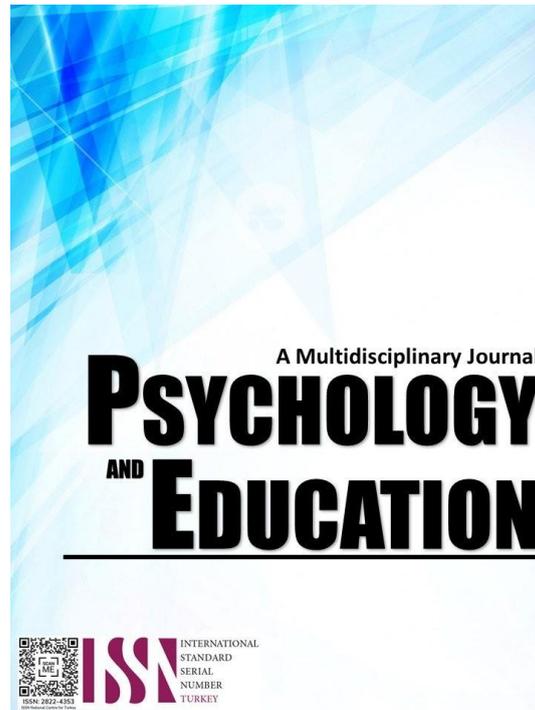


**ELECTRONIC LEARNING ACTIVITY SHEETS
(E- LAS): ITS EFFECT ON THE ACADEMIC
PERFORMANCE AND ATTITUDE OF
GRADE 10 SCIENCE STUDENTS**



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Electronic Learning Activity Sheets (e-LAS): Its Effect on the Academic Performance and Attitude of Grade 10 Science Students

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Abstract

This research study was conducted to investigate the effects of Learning Activity Sheets (ELAS) on the Academic Performance and Attitude of Grade 10 Science Students. This study was conducted at Silae National High School, District X of Malaybalay City Division for school year 2022-2023. Electronic Learning Activity Sheets every lesson of the five modules were made by the researchers with the following parts, namely; Objectives, Presentation of the Lesson, Practice Exercises and Evaluation. It is an electronic instructional material that aids in facilitating the lessons in the class. In this study, a quasi-experimental pretest-posttest research design was used. The participants of the study were sixty-one grade 10 students as experimental and controlled group. The researchers made electronic learning activity sheets in every lesson of the five modules of the third quarter identified as least mastered competencies during the 2022 Basic Education Learning Assessment (BELA). The developed lessons and the 30-item academic performance test in Science were evaluated and assessed by the panel of experts. Final material was made base from the suggestions and recommendations of the experts. An attitude scale adopted from Directo was modified and used to assess the attitude of students toward Science using electronic learning activity sheets. To determine the validity and reliability of the instrument, pilot testing was done in Grade 11 classes of Silae National High School with Cronbach-alpha of 0.863. The data were treated with the mean, standard deviation and one-way analysis of covariance (ANCOVA) at 0.028 level of significance. The findings of the study showed that the post-test of the experimental group is outstanding compared with that of the control group which was very satisfactory. Moreover, the study reveals that there is a significant difference in the academic performance between students taught with ELAS and of students taught with conventional teaching approach. The study also reveal that the experimental group had very high positive attitude toward science subject. Based on the result, it can be concluded that the use of electronic learning activity sheets to improve the academic performance and attitude of students is effective.

Keywords: *academic performance, attitude, electronic learning activity sheets, science*

Introduction

Face to face classes of students and teachers within the school has been deferred due to the pandemic. This epidemic has firmly covered the operation of Modular Distance Learning as an immediate reaction to ensure educational continuity. The Philippines is now transitioning to the new normal form of education, and educators' ongoing innovations, as well as the active engagement of other stakeholders, are the driving forces behind its success (Sabayon, 2020). According to Kellogg et al (2011), teaching is not enough to master the core subject and be equipped with critical thinking, communication, collaboration, and creativity to accommodate the needs of 21st century skills. The key factor in improving the academic performance is an atmosphere of free, open, democratic, and positive learning. Student's worksheets that accommodate this can be used to enhance creativity in science today. Students are motivated during the learning process, help think flexibly, do not control excessively, and collaborate with creative people (Santrock, 2009)

long time. In modern time, worksheets have even become a strong part of curriculum in various nations. Teachers apply the worksheets in order to improve their studies, support and enhance Active Learning, levitate pupils' interest in math or evaluate them. A wide variety of studies have shown positive effects on students' achievement in the field of learning through good design of worksheets (Lee, 2014).

In order to ensure that learning opportunities are provided to learners in a safe and secure manner, using different learning methods, the policy of DepEd Order No. 18 of 2020 aims to establish guidelines enabling the Department of Education to provide learning resources and implement the Basic Education Learning Continuity Plan, BELCEP, to ensure that learning opportunities are provided to learners in a safe and secure manner, using different learning methods. The Learning Activities Sheets have been included in the modules and are used to assess the level of knowledge attained by learners during the course (D.O. #18, s.2020)

Worksheets have been used in teaching practices for a

Using electronic learning activity sheets (LAS) as supplemental learning resources for students is one

method for sustaining the teaching and learning process today. The LAS has been involved in online activities to foster learning environments, which measure the understanding of learners so they can adapt or carry out what they have learnt. While concentrating on an activity sheet, a teacher may monitor the pupils who have already received this information and those who are unable to do so. The sheet is one of the training materials used to improve teachers' abilities and that plays an important role in learning process effectiveness. The role of the teacher is reduced to that of a facilitator rather than a primary source of learning in the case of LAS based on scientific principles.

Bringing about a desirable change in the behavior of study is an important aspect of good teaching. In order to achieve the objectives of the lesson, the teacher uses teaching strategies. This results in more difficult and challenging teaching because there are various methods and techniques for different students' abilities and behavior.

Attitude toward science is not only a byproduct of teaching, but it can also be a significant outcome in and of itself (Osborne et al., 2003). Student achievement and gains in content knowledge can also be statistically related to attitudes toward science (Bybee & Mc Care, 2011; Newell, Zientek, Tharp, Vogt, & Moreno, 2015), which may have a direct or indirect effect on students' engagement, motivation, or persistence with academic study of science. In addition, attitude is an essential factor for learning scientific concepts and the application of them in everyday life. When students have good attitudes toward the topic, they are willing to engage in scientific activities and learn.

During an assessment of Basic Education Learning conducted SY 2021-2022 the researchers observed students' low levels of achievement in Science 10 at Silae National High School. Aside from conventional way of teaching, learning at recent needs instructional materials and technology to empower students by giving them chances of using gadgets to make education more applicable to their digital lives. Checking emails and text messages, updating social media status, submitting reports online, and having a video chat can be done by a simple hand-held device by simply manipulating its feature. The way in which the world communicates seems to have been altered by technology (Lamanauskas, 2011).

With this in mind, the researchers would like to investigate whether the electronic Learning Activity

Sheets are of great help in improving the academic performance of students for a better teaching-learning experience that could be utilized by all types of learners. It is on this juncture that the researchers engaged in this research endeavor to purposely looking into how effective of utilizing electronic Learning Activity Sheets to improve the academic performance of students in our school.

Research Questions

This study determined the effects of Electronic Learning Activity Sheets (e-LAS) on the academic performance and attitude of Grade 10 Science students. The study was conducted at Silae National High School, school year 2022-2023. Specifically, the study answered the following questions:

1. What is the academic performance of students in Science taught with and without Electronic Learning Activity Sheets (e-LAS)?
2. What is the attitude of Grade 10 students toward learning Science who are taught with Electronic Learning Activity Sheets?
3. Is there a significant difference in the academic performance of students in Science with and without Electronic Learning Activity Sheets?

Innovation, Intervention and Strategy

The study tried to test the effectiveness of electronic learning activity sheets for Grade 10 Science students. This aimed to explore, and experience the trends in Science and focused on developing methods and strategies that can be used to develop electronic learning activity sheets. To produce quality graduates as the primary concern of the Department of Education, it encouraged teachers to innovate contextualize and localize materials useful to our learners. As stated in DepEd Order No. 43 s. 2013, also known as the "Enhanced Basic Education Act of 2013", Section 10.2 Article(d) and (h) "the curriculum shall be contextualized, global and flexible enough to enable and allow schools to localize and indigenize, and enhance the same based on their respective educational and social contexts."

The Electronic Learner Activity Sheet (E-LAS) used in this study was created using Adobe Acrobat DC. Converting virtually any document into PDF format while preserving the look and content of your original is a vital tool for viewing documents in PDF format. Not only do Adobe Acrobats have the features of Adobe Reader, but you can use them in a lot more



ways than just creating and editing text and images for PDF documents.

The ELAS made has seven features. These are heading, objective, presentation of the lesson, practice exercises, evaluation, references, and name of authors. The heading consisted of the learner's name, grade and section and the date. The objective was based on the Most Essential Learning Competencies (MELC) with specific code. In the presentation of the lesson, it was specific, clear and complete so that the learners will fully understand the lesson. The practice exercises were composed of drills, puzzles, and other activities that were adopted or developed localized and contextualized by the teacher. The evaluation part was consisted of 10-15 item multiple choice test. References was added to serve as guide for students to know the source of the lesson and for advance reading and research. The last part was the names of the authors.

The teacher used the ELAS as an enrichment component of the lesson. These served as enhancement activity to further develop the learning. This also assessed the mastery of the learners about the lesson. It was also given as an assignment. The learners were given a copy of the ELAS through the group chat as a link, or through Bluetooth sharing. When the students were finished and they have access in the internet, they sent it to their teacher's email address. If the students don't have internet access, they submitted it to their teacher through Bluetooth sharing. The teacher then checked it and gave feedback to the learners.

The model of Gerald Leigh in YouTube (2021) was the basis in developing the learning activity sheets. It consists of the following features; Objectives, Presentation of the Lesson, Practice Exercises, and Evaluation. Phase I is the Design and Development which include preparation stage, writing objectives, development of the student activities, and writing the lessons materials. Phase II is the validation stage which included the validation of the learning activity sheets by experts of the subject, revision base from suggestions from experts and finalization of the materials to be utilized by the subjects of the study.

One of the experts was the School ICT coordinator, who evaluated the usage of technology in teaching and learning process. Another expert is highly intellectual and dedicated teacher, master in the content who is handling higher Science subject. Nevertheless, an expert English teacher who can greatly help in the language used. Suggestions from the panel of experts were accepted and given due considerations. These

greatly helped in the development of the study.

The electronic learning activity sheets were developed from the following lessons: Reproductive and Endocrine System, Feedback Mechanism in the Female Reproductive System, Nervous System: The Control System of the Body, Protein Synthesis, and Mutation. These topics are part of the K to 12 Curriculum.

The evaluators were provided with evaluation checklist and set of criteria for the rating of instructional material which was adopted from Alberto (1986) and revised by the researcher to fulfil the aim of the study. The following criteria was examined by the experts: Content and content accuracy, clarity and appropriateness of materials. The responses were analysed through the use of mean. The scoring guide for rating the developed lessons will be shown as follows, suggestions and comments are also considered in the revision of the lesson.

The lessons in the Electronic Learning Activity Sheets were validated by the experts that includes content and content accuracy, clarity of the materials, and appropriateness of the instructional materials. The comments of the panel of experts on the content and content accuracy was used to emphasize and clarify few concepts relating to the lessons to cover in-depth details and examples with the curriculum standards.

The comments of the panel of experts on the clarity of instruction was used to emphasize the clarity of instruction in the learning activity sheets. This is to ensure that instructions can easily be understood, hence the learners answered the given activity accurately.

Rating of the panel of experts was necessary to check whether the lessons are well developed and substantial in shaping the students into active participants of the teaching and learning process. The instructional materials developed was properly validated its appropriateness to the level of the learners.

To test the effectiveness of this strategy, the students were given time frame to work individually using their cellular phones, interact with classmates and teachers virtually or sharing the app by pair. This application developed also their skills in ICT, enhanced their attitude toward the subject and their independence in learning Science concepts.



Methodology

Participants and/or Other Sources of Data and Information

The study was conducted at Silae National High School, Purok 3, Silae, Malaybalay City, Bukidnon. The school is the pioneering public secondary school in District X, Malaybalay City Division and was founded in 1995.

The participants of the study were the intact classes of Grade 10 of Silae National High School which had an average of 30 students per section. There were two groups in this study, one section had given learning modules while the other section had learning modules with electronic learning activity sheets. The Grade 10 students were chosen because they are the learners who will take Basic Education Learning Assessment (BELA) or National Achievement Test (NAT).

Table 1. *Number of Participants*

<i>Grade And Section</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Grade 10- Onyx	15	15	30
Grade 10- Aquamarine	17	14	31
Total	32	28	61

In the Implementation of the study, reliability testing was applied. Fifty (50) test items were made and subjected for reliability test through Cronbach Alpha. Pilot testing was administered to the Grade 11 students after the conduct of reliability test. Quasi experimental research design was used in this study using purposive sampling in which one section was the controlled group while the other served as experimental group.

In the implementation of the study, they were given pre-test before the conduct of the lesson. In this design, the answer of the students in the pre-test determined prior knowledge of learners in Science subject. At the end of lessons, the post test score of the two groups were compared and analysed.

Data Gathering Procedure

In this study, Quasi experimental research design was used by means of purposive sampling which involved two groups. One section was the control group while the other was the experimental group. The researchers employed pre-test before the conduct of the lesson and post –test at the end of the lessons. An innovation used

which is the electronic learning activity sheets as part of the instruction served as the independent variable of the study. The dependent variables were the academic performance of students in science subject and their attitudes toward learning the subject.

The academic performance test and survey questionnaire were the instruments used in this study. The test was based on the five topics and activities which are least mastered competencies. Pre-test and post-test questions were the same but found in varying item number. The researchers made fifty (50) questions subjected to pilot testing. Cronbach alpha WITH A VALUE OF 0.863 was used to identify the most reliable items. From fifty (50) questions in multiple choice, it was trimmed down to thirty (30) test items based on the least mastered learning competencies during the 2022 Basic Education Learning Assessment (BELA) set by Malaybalay City Division of the Department of Education. The topics included Reproductive and Endocrine System, Feedback Mechanism in the Female Reproductive System, Nervous System: The Control System of the Body, Protein Synthesis, and Mutation. These topics were part of the K to 12 Curriculum. The Table of Specifications (TOS) with the following cognitive process: remembering, understanding, applying, analysing, evaluating and creating was the basis in the construction of the academic assessment.

The academic performance test was validated by a senior high school science teacher of Silae National High School who is expert in the subject for the checking of the content. An English teacher served as grammarian for the accuracy of the language use. Comments and suggestions from the panel of experts were accepted for the final printing of the test. The academic performance of the students was measured using the following scales below. The highest possible score is thirty (30) since every correct answer was given one (1) point.

Prior to the conduct of the study, a letter of permission was sent to the school principal for the conduct of the study. The study proposed the use of electronic learning activity sheets for Grade 10 Science in the third quarter. The five developed lessons had varied competencies based from the Most Essential Learning Competencies (MELC) administered during the conduct of the study. The lesson was supported with lesson plan reflecting the electronic learning activity sheets prepared by the researcher.

With the permission given by school head, the study was conducted following the flow chart as shown



below. The two classes of Grade 10 namely: G10-Onyx and Grade 10- Aquamarine has the following Science schedules respectively 7:30 am- 8:30 am and 9:45 am-10:45 am. As shown in the flow chart, the conduct of the study started with an orientation to the participants of the study. Consequently, administering the pre-test to the classes of Grade 10 students followed. The pre- test of the students was checked and recorded.

After the pre-test, the Electronic Learning Activity Sheets was presented to the students of Grade 10-Onyx covering five lessons based from the least mastered competencies in science during the BELA. Grade 10-Aquamarine served as the control group in which conventional teaching took place. Lessons was taken from the third quarter of the school year.

After the topics were all presented, the post-test was administered to the Science 10 students of the two sections in order to determine the academic performance of the students. The outcome of the post test was logged and compared with the results in pre-test to see if there is a difference in knowledge gain by the two sections about the topics.

Ethical Issues

With proper protocol, the researchers asked permission from the office of the school head of Silae National High School and the office of the Schools Division Superintendent of the Division of Malaybalay City. Parental consent was obtained from the participants before the conduct of the study. This was to inform them regarding the purpose of the study, the benefits that the students gained as participants of the study, and assured them of the safety and confidentiality of the students and the data used are purely for research purposes. The researchers ensured that participants of the study were not pressured nor coerced, no discrimination in any form during the conduct of the study.

Data Analysis Plan

Appropriate statistical tools were used in the treatment of data. These data were analysed.

For problems 1 and 2, the mean and standard deviation (SD) were used to assess the academic performance and to identify the attitude of Grade 10 students who were presented and taught with and without Electronic Learning Activity Sheets (ELAS).

For Problem 3, Analysis of Covariance (ANCOVA) was used to identify the significant difference in the academic performance of students in Science with and

without Electronic Learning Activity Sheets.

Results

The study showed a significant difference in the pupil's educational performance between students who had been taught with eLearning Activity sheets and those who did not. Analysis of covariance (ANCOVA) was utilized to determine the level of performance of students when exposed and not exposed to electronic learning activity sheets. The independent variable was the kind of intervention (taught/exposed with ELAS) while the dependent variables were the measure of the academic achievement and attitude of students in Science determined after the study was completed. The students' pre-test and post-test means, standard deviations and overall mean are shown in Table 2.

Table 2. Academic Performance of Grade 10 Students in Science

Level of Proficiency	Range of Scores	Control Group				Experimental Group			
		Pre-Test		Post-Test		Pre-Test		Post-Test	
		F	%	F	%	F	%	F	%
Outstanding	28-30	0	0	0	0	0	0	14	46.66
Very Satisfactory	25-27	0	0	14	46.66	0	0	6	20.00
Satisfactory	22-24	0	0	7	23.33	0	0	4	13.33
Fairly Satisfactory	18-21	0	0	9	30.00	0	0	3	10.00
Did Not Meet Expectations	0-17	31	100	1	3.33	30	100	3	10.00
Mean of Scores	9.55	23.42		9.07		25.37			
SD	2.88	2.94		2.51		4.67			
Proficiency Level	Did not meet the Expectation	Satisfactory		Did not meet the Expectation		Very Satisfactory			

The pre-test scores show that before the conduct of the study, the mean of the control group is 9.55 and experimental group obtained a mean of 9.07. Both groups did not meet expectation. After the conduct of the study, the mean increased to 23.42 for the control group and 25.37 for the experimental group. The control group reached satisfactory while the experimental group improved to Very satisfactory. This means that learners have few knowledge and skills and need to be enhanced by exposing themselves to gadgets with more learning engagements. Furthermore, interventions or strategies were needed to improve the academic performance of the students.

The learners struggle with knowledge, skills and



understanding and have not acquired or developed to aid understanding prior to the conduct of the study. When e-LAS were integrated in the lessons for the third quarter of Science 10, it was found out that the learners of the control group had developed the fundamental core understanding in terms of knowledge, skills and understanding, and transfer them automatically through authentic performance task. However, the experimental group had developed the fundamental core requirements in terms of knowledge, skills, and understanding, and transfer them automatically through authentic performance task. It was revealed that the experimental group had greater post-test results than the control group. Although both groups have obtained an increase in the post-test scores, their standard deviations indicated that the control group had highly concentrated scores than the experimental group. This implies that the distribution of scores by the learners for the experimental group showed more scatter as compared with the control group since majority got outstanding and only few are very satisfactory.

In addition, the findings show that both groups increased their mean scores in the test, but it is the experimental group where students have greater gains. The results can be justified by the effect of integrating e-LAS in the learning process. It was observed that students had different levels in terms of using ICT. Students who were less exposed to gadgets had difficulty in following the offline activities in the e-LAS, others were moderately knowledgeable and able to follow the steps in exploring the learning activity sheets. Those advanced had the capacity to explore more on the features of the applications. In addition, they became tutors to their classmates in performing the given activities.

The mean scores indicate that interactive teacher method was the most efficient teaching method followed by student-centered method and teachers' approach, which were least effective as regards teaching methods. A typical learning environment with a presentation from the course teacher accompanied by a lecture neither promotes learners' participation nor build the required level of reasoning among students. When students are involved in solving the problem during their classroom activities, they will have a better understanding of key concepts. (Ganyaupfu, 2013).

The results indicate that students' performance on practical tasks related to skills acquisition is improved as a result of the envisaged instruments. In each experiment group, average results improved despite

the very low participation rates that affected all of them (De-Marcos, et al., 2014). Moreover, results show that mobile learning has a significant impact on students' academic success and conversation skills (Elfeky et. al., 2016). With regard to the results achieved, eLearning has had a positive influence on high school students' performance in learning. Conclusion: Traditional learning can cost a lot, it's difficult to do and the results may be different. E-learning offers an alternative that can be used more rapidly, at a lower cost and possibly with greater efficiency. There is a need to implement eLearning and make it easily accessible for all (Suresh, et. al., 2018). Additionally, statistically significant increases in the scores on measured variables, knowledge and creativity have been detected for the experimental group from data analysis using an independent t=sample test conducted by SPSS. It was concluded that eLearning is an efficient way of acquiring knowledge and creativity between students from the chemical sector, which should be made available to further audiences through larger range of educational opportunities (Sarikhani, 2016). The study demonstrated that eLearning allows students to make time available for their studies, and is motivating them to pursue their own work without the help of others. The fact that students were comfortable using the Internet was also a result of this (Salamat, et.al., 2018). Higher student performance and the effectiveness of teaching practices can be achieved by more use of e Learning materials and tools within an educational context (Alenezi, 2020).

The statistical treatment used to determine the significant difference in the academic performance between students taught with e-LAS and without e-LAS was one-way ANCOVA at 0.05 level of significance. The summary of results is shown in Table 3.

Table 3. ANCOVA Summary of the Comparison of the Academic Performance of Grade 10 Learners in Science

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	519.716(a)	2	259.858	49.521	.000
Intercept	1974.370	1	1974.370	376.256	.000
Pretest	47.826	1	47.826	9.114	.004
Group	496.696	1	496.696	94.655	.000
Error	304.350	58	5.247		
Total	34912.000	61			
Corrected Total	824.066	60			

a R Squared = .631 (Adjusted R Squared = .618)

The results of the analysis of covariance in the post



test revealed that there is a significant difference between the two adjusted means, with p-value of 0.000. Since the p-value is less than 0.05 the data shows that there is a significant difference between the academic performance of the students who used electronic learning activity sheets and those who did not use.

The significant difference in the academic performance between students exposed to e-LAS and students taught using the K to 12 Learning Modules indicated that the students from the experimental group developed the fundamental core requirements in terms of knowledge, skills, and understanding, and transfer them automatically through authentic performance task.

The results proved and established statistical support that electronic learning activity sheets has significant effect on the academic performance of science students. Based from observation in the classroom setting, the control group had more learning experiences through exploration in the features of the e-LAS. They were interactive and provided with meaningful learning experiences. Hence, they were suited to learn more when exposed to gadgets. On the contrary, conventional way of teaching provides less exposure of students to gadgets and became less effective in recent generation.

“Constructivist learning theory shows that students learn easily when they have mental hooks upon which to hang new ideas. These hooks, of course, consist of previously-grasped concepts; making connections between these concepts enable them to apply the newly learned in formation in real life situation” (Weyls, 2008). Previous knowledge is connected to present activities for the learners to investigate new ideas. Results confirm a relationship between students' age, occupation and technology use in general, and between technology use and increased self-perceived confidence in digital competence in the distance language learning mode in particular.

Overall, students recognize that information and communication technology can have a positive effect on their learning as well as expecting education to be valuable in the future (Arrosagaray, et al., 2019).

Activity sheets provide independent learning in the classroom. “Students learn best when they are given a chance to interact with the learning materials and to explore it” (worksheetlibrary.com). Making use of the electronic learning activity sheets which can be offline is a great way to reinforce students' understanding about the lessons. Furthermore, it is a tool teacher can

use to enable students to gain an understanding of the student's previous knowledge, results and learning processes while helping them monitor progress in their education as reported by Chedi Lee (2014).

Attitude Toward Learning Science of Grade 10 Students

The data in Table 4 shows the Attitude toward learning Science of Grade 10 students in the experimental group only after the conduct of the study. It consists of 34 items representing 5 dimensions. The 5 dimensions include: Self- Efficacy, Active Learning Strategies, Science Learning Value, Performance Goal and Learning Environment Stimulation. Results presents that after the conduct of the study, the participants in the experimental group possessed very good attitude toward learning Science from the attitude to learn scale.

Table 4. Attitude to Learn Science of the Experimental Group

Attitude Dimension	Experimental		
Self- Efficacy	X	sd	QS
Self- Efficacy	4.32	0.71	Very Good
Active Learning Strategies	4.16	0.64	Very Good
Science Learning Value	4.56	0.5	Very Good
Performance Goal	4.08	0.63	Very Good
Learning Environment Stimulation	4.16	0.64	Very Good
Overall	4.25	0.62	Very Good

The overall mean of students' responses was 4.25 which is high and the standard deviation was 0.62 showing homogeneity in the distribution of the responses. Furthermore, each item in the five dimensions of Attitude to Learn Science was taken into consideration to have a more comprehensive discussion of the results. The lowest mean was 4.08 under Performance Goal and the highest mean was 4.32 on Self- Efficacy.

The table results revealed that learners have a positive attitude toward learning science in all dimensions. However, performance goal had the lowest mean while self-learning value was the highest.

Dimension 1 (Self-Efficacy) shows the mean, standard deviation, and students self- efficacy toward learning science using electronic learning activity sheet. Tabular data reveals that the experimental group possessed very high positive attitude, it shows that students had self-esteem and confidence in science class. Students value themselves and persevere no

matter how difficult is the topic in science.

The data shows that students who were taught using electronic learning activity sheets were self-driven to learn. They were confident, exerted more efforts and being independent to learn. Furthermore, they have positive outlook toward learning science subject.

According to Kaymakci (2012) in Karadeniz Technical University in Turkey, one of the most significant materials to reach educational objectives is a worksheet or activity sheet. It'll help students understand more and be inspired to have a higher self-esteem in the study of science.

Dimension 2 (Active Learning Strategies) shows the mean, standard deviation, and active learning strategies of students who used electronic learning activity sheets. Active learning strategies were ways and means practiced by students just to understand science concepts. It further shows that the overall mean is 4.16 and standard deviation of 0.64.

The data implies that the experimental group had more active learning strategies in science subject. With the use of electronic learning activity sheets, students became extrovert who discussed the concepts with the teacher and students to clarify their understanding about science concepts. Moreover, they find more connections to bridge the learning gap.

Dimension 3 (Science Learning Value) presents the mean, standard deviation and learning value of students toward the science subject taught with electronic learning activity sheets. The overall mean in this dimension is 4.56 and the standard deviation is 0.5.

The data shows that learners in the experimental group had high positive attitude with regards to valuing of science concepts. Students discovered the importance of learning science. With the knowledge they acquire from the subject, they can use it in their daily activities. In addition, the set of activities in the given learning activity sheets stimulates their thinking and satisfied their learning curiosity.

A person's behaviour and choices when confronted with tasks are determined more by his beliefs and personal experiences rather than by his knowledge of specific tasks (Pilippou & Christou, 1998). When students build positive attitude toward the subject, they are more interested, motivated, and they enjoy in the given activities. Hence, they become more interested and excel in the subject.

The fourth dimension of learners' attitude toward learning science is performance goal. Performance goal was the target set by the learners to achieve greater performance in the subject. The data reveals that there were six parts that are very high positive attitude and three parts with high positive attitude. The mean in this dimension is 4.08 and standard deviation of 0.63.

The data shows that students who were taught with electronic learning activity sheets were goal oriented. They were the learners with higher set of standard.

The fifth dimension is Learning Environment Stimulation. Students are actively engaged if they are stimulated by varied teaching strategies where students are actively engaged in class activities.

This study revealed that using Electronic Learning Activity Sheets can greatly help in the improvement of the academic performance of students over conventional way of teaching. These instructional materials are useful specially on the following topics of Science 10: Reproductive and Endocrine System, Feedback Mechanism in the Female Reproductive System, Nervous System: The Control System of the Body, Protein Synthesis, and Mutation. The results were supported by Chu & Chen (2000), who claimed that Computer Assisted Instruction had significantly better effect than Traditional Instruction on Cognitive learning. Consequently, Mayer (1997) asserts that with the use of multimedia learning, learner must build connections between verbal and virtual representations, this will help learners create a representation of the concept leading to a better understanding of the concepts presented.

According to Kellog et al. (2011), teaching is not enough to master the core subject and be equipped with critical thinking, communication, collaboration and creativity to accommodate the needs of century skills. In addition, the use of student worksheets that can accommodate a free, open, democratic and positive learning atmosphere can enhance creativity to learners (Hu et al., Suyidno et al., 2019). Furthermore, behavioural intention to use E-learning is influenced by perceived usefulness and self-efficacy. Regarding student's attitudes, self-paced, teacher-led, and multimedia instructions are major factors to affect student's attitudes toward e-learning as an effective learning tool (Naghavi, 2023). eLearning becomes a more suitable environment for millions of students as Internet enables communication irrespective of distance, enabling all kinds of information required in the education process, including exam and evaluation

systems, to be transmitted without delay (Bertea, 2009). Students feel that teachers use technology in the classroom is vital for their overall life success, and they report being able to enjoy using it as part of teamwork. When students are in groups and working on assignments, they become more familiar with the subject matter, in particular when the teacher allows the content to be delivered via PowerPoints Google Slides or by making a movie (Hoffmann, et al., 2018).

The study's findings are supported by previous research in which students who learned academic subjects using learning activity sheets performed significantly better than those students using conventional approach. This proves that Multimedia Learning by Mayer (1998) is effective in improving student's academic performance. Moreover, the results also revealed that experimental group have positive attitude toward their learning in science. Since the students possessed very good attitude toward science, ELAS could motivate the students to learn and engage more in learning the subject.

Discussion

Millennial learners are creative and multitasking. As teachers, we should cope-up with the trends of education that the learners have. Teachers are no longer the main source of knowledge but facilitator of learning who provides ICT-based activities to make the lessons more interesting to the learners. As much as possible, teachers are millennials also who get away from conventional way of teaching. We need to be equipped with 21st century skills to cope-up with the expectations of our learners. Hence, electronic learning activity sheets is one of the instructional materials to the millennial learners need in order for learning to become more meaningful and enjoyable.

Conclusion

Based on the findings of the study, the following conclusions are drawn: The result of the study revealed that the academic performance of the students had significant increase when exposed electronic learning activity sheets. They could transfer their knowledge in real life situation. The developed lessons could enhance the academic performance of the students. The Electronic Learning Activity Sheets could help develop positive attitude among students to learn science concepts. It will eliminate the stigma that science is a boring subject. Moreover, Electronic

Learning Activity Sheets can also be used in other subject areas to enhance the academic performance of the students. Administrators can encourage other teachers to use e-LAS in their classes for effective learning to happen.

The following are the recommendations drawn from the study: First, Electronic Learning Activity Sheets could be used in teaching other subjects for enhancing the academic performance of the learners. Second, teachers can design electronic learning activity sheets on other subjects to develop positive attitude of students toward learning the subject. Aside from that, administrators and science teachers may encourage other teachers to create innovations similar to electronic learning activity sheets. In this way, students have variety of learning experiences other than conventional method. In addition, a similar study could be made to determine the effectivity of electronic learning activity sheets as instructional material with other subjects in the K to 12 Curriculum. Lastly, a similar study could be made to determine the effects of learning activity sheets on the attitude of learners toward other subjects.

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