

INTERVENTION MATERIAL FOR LEAST LEARNED COMPETENCIES IN SELECTED TOPICS IN PHYSICS 10

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Abstract

The study was conceptualized to address the need for the development and validation of an intervention material for least learned competencies in selected topics in Physics 10. Moreover, it is also focused on understanding how the intervention material will help improve the learners' mastery of concepts and the perceived effectiveness of the intervention material to the learners.

The research design used in this study is the Quasi-Experimental method of research. The present study concerns with the development and implementation of an intervention material for least learned competencies in selected topics in Physics 10. Thus, quasi-experiment was used. The respondents of the study were the Grade 10 learners in Magdalena Integrated National High School.

The area of investigation was limited to four (4) areas of investigation: 1) what is the level of performance of the Grade 10 students in Physics?, 2) what is the level of acceptability and validity of the intervention material as rated by teachers and students?, 3) if there is a significant difference between the student's performance in terms of pretest and posttest?, and 4) if there is a significant relationship between the level of acceptability as rated by the teachers and students and the mean scores of the students.

The findings of the study were the difference in the learners' academic performance it was noted that there was a substantial increase in the students' performance. Shown by a mean difference of 11.13, it was found that there is a significant difference in the students' performance, based on their pre-test and post-test scores ($t=-27.518$, $p=0.00$). In addition, the difference in the level of acceptability as rated by the two groups of respondents, both the students and the teachers assessed the acceptability of the intervention material in terms of adaptability as highly adaptable. No mean difference was noted in their ratings about its adaptability. Therefore, there is no significant difference in ratings given by the students and the teachers with regard to the adaptability of the supplemental material ($t=0.309$, $p=0.764$).

It was concluded that the adaptability, content and usefulness of the intervention materials were acceptable to the teachers and students as intervention to the least learned competencies in selected topics in Physics 10 and the students' performance pretest and posttest were evident that the result of the posttest increased thus, the intervention materials were effective to the least learned competencies, they increased their academic performance after they use the intervention learning materials.

Keywords: Intervention Materials, Least learned competencies, Physics, Optics

1. Main Text

Introduction

The Department of Education (DepEd) ensures that no student is left behind. Thus, inclusive learning is one of the thrusts of the K to 12 Basic Education Curriculum. This thrust ensures that all learners are given the equal chance to grow at their own pace through varied learning activities. Differentiated instructions and contextualization allow teachers to provide individual learners the ability to concretize their learning.

The aim of education is to produce well-rounded and well-prepared students who are ready to face the reality. Also, it provides students the things they need to develop so they can continue to be successful in their chosen endeavor after graduation. As stipulated in Section 2 of the Republic Act No. 10533 "The State shall create a functional basic education system that will develop productive and responsible citizens equipped with the essential competencies, skills and values for both life-long learning and employment."

However, given the current state of the Philippine educational system, the Department of Education's (DepEd) budget is insufficient to meet every classroom's needs; there are a shortage of classrooms nationwide as well as a lack of appropriate instructional materials and other tools that teachers can use in the classroom. Participating in enrichment and intervention programs is one way to approach this problem. According to Department of Education officials, Ronda (2014) stated in his article for the

Philippine Star, "the intervention class intended to raise the quality of education in all public schools in compliance with the K+12 (Kindergarten+12 Basic Education Curriculum) program." Underachievers will be obliged to attend mandatory remedial sessions at the conclusion of each quarter. Every teacher wants their students to grasp and put what they've learned in class into practice, but if the students themselves have trouble understanding the teachings in Science, their efforts may be in vain. Utilizing intervention materials is one technique to assist learners in succeeding in their academic endeavors.

Every school, from kindergarten to college, should have enrichment or intervention classes. It aids in the student's attainment of expected capabilities in certain disciplines. Students who struggled with a topic were given the opportunity to completely comprehend the subject's least learned abilities. Furthermore, according to the Department of Education Memorandum No. 46, series of 2013, "conducting of the new intervention should be done to guarantee that low performing pupils/ students are adequately equipped for the next level." In enrichment and intervention classes, relevant teaching tools and resources should be used to fulfill the school's objectives. These instructional resources should be tailored to the students' various skills and maturity levels.

The Department of Education (DepEd) releases DepEd Order 12 s. 2020, dated June 19, 2020, and titled "Adoption of the Basic Education Learning Continuity Plan for School Year-2021 in light of the COVID-19 Public Health Emergency". With the existence of today's health crisis, the world is focused on the development of medicine that would cure and lead to the deterrence of covid-19 pandemic, in line with this, the education sector looks for possible flexible learning to pursue in adherence to the goal of the Department of Education that is "Education Must Continue." Education must continue whether face-to-face or virtual, with or without physically going to school," (Education Secretary Leonor Briones.)

The Pandemic that is ravaging the globe is likely to cause the most serious disruption to educational opportunity in at least a century according to the World Health Organization (2020). The studies and lives of those currently in school will be impacted in multiple ways, some yet to be understood. Most immediately, because necessary physical distancing measures will interrupt or have already their opportunity to attend school they will learn less than they would have otherwise.

One of the most crucial parts of learning is effective instruction. Many studies focus on the characteristics that determine successful teaching, which may be seen in students' academic results. These elements may be found in a variety of sectors, but several studies reveal that teachers' activities in the classroom are the most essential, according to Marzano (2013), when compared to all that education and school officials do.

Intervention materials are school resource inputs (SRI), they include print and non – print items that are designed to impart information to students in the educational process. Instructional materials also include items such as kits, textbooks, magazines, newspapers, pictures, recordings, slides, transparencies, videos, video discs, workbooks and electronic media including music, movie, radio, software, CD – ROMs, and online services emphasis by Dahar (2012). Instructional material plays a very important role in the teaching learning process. It enhances the memory level of the students and makes the teaching – learning process interesting added by Raw (2013).

Academic underachievement, according to Gillies (2012), is defined as the failure of students to fulfill their full potential. Underachievement, according to Connor (2014), is defined as failing to meet the school's academic criteria. Academic underachievement is a major source of concern, particularly because it affects students of all abilities and is not limited to talented students. Because standardized examinations are the most common means to assess and evaluate students, underachievement is frequently linked to their performance on them. This explains why academic underachievement is associated with low academic performance. Unfortunately, classroom instruction is still plagued by it.

According to Jamela (2011), low student performance is due to a lack of textbooks and instructional resources in the subject's teaching. As a result, it is critical for teachers to understand how to create instructional aids and resources. The teaching materials should be chosen depending on the students' requirements, interests, and skills. Similarly, Section 5 of Presidential Decree No. 6-A states: "Quality education shall be achieved by designing, employing, and upgrading instructional technology, as well as generating or manufacturing textbooks and other instructional materials." In the teaching-learning process, developing instructional materials is critical. It is a tool for making the learning process more fruitful and organized. According to Salandanan (2001), as reported by Baltazar (2011), instructional resources, particularly printed ones, provide the best results.

Procrastination, unfinished assignments, disorganization, and sloppy work, according to Rish (2013), become common signs of underachievement syndrome. Poor study habits, peer acceptability issues, school attention issues, and home and school disciplinary issues, according to Dough and Rish (2013), all contributed to the underachievement pattern. It is also clear that if a youngster does not recognize a link between effort and results, he or she will be less motivated to try to succeed (Dough & Rish, 2013).

Modular distance learning is the modality used in Magdalena Integrated National High School. As time passed by, the problem or issue rampant in the school nowadays is an underachievement of the learning competencies, specifically in Science. Underachievement is the failure to reach the full potential of learners.

For this reason, the researcher aims to develop a teacher-made supplemental instructional material to help improve students' level of understanding on the least learned competencies in Grade 10 Physics.

Background of the Study

Ray diagrams provide an effective foundation for comprehending and describing a variety of optical system characteristics, including pictures and magnifications. For students, this architecture also presents a number of conceptual challenges. The primary source of conceptual issues is the notion that waves propagate by way of a light ray, which is a line or curve perpendicular to the wave front. Similar to how geometrical optic constructs need a thorough knowledge of trigonometrical connections, the study of optical objects is a challenging subject.

As time passes by, students had trouble understanding the variations between spherical mirrors. They struggle to recall the ray diagrams for curved mirrors and have trouble understanding the distinctions between concave and convex mirrors.

Intervention materials have been observed as a powerful strategy to bring about effective teaching and learning. The importance of quality and adequate intervention materials in teaching and learning can occur through their effective utilization during classroom teaching. Intervention materials here include all the tools that the teachers can use to make the learning more interesting and memorable.

Teachers' strategic component in organizing and providing education, according to Euni (2012), is instructional resources. This is because they assist in the development of a notion that the instructor could not develop without the assistance of instructional materials. This permits pupils to learn more easily, which has a good impact on their academic achievement.

The goal of every effort and deliberate determination made during the learning process is to improve the quality of life. Various approaches have been developed, beginning with direct instruction at the beginning of the learning process. Face-to-face meetings with students up to the point where no meetings are required but are still desirable. Online classes have made this possible. The advancement of information and communication technology so quickly transformed, causing outside-guided learning activities to become self-guided oriented. It also has largely because to the availability of internet connection, e-learning is becoming increasingly popular in education. E-learning will never be separated from the usage of the internet, according to Majaro (2014).

One of the strategies used by the Department of Education to improve academic attainment of children who perform poorly in science and technology is Strategic Intervention Resource, which is an instructional material for remedial purposes. Science secondary teachers received instruction in the production of SIMs through DepEd Memo No. 117, series of 2010, titled Training Workshop on Strategic Intervention Materials (SIMs) for Successful Learning. As part of intensifying and developing strategic intervention materials as tool for remediating poor performance in Science. The Department of Education included the SIM making as one of the contests during science fairs in school, division, regional, and national level competitions.

Books, audio-visual, software, and hardware of educational technology are all examples of instructional resources, according to So Ang Kuh's (2012). He also believes that the availability, sufficiency, and relevance of instructional materials in classrooms can impact great teaching, which can help students learn and perform better. So Ang Kuh's insight into the importance of connecting instructional resources to students' academic success is crucial in providing high-quality education. The role of instructional materials in academic performance in community secondary schools in rombo district originates from such ideas. Efficiency and high productivity in teaching and learning transaction. In my views, start from the access to quality and adequate instructional materials, and these should be prepared well before the class interaction.

DepEd also issued Department Order 08 s. 2015 or the Classroom Assessment Policy Guidelines. It states, "There must be sufficient and appropriate instructional interventions to ensure that learners are ready before summative tests," and "There must be intervention by remediation and extra lessons from that student's subject teacher to a student who receives a grade below 75 in any subject in any quarter." This policy guideline outlines the need to arrest academic underachievement by giving the learners adequate intervention. It also emphasizes inclusive learning. As such, there will be no learners left behind as appropriate instructions and interventions are given to meet individual needs.

As teachers we've all watched our students work through a problem that they "should" know how to do. The student works through each question seemingly without creating a mental representation or making sense of the equation. This can be seen in mistakes such as always putting in zero for the initial velocity. Another common behavior is for students to forget what they have already found.

In the South African secondary school (Grades 10 to 12) Physical Sciences' curriculum, the learners are expected to learn how to draw a ray diagram both for a point object and for an extended object, but less focus is normally given to the ray diagram for an extended object (Department of Education 2011).

Research Methodology

The present study utilized the design and development research approach to establish an empirical basis for the creation of intervention material from different sources.

The study dealt with development and implementation of an intervention material for least learned competencies in selected topics in Physics 10 in Magdalena Integrated National High School.

The research design used in this study is the Quasi-Experimental method of research. The present study concerns with the development and implementation of an intervention material for least learned competencies in Physics 10. Thus, quasi-experiment was used. The respondents of the study were the Grade 10 learners in Magdalena Integrated National High School.

The respondents of the study came from Magdalena Integrated National High School, the eighty-nine (89) tenth graders of the said school were the center of the study.

An Evaluation Checklist of the Intervention Material was accomplished by the Science teachers of Magdalena Integrated National High School. After the validation of the intervention material, a set of questionnaires was issued to the actual respondents of this study after the series of lessons. The items in the said questionnaires were based on the basic problems advanced in this study for objectivity, relevance and suitability to the problem areas investigated, as well as probability of favorable reception and return from the said respondents.

The Student's Pre-Test and Post-Test in Physics 10 is a multiple-choice type consist of 50 items to measure students' level of competency in terms of concept, understanding, and procedure.

Results and Discussion

The level of acceptability of the intervention material as rated by Science teachers and students in terms of adaptability has an overall mean of 4.78 both teachers and students with verbal interpretation of highly adaptable, content validity with an overall mean of 4.82 assessed by students and 4.84 assessed by teachers' verbal interpretation highly adaptable and usefulness of the material with an overall mean of 4.78 assessed by students and 4.84 assessed by teachers with verbal interpretation highly useful.

According to Bunagan (2012) defined Strategic Intervention Material as meant to re-teach the concepts and skills (least mastered). It is a material given to students to help them master competency – based skills which they were not able to develop during a regular classroom teaching. It consists of both learning strategies (for students) and content enhancement (for teachers).

The level of student's performance before and after the use of a supplemental instructional material for qualitative characteristics of images formed by mirrors and lenses for Grade 10 learners, the students showed satisfactory level of performance ($M=22.97$, $SD=5.84$). In the post-test, the students showed very satisfactory level of performance ($M=34.10$, $SD=6.15$).

The use of the intervention material helped the students attain the learning competencies using the supplemental materials whereas, the intervention materials help them to understand fully the qualitative characteristics of the images formed by mirrors and lenses because it is modified from different sources, the intervention material were more attainable and cleared to the target learning competencies whereas, the learning activities were localized and with modifications. However, the intervention materials has an impact to the student's performance based on the result presented.

For instance, Smedley (2017) offered a set of strategies that may assist self-directed learning readiness: creating a supportive learning environment; providing constructive feedback; encouraging self-assessment; using self-reflection; providing opportunities to engage in their own learning processes; and developing goal orientation values. These strategies may be helpful for teacher educators who consider taking a step towards fostering students' self-directed learning and helping students to survive and thrive in this information age.

On the other hand, Achimugu, (2019) cited that related poor performance in Chemistry to the teachers 'inability to conduct quality practical sessions. Lack of adequate instructional materials has been found to affect the quality of practical work carried out in schools.

The difference in the learners' academic performance it was noted that there was a substantial increase in the students' performance. Shown by a mean difference of 11.13, it was found that there is a significant difference in the students' performance, based on their pre-test and post-test scores ($t=-27.518$, $p=0.00$).

This means that the intervention materials was effective based on the resulted presented from the result of pretest and posttest of the learners in Science. Thus, the intervention material modified by the researcher and evaluated by the teachers and students was effective and showed by the result of the pretest and posttest of the learners. Hence the student's performance increased after they used the intervention materials.

As mentioned in Dahar (2012) stresses that developing instructional materials play an integral role in the teaching – learning process. The use of intervention materials has a strong relationship with academic performance at the secondary students.

In addition, Kelly (2017) contented that the teachers need to know the students' knowledge before the lesson begins. Pre-test is one way to make this determination to assess the students' proficiency that will be taught in the lesson. Therefore, before teaching, teachers should carefully review the results, the data from the pre-test. Pre-test helps measure students learning over a period of time and marks the level of understanding before the instruction. Meanwhile, post-test measures student learning after the learning materials.

The difference in the level of acceptability as rated by the two groups of respondents, both the teachers and the students assessed the acceptability of the intervention material in terms of adaptability as highly adaptable. No mean difference was noted in their ratings about its adaptability. Therefore, there is no significant difference in ratings given by the teachers and the students with regard to the adaptability of the intervention engagement material ($t=0.309$, $p=0.764$).

From the findings above, we can infer that at 0.05 level of significance, the null hypothesis "There is no significant difference between the level of acceptability as rated by the Science teachers, and students and the mean scores of the students" is accepted.

Science teachers have trainings and seminars on how to prepare the intervention materials to help the learners in Science to meet the learning competencies therefore, they have perspectives on the said criteria.

DepEd Memorandum No. 117, series of 2005, provided the teachers the training and workshop on how to prepare this intervention material. As part of promoting the wide use of the material, the Department of Education included SIM making that is open to all science teachers as one of the contests in yearly science fair in the school, division, region and national level competitions.

Performance is the degree to which a development in partner operates according to specific criteria, guidelines or achieves result in accordance with stated goals and plans. (Delgado, et.al. 2010).

According to Ramizo, as cited by Martinez (2015), stated that quality education is best achieved when all learners attain competencies in all areas of educational instruction.

Conclusion

The adaptability, content and usefulness of the Intervention material were acceptable to the science teachers and students as intervention to least learned competencies in selected topics in Physics 10.

The students' performance in pretest and posttest were evident that the result of the posttest increased thus, the intervention materials were effective to the least learned competencies, they increased their academic performance after they use the intervention materials.

There is no significant difference between the level of student's performance before and after using the intervention material for least learned competencies in selected topics in Physics 10.

There is no significant difference between the level of acceptability as rated by the Science teachers, and students and the mean scores of the students, therefore, the hypothesis is accepted.

Recommendations

Based on the drawn conclusions, these were highly recommended.

1. The school head may give technical assistance for the teachers through Learning Action Cell (LAC) to enhance the strategies has been using in maximizing the learning of the students specially in the new normal specially to those least learned competencies learners. It also includes the learning modalities in the new normal to develop the skills of the students to increase their academic achievements even at home on how to design the intervention learning materials. It may also work for the program for stakeholders to leveraging the engagement of the parents in school and to their child.
2. The teacher may upgrade their learnings on how to design the intervention learning materials to help the learners to attain the learning competencies, however It may serve as a can opener for the teacher to use the differentiated instruction based on the needs of the learners to help them develop their skills in learning. Hence, the teacher will modify the learning activities to be able to understand fully of the learners even in this time of pandemic.
3. The parents may maximize the potential in helping their child to their learning when they are at home. Basically, parents will serve as para-teacher to their own child so that the learnings will continue with their guidance. They may give time teaching their child at home.

4. The students may help themselves in learning Physics through the use of the intervention learning materials with the help of their parents and teachers to increase their learning performances. 504
5. The future researcher may use another learning area or grade level to get different answer and explore more about the topic.

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