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Student-Made Electric Generator for Better Retention and Understanding of Electromagnetism of Grade 10 Student

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ABSTRACT

Electromagnetism is one of the most difficult concepts to grasp in Physics as shown by the decline in the mastery level of grade 10 students in the achievement test administered in school year 2016-2017. To address the problem of declining academic performance in Physics of the students, this study explored the effectiveness of using student-made electric generator as an authentic assessment tool in enhancing retention and understanding of electromagnetism concepts of selected grade 10 students at Malinta National High School in the School year 2017-2018. Utilized the experimental pretest-post test control group design with 45 students who composed the experimental group and another set of 45 students who were assigned in the control group as participants. After the seven-day lecture, the control group was given the usual posttest while the experimental group was asked to make their own electric generator after which they evaluated their outputs using a rubric. Focus group discussion was undertaken by the experimental group wherein their insights and personal evaluation of their experiences while performing the task i.e. making their own electric generator were generated. After one week, both groups were given 30-item multiple choice retention test in order to determine if the use of authentic assessment given to the experimental group promotes better retention than simple lecture and traditional assessment assigned to the control group. Results indicated that the experimental group gained significantly higher mean scores than those of control group in the posttest and in the retention test. It also showed that the experimental group enjoyed the authentic task and captured r\the interest of the students. Based on the foregoing results, the experimental group demonstrated better retention and better understanding of electromagnetism than the control group. The study recommended that teachers should design authentic assessment tools that are relevant and attuned to real-life situations to ensure students' success in retaining and understanding other concepts in Physics.

Keywords: Authentic assessment tool, Authentic learning, Electromagnetism, Focus Group Discussion, Retention test, Traditional assessment

I. INTRODUCTION

Electromagnetism is one of the most difficult concepts to grasp in Physics The decline in the mastery level of Malinta National High school Grade 10 students in Physics from 54.57 % to 48.43 % in S.Y. 2016-2017, which prompted this researcher to think of a strategy that will improve their understanding of electromagnetism concepts. It was discussed on the learning action cell session of grade 10 science teachers that students must be given meaningful activities to upgrade their performance in class. Thus, this

study implemented the use of an authentic assessment tool for the improvement of conceptual understanding in electromagnetism. Authentic assessment does not just provide teachers the opportunity to evaluate students learning but also help students in enhancing conceptual understanding of the lesson. It is a method of evaluating students' knowledge by giving appropriate, students-centered learning task (Foster 2012). Through this evaluation, teachers are able to adjust their teaching strategies to suit the learning styles of the learners. Authentic assessment helps develop lifelong learning because of real-life challenges provided to the learners.

The aim of this action research is to determine the effect of authentic learning assessment tool on the conceptual understanding of the students on the topic electromagnetism. Specifically, this action research sought to answer the following questions:

1. What is the mastery level of the control and experimental group before and after the implementation of the teaching strategy?
2. Is there a significant difference between the posttest results of the control and experimental group?
3. Is there a significant difference between the retention test results of the control and experimental group?
4. How does authentic learning assessment task affect students learning interest?

II. METHOD

The participants of this action research were two (2) heterogeneous sections of Grade 10 students from Malinta National High school. Each section includes forty-five (45) students. The students were given a thirty-item multiple choice pretest. After the seven-day lecture the control group was given posttest while experimental group was given an authentic assessment task. The experimental group were asked to make their own electric generator. Materials and worksheets were provided by the teacher. The students' outputs were evaluated using a rubric. Focus group discussion (FGD) was also administered to the experimental group. The participants were asked questions that would determine their insights and personal evaluation of their experiences while performing the authentic task. Thirty-item multiple choice retention test was given to both groups after one week. This is to determine if the authentic assessment given to the experimental group promote better retention than simple lecture and traditional assessment.

III. RESULTS AND DISCUSSION

The mastery level of control group and experimental group (table 1) shows that the control group with 47.33 mastery level is better compared to the experimental group with 35.59 before the intervention. Looking at the post test result (table 1), the control group increased its mastery level to 51.63 while the experimental group obtained 63.04. Although both groups show an increase on their mastery level, data revealed that the experimental group gained higher after the intervention. The t test result (Table 2) revealed that there is a significant difference between the control and experimental group posttest. The result indicates that the intervention conducted improve the learning of the students which results to a better understanding of the lesson In terms of retention (table 1), experimental group showed a better retention with a mastery level of 56.58 compared to control group with 47.93.The t test result (table 3) of the retention test revealed that the experimental group who have undergone intervention has a better retention of the lesson compared to the control group.

The result of the focus group discussion (Table 4) revealed that the students enjoyed the authentic task. They were challenged to do the task and cooperation was present. This proves that the authentic learning

assessment captures the interest of the students. Students also gave positive feedback on the effect of authentic learning assessment on their conceptual understanding of Electromagnetism.

IV. CONCLUSIONS

Based on the data presented, the results concluded that the use of Student-Made Electric Generator as an authentic learning assessment tool develops higher order thinking skills. It improves the mastery of lesson and promote better retention of the concept. The authentic assessment task also, increased the interest and cultivated camaraderie and cooperation among students. It developed students' creativity, craftsmanship and challenged students' critical thinking skills as they build their own electric generator. Likewise, the students became responsible of their own learning. Authentic assessment gives a new view about assessing students' knowledge. It is not just something given at the end of every lesson; teaching-learning process and assessment are intertwined in enhancing students' performance.

V. RECOMMENDATION

During the implementation of the intervention, there were some members of the group who just served as spectators thus, the researcher plan to have smaller number of members per group. The students were limited only to the materials given to them. Thus, improvisation maybe applied to improve students' creativity. Additional task to challenge the students will be given by asking them to power up materials like cellphone or mini fan using their electric generator.

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