

## Mobile-Based Education App for Improved Performance in Empowerment Technologies

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**ABSTRACT:** This study aimed to improve the performance in Empowerment Technologies subject of the Grade 11 TVL students, the researcher sought to find out if creating an interactive application would make an impact to the teaching and learning process. The study employed an experimental design where the researcher used the mobile-based education app to improve the written and hands-on performance of the students in Empowerment Technologies subject. This study is also descriptive where the respondents' perception about the application in terms of the aspects of mobile learning was evaluated. Thus, the researcher tested whether the perception of the students in terms of the aspects of mobile learning on the developed mobile-based education app is significantly related to students' performances. The findings reveal that there were more female among the respondents. The parents' educational attainment was high school graduate and have an income of less than 10,000 pesos per month. Majority of the respondents have a smartphone as their available gadgets at home. Furthermore, the mobile-based education app on the aspects of mobile learning such as device aspect, learner aspect and social aspects were strongly agreed. The majority of the respondents were fair level during the pre-test written performance and has significantly improved after using the mobile-based education app. Thus, majority of the respondents were very satisfactory in their hands-on performances. The perception of the respondents in the aspects of mobile-based education app is not significantly related to their performances.; the hypothesis was Sustained. It is recommended that the developed mobile-based education app be used in other grade levels whenever applicable for any intervention or enrichment activities.

**KEYWORDS:** Empowerment Technologies, Mobile-based Education App, Senior High School, Mobile learning, Technology and Livelihood Education

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### I. INTRODUCTION

In the current technology era, mobile applications are software programs that have consistently revolutionized and improved people's lives. The majority of today's mobile devices run a variety of mobile applications. These applications serve different purposes depending on the user's needs. Because people's access to many goods was limited due to the pandemic, they became more reliant on mobile applications. As a result, mobile devices provide users with various ways to connect to various things, such as entertainment, news and information, resource access, and the ability to bridge communication gaps between people.

This pandemic may appear to be a major impediment to continuing education. Still, the education sector is looking at every angle they can use to launch an immediate response and build a learning continuity plan and has devised a strategy that includes the use of many modes. This is to safeguard the health and safety of our students while also providing an opportunity for them to complete their education. Our school is now implementing full face-to-face classes with precautionary measures that are being followed to cater to the needs of a continuity education program. Modules are still being utilized in our daily classes as we adapt to the changing phase of returning to normal classes. According to Ambayon (2020), as compared to traditional teaching methods, modular instruction is more effective in the teaching-learning technique because students learn at their own pace or plan. Our learners, on the other hand, receive no interaction or auditory or visual effects from printed materials. If the learners are not readers or find the subject solely written in words, they may find it dull and not want to learn. Mobile applications may provide interactive learning tools to encourage our students to enjoy learning. During these times, technology plays an important role in the continuity of education. Students, on the other hand, having no choice but to adapt to the sudden changes in education, and engage themselves in learning through technology or mobile learning.

In the study of Keane, T., Linden, T., Hernandez-Martinez, P., & Molnar, A. (2022), this pandemic time made great realizations to our students transitioning from face-to-face classes to online or modular classes greatly affected their learning experiences. Thus, students discovered the benefits of both online and face-to-face classes. Students may enjoy the free time they have during the

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pandemic, thus the interaction through mobile technology, students realize the other side of the learning experience in a classroom setup. Transitioning to online or mobile learning for most of the students was not a difficult matter. Students nowadays are fond of using gadgets, and Generation Z students are more adapted to technology than others. On the other hand, a few students find it challenging to adapt to the fast-changing modality of learning, which leads to quitting or deferring studies. Based on their study, half of the students who were exposed to the learning experience of mobile learning strongly preferred learning through the combination of online and face-to-face classes.

Furthermore, integrating mobile app-based instruction in the distance learning modality implemented will not only engage students in the lesson, instruction, and activities, it can also help students create an interactive learning environment and transform them into digitally literate students. Farrah and Dawood (2018) asserted that the utilization of mobile devices in the learning environment had become a reinforcement for teaching and learning, making the acquisition of content convenient and easy for students. Thus, different pedagogical advantages are associated with mobile learning as stated in the study of Ligi B. and Dr. Raja (2017), such as Flexible learning, Collaborative learning, Blended Learning, and Interactive Learning. Integrating such advancement in the teaching and learning process will engage the students in the instruction and activities and transform them into digitally literate citizens.

As studied by Biswas, B. Roy, S.K and Roy F. (2020), most students of today possess positive attitudes toward mobile learning. The results of this survey indicate that most university students see mobile learning favorably. Thus, mobile learning is very helpful in recovering the study gaps caused by the COVID-19 pandemic.

Empowerment Technologies is a specialized subject given to Technical-Vocational Livelihood students that integrate ICT computers and the Internet. It provides students with the foundation for learning about the computer. Empowerment Technologies is a specialist module that teaches students the fundamental information and abilities needed to succeed in contexts where computers and the Internet are used. It addresses issues such as how to work, collaborate, and create online content in the twenty-first century. This course will assist in teaching competencies that are critical in the information age, such as the state of ICT technologies; online safety, security, ethics, and etiquette; productivity tools with advanced application techniques; imaging and designing for the online environment; multimedia tools; and powerful tools to create social change, all of which are aligned to the Department of Education's standards for senior high school students. (Robert Diosto, 2020) Empowerment technologies refer to the computer technology that we use. This subject creates a foundation for learning about the world of ICT and demonstrates its proper use. It also aims to work collaboratively among students. The Philippines is considered the "ICT Hub of Asia" as there has been a huge growth in ICT-related works such as BPO companies. Thus, Filipinos are among the highest user of mobile technologies. Mobile technologies have made a huge impact on our daily lives.

To improve the performance in the Empowerment Technologies subject of the students in senior high school, the researcher sought to find out if creating an interactive application would impact the teaching and learning process.

### **II. OBJECTIVES OF THE STUDY**

Paiisa National High School -Senior High turns into Digitized Modular Distance Learning as our Division office granted our school tablets that our students can utilize. Digitized modular learning is a type of learning that practically utilizes modules, thus, these modules are converted into a digital format that can only be accessed using computers, tablets, smartphones, and other digital devices. The principal objective of digitization is to minimize the use of printed materials and to increase learners' productivity in the modern era. The development of the learning modality aims to address issues that the department has encountered during this pandemic. These problems include the reproduction and distribution of printed materials and the high possibility of virus transmission.

Moreover, Kotobee Reader is a mobile-based application that can be installed and utilized by our students either online or offline. Kotobee Reader can be a tool to read modules interactively. It has an interface, the Kotobee writer, where the teacher can design interactive modules in a way that they can attach pictures, videos, online links, games, and quizzes.

In line with this, the study intends to identify the effectiveness of integrating mobile-based applications in improving the teaching and learning process in the empowerment technologies subject. Creating an interactive module that can be utilized offline and improve the learners' learning strategies. Thus, maximizing the utilization of the gadgets the students have.

### **III. METHODOLOGY**

The researcher employed a single group experimental-descriptive research method in determining the effects of using mobile-based education app in improving the learning strategies of the respondents in the Empowerment Technologies subject. A survey questionnaire was used to determine the respondents' demographic profile in terms of age, sex, mother's and father's educational attainment, family monthly income, and available gadgets. The researcher developed an e-learning material through the use of KOTOBEE reader application. The learning material is then published and extracted as a file. This mobile-based education app through the use of the KOTOBEE application was used as the experimental treatment in this study. Furthermore, the researcher

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prepared a test and instructions based on the Empowerment Technologies skills to assess the variables contained in the study and to determine the interdependence of the pre-test and post-test as trustworthy data for interpretation.

### IV. RESEARCH PROCEDURES

The researcher considered the following steps in gathering and managing the data.

For ethical considerations, the researcher secured the necessary permits from the school authority, to the District Supervisor. For the conduct of the study, a request letter noted by the research adviser was personally given to the concerned office by the researcher. The researcher stated the purpose of the study, the relevance of the respondents' participation, and guarantee the confidentiality of the response.

Upon the approval of the request, the researcher asked permission from the principal of the locale of the study with a letter of endorsement from the District Supervisor to conduct the study.

Before the conduct of the study, the researcher developed a learning material embedded in the application KOTOBEE author based on the lesson intended for the students. It focused on the lessons included in the Empowerment Technologies subject. The lesson conveys the topics, the developed learning material was extracted as a file and downloaded by the students as e-learning material utilized in KOTOBEE reader app during the class. Ample time was given to the students to download and install the mobile-based education app on their corresponding tablets.

The researcher personally made the test distributed and administered to the Grade 11 TVL students. The pretest was given on March 2023. After analyzing the pre-test result, a mobile-based education app was introduced to the class, the learning material was composed of three lessons in Empowerment Technologies and was utilized to address the learning needs identified among the respondents. With the availability of the tablets in school, the mobile-based education app was utilized throughout the lesson conducted. Hands-on performance tasks were given after the lesson about multimedia and interactivity. Then, post-test was given on April 2023.

The researcher handed the rest of the survey questionnaire and evaluated the hands-on output of the students. This was also done on April 2023. During the data gathering procedure, ample time were given to enable the students to answer the distributed instrument carefully and concisely.

After conducting the study, the researcher retrieved the tests, checked them, and made a data matrix of the results of the respondents' answers. After revisions and checking of the statistician, the researcher passed it to the statistics center and the researcher analyzed and interpreted the gathered results.

### V. STATISTICAL TREATMENT OF DATA

Different statistical tools were utilized to summarize, present, analyze and interpret the data gathered by the researcher. Data were treated statistically using the following statistical tools:

#### 1. Frequency – Percentage

This formula was utilized by the researcher in order to determine the frequency count and percentage distribution of the student respondents' demographic profile, which includes sex, parent's educational attainment, family monthly income and available gadgets they can use.

Moreover, it was also used in examining the responses of the student-respondents on their performance in terms of written (pre-test and post-test) and hands-on.

#### 2. Mean and Standard Deviation

The mean and standard deviation was utilized by the researcher in order to fully examine their perception towards the developed mobile-based education app in terms of the aspects of mobile learning such as device aspect, learner aspect and social aspect.

#### 3. Paired T-test

The researcher used paired T-test to identify if there was a significant difference between the pre-test and post-test written performance of the respondents after the implementation of mobile-based education apps.

### VI. RESULTS AND DISCUSSION

#### Demographic Profile of the Respondents

**Table 1. Distribution of Respondents according to Age, Sex, Family Monthly Income, and Available Gadgets Used.**

	Demographics	Frequency	Percent
Age	13 years old and below	0	0.0
	14-17 years old	42	84.0
	18 years old and above	8	16.0
Sex	Male	17	34.0
	Female	33	66.0
Family Monthly Income	Below P10,000.00	41	82.0
	P10,001.00 to P20,000.00	7	14.0

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	P20,001.00 to P30,000.00	2	4.0
	Above P30,000.00	0	0
Available Gadgets Used	Smartphone/Android/IOS	46	92.0
	Cellphone	0	0
	Desktop Computer	2	4.0
	Tablet	3	4.0
	Laptop		
<b>N=50</b>			

This table shows the respondents' age group, where 42 or 84% of the respondents belongs to 14-17 age group. It also shows the respondents' sex wherein it revealed that males got a frequency of 17 or 34% while females got a frequency of 33 or 66%.

The family monthly income shows that forty 41 or 82% of them receive less than 10,000 per month. These indicates that the level of family income only meets the minimum living condition.

The data about the available gadgets revealed that the respondents have a smartphone with a frequency of 46 or 92%. It is followed by others with a frequency of 2 or 4%. It means that majority of the respondents have a smartphone which is primarily use for communication such as personal, for livelihood transactions and academics, specifically in online class and researching. Despite the reflecting percentage of family monthly income, students nowadays have been attached and familiarized to different gadgets. Mobile phones today have become exceptionally normal in regular day to day existence, including understudies with the goal that their reality can upset the learning system in ordinary classes (Yavuz, 2016).

**Table 2. Distribution of Respondents Profile According to Parents' Educational Attainment**

Educational Attainment	Father		Mother	
	F	%	F	%
No Formal Schooling	0	0	0	0
Elementary Level	8	16.0	4	8.0
Elementary Graduate	7	14.0	12	24.0
High School Level	11	22.0	11	22.0
High School Graduate	19	38.0	17	34.0
College Level	1	2.0	2	4.0
College Graduate	4	8.0	4	8.0
	<b>50</b>	<b>100.0</b>	<b>50</b>	<b>100.0</b>

The table above also presents the respondents' parents' highest educational attainment. It revealed that both mothers and fathers of the respondent are high school graduates with a frequency of 19 or 38% for the father and 17 or 34% for the mother. 4 or 8% of their father and mother were able to graduate with a Bachelor's degree. It means that many of their parents were not able to pursue their college degrees. It is related to the financial constraints experienced by the community, and its accessibility or distance to nearby colleges or institutions offering free tuition.

**Table 3. Respondents' perception on the Mobile-based education apps in terms of Device Aspect.**

Indicators	Mean	Std. Deviation	Verbal Interpretation
The mobile application...			
1. ...is easy to use and learned.	3.76	0.39	Strongly Agree
2. ... has contents that are hierarchically organized in order.	3.53	0.50	Strongly Agree
3. ...has the right amount of text and its font size and style are suitable for the material and not overwhelming.	3.63	0.56	Strongly Agree
4. ...gives emphasis on the vital information of the lesson.	3.69	0.47	Strongly Agree
5. ...has pictures or image that harmonized the contents.	3.73	0.46	Strongly Agree
6. ...presents the lesson logically.	3.71	0.48	Strongly Agree
7. ...has interface and interaction methods that are familiar to me.	3.59	0.54	Strongly Agree
8. ...is accurate and it helps to achieve the intended learning outcome.	3.8	0.45	Strongly Agree
9. ...performs as expected.	3.55	0.54	Strongly Agree
10...is exhausting to use.	2.08	0.78	Disagree
Overall	3.47	0.22	Agree

**Legend:** 4.00 - 3.00 (Strongly Agree); 2.99 – 2.00 (Agree); 1.99 – 1.0 (Disagree); 1.00 – 0.99 (Strongly Disagree)

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Table 3 presents the respondents' perception towards Mobile-based education apps in terms of Device Aspect. The result presents an overall mean of 3.47 with a verbal interpretation of Agree. It means that the respondents moderately manifested that the mobile-based education app provides the technicality and the physical characteristics that would help them to easily access the said material. The respondents perceived that the developed mobile-based education app is accurate with its lessons given and helps them to achieve their intended learning outcome which gained the highest mean of 3.8 with the verbal interpretation of Strongly Agree. It implies that the respondents perceived the indicator as highly manifested in the mobile-based education app because they were able to achieve the learning outcome indicated in the modules provided by the learning material. This is related to the results presented in Tables 7 and 8, wherein it shows the improvement in the respondents' performance in Empowerment Technologies. According to Sophonhiranrak, S. (2021), because the mobile learning entails more than just using mobile devices to convey information to students, instructors should take consider their students' learning styles, attitudes, and readiness to accept mobile learning. This will lead to determining how to provide material, organize the activities and conduct the assessment which begins with the analysis of the content, tools and objectives.

On the other hand, the perception that the Mobile-based education app is exhausting to use got the lowest mean of 2.08 with the verbal interpretation of disagree. The researcher provided a time frame for the student-respondents to install the mobile-based education apps to the tablets available in the school and utilized each module embedded in the said application as a learning material in Empowerment Technologies. In the installation period given by the researcher, there are technical problems encountered such as poor internet connection. This seem to cause some difficulties in accessing the material. On the other hand, after the installation of the material, students can freely access the mobile-based education app even without internet connection. In the study of Smith, (2017), the usability of the mobile technologies in mobile learning refers to how well a user can interact with a product and how simple it is to use. The mobile-based education app provided a user-friendly interface, simple enough for the students to navigate the learning material and to access the information they needed for the subject used.

**Table 4. Respondents' perception on the Mobile-based education apps in terms of Learners' Aspect.**

Indicators	Mean	Std. Deviation	Verbal Interpretation
The mobile application...			
1. suits the level of learner's knowledge.	3.59	0.48	Strongly Agree
2. is fitted to be used with less supervision for students.	3.57	0.61	Strongly Agree
3. enables the students to write notes while using the app.	3.69	0.51	Strongly Agree
4. helps students to be independent learners.	3.61	0.57	Strongly Agree
5. is adaptable to the learners' needs, interests and abilities.	3.67	0.48	Strongly Agree
6. would likely to improve students' performance in class.	3.84	0.40	Strongly Agree
7. would likely enable me to accomplish learning tasks more quickly.	3.69	0.49	Strongly Agree
8. would likely increase my productivity.	3.59	0.54	Strongly Agree
9. would likely enhance the effectiveness of my learning practices.	3.75	0.48	Strongly Agree
10. would likely be useful in my learning practices.	3.75	0.53	Strongly Agree
<b>Overall</b>	<b>3.636</b>	<b>0.30</b>	<b>Strongly Agree</b>

**Legend:** 4.00 - 3.00 (Strongly Agree); 2.99 – 2.00 (Agree); 1.99 – 1.0 (Disagree); 1.00 – 0.99 (Strongly Disagree)

The table 4 presents the respondents' perception on the Mobile-based education apps in terms of Learners' Aspect. It got an overall mean of 3.636 with a verbal interpretation of Strongly Agree. It means that the students-respondents highly manifested that the mobile-based education app is associated to their emotional aspect and their motivation regarding its use in Empowerment Technologies subject. The respondents perceived that the mobile-based education app would likely to improve their performance in class which gained the highest mean of 3.84 and a verbal interpretation of Strongly Agree. In the study of Jen0, L.M., Grytnes, J.A., & Vandvik, V., 2017, students that used the mobile app showed better intrinsic motivation, perceived competence, and accomplishment levels. Furthermore, when compared to the textbook, using the mobile app predicted intrinsic motivation, which in turn predicted greater accomplishment scores. A positive attitude towards the use of learning material would likely to improve the student's performance.

On the other hand, the perception that the mobile-based education app is fitted to be used with less supervision for students got the lowest mean of 3.57. Though it is the lowest indicator, it still has a verbal interpretation of Strongly Agree. The researcher takes in consideration the familiarization of the students to the given application. Instructions were given prior to the use of the mobile-based application as well as the proper utilization and navigation of the learning material. According to Cavus (2016), the basic component of mobile learning are learners, teachers, content, environment and assessment which all in all takes a specific role for the learning process to be successful. Teachers plays an important role as guide to our student. The effectiveness of the

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implementation of mobile learning is positively impacted by the collaborative effort of teachers and students towards achieving the learning outcome.

Table 5 on the next page presents the respondents' perception on the mobile-based education apps in terms of Social Aspect. It got an overall mean of 3.80 with a verbal interpretation of Strongly Agree. Based on the result, student highly manifested that the mobile-based education app provides interaction and cooperation processes between the teachers and learners and or among the learners themselves.

**Table 5. Respondents' perception on the Mobile-based education apps in terms of Social' Aspect.**

Indicators	Mean	Std. Deviation	Verbal Interpretation
The mobile application...			
1. will help me build good relationship with my teacher in the teaching and learning process.	3.61	0.56	Strongly Agree
2. will allow me to do collaborative effort among my classmates.	3.69	0.45	Strongly Agree
3. will give me an opportunity to explore and learn more of our lesson through team activity	3.65	0.48	Strongly Agree
4. used in collaborative learning will help me improve my communication skills.	3.65	0.53	Strongly Agree
5. used in collaborative learning will help me easily understand and adapt the lesson.	3.59	0.50	Strongly Agree
6. allows the student to explore Empowerment Technologies and utilizes higher level thinking skills	3.75	0.46	Strongly Agree
7. can serve as a vehicle to learn the basic knowledge about Empowerment Technologies to direct students within and outside the classroom.	3.86	0.40	Strongly Agree
8. can be used together with other external educational sites for better learning.	3.69	0.49	Strongly Agree
9. has a feature to promote collaboration within class	3.51	0.53	Strongly Agree
10. encourages development of skills which will be useful for the student's future careers.	3.65	0.61	Strongly Agree
Overall	3.80	0.24	Strongly Agree

**Legend:** 4.00 - 3.00 (Strongly Agree); 2.99 – 2.00 (Agree); 1.99 – 1.0 (Disagree); 1.00 – 0.99 (Strongly Disagree)

Table 5 presents the respondents' perception on the mobile-based education apps in terms of Social Aspect. It got an overall mean of 3.80 with a verbal interpretation of Strongly Agree. Based on the result, student agreed that the mobile-based education app provides interaction and cooperation processes between the teachers and learners and or among the learners themselves. The respondents perceived that the mobile-based education app can serve as a vehicle to learn the basic knowledge about Empowerment Technologies and to direct students within and outside the classroom which gained the highest mean of 3.86 with a verbal interpretation of Strongly agree. As education adapt to the needs of continuity, despite the hindrance brought by the pandemic and the changing climate, learning modalities are constantly changing its phase. Blended learning is still one of the options that the Department of Education is considering to cater the needs of the students for learning and at the same time lessen the risk to their health. Teachers can easily direct their students outside the classroom using the mobile-based education app developed. In the study of Keane, T., Linden, T., Hernandez-Martinez, P., & Molnar A., (2022), half of the students who are exposed to the learning experience of mobile learning gave a strong preference in learning through combination of online and face to face classes.

On the other hand, the indicator stating that the mobile-based education app has a feature to promote collaboration within class got the lowest mean of 3.51, but it still falls to strongly agree verbal interpretation. Using mobile devices, level of collaboration to learning were being established through communication. Students take in, create and trade a variety of information across time and place. (Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012) Mobile-based education apps with the use of the internet may promote better collaboration among students and build communicable relationship with their teachers for better learning.

**Table 6. Summary of the Respondents' perception on the Mobile-based education apps in terms of the Aspects of Mobile Learning.**

Mobile-based education app	Mean	Std. Deviation	Verbal Interpretation
Device Aspect	3.47	0.22	Agree

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Learner Aspect	3.636	0.30	Strongly Agree
Social Aspect	3.80	0.24	Strongly Agree
Overall	3.64	0.25	Strongly Agree

**Legend:** 4.00 - 3.00 (Strongly Agree); 2.99 – 2.00 (Agree); 1.99 – 1.0 (Disagree); 1.00 – 0.99 (Strongly Disagree)

Table 6 presents the summary of the respondents' perception of mobile-based education apps in terms of the Aspects of Mobile Learning. It has an overall mean of 3.64 with a verbal interpretation of Strongly Agree. It means that the aspects of mobile learning in terms of the device, learner, and social aspect are highly manifested in the Mobile-based education app. The researcher crafted the Mobile-based education app carefully in terms of its contents, objectives, activities, and evaluation that are based on the subject Empowerment Technologies and addresses the learning needs of the respondents to the subject.

The respondents perceived that the mobile-based education app provides the technicality and the physical characteristics that would help them to easily access the learning material. They also perceived that the developed mobile-based education app is accurate with its lesson and helps them to achieve their intended learning outcome.

In terms of the Learner Aspects of the mobile-based education app, the student-respondents highly manifested that the application is associated to their emotional aspect and their motivation regarding its used to Empowerment Technologies subject. Thus, they perceived that the mobile-based education app would likely to improve their performance in class as reflected to the results of the written and hands-on performance.

In terms of Social Aspect, student agreed that the mobile-based education app provides interaction and cooperation processes between the teachers and learners and or among the learners themselves. The respondents perceived that the mobile-based education app can serve as a vehicle to learn the basic knowledge about Empowerment Technologies and to direct students within and outside.

As a summary, the social aspect of the mobile-based education app, which constitutes to the interactions process of the teachers and the students or among other students while using the application gained the highest mean of 3.80 with verbal interpretation of strongly agree. It is followed by the learner aspect with a mean of 3.636 with verbal interpretation of strongly agree, which caters the student's motivation regarding the use of the mobile-based education app in education. Lastly the Device aspect gained the lowest mean of 3.47 but still has a verbal interpretation of strongly agree. The mobile-based education app provided a user-friendly interface, simple enough for the students to navigate the learning material and to access the information they needed for the subject used.

Zhu et. Al, (2011) asserted that mobile gadgets can help students learn, especially when a clear educational purpose is established and the use of such devices is promoted by the teacher. As a result, its application is merely one of several ways and strategies that educators might use in the classroom. The continuous improvement of the learning material may cater the needs of the students. Thus, it makes both learners' and teachers' teaching-learning experiences more worthwhile and beneficial.

### Performances of the Respondents

**Table 7. Respondents' written performance in Empowerment Technology in the implementation of mobile-based education app.**

Written Performance Scores	Pre-test		Post-test		Verbal Interpretation
	F	%	F	%	
41-50	0	0	7	14.0	Outstanding
31-40	0	0	16	32.0	Very Satisfactory
21-30	10	20.0	24	48.0	Satisfactory
11-20	29	58.0	3	6.0	Fair
0-10	11	22.0	0	0	Need Improvement
Total	50	100.0	50	100.0	

Table 7 presents the respondents' written performance in Empowerment Technologies in the implementation of mobile-based education app. In the pre-test, the majority of the respondents got a fair performance of 11-20 score having a frequency of twenty-nine (29) or 58%. It is followed by eleven (11) or 22% written performance scores of 0-10 (need improvement) and ten (10) or 20% with written scores of 21-30 (Satisfactory).

As a result of the pre-test, most of the respondents' prior knowledge about the Empowerment Technologies subject includes the lesson ICT in the context of Global Communication, which covers and tackles about the use of ICT in communication. Respondents are familiar with the use of different social media and their focus to communication, brand exposure and advertising opportunities.

On the other hand, the respondents' fair level of knowledge falls in the learning objective about identifying the internet threats. As stated in the study of Samuel Roy (2017), students nowadays are more compelled to use their phone for

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everything. Internet is highly accessible and that everything is beyond reach through the use of different gadgets. Students are exposed to different internet threats without them realizing it.

Thus, the researcher developed a mobile-based education app which addresses the learning needs of G11 students with the subject. The mobile based education app conveys lessons and activities and was utilized to increase the academic performance of the respondents. It marks important details and information in the Empowerment Technologies subject including the definition of terms, emphasis of words, examples and video lesson which may aid the students to remember the key points of the lesson.

Samuel Roy (2017) stated that students nowadays are more compelled and familiarized with the use of mobile phones not only for games, but also for communication and learning. The use of mobile phones together with the educational application may lead to different advantages in improving the learning of students. It also bridges the communication gap between students and institutions during distance learning modalities.

In the post-test, the respondents got a 21-30 written performance score having a frequency of 24 or 48% with a verbal interpretation of satisfactory. It is followed by a written performance score of 31-40, having a frequency of 16 or 32%, with a verbal interpretation of very satisfactory. Then, it is followed by a written performance score of 41-50, having a frequency of 7 or 14%, with a verbal interpretation of Outstanding. Lastly, it is trailed by a written performance score of 11-20, having a frequency of 3 or 6% having a verbal interpretation of Fair.

It entails that there is an improvement in the academic performance of the students in Empowerment Technologies. Objectives were achieved at a given period of time. Students were familiarized with the lesson, and became more knowledgeable about the use of ICT. Identifying the internet threats in a given scenarios were learned. Learning through the empowerment Technologies subject implies the right use of devices as well as the internet in communication. Having the right knowledge to online safety, security and etiquettes lead the students to careful use of the internet as well as the information that we share online.

The Kotobee app which conveys the three modules of Empowerment Technologies emphasized the lessons they have to learn which lead to the increase in the students' written performance scores as evident in Table 9.

**Table 8. Respondents' Hands-on performance in Empowerment Technology in the implementation of mobile-based education app.**

Hands-on Performance Scores	F	%	Verbal Interpretation
17-20	13	26.0	Outstanding
13-16	28	56.0	Very Satisfactory
9-12	9	18.0	Satisfactory
5-8	0	0	Fair
0-4	0	0	Need Improvement
Total	50	100.0	

Table 8 presents the Hands-on Performance scores of the respondents in Empowerment Technologies in the implementation of mobile-based education app. As a result, majority of the respondents got a 13-16 hands-on performance scores having a frequency of 28 or 56% with verbal interpretation of Very Satisfactory. The respondents who got a 17-20 hands-on performance scores have a frequency of 13 or 26% with a verbal interpretation of Outstanding. It is followed by hands-on score group of 9-12 having a frequency of 9 or 18% with a verbal interpretation of Satisfactory.

In terms of the hands-on skills performance of the students, most of their works created a story line which shows creativeness and profound connection to the given topics. It only implies that students were able to combine their prior knowledge of using different devices to create a multimedia, as well as the gained knowledge throughout the discussions. The utilization of the mobile-based education app as a learning resource material added more information on how they can build up their performance tasks.

Students perform better when a mobile application is used as a tool to improve their technical and soft abilities. (De La Cruz, E. M., Meza, M. A. T., & Andrade-Arenas, L., 2023). Thus, mobile devices also give teachers a way to increase the effectiveness of their instruction and track the development of their students. Increased effectiveness to instruction may lead improvement of learning. (Azizi, Rassaei and Bagheri, 2020)

### Difference between the written performance of the respondents in Empowerment Technology.

**Table 9. Test of Significant Difference between Written Performance of the Respondents**

EMPOWERMENT TECHNOLOGIES	Pre-test		Post-test		t	df	Sig.(2-tailed)	Verbal Interpretation
	Mean	SD	Mean	SD				
Written Performance	17.40	6.07	32.30	7.65	-	49	.000	SIGNIFICANT
					22.974			



## Mobile-Based Education App for Improved Performance in Empowerment Technologies

Table 9 presents the difference between the pre-test and post-test written performance of the respondents. The respondents got a t-value of -22.974, which is significant at a .000 level. Hence the researcher rejected the null hypothesis. It means that there is a significant difference between the pre-test and post-test written score performance of the respondents using the mobile-based education app. (Voshaar, J., Knipp, M., Loy, T., Zimmermann, J., & Johannsen, F., 2023). Students that used the mobile education apps showed better intrinsic motivation, perceived competence and accomplishments level. Furthermore, when compared to textbooks, using the mobile-based education app predicted intrinsic motivation, which in turn predicted greater accomplishment scores (Jeno, L. M., Grytnes, J.A. & Vandik, V., 2017)

### VII. SUMMARY OF FINDINGS

The study yielded the following findings:

1. There were more females among the respondents. The parents' educational attainment was high school graduate and have an income of less than 10,000 pesos per month. Majority of the respondents have a smartphone as their available gadgets at home.
2. The aspects of mobile learning such as device aspect, learner aspect and social aspect are strongly agreed and reflected in the mobile-based education app.
3. Majority of the respondents were fair during the pre-test and showed improvement on their written performance in their post-test. In addition, majority of the respondents gained a very satisfactory result in their hands-on performance.
4. There is a significant difference between the written performance of the respondents in Empowerment Technologies before and after the implementation of mobile-based education apps.
5. The perception of the respondents in the aspects of mobile-based education app is not significantly related to their performance in Empowerment Technologies.

### VIII. CONCLUSIONS

Based on the results presented, the following conclusion is drawn.

1. The hypothesis stating that there is no significant difference between the written performance of the respondents in Empowerment Technologies before and after the implementation of mobile-based education apps, is therefore, not sustained.

### IX. RECOMMENDATIONS

Based on the study's findings and conclusions, it is suggested that the mobile-based education app may be adopted by the teachers to enhance the learning materials to further improve the students' performance and learning strategies. They may modify the material to address the learners' needs for learning. They may also use this as an intervention to assist students during modular distance learning.

Future researchers may conduct another study involving much wider population in terms of experimentation and acceptability of the material. They may also consider the views of the teachers in terms of creating and improving their own material.

Module designers may improve the content of the learning material to increase students' motivation in using the mobile-based education app in learning.

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