning skills among students depending on the types of technology they use.

In line with this, the rise of mobile technologies and hardware devices has instigated investigations into their impact on teaching and learning. For instance, Sung et al. (2016) reported a moderate effect on students' performance from the use of mobile devices in the classroom compared to the use of desktop computers or the non-use of mobile devices.

Similarly, Schmid et al. (2014) reported medium–low to low positive effects of technology integration (e.g., CAI, ICTs) in the classroom on students' achievement and attitude compared to not using technology or using technology to varying degrees.

Furthermore, Tamim et al.(2015) found a low statistically significant effect of the use of tablets and other smart devices in educational contexts on students' achievement outcomes. The authors suggested that tablets offered additional advantages to students; namely, they reported improvements in students' notetaking, organizational and communication skills, and creativity. These findings collectively underscore the significant role of technology in shaping learning outcomes among students.

Conclusions

The study concluded that access to technology plays a significant role in enhancing the learning skills of senior high school students, particularly in the areas of communication, collaboration, creative thinking, and critical thinking. Among these, communication skills were most positively impacted, with students strongly agreeing that technology helps them effectively send and receive information through various digital platforms. The respondents were predominantly female and 16 years old, mostly in Grade 12. Additionally, the findings revealed that perceptions of the impact of technology on learning varied significantly based on demographic factors such as age, sex, grade level, and the types of technology used. Overall, the research underscores that technology access is a crucial factor in supporting and developing students' learning capabilities. Based on these findings, the study recommends that school administrators recognize how technological tools influence student learning and explore alternative methods to enhance access. Teachers are encouraged to integrate innovative concepts that engage students, while students themselves should be supported in gaining consistent access to suitable technology. Finally, future researchers are advised to expand on this study by exploring other variables that may further illuminate the relationship between technology and learning outcomes.

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Affiliations and Corresponding Information

Aira C. Clores
Eastern Quezon College - Philippines

Melchor B. Espiritu, Ed.D.
Eastern Quezon College - Philippines

Maria Celerina D. Oreta, Ed.D.
Eastern Quezon College - Philippines

Gil T. Segui, LPT
Eastern Quezon College - Philippines