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Redesigned Learning Material Model in TLE:
It's Impact on the Academic Performance of Grade Eight Students

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Abstract
Active learners who utilize interactive learning materials are more likely to demonstrate positive academic success. The purpose of this quasi-experimental study was to determine the effect of the redesigned learning material in TLE on the academic performance of eighth-grade students. The study sample consisted of one hundred (100) eighth-graders from Lopez National Comprehensive High School, Lopez West District. The respondents were separated into two groups: a control group of fifty (50) learners and an experimental group of fifty (50) students. During a four-week period of modular distance learning, the control group utilized printed self-learning modules (SLM), whereas the experimental group utilized the researcher's redesigned learning material. During the pre-test, respondents in both the control and experimental groups demonstrate poor to average performance. Both the performance of the control group and the experimental group has improved. However, the experimental group has a higher post-test rating than the control group. During the fourth quarter, the experimental group also earns greater grades than the control group. The control group's pre- and post-test scores do not have significant difference, whereas the experimental group's do. The study also revealed a strong positive correlation between the post-test scores and the academic performance of respondents.

Keywords
E-learning, Distance Education, Learning Material, Technology Education, PowerPoint, Interactive

INTRODUCTION
The growing popularity of mobile devices such as smartphones and tablet computers are quietly altering students' learning habits and learning environments. As it happens, mobile learning will become a common paradigm of education within the next one to two years. Mobile learning has a number of advantages, including ease of use, adaptability, and immediacy of information intake. With their increasing capability, mobile applications can assist in the design and implementation of a variety of learning activities in a variety of environments.

Mobile learning or M-Learning is viewed as a supplement to existing remote learning methods since it liberates learners from time and boundary constraints. It is a sort of e-learning in which the learning experience is enhanced by the use of wireless and mobile technology. Heick (2018) described mobile learning as acquiring knowledge via digital devices such as smartphones, tablets, and other technical gadgets.

Students' lives are made easier by mobile technology. They no longer need to rent a computer or visit large libraries to find the answers they require. Some educational applications can be installed on mobile devices and used for better understanding and self-studying. Also, because some educational applications may be utilized offline, mobile applications can be used as a reference without requiring them to connect to the internet.

Today's smartphones have the same computing capability as desktops did just a few years ago. Now, we can utilize software packages such as Microsoft Office, Acrobat Reader, and others that were previously restricted to computers on these devices. Cellular technology has evolved to the point that it has surpassed desktop PCs.
The researcher created interactive M-learning (mobile-learning) modules with the goal of increasing active learning among secondary school students.

The author chose PowerPoint as the application for producing learning media since it is already widely used in the field of education and the learning process, and educators will have no issue developing or adapting it to new resources. While PowerPoint is typically used for presentations, it also has features for interactive multimedia learning.

Text, sound, pictures, and video can all be entered by program creators. Slides or PowerPoint pages can be customized to include buttons that users can utilize to perform PowerPoint activities.

Additionally, the PowerPoint presentation format can eliminate the user's interaction with educational media. Users can select the desired menu for the subsequent process and receive responses to issues that arise throughout its use. Additionally, users will be able to replay the material if they are unsure. The presence of this interactive multimedia will significantly benefit students and will help them develop their diverse abilities in the use of instructional media. They may adapt it to their level of comprehension and make the learning process more enjoyable, hence improving student learning outcomes.

LITERATURE REVIEW

Mobile learning has become part of education with the convenience and accessibility of mobile devices. The features allow students to learn anytime and anywhere while encouraging collaboration and interaction between teachers and students (Shi, Luo, & He, 2017). Pandemics make it more important for the Philippines to have mobile learning. In the country, more than half of the students aged 5 to 20 use smartphones for distance learning (Bernardo, 2021).

In the Philippines, Technology and Livelihood Education is included under the K to 12 program, where it will lay emphasis on the practical skills of workers for employment or entrepreneurship. TLE helps those students who do not pursue tertiary education and skill themselves to benefit families and communities (Tan, 2021). Performance tasks, which ascertain whether learners have mastered their learning in real-life settings, are the core of TLE. These tasks evolved into online activities during the pandemic (Mateo, 2020). However, maintaining student motivation remains a challenge, especially when teaching methods lack creativity (Djamarah, 2018).

Interactive PowerPoint presentations have been found to be valuable in increasing the participation and performance of students. In fact, an interactive presentation can contribute to higher scores as well as satisfaction (Sinta & Rufa, 2020). Given that PowerPoint is available at a minimal cost, it serves as a feasible material source for schools (Imkampe, 2017). Moreover, the LRMDS of DepEd ensures the quality of learning materials prepared and integrated into the system (DepEd Memorandum No. 82, s. 2017).

Mobile learning can improve learning outcomes when designed appropriately and in line with the needs of learners (Kintu et al., 2017). However, some believe that mobile learning is not academic enough or could make certain learners feel uncomfortable (Drew & Mann, 2018).

MATERIALS AND METHODS

This is a quasi-experimental research design aimed at establishing the effects of redesigned learning materials on the academic performance of Grade 8 students. Specifically, it adopted a pretest-posttest control group design in which control and experimental groups were subjected to both pre-intervention and post-intervention tests. Here, while the control group was only allowed to stay with the printed SLMs, the experimental group was provided with redesigned e-modules via the use of smartphones.

The sample consisted of 100 Grade 8 students from Lopez National Comprehensive High School, equally divided into the control group with 50 students and the experimental group consisting of 50 students, and used purposive sampling.

A pre-test was given to both groups in advance of the treatment. The experimental group used the revamped e-modules for four weeks while the control group only used the SLMs. A post-test was applied after the treatment to ascertain the effectiveness of the revamped learning material.

The tool was also subjected to three Technology and Livelihood Education experts to validate the research instrument, further perfected the e-modules. Data was also collected using Google Forms, and the rights to access the students' data were sought from the school authorities.

The data set analyzed through SPSS software involved the use of a t-test ascertaining if the difference in scores before and after the tests was statistically significant. The Pearson Correlation Coefficient was applied to find the relationship of post-test scores with academic performance.

RESULTS AND DISCUSSION

This study examined the impact of the redesigned Technology and Livelihood Education learning material model on the academic performance of eighth-grade students. The study's findings can be used as a basis for interactive e-module instructional content. Specifically, the following questions were answered:

1. What is the pretest result of Grade 8 Electrical Installation and Maintenance Students as divided into:
1.1 control group; and
1.2 experimental group?

Table 2 Pretest Scores in Electrical Installation and Maintenance of Grade 8 TLE Students

Group	Mean Score
Control Group	18.0
Experimental Group	26.2

Table 2 displays the pre-test scores in Electrical Installation and Maintenance for the control and experimental groups of 8th grade TLE students in the Lopez West District. The mean score for the control group was 18.0, while the mean score for the experimental group was 26.2.

The pre-test performance of respondents in the control and experimental groups is low to average, according to the data.

2. What is the post test result of Grade 8 Electrical Installation and Maintenance students as divided into:
2.1 control group; and
2.2 experimental group?

Table 3 Posttest Scores in Electrical Installation and Maintenance of Grade 8 TLE Students

Group	Mean Score
Control Group	19.7
Experimental Group	30.4

Table 3 reveals the post-test scores of the control and experimental groups of 8th grade TLE Electrical Installation and Maintenance students from the Lopez West District. It reveals that the mean score for the control group was 19.7, while the mean score for the experimental group was 30.4.

Consequently, both the performance of the control group and the experimental group has improved. However, the experimental group has a higher post-test rating than the control group.

3. What is the extent of academic performance of grade 8 students in TLE-EIM at the end of the quarter for control and experimental group in terms of their Grades?

Table 4 Academic Performance in Electrical Installation and Maintenance of Grade 8 TLE

Group	Mean Score
Control Group	85.2
Experimental Group	93.1

Table 4 displays the end-of-quarter academic performance in Electrical Installation and Maintenance for the control group and experimental group of eighth-grade students in the Lopez West District. It reveals that the mean score for the Control group is 85.2 while the mean score for the experimental group is 93.1.

The data shows experimental group after the intervention have higher mean score of their grades at the end of the quarter compared to the control group.

4. Is there a significant difference between the pre and post test results of students when their group is taken as factor?

Table 5 T-Test for the Significant Difference between the Pretest and Posttest Results of Grade 8 TLE

Control Group	Pretest	Posttest
Mean	18.0	19.7
Standard Deviation	7.8	8.0
Computed t	1.88	
p-Value	0.065	
Decision	Retain Ho	
Conclusion	Not Significant	
Experimental	**Pretest**	**Posttest**
Mean	26.2	30.4
Standard Deviation	8.0	5.1
Computed t	5.22	
p-Value	0.000	
Decision	Reject Ho	
Conclusion	Significant	

Table 5 displays the T-test for the significant difference between the pre- and post-test scores of the control and experimental groups of eighth-grade TLE students from Lopez West District. The Control group received a mean score of 18.0 on the pre-test and 19.7 on the post test. The pre-test standard deviation is 7.8 and the post-test standard deviation is 8.0. With a computed t of 1.88 and a p-value of 0.065, the decision is made to accept the null hypothesis with the interpretation and conclusion that it not significant. In contrast, the experimental group received a mean score of 26.2 on the pre-test and 30.4 on the post-test. Pretest standard deviation is 8.0, while posttest standard deviation is 5.1. The calculated t value is 5.22, and the p-value is 0.00, leading to the rejection of the null hypothesis and the conclusion that the result is significant.

Since the developed material is a mobile learning application, the data supports a study indicating that the benefits of mobile learning are attributable to the technological characteristics of mobile devices, such as portability, immediacy, connectivity, ubiquity, and adaptability (Shi, Luo, & He, 2017), which elements facilitate peer cooperation, knowledge acquisition, information retrieval, and increased teacher-student engagement. In addition, it supported another study by Sinta and Rufa (2020), which demonstrated that PowerPoint media produces excellent results, as evidenced by

feasibility statistics and student score analysis, which revealed that the average pre-test score for 23 students was 44.7, while the average post-test score was 80.1.

5. Is there a significant relationship between the post test results of the control and experimental group to the extent of their level of academic performance?

Table 6 Pearson r: Significant Relationship between the Academic Performance of the Respondents and the Posttest Results

Academic Performance					
Group	Pearson Coefficient	Interpretation	p-value	Decision	Remarks
Control Group	0.6618	Strong Positive Correlation	0.000	Reject Ho	Significant
Experimental Group	0.5650	Strong Positive Correlation	0.000	Reject Ho	Significant

Note: "If p value is less than or equal to the level of significance (0.05) reject Ho, otherwise failed to reject Ho."

The correlation between the academic performance of respondents and their post-test scores is illustrated in Table 6.

The Pearson coefficient for the control group is 0.6618 with a verbal interpretation of a strong positive correlation and a p value of 0.000, which leads to the decision to reject the null hypothesis with the concluding comment that it is significant.

The experimental group has a Pearson coefficient of 0.5650, indicating a strong positive correlation, and a p-value of 0.000, leading to the rejection of the null hypothesis with the conclusion that it is significant.

The data supports Pechenkina et al. (2017), who found a favorable association between mobile learning and academic achievement in their study. In addition, a study by Djamarah (2018) indicates that students' lack of motivation affects their academic performance. So, in comparison to printed self-learning modules, the interactive learning material has a good effect on academic achievement, as shown by the data collected.

CONCLUSION

In the light of the findings of the study, the following conclusions were drawn:

1. Both the control and experimental groups performed poorly to average on the provided pretest. It is determined that both groups have limited prior understanding of the topic.
2. After the posttest, the performance of both the control and experimental groups has improved, but it is clear that the experimental group's scores are significantly higher than those of the control group. It concludes that the experimental group's performance is positively affected by the redesigned learning materials.
3. The experimental group's academic performance is relatively superior to that of the control group. This indicates that students who utilized the learning material were more likely to complete and submit assignments and activities assigned by their teachers than those who did not use the mobile learning application.
4. There is no significant difference in the results of the pre- and post-tests for the control group, whereas there is for the experimental group. This indicates that students who utilize the mobile learning application acquire more subject matter knowledge than those who do not use the program and rely solely on printed self-learning modules.
5. There is a significant correlation between the posttest results of the control group and the experimental group and each group's academic success. Since post test results and academic performance are positively correlated, the fact that the experimental group's post-test scores increased relative to those of the control group demonstrates that the redesigned mobile learning material has a positive effect on the academic performance of its users.

FUNDING INFORMATION

DECLARATION OF CONFLICT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

REFERENCES

1. Alalwan, N., Al-Rahmi, W. M., Alfarraj, O., Alzahrani, A., Yahaya, N., & Al-Rahmi, A. M. (2019). Integrated three theories to develop a model of factors affecting students' academic performance in higher education. *IEEE Access*, *7*, 98725-98742. doi:10.1109/access.2019.2928142
2. Alqahtani, A. Y., & Rajkhan, A. A. (2020). E-learning critical success factors during the COVID-19 pandemic: A comprehensive analysis of E-learning managerial perspectives. *Education Sciences*, *10*(9), 216. doi:10.3390/educsci10090216
3. Arthur-Nyarko, E., Agyei, D. D., & Armah, J. K. (2020). Digitizing distance learning materials: Measuring students' readiness and intended challenges. *Education and Information Technologies*, *25*(4), 2987-3002. doi:10.1007/s10639-019-10060-y
4. Ayuyang, R. R. (2019). Interactive learning (iLEARN) tool. *Proceedings of the 2019 5th International Conference on Computing and Artificial Intelligence - ICCAI '19*. doi:10.1145/3330482.3330507

5. Bernardo, J. (2021, March 2). More than half of enrolled students use devices for distance learning: SWS. Retrieved from https://news.abs-cbn.com/news/03/02/21/more-than-half-of-enrolled-students-use-devices-for-distance-learning-sws

6. Chee, K. N., Yahaya, N., & Ibrahim, N. H. (2017). Effectiveness of mobile learning application in improving reading skills in Chinese language and towards post-attitudes. *International Journal of Mobile Learning and Organisation*, *11*(3), 210. doi:10.1504/ijmlo.2017.085347

7. Fajar, J. T. (2020, April 8). *Daftar Sektor Industri Yang Terdampak COVID-19, APA Saja?*. Retrieved from https://economy.okezone.com/read/2020/04/08/320/2196153/daftar-sektor-industri-yang-terdampak-covid-19-apa-saja

8. Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of quasi-experimental research designs in education research: Growth, promise, and challenges. *Review of Research in Education*, *44*(1), 218-243. doi:10.3102/0091732x20903302

9. Gravetter, F. J., & Forzano, L. B. (2018). *Research methods for the behavioral sciences*. Cengage Learning.

10. IKADEMIYA Mentors. (2021, September 8). *Technology and livelihood education for secondary teacher examinees*. Retrieved March 12, 2022, from https://courses.ikademiya.ph/courses/technology-and-livelihood-education-for-secondary-teacher-examinees/

11. Imkampe, J. (2017, November 17). Self-directed learning with PowerPoint: Visually appealing and cost effective – CAST PHARMA. Retrieved from https://www.cast-pharma.com/self-directed-learning-powerpoint-visually-appealing-cost-effective/

12. Irawan. (2020, March 23). *Inovasi Pendidikan Sebagai Antisipasi Penyebaran COVID-19*. Retrieved from https://ombudsman.go.id/artikel/r/artikel--inovasi-pendidikan-sebagai-antisipasi-penyebaran-covid-19

13. Kirschner, P. A., Park, B., Malone, S., & Jarodzka, H. (2017). Toward a cognitive theory of multimedia assessment (CTMMA). *Learning, Design, and Technology*, 1-23. doi:10.1007/978-3-319-17727-4_53-1

14. Kumar Basak, S., Wotto, M., & Bélanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. *E-Learning and Digital Media*, *15*(4), 191-216. doi:10.1177/2042753018785180

15. Legamia. Jr., B. P., & Akiate, Y. W. (2020). The contribution of online resources to fostering digital learning and effective teaching. *Universal Journal of Educational Research*, *8*(11), 5660-5669. doi:10.13189/ujer.2020.081170

16. LR Portal. (n.d.). Retrieved from https://lrmds.deped.gov.ph/about

17. Mateo, J. (2020, October 12). Written works, performance tasks: Here's how students will be graded this school year. Retrieved from https://www.onenews.ph/articles/written-works-performance-tasks-here-s-how-students-will-be-graded-this-school-year

18. Mayer, R. E., & Fiorella, L. (2021). *The Cambridge handbook of multimedia learning*. Cambridge University Press.

19. Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, *38*(1), 43-52. doi:10.1207/s15326985ep3801_6

20. McTighe, J. (2017, July 14). What is a performance task? (Part 1). Retrieved from https://blog.performancetask.com/what-is-a-performance-task-part-1-9fa0d99ead3b

21. Ng, S. F., Azlan, M. A., Kamal, A. N., & Manion, A. (2020). A quasi-experiment on using guided mobile learning interventions in ESL classrooms: Time use and academic performance. *Education and Information Technologies*, *25*(6), 4699-4719. doi:10.1007/s10639-020-10191-7

22. Prabowo, A., Anggoro, R. P., Adiyanto, R., & Rahmawati, U. (2018). Interactive multimedia-based teaching material for trigonometry. *Journal of Physics: Conference Series*, *1097*, 012138. doi:10.1088/1742-6596/1097/1/012138

23. Roy, S. (2017, August 26). *5 benefits of using mobile apps in education*. Retrieved from https://elearningindustry.com/mobile-apps-in-education-5-benefits

24. Shi, Z., Luo, G., & He, L. (2017). Mobile-assisted language learning using We Chat instant messaging. *International Journal of Emerging Technologies in Learning (iJET)*, *12*(02), 16. doi:10.3991/ijet.v12i02.6681

25. Tan, M. C. (2021, April 2). Retrieved from https://www.journalajarr.com/index.php/AJARR/article/download/30369/56982/