# Experiential Learning Approach: Its Effects on the Academic Performance and Motivation to Learn Physics of Grade 10 Students

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***Abstract***- This study explored the effects of Experiential Learning Approach on the academic performance and motivation to learn physics of grade 10 students. This was conducted at Kinawe National High School (KNHS) during the school year 2016-2017. The study determined the significant difference in the academic performance between the students taught with the experiential learning approach and those taught with the conventional method.

This study employed the quasi-experimental pretest-posttest control group design with two intact groups who were randomly chosen to constitute the experimental and the control groups.. An adopted motivation scale administered to the experimental group was used to assess the level of motivation of students taught with experiential learning approach.. The statistical tools used were the mean, standard deviation and Analysis of Covariance (ANCOVA) at the 0.05 level of significance.

The findings of this study revealed that there was a significant difference in the academic performance between the students taught with experiential learning approach and the students taught with the conventional method. The students taught with experiential learning approach had meaningful and significant learning experiences using the stages of the experiential learning approach.

***Index Terms***- Experiential Learning, Conventional Method, Motivation to Learn

## I. Introduction

The science education has continuously been searching for new and effective strategies in teaching in order to develop their competencies needed for their success. One of the approaches that meets this criterion is the experiential learning approach.

Experiential learning is referred to as learning through action, learning by doing, learning through experience, and learning through discovery and exploration. Dewey contends that in order for education to be progressive there has to be an experiential component to the lesson. He argues that by focusing only on content, the teacher eliminates the opportunity for students to develop their own opinions of concepts based on interaction with the information. Dewey said that not all experiences "are genuinely or equally educative" · He further suggests that in progressive education, the quality of the experience is essential. He also maintains that in order for education to be progressive, there must be a solid philosophy that privileges experiences that are "fruitful and creative"[3] and that enhance subsequent learning experiences.

Experiential Learning is an approach in teaching which offers the learners the opportunity to acquire skills and knowledge through first hand experiences, reflect upon those experiences and transform it to functional experiences in daily life situations. The classroom or laboratory can serve as a venue for experiential learning through embedded activities, problem based studies, guided inquiry simulation, experiments or art projects (Wurdinger and Carlson, 2010).

An existing problem in Kinawe National High School (KNHS) is the low academic performance of the students in Science in all Grade levels. The National Achievement Test results in the past years and the students' grade earned in the science subjects were consistently low despite the conduct of intense review sessions. There is a need for a teaching approach that would offer more meaningful learning experiences to the students in order to address the existing problem on low academic performance in physics.

Experiential learning approach encourages different activities where students can reflect, develop knowledge –and apply what they learn to a new situation in their daily life. It is about learning which depends on the basic skills and accomplishing or acting on more complicated skills in the future. The teaching-learning time can be extended to include off school learning activities and experiences which eventually are being reflected in the transfer of learning tasks into products and performances that constitute the constructed knowledge and skills out of these activities and experiences.

This study aims to find the answer to the following questions:
1. What is the academic performance in physics of Grade 10 students taught with the experiential learning approach and those students taught with the conventional method?
2. Is there a significant difference in the academic performance in physics between those students taught with the experiential learning approach and those taught with the conventional method?
3. What is the motivation to learn physics among students who were taught with experiential learning approach?

## II. Research Design

The study used a quasi- experimental non equivalence, comparison pretest, posttest research design. This design was used

to investigate the effects of experiential learning approach on the academic performance in physics of the grade 10 students. The study used two heterogeneous intact classes respectively the experimental group and the control group. The experimental group was taught the experiential learning approach, while the control group with the conventional method (lecture method) using the K to 12 learning material for grade 10 science.

A pre-test was administered to both experimental and the control group using the researcher made validated test. The pre-test served as the covariate of the study for both groups and was compared and treated as the independent variable of the study. The pre-test post-test results of the two groups were compared using ANCOVA at 0.05 level of significance in order to control for the possible existence of extraneous variable that could cause variation between the experimental and control- groups.

## III. Research Locale

This study was conducted at Kinawe National High School (KNHS) Kinawe, Libona, Bukidnon with a total students population of 547 in S.Y. 2O16-2017 . The school also has its Senior High School with two sections. The teachers handling subjects in the junior high school (Grade 7-10) were trained in the K to 12 Curriculum-. Some of the teachers as well in the junior high school were trained in the senior high school program. Teachers were assigned to teach in wtheir own specializations except for some who were assigned to teach other subjects.

## IV. Participants of the Study:

The participants of this study are the two intact heterogeneous classes of grade 10 students at Kinawe National High School for S.Y.2016-2017. These two classes were assigned as the experimental group and control group respectively. Out of the students in both groups, 30 select students from the experimental group were paired with another 30 students in the control group based on their grades in physics during the first grading period. The purpose is to have a control over probable intervening variables in the conduct of the study. Hence, the study used the static group comparison method.

## V. The Research Instruments

### A. Academic Performance in Physics

The research instrument used in this study is a 30 item multiple choice researcher made academic performance test in Physics. The topics included are categorized as follows: The Law of reflection, images in plane mirrors, reflection in spherical mirrors, images formed by concave mirrors and images formed by convex This was patterned from the K to 12 Curriculum Guide of the Department of Education. The lessons developed was guided by the Task Analysis Matrix (TAM). For proper distribution of topics, a Table of Specification served as guide in the construction of the test. The performance domains are: Remembering, Understanding, Applying, Analyzing, Evaluating and Creating.

### B Motivation to Learn Physics

The motivation to learn physics of the grade 10 students were assessed based on their responses to the 25 indicators of Science Motivation Questionaire 11 (SMQ) (Shawn M.,Glynn,.Koballa, 2011). The motivation questionnaire was divided into five categories namely intrinsic motivation, self efficacy motivation, self determination motivation, grade and career motivation.

*Academic Performance of Grade 10 Students in Physics*

The results from the pre-test and post-test of the experimental and the control groups are presented, analyzed and interpreted using their frequency, mean scores, standard deviations, frequency percentage and qualitative descriptions. These are shown in table 1.

As shown in the table, the pretest mean scores of the grade 10 students in the experimental group and the control group differed only by 1.07. The difference in their mean scores in the pretest implies the comparable skills of the two classes before the study was conducted.

The standard deviation of the experimental group in the pretest was a little bit higher than the standard deviation of the control group. This means that the scores in the pretest of the experimental group were more scattered compared to the scores of the control group. This signifies the heterogeneity of the students in the two classes.

Table 1
Performance of Grade 10 Students in Physics

| Level of Performance | Range of Scores | Experimental Group | | | | Control Group | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Pretest | | Posttest | | Pretest | | Posttest | |
| | | f | % | f | % | f | % | f | % |
| O | 28-30 | 0 | 0 | 1 | 3.33 | 0 | 0 | 0 | 0 |
| VS | 25-27 | 0 | 0 | 5 | 16.67 | 0 | 0 | 0 | 0 |
| S | 22-24 | 0 | 0 | 8 | 26.67 | 0 | 0 | 7 | 23.33 |
| FS | 19-21 | 0 | 0 | 3 | 10 | 0 | 0 | 6 | 20 |
| DNME | 0-18 | 30 | 100 | 13 | 43.33 | 30 | 100 | 17 | 56.67 |
| X | | 4.70 | | 18.87 | | 5.77 | | 16.40 | |
| s.d. | | 2.98 | | 5.41 | | 2.75 | | 4.27 | |

Legend: X – Mean; SD – Standard deviation

The result further shows that the students in the experimental and control groups were on the lowest performance level (Did not meet expectations) in the pre-test. As shown in their low mean scores, the students' low level of performance in the pretest is an indication that the students in both groups struggles with their understanding with the prerequisite fundamental knowledge and skills about the topics on reflection in plane and curved mirrors before the conduct of the study.

The results further show that both groups are on the lowest proficiency level in the posttest. The students belonging to the satisfactory level for both experimental and the control group are almost the same which means that scores are clustered on this level. It further suggest that the students have developed the fundamental knowledge, skills and core understanding on reflection in mirrors with little guidance from the teacher or with assistance from peers and they can transfer these understanding through authentic performance tasks. However, the students taught with the Experiential Learning Approach obtained a higher mean score than the mean score obtained by the students taught with the conventional method which suggests that the approach can improve the academic performance of students in physics.

In addition, the data on the table show that the students' individual mean scores differs in experimental and control groups. There is 3.33% in the experimental group who belongs to the outstanding level which suggest that this student has exceeded the core requirements in terms of knowledge, skills and understanding and can transfer them automatically and flexibly through authentic task with the use of experiential learning approach. On the very satisfactory level there were 16.67% in the experimental group while there is none in the control group. These students on this performance level which all comes from the experimental group has developed the fundamental knowledge, skills and core understanding on reflection in plane mirrors and can transfer them independently through authentic performance tasks.. The biggest number of students who did not meet expectations comes from the control group with 56.56% while 43.33% comes from the experimental group. This means that these students still struggles with understanding prerequisite and fundamental knowledge and skills on reflection in mirrors and lessons have not been acquired or developed adequately to aid understanding. This might be because most of the students are still adjusting to the use of experiential learning approach since this is new to them. The stages of experiential learning approach also requires more time for the students to fully immersed themselves in the experiences for the lesson and take full ownership of their learnings.

In addition, there were fewer students in the experimental group who were in the lowest performance level compared to the control group. This denotes a difference in the academic performance of students in physics using experiential learning approach and with those taught with the conventional method in favor of the experimental group

Moreover, it was observed that the experimental group taught with experiential learning approach obtained a greater mean difference between the pretest and the posttest than the control group who were taught with the conventional method. The mean of both the experimental and the control groups both increase, but the experimental group had higher increase compared to the control group.

This result shows that the academic performance of students taught with experiential learning approach is greater compared to the academic performance of students taught with the conventional method. This implies that using experiential learning approach contributed to the improvement in the academic performance of students in physics.

The findings of the present study collaborates with the findings of (Taludjog, 2016), (Abonyi & Okoli 2014) which revealed that the academic performance of students taught with experiential learning approach is higher compared with those who are taught with the conventional method, Furthermore, the study conducted by Spect & Sandlin using experiential learning approach revealed no significant difference in the short term learning and which indicates that the key difference in the two learning methods used is the students' retention of the concepts over time and when concepts are retained, this will become part of day to day living.

According to Dewey (1938); Enfield (2001), the educator must create an atmosphere in which the experiences are reflected upon by the learner so they become meaningful. Experiential learning approach will help the learners to have in depth investigation of their new learning to boost their curiosity and make ways to better understand the things they do not know. The teaching learning time can be extended beyond the four corners of the classroom so that these experiences will become meaningful. As described by Kolb (1984) and Enfield (2001), the experiential model components include the students exploring, doing or performing an activity. According to Carlson & Maxa, (1998) the conceptualization phase in experiential learning helps the learner deepen and broaden their understanding of a concept or situation by cementing their experience through generalizations and applications.

*Comparison on the Academic Performance of Students in Physics*

The summary of ANCOVA results for the comparison on the performance of students taught with the experiential learning approach is presented in Table 2. ANCOVA was used as a statistical tool in the comparison of the academic performance of the students since a pretest was given to serve as covariate of the study.

Table 2
Comparison on the Performance of Students Using ANCOVA

| Source | Type 111 Sum of Square | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 149.385 | 2 | 74.693 | 2.863 | .065 |
| Intercept | 3573.307 | 1 | 3573.307 | 136.955 | .000 |
| Pretest | 65.369 | 1 | 65.369 | 2.505 | .119 |
| Group | 115.714 | 1 | 115.714 | 4.435 | .040 |
| Error | 1487.198 | 57 | 26.091 | | |
| Total | 20187.000 | 60 | | | |
| Corrected Total | 1636.583 | 59 | | | |

- Significant at 0.05 level

The data in the table reveal that the group test obtained a p value of 0.040 which is less than the significance level of 0.05 ; hence, the null hypothesis which states that there is no significant difference in the academic performance in physics between those students taught with the experiential learning approach and those students taught with the conventional method was rejected.This result shows evidence the findings of Abonyi & Okoli (2014) that experiential learning is a more effective strategy than the conventional method in enhancing the academic achievement of students.. This result was supported by the study of Taludjog (2016) who also investigated the effectiveness of Experiential Learning Approach on the academic performance and motivation to learn physics of the students.

Furthermore, the results of this study is also strengthened by the study conducted by Doring (2016) on his study on the comparison of game based learning with the conventional method. Game based learning is a form of experiential learning which also offers the students first hand learning experiences similar to experiential learning approach. The results of his study showed a significant difference in the academic performance of students taught with game based learning and those taught with the conventional method.

Results revealed that the academic performance of the grade 9 students taught with the experiential learning approach is higher compared with those who are taught with the conventional method. According to Newman (1992), student involvement and participation promotes a sense of commitment like to concentrate attention and enjoyment. This is supported by the idea of Bretz (2001) that meaningful learning occurs when students are provided with enjoyable experiences that require students to connect their knowledge across the cognitive, affective and psychomotor domains.

The researcher also observed that the students showed less participation during teacher's discussion, but preferred to do more work putting their involvement in performing the activities following the stages of the experiential learning approach. This is supported by Danielson's (2014) claim that when students are provided with learning tasks that would allow them to understand through hands on activities, they often take initiative to modify a learning task to make it more meaningful or relevant to their needs

This claim by Danielson is further strengthened by the responses of the students on the prompts given to them. When they were asked to give the difference between the conventional method of teaching and the experiential learning approach, the responses are " Nakalahi ang experiential learning sa usual way of teaching or conventional method tungod kay sa experience mas enjoyable kay nay mga butang nga nalipay ka sa experience ug maka tuon", "It differes in the way that the new approach let the students to learn with just the teacher only facilitating , guiding and correcting the things that the students have done if it is wrong"' "It is more challenging and Exciting", " It helps you to think deeper", " It teaches us to learn on what we really experience and allows us to use what we've learned to daily life".

These responses from the students strongly supports the statement of Wurdinger (2005) that the "outcomes of the learning process are varied and often unpredictable" and "learners play a critical role in assessing their own learning". The observation also agrees with the claim of Isaacs, Carrol and Bell (2001) that teaching learning process is more productive when learners are actively involved in the activities in order to find meaning and connect their learned concepts and skills to the next level of learning.

## VI. Motivation to Learn Physics of Grade 10 Students

Motivation questionnaire was given to the students taught with experiential learning approach, The questionnaire is divided into 5 dimensions and each has 5 items. The 5 dimensions are: Intrinsic Motivation, Self Efficacy, Self Determination, Grade Motivation, and Career Motivation. Students gave their responses as either Strongly Agree (SA), Agree (A), Uncertain (U), disagree (D), and Strongly Disagree (SA). Table 3 presents the summary of mean and standard deviation for each dimension of motivation to learn Physics.

Table 3: Summary of Motivation to Learn Reflection in Mirrors of Grade 10 Students.

| Categories | Mean | S.D. | Motivation Level |
|---|---|---|---|
| Intrinsic Motivation | 4.39 | 0.72 | Very High |
| Careeer Motivation | 4.33 | 0.74 | Very High |
| Grade Motivation | 4.28 | 0.93 | Very High |
| Self Efficacy | 4.06 | 0.95 | High |
| Self Determination | 4.05 | 0.82 | High |
| Average | 4.22 | 0.83 | Very High |

As seen in Table 3, the students' motivation to learn reflection in mirrors is very high. Students got the very high mean in intrinsic motivation, career motivation and grade motivation while self determination and self efficacy belongs to high motivation level.. As indicated by the results , students had a very high intrinsic motivation, career motivation and grade motivation by using the experiential learning approach. Looking at the results, students are intrinsically motivated with the use of experiential learning approach.

## VII. Conclusions

1. The academic performance of students in the experimental group has improved compared with the control group even if most of the groups had overall did not meet expectations. This is evidence by the distribution of the profile in the posttest of both groups.
2. There is significant difference in the academic performance in physics of grade 10 students taught with experiential learning approach compared to the control group, thus, the activities in the stages of experiential learning approach can help improve the academic performance of students in physics.
3. Students taught with experiential learning approach have very high motivation, hence they are encouraged or driven to study using experiential learning approach.

## VIII. Recommendations

Based on the outcomes and implications of the study, the following are recommended:

1. Science teachers are encouraged to use experiential learning approach In teaching concepts and developing skills to provide students with more meaningful learning and obtain better academic performance.
2. School administrators and DepEd officials may recommend the use of experiential learning approach to science teachers.
3. Teachers in the different subjects of the K to 12 curriculum could prepare activities in the subject using experiential learning approach.
4. Future researchers may conduct a similar study to cover a large number of participants in another venue and on other topics in physics.

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