

Mobile E- Module in Teaching Shielded Metal Arc Welding 8 819

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Abstract

This study determines the effectiveness of using the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 on the performance of Thirty-Six (36) Grade 8 – Courageous Students of Buenavista Integrated National High School, in the Third Grading Period of School Year 2021 – 2022.

Specifically, the researcher sought to answer the following questions, (1) What are the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its: (1.1) accessibility; (1.2) usability; (1.3) aesthetic value; and (1.4) suitability? (2) What is the level of student's performance as to the result of their formative test in Shielded Metal Arc Welding 8? and (3) Do the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 has a significant effect on the student's performance in Shielded Metal Arc Welding 8.

The researcher used a quantitative approach with an Experimental Research Design since the researcher chose his Grade 8 Student for the Third Quarter of School Year 2021-2022 to test the effectiveness of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8.

The findings of the study of the features of the Mobile E-Module in teaching Shielded Metal Arc Welding 8 in terms of accessibility is very high which means that the E-Module is accessible, in terms of usability it is very high which states that it is usable, in terms of its aesthetic value it is very high that gives it an impression that is feasible to the eye of the user and in terms of suitability it is also very high which indicate the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 is suited to be used in distance learning.

The student's performance based on the result of their formative test in Shielded Metal Arc Welding 8 obtained an outstanding performance. The mean indicates that the performance of the students on the formative test was outstanding. This means that on average the students' performance was beyond high expected performance.

Lastly, To identify if the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 have a significant effect on the student's performance in Shielded Metal Arc Welding 8. Its usability and suitability obtained a lower p-value which indicates that these two features have a significant effect on students' performance in the formative test. Nevertheless, the p-value gained by accessibility and aesthetic value both suggested that these features have no significant effect on students' performance in the formative test. This meant that accessibility and aesthetic value do not influence the result of their formative test. This indicates that the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 have a partial effect on the student's performance.

Keywords: E-Module; Shielded Metal Arc Welding; Mobile Learning

1. Main text

Introduction

Information and Communication Technology plays a vital role in the field of education in acquiring new learning. Technology integration in education has been deemed effective in addressing a diversity of learners across learning areas. Developed and developing countries alike have embraced the positive effect of technology in enhancing the cognitive abilities of both students and academe.

At this time globally, where we are struck by the COVID - 19 pandemic. We people are connected from a distance. The progress of technology makes it easy for most people to cope with the new normal that we have today. The use of Personal Computers, Tablets, and Mobile Phones has been maximized especially in the field of communication, business and education.

Academically, we have some challenges that we face because of the current situation we have today, but this will not stop learning. Learning is a continuous process,

As learning materials are a concern, we have modules, e-assessment, presentations, and instructive videos that will cope with the needs of our learners based on the needed competencies.

During the declaration of academic freeze because of the pandemic last March 15, 2020, DepEd is finding ways how to continue education in the Philippines, the former academic school year starting from June was moved. During this duration virtual seminars and training were conducted, one of the skills thought was how to digitize the hard copy modules that we are currently using and make them functional on tablets and mobile phones. Various platforms such as Android Studio, Kotobee, and Kodular were used to make the e-book we are using will be feasible for the learners. The researcher uses the Kodular platform which the researcher finds easier to use but basic HTML knowledge is needed to be guided while doing it.

Digitizing the modules will not only help the students but will also help the school to lessen the expenses of producing printed materials, It will be portable, accessible, cost-efficient, and will prepare the learners for whatever platform of learning that will be introduced in the future while following the safety protocols while studying.

The main concern of the study was to test the effectiveness of the Mobile E – Module in Teaching Shielded Metal Arc Welding 8 on the Grade 8 Students of Buenavista Integrated National High School, as an innovation on the existing materials and aid the distance learning that we face today.

Statement of the Problem

The study aimed to determine the effectiveness of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 on the Grade 8 Students of Buenavista Integrated National High School, Magdalena Laguna.

Specifically, the study sought answers to the following questions:

1. What are the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its:
 - 1.1 accessibility;
 - 1.2 usability;
 - 1.3 aesthetic value; and
 - 1.4 suitability?
2. What is the level of student's performance as to the result of their formative test in Shielded Metal Arc Welding 8?
3. Do the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 has a significant effect on the student's performance in Shielded Metal Arc Welding 8.

Results and Discussion

Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8

This aims to assess the features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8. Like other Mobile Applications, before it is marketed test runs were conducted and commonly beta versions are released. Reviews from the users were gathered to know what are the changes and development needed to address the user's needs. This will also tell its distinct attributes of it and if additional features are necessary to make it effective and acceptable.

Table 1. Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its accessibility.

STATEMENT	Mean	SD	Remarks
The accessibility of the Mobile E-Module ...			
can make the user navigate and browse the content of it anytime, anywhere.	4.83	0.38	Strongly Agree
is free from glitches or bugs.	4.92	0.28	Strongly Agree
ensures FULL ACCESS once downloaded or share with the device	4.81	0.40	Strongly Agree
can be installed on devices such as Android Phones, Tablets, and PCs.	4.75	0.44	Strongly Agree
can be shared via a third-party application like SHAREIT and other related apps.	4.92	0.28	Strongly Agree
Grand Mean	4.84		Strongly Agree
Interpretation		Very High	

Presented in the above table were the very high-level features of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its accessibility denoted by the grand (M=4.84). This means that students were able to access the mobile e-module easily.

The students strongly agree that the mobile e-module is free from glitches or bugs and can be shared via a third-party application like SHAREIT and other related apps, it gained the highest (M=4.19, SD=0.99). Similarly,

In the statement, if it can be installed on devices such as Android Phones, Tablets, and PCs, it obtained the lowest (M=4.75, SD=0.40). This implies that some students have a hard time installing it on their devices since not all devices have the same features, specifications, limitations, and procedures on how they can be used on them. The data shown above tells that the students affirm that enjoyment and fascination in exploring different topics in the self-learning module boost their interest to learn.

The result above tells that with the advancement of technology after eLearning came into being. The next development was mLearning, where students receive their learning materials on their mobile devices (LYNCH, 2019).

Table 2. Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its accessibility with regards to its usability.

STATEMENT	Mean	SD	Remarks
The usability of the Mobile E-Module ...			
provides a user-friendly interface.	4.86	0.35	Strongly Agree
had pages are properly linked to each other.	4.86	0.35	Strongly Agree
navigation is simple.	4.86	0.35	Strongly Agree
navigations are clickable and active.	4.86	0.35	Strongly Agree
It can be used as a tool for instruction.	4.72	0.45	Strongly Agree
Grand Mean	4.83		Strongly Agree
Interpretation		Very High	

Considering the usability of the Mobile E-Module in Teaching Shielding Metal Arc Welding 8. The researcher found out upon the result of the conducted survey that it is usable and got an interpretation of Strongly Agree ($M=4.83$).

The students strongly agree that it provides a user-friendly interface, had pages properly linked to each other, navigation is simple, and navigations are clickable and active ($M = 4.86$, $SD = 0.35$).

In regards to its usability, if it can be used as a tool for instruction, it obtained the lowest ($M = 4.72$, $SD = 0.45$). Some students prefer more graphically oriented APPS where it can be on par with the mobile games that they are using. Still the overall result of its usability is Very High. Since its interface is the same as flipped e-books and watt pads which this generation of learners is more familiar to.

As Kumar et al., (2018) mentioned that usability is one of the determinants for successful technology adoption. Adoption refers to the user's intention of using the new system. The decision to adopt the technology depends on the degree users feel the system is usable and will improve work performance.

As also concluded by Hence Ishaq, et al., (2020). These usability characteristics help to evaluate the quality of certain products.

Espanol (2016) cited Orfanou et al., (2015), perceived usability as it greatly affects student's effective learning and overall learning experience, and thus is an important requirement of educational development. The word "usability" is usually synonymous with the functionality of the system for the user. Also, the usability of a material is defined as something that can be used by a specific group of people to carry out specific objectives in an effective way with efficiency and satisfaction. This means that the developed Mobile E-Module in Teaching Shielding Metal Arc Welding 8 was useful for the students.

Table 3. Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its aesthetic value.

STATEMENT	Mean	SD	Remarks
The aesthetic value of the Mobile E-Module....			
utilizes icons and colors that were appealing to the user.	4.61	0.49	Strongly Agree
contains icons that were easily identified.	4.69	0.47	Strongly Agree
has observed balance and is readable to the user.	4.61	0.49	Strongly Agree
has a template that is appealing to the user.	4.64	0.49	Strongly Agree
contains pictures that are more visible, clear, and understandable to the user	4.75	0.44	Strongly Agree
Grand Mean	4.66		Strongly Agree
Interpretation		Very High	

Viewed from the above findings the features of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its aesthetics is that it is Very High and denoted by the grand mean ($M=4.66$). This means that students were satisfied with the looks of the Mobile E-Module.

The students strongly agree that the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 contains pictures that are more visible, clear, and understandable to the user, it gained the highest ($M=4.75$, $SD=0.44$). Probably this indicator is because of the recent experiences of the class in regards to printed modules since most pictures were in black and white and misprints do happen.

The lowest indicator was if it utilizes icons and colors that were appealing to the user and has observed balance and is readable to the user ($M = 4.61$, $SD = 0.49$). Since most of us have a preferred look on the type of mobile app that we are using, the researcher made the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 design simple as possible. Few fonts and colors are used to maintain a balanced and harmonious look. Maybe what is pleasing the app developer is not to the user.

As Zainuddin et al., (2020). cited that although aesthetics is a word that is not so popular among the

public, it is an important element that can influence people's attraction. The aesthetic in mobile interface design is extremely challenging. The fast technology growth of mobile learning interface design is a key factor driving researchers and designers to incorporate the technology into a key element of designing mobile interfaces. The design principles considered should be balanced, in sequence, rhythm, order, and complexity.

Hence also Pinchot (2020) mentioned that aesthetics and graphic design principles are also an important part of UX (User Experience) design and should be leveraged to create a pleasing layout and convey clarity of information.

But rest assured that this will be noted and further improvements will be made in the future if it will be fully implemented for all of our grade 8 learners.

Table 4. Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its accessibility with regards to its suitability.

STATEMENT	Mean	SD	Remarks
The suitability of the Mobile E-Module...			
fits the user's needs in this time of the pandemic.	4.83	0.38	Strongly Agree
can be an alternative to Printed Modules which we can save time, money, and manpower.	4.83	0.38	Strongly Agree
helps prevent the spread of communicable diseases since face-to-face contact is not necessary to access the lessons.	4.78	0.42	Strongly Agree
addresses the knowledge and skills, especially in the use of technology.	4.83	0.38	Strongly Agree
prepares the learner to adapt to the blended type of learning environment.	4.92	0.28	Strongly Agree
Grand Mean	4.84		Strongly Agree
Interpretation	Very High		

It can be gleaned in table 4 that the features of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its suitability show that the learners strongly agree with the Mobile APP. Based on the result, it has a grand mean of 4.84 and a standard deviation of 4.84.

This means that Mobile E-Module in Teaching Shielded Metal Arc Welding 8 is suitable to use in this pandemic and distance learning.

The learners *strongly agree* that Mobile E-Module in Teaching Shielded Metal Arc Welding 8 can prepare the learner to adapt to the blended type of learning environment. It gained the highest weighted mean of 4.92 and a standard deviation of 0.28.

As a result, some suitable learning methods have emerged not only to take advantage of available resources and time but also to improve teaching and learning processes (Reimers, and Marmolejo 2022). Instructional modules take an essential role to stimulate students' learnings experience and are effective in the adaption of the student's knowledge suited to their level (Guido, 2014).

Researchers increasingly use technological advancements emerging from learning analytics to support digital education, whereas a surprisingly big interest has the global community for adaptive learning in the online educational systems. That means learning does not have to be restrained in the classroom (Matzavela et al., 2021).

Level of the Students' Performance

Table 5. Level of Students' Performance as to the result of their Formative Test in Shielded Metal Arc Welding 8

Grading Scale	Frequency	Percentage	Descriptors
90 – 100	33	92%	Outstanding
85 – 89	3	8%	Very Satisfactory
80 – 84	0	0	Satisfactory
75 – 79	0	0	Fairly Satisfactory
Below 75	0	0	Did Not Meet Expectations
Mean	94.65	Interpretation	Outstanding

Table 5 presents the student's performance based on the result of their formative test in Shielded Metal Arc Welding 8. It can be seen that 33 out of 36 or 92 percent of the students obtained an outstanding performance and 3 out of 36 or 8 percent of the students got a very satisfactory performance. The mean of 94.65 indicates that the performance of the students on the formative test was *outstanding*. This means that on average the students' performance was beyond high expected performance.

Significant Effect of Features of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 on Student's Performance

Minitab 14 was used in computing the data gathered and treated them statistically using Analysis of Variance. The computed p-values were compared to the level of significance at 0.05 to determine the significant effect of features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 on student's performance as to formative test.

Table 8. Significant Effect of Features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 on Student's Performance as to Formative Test

<i>Variables</i>		<i>t-value</i>	<i>p-value</i>	<i>Analysis</i>
Accessibility	<i>Formative Test</i>	1.25	0.222	Not Significant
Usability		2.31	0.028	Significant
Aesthetic Value		1.07	0.294	Not Significant
Suitability		3.21	0.003	Significant

**significant at .05 level of significance*

Table 8 presents the effect of features of mobile e-module on student's performance as to formative test.

It can be gleaned that the features of mobile e-module with regards to its usability gained p-value (0.028) and suitability obtained p-value (0.003) which was lower than 0.05 level of significance denoted a *significant effect* on student's performance as to formative test. This implies that the usability and suitability of the module as rated by the students showed an impact on their performances in the formative test. Nevertheless, the p-value gained by accessibility (0.222) and aesthetic value (0.294) were both higher than the 0.05 level of significance which suggested that these features have *no significant effect* on students' performance in the formative test. This meant that students' evaluations of the accessibility and aesthetic value do not influence the result of their formative test. This indicates that the null hypothesis is partially not accepted.

The result of the study implies that though it will help the students in studying distant learning and will assist schools in implementing blending learning, changing the platform of learning has an impact on the students. From a traditional pen and paper to a digital format such as e-modules and using mobile learning. Several factors still need to be considered in doing this. Such as by making it usable, suitable for the students, accessible, and considering its aesthetic value or the design of the platform that we will be using.

As mentioned by Lawas (2016), that usefulness was the quality of having utility and especially practical worth or applicability. This means that having a material accessible doesn't mean that it is usable. Having pieces of information in the palm of your hand because of the mobile devices that we have ensures that users perform tasks in convenient ways (Mkpojiogu, 2018).

Based on the result of the study that the usability and suitability features of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 have a significant effect on the student's performance in the Formative Test.

As stated by Aisha Yabquob, et al (2015) that, the accessibility of learning tools must be a priority as well as a prerequisite for the developers of learning applications so that all students will benefit equally. Due to the security features of recent mobile phones, the digitized module made by the researcher was not easily recognized by the learner's mobile phone making them doubtful if they will install it on their phones or not. Its aesthetic value, as mentioned by Pinchot (2020) that design should be leveraged to create a pleasing layout and convey clarity of information. The mentioned authors above emphasize that accessibility and aesthetic value must be considered in digitizing traditional modules. The result of the study shows that these two features don't have a significant effect on the student's performance in the Formative Test. The researcher suggests that various improvements will be made before it will be fully used at the higher level.

Conclusion

Based on the findings of the study, the following conclusion was obtained.

The features of Mobile E-Module in Teaching Shielded Metal Arc Welding 8 with regards to its accessibility, usability, aesthetic value, and suitability are very high. Its accessible, usable, visually feasible to the user, and suitable to use in distance learning.

The learners got an outstanding performance in pertains to its formative test. Making the said Mobile E-Module greatly helps the students while taking the subject.

The result indicates that the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 has a partial significant effect on the student's performance. Therefore the research hypothesis is partially not accepted.

Recommendation

In the light of the foregoing findings and conclusions, the following recommendations are respectfully endorsed.

The researcher suggests that to have better accessibility of the Mobile E-Module in Teaching Shielded Metal Arc Welding 8 it must be yearly updated to cope with the kind of devices that the users are using. Since the application is not downloaded in google playstore and other related sites it is recognizable as a virus or malware on high-end mobile phones. Due to the security features of some recent mobile phones, some learners have a delay in accessing them.

In terms of its Aesthetic Value, the researcher recommends having an expert or group of graphic designers that are specialists in designing Mobile Applications. They will be a great help in improving the looks and the kind of platform design intended for mobile learning.

The researcher suggests that the future researcher will modify the assessment part of the Mobile Application. Online assessment can be used like Google forms, Quizzzy, and other related assessment platforms that be integrated into Mobile phones.

Aside from kodular site, the researcher recommends that the future will look for easier platforms and applications that will digitize not only Technology and Livelihood subjects but also the Self-Learning Modules that we are using in the Department of Education.

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References

- Aisha, Y. A., Nawaz, K., Harjinder, R., (2015), DAEL Framework: A New Adaptive E-learning Framework for Students with Dyslexia, *Procedia Computer Science*, Volume 51, 2015, Pages 1947-1956, ISSN 1877-0509,
- Español, R.N. (2016). *Mathematics Workbook for Grade 7 Students of Magdalena National High School. Masters Thesis. Laguna State Polytechnic University, Sta.Cruz Laguna.*
- Lawas, M. H. (2016). *E-Modules in Home Economics for Edukasyong Pantahanan at Pangkabuhayan (E.P.P)4 Masters Thesis. Laguna State Polytechnic University, Sta.Cruz Laguna.*
- Lynch, M., (2019) THE DIFFERENCE BETWEEN MOBILE LEARNING AND ELEARNING. <https://www.thetechadvocate.org/the-difference-between-mobile-learning-and-elearning/>
- Kumar, B, A., and Mohite, P., "Usability of mobile learning applications: a systematic literature review." *Journal of Computers in Education* 5.1 (2018): 1-17.
- Guido, R.M.D., (2014). Evaluation of Modular Teaching Approach in Materials Science and Engineering. *American Journal of Educational Research* 2.11 (2014):1126-130.
- Ishaq, K., Rosdi, F., Mat Zin, N. A., and Abid, A., (2020). "Usability and design issues of mobile assisted language learning application." *International Journal of Advanced Computer Science and Applications* 11, no. 6
- Matzavela, V, and Alepis, E., (2021). "M-learning in the COVID-19 era: physical vs digital class." *Education and Information Technologies* 26.6 (2021): 7183-7203
- Mkpojiogu, E. O., Hussain, A., and Hassan, F., (2018). "A systematic review of usability quality attributes for the evaluation of mobile learning applications for children." *AIP Conference Proceedings*. Vol. 2016. No. 1. AIP Publishing LLC.
- Orfanou, K., Tselios, N., and Katsanos, C., (2015). "Perceived usability evaluation of learning management systems: Empirical evaluation of the System Usability Scale." *The International Review of Research in Open and Distributed Learning* 16, no. 2 227 - 246.
- Pinchot, J., (2020). "USER EXPERIENCE (UX) DESIGN CONCEPTS FOR MOBILE APP DEVELOPMENT COURSES..." *Issues in Information Systems* 21.4
- Reimers, F.M., and Marmolejo, F. J., (2022). *University and School Collaborations During a Pandemic: Sustaining Educational Opportunity and Reinventing Education*. Springer Nature
- Zainuddin, N. F. F., Bakar, Z. A., and Noor, N.M.M., (2020). A RESEARCH OF AESTHETIC MOBILE LEARNING INTERFACES FOR PRIMARY EDUCATION. *International Journal of Advanced Science and Technology*, 29 (6s), 823 - 833.