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Modular Learning Modality: Effects on the Mathematics Achievement of Grade-10 Students in MSU-Sulu Laboratory High School

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***Abstract*: This study aimed to investigate the effect of Modular Learning Modality on the Mathematics Achievement Level of grade-10 students of MSU-Sulu Laboratory High School. Focus Group Discussion was utilized to define Modular Learning Modality. The average grades of the grade-10 students were used to determine the Mathematics Achievement Level. Simple regression was used to determine the significant effect of Modular Learning Modality on the Mathematics Achievement Level. One Way ANOVA was used to determine the significant difference between the Mathematics Achievement Level when the grades are grouped according to sections. The Modular Learning Modality is effective teaching strategy in achieving very satisfactory Mathematics Achievement Level. There is significant effect of Modular Learning Modality to the Mathematics Achievement Level at 52.6 percent of the average grades accounted by the regression model. There is significant difference of the Mathematics Achievement Level when the average grades are grouped according to sections.**

***Keywords*: Modular learning modality, Mathematics achievement of Grade-10 Students.**

1. Introduction

Education amidst COVID 19 Pandemic forced teachers and school heads to adopt modular learning modality. The alarming condition "Pandemic" has brought to education doubted school officials remained undecided for its face-to-face reopening. Although, parents and pupils are hauling for opening of the face-to-face new normal. The government no less than the President of the Republic of the Philippines, Rodrigo Roa Duterte is still giving warning and in favor of the no face-to-face classes. As an alternative strategy to continue the educational operation, modular learning, blended learning and synchronous learning are some of the immediate recourse for education.

Since, technology resources remained inappropriate to completely maneuver rightful education in the blended learning and synchronous learning, the DepEd officially mandated the use of the modular learning where modules are centrally prepared by the selected skillful and supportive teachers for the different grade levels. The collaborative efforts of teachers and school administrators enlightened parents to support modular learning modality, of course, not without problem as Camala, et.al., (2021) suggested that the education sector needs to re-examine and regulate the utilization of technology for emergency remote education to happen between the pupils and also the teachers…The results of emergency remote teaching, the educational systems worldwide are left with no choice but to understand, experience, and accept the great and rapid change (Camala, citing Hung, et.al., 2020).

Modular learning in the remote areas, outside towns and cities, have experienced problems and incompetence in module delivery. In the town of Jolo, particularly MSU-Sulu Laboratory High School where lighting facilities and technology resources are available but just like other schools parents have not attained higher education, remained problematic to response to the module evaluation and learning activities. Modular educational system and its impact in the grade-10 students' mathematics learning may become treat on the quality of mathematics learning. This study was focused to determine the effect of modular learning modality on the mathematics achievement of the grade-10 students in MSU-Sulu Laboratory High school.

2. Statement of the Problem

In mathematics achievement as experienced by the grade-10 students, even in the face-to-face classes, difficulties is still imprinted in the mind of the students. There is no single student, except born diligent can claim the serious perception that "mathematics learning is just a chicken feed" for me. Many students can still claim mathematics is very difficult subject to learn by the average students. This study is designed to investigate the mathematics learning of grade-10 students in MSU-Sulu Laboratory High School focus on educational modular experience during the COVID 19 Pandemic. Hence, this study sought to answer the following research questions. [1] What is Modular Learning Modality? [2] What is the level of Mathematics achievement of grade-10 students in MSU-Sulu Laboratory High School? [3] Is the effect of Modular Learning Modality during COVID 19 Pandemic significant to the Mathematics Achievement Level (MAL) of grade-10 students in MSU-Sulu Laboratory High School? [4] Is there significant difference of the Mathematics Achievement Level of grade-10

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students when grouped according to section?

3. Hypothesis

This study will test the following hypothesis: [1] The effect of Modular Learning Modality during COVID 19 Pandemic is not significant to the Mathematics Achievement Level (MAL) of grade-10 students in MSU-Sulu Laboratory High School. [2] There is no significant difference of the Mathematics Achievement Level (MAL) of grade-10 students when grouped according to sections?

4. Significance of the Study

The abrupt decision of the government to stop the face-to-face schooling put the teachers, school officials, parents, students and other school stakeholders to the blue and made them restless to cope with the new teaching modalities such as modular learning, blended learning and synchronous learning. The lack of technology resources such as signal and devices like laptop, tablet, computer and cellphone even made the low income parents problematic to secure and accomplish the task instructed by the schools. This study focused on the Modular Learning Modality's effect on the Mathematics Achievement (MAL) of the grade-10 students of MSU-Sulu Laboratory High School. Therefore, the results of the study may provide benefits to the supervisors, school heads, teachers, parents, students and researchers.

The supervisors can monitor appropriate Mathematics Education Strategy amidst the COVID 19 Pandemic crisis to enhance improved learning strategies in the absence of face-to-face classes. The school principal can create effective strategies to enhance easy, simple and realistic teaching activities and learning evaluation. The teachers can implement proper and appropriate Mathematics Education Strategy to enhance effective distribution, proper orientation, and retrieval of module and do effective monitoring of the uneducated parents, reluctant modular responses, and other learning activities. The parents can acquire easy and simple modular responses and submission to the teachers. The students can support and manage the parental guidance to enhance high spirit of educational endeavors towards progressive and effective Modular Learning Modality. The researchers may utilize the results of this thesis to include in the related literature and other components of research works.

5. Theoretical/Conceptual Framework

This study is anchored on the following theories on mathematics learning. In general, societies rely on two central institutions to work in tandem to support children's educational development – the school system and family. This partnership supports community resilience in two different ways. First, schools are vital partners in the shared work of child development. While children's environments have significant impact on their school-based learning (Fay, et.al., 2020; citing Reardon, 2011; p. 10).

Constructivist Theory: constructivist theory invites students to construct their own knowledge through exploration, as opposed to the traditional educational model that simply provides students with correct answers or facts. To assert the constructivist method, teachers need to provide students with lessons that they can employ in real world situations.

6. Literature Review

Llewellyn (2007), the 5E instructional model can help students move from understanding concrete experiences to the application of principles. The model provides students with opportunities to deeply and meaningfully recall what they already know at the engagement stage, the instructional task is identified and introduced to the students. Short activities are used to engage learners in the lesson and to spur their curiosity about learning. These activities also enable teachers to assess learners' previous knowledge, so that connections can be made between past and present learning experiences. In the exploration stage, students are provided with opportunities to engage with the materials and phenomena. Students work with one another to explore ideas through hands-on activities. Under the guidance of their teachers, students clarify their own understanding of major concepts and skills. The teachers' role at this stage is one of a facilitator who provides materials and guides students' focus and concentration while they use their prior knowledge to compose new ideas, explore questions and possibilities, and design investigations (Bybee et al., 2006). The explanation phase focuses students' attention on particular aspects of their exploration experiences. This stage provides them with opportunities to demonstrate their conceptual understanding and process skills. Learners explain their understanding of the concept and teachers work to address misconceptions. Teacher explanations guide learners towards a deeper understanding, which is a critical part of this phase (Bybee et al., 2006).

Most parents are ill-equipped to step fully into teachers' educational roles even under propitious circumstances. Teaching is already a complex task that requires professional judgment and expertise that most parents lack (Alterator et al., 2018; Parker & Hess, 2001; Shulman, 1986). On top of that, most parents are either trying to balance an increased role in educating their children with the other job they were already doing, or are trying to educate their children while they endure the stresses associated with the loss of the job they were previously doing (Long, 2020; Harris, 2020). The vast majority of parents cannot simply step into the role of teacher and do so effectively.

The result of the Department of Education (DepED) National Learner Enrolment and Survey Forms (LESFs) survey, out of the 22.2 million enrollees, 8.8 million or 39.6% of total respondents preferred modular distance learning for the school year 2020-2021. Further, 3.9 million enrollees 0r 17.6% preferred blended learning (which uses a combination of different modalities), 3.8 million or 17.1% chosen online learning, and 1.4 million and 900,000 enrollees selected TV-based and radio-based learning, correspondingly.

In a study done at an American Community College, Wenner. Burn, and Baer (2011) demonstrated that students did better in remedial math courses when the math was taught using

the context of application to geoscience. The researchers compared two types of remedial math courses, one that used a traditional approach, and one using the applied math typical in a modular course. Wenner et al. found the modular approach in a remedial math course was successful, but that the success of higher levels of student participation and completion depends on the kind of school, courses, quantitative concepts covered, assessment, and teachers teaching methods. Beneficial instructor participation included an appropriate introduction to the modules and instructions on how to navigate testing sites and the learning management system. It was also shown to be important that instructors reinforced the adequacy of the modules in helping the students pass the post-module quizzes. This positivity helped students feel better about themselves, their performance, and their chances for success; thereby motivating them to complete the modules. Finally, when instructors made the connection between the math being learned and its relevancy to real problems, students tended to complete modules more readily. In the modular approach, according to Goldschmidt & Sejpal (2013), teaching enables the learner to accept greater responsibility for learning and to have control over his/her learning. Goldschmidt & Sejpal (2013) stresses further, that on the part of the learner, the modular approach demands greater maturity is more suitable for more mature students. In the modular approach, all the capabilities required to perform are closely related. For them, sets of tasks are grouped together. For instance, capabilities required financial management in managing an institution that includes generation of finances, allocation, accounting, and monitoring.

In Addition, Gonzales, (2015) states that modular learning is one of the teaching approaches where the students have to learn everything in the module using their own effort at their own pace. Moreover, He asserted that the method differs from the traditional one wherein the students just listen to learn the concepts presented by the teachers. Further, in order to surpass the difficulties faced by the students in the traditional classroom situation, He further suggested that the modular approach may be a good alternative since it is student-centered, self-paced, and requires no note-taking. Also, teaching the English language using a module compared to using a textbook in the traditional methods meant to increase active learning and improve critical thinking, as well as problem-solving skills. It is given the lecturer the opportunity for Proceedings of SOCIOINT 2021 8th International Conference on Education and Education of Social Sciences conducting formative assessments in the classroom.

Also, Cheng and Bakar (2017) emphasized standardized textbooks have their own styles, and the organization of their contents, depth of coverage of materials, may affect the teaching and learning environment. Thus, according to them, the use of a module presents a more flexible learning environment for both instructors and learners. Modular learning has been in practice for many decades, but at this moment there exists an incredible opportunity to the remarkable learning process with the power of exploding technological innovation. As educators and researchers in a leading online university, educators are poised to offer contributions to the next ―Gutenberg‖ or ―printing press‖ moment in education, which captures the dramatic way human thinking produces a revolutionary movement. The original ―Gutenberg moment‖, which took hundreds of years, created the mass production of books, lower unit cost, democratized ownership of knowledge, and assured consistency and quality in transferring knowledge. Today, the innovation and impact of change have accelerated exponentially.

The DepEd is providing devices such as computers, tablets, and smartboards to schools that are the Center of Excellence or central schools. Because Technical Elements according to Mean-Chin (2020) are the most substantial issue on distance learning that involves the availability of devices such as mobile phones, computers, laptops, printers, and internet connection for both students and teachers. To Chen & Huang, 2018; and Hussin (2018) these devices are needed for distance learning education and for embracing the 4.0 trend in education, that promotes the use of the E-instruction system, that enabling learners' achievement and implementing a task-based and performance-based on a specific learning goal.

In the report of the DepEd, over 1 million computer devices were distributed in 44,155 public schools. But, half of these cannot be lent as they are thin clients – computers meant for establishing connections in a far-lang area with a server-based computing environment. Also, Phil Vahey and Jim Vanides, (2020) claim that there are still significant hurdles to technology creating more, not less, equitable learning environments. These hurdles became glaringly obvious in the move to emergency remote teaching during the pandemic. For instance, communities must overcome the significant inequalities in access — access to computers, reliable high-speed internet, and the digital literacy and support required to take advantage of learning. Overdependence on technology can be a major drawback in the distance learning mode of education, especially when the learning takes place in an online environment. Any malfunctioning software or hardware can bring an ongoing class to a standstill and interrupt the learning process. Similarly, if a student is not a computer and tech-savvy, his learning experience can be dissatisfactory. (Bijeesh, 2020).

7. Method

The grade-10 teachers of MSU-Sulu Laboratory High School are using Modular Learning Modality in teaching Mathematics. The researcher used primary data from the records of the Mathematics teachers to analyze and determine the achievement level in mathematics. Arithmetic Mean was utilized to interpret the mathematics achievement. Simple Regression was used to determine the significant effect of the Modular Learning Modality on the Mathematics Achievement Level. One Way Analysis of Variance was used to determine the significant difference of Mathematics Achievement Level when the average grades in Mathematics are grouped according to sections.

8. Results

In the Focus Group Discussion conducted by the researcher, participated by the grade-10 teachers of MSU-Sulu Laboratory High School to define Modular Learning Modality, the teacher participants defined Modular Learning Modality (MLM) is a strategy of teaching characterized by student self-learning pace. The students are given module prepared by the teachers in Mathematics based on the components such as pre-evaluation (pretest), objectives, module, and post-evaluation (posttest). Modular Learning Modality (MLM) is effective Mathematics teaching strategy, the grade-10 students of MSU-Sulu Laboratory High School has achieved (μ = 87.725) very satisfactory in Mathematics. When regressed to determine the significant effect (R = .725; p = .000 at α = .05) indicates that the hypothesis is rejected with (R^2 = 0.526) emphasized that 52.6 percent of the data are accounted by the regression model. Therefore, there is significant effect of Modular Learning Modality to the Mathematics Achievement Level (MAL) of the grade-10 students of MSU-Sulu Laboratory High School. When the Mathematics Achievement Level was subjected to test using One Way ANOVA, the (F = 6.34; p = 0.002 at α = 0.05) the hypothesis is rejected. Therefore, there is significant difference between the Mathematics Achievement Level of grade-10 students of MSU-Sulu Laboratory High School when the average grades were grouped according to sections.

9. Conclusion

The Modular Learning Modality is effective teaching strategy in achieving very satisfactory Mathematics Achievement Level. There is significant effect of Modular Learning Modality to the Mathematics Achievement Level at 52.6 percent of the average grades accounted by the regression model. There is significant difference of the Mathematics Achievement Level when the average grades are grouped according to sections.

10. Recommendation

The mathematics teachers should continue to use the Modular Learning Modality in teaching Mathematics subject to harness very satisfactory Mathematics Achievement Level. The school administrators should support the teachers with the supply of technical resources such as computer, laptop, tablet and cellphone to modify the teaching learning processes to other teaching modalities such as blended learning and synchronous learning. The parents should continue to support the Modular Learning Modality by motivating their children comply with the instructions and other activities to achieve further. The pupils should continue to exert efforts to maintain the Mathematics Achievement Level.

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