



Development of three differentiated mathematics learning modules: A blended and scaffold-based learning materials for new normal remote learning

Jesus Parena Santillan*

Teacher Education Department, Faculty, Camarines Norte State College – Ret. Judge Antonio C. Entienza Campus Sta. Elena, Camarines Norte, 4611, Philippines

ABSTRACT

Effective strategies in the new normal education system are the main concern of the Department of Education amidst pandemic. Teacher-experts are encouraged to innovate intervention-learning materials as a support mechanism to address the issues on distance and remote teaching and learning process and provide the quality of education in the Philippines under the (K to 12) Curriculum. This study developed learning modules considering the students' differences and preferred learning styles applicable in this current situation. The study utilized descriptive-exploratory with developmental research design. The code-switch instructions (Tagalog-English) on the supplement video lessons was the key feature of three (3) differentiated learning materials based from the qualitative findings of this study. The contents of these are lessons about Solving Linear Inequalities since the researcher found it to be the least learned area in Mathematics 8. Moreover, the developed learning modules were highly accepted by the selected expert respondents of the study.

KEYWORDS: *Mathematics Education, Basic Education, Learning Module Development, Blended Learning, Distance Learning*

1 INTRODUCTION

Novel Coronavirus or COVID 19 challenge the educational system of the whole nations. Different countries provide and introduce various teaching interventions and learning strategies to adopt the new normal education process amidst pandemic. Schools have been using the different online learning platforms, distance and remote learning set up, or the synchronous and asynchronous way of teaching (UNESCO, 2020). Synchronous teaching and learning strategy provide an opportunity for teachers and students to interact in real-time through any available media like Zoom, Skype, Messaging App, and the like. While, asynchronous strategy enables the faculty and students to interact but not in real-time. This includes providing students offline

resources like lectures, modules, Power-point presentations, recorded videos, etc., (Tria, 2020 and ChED, 2020).

Schools and institutions forcedly adapt these new normal teaching and learning strategies as alternative ways to resume the education system in the Philippines. However, online learning platforms will not be as effective as conventional learning to underdeveloped countries (Adnan & Anwar, 2020) like the Philippines because of poor internet connectivity, most especially to those students and schools located in far-lung or remote areas. This country has the lowest-average internet connection speed in the world and among Asia-Pacific countries with only 4.5 Mbps (Philstar, 2017). Thus, the department of education adapted the new normal education system and switch to modular and blended learning approaches for distance and remote learning education. Modular distance learning refers to individualized instruction, and self-learning modules, it can be printed or electronic copy. While, blended learning is a combination of two or more learning modalities (DepEd, 2020). In addition, based from the conducted learner enrollment survey by the Department of Education, there are almost 8.8 million parents who chose modular (or printed learning material) and 3.9 million parents chose the blended as their learning modalities to their child (The Melinial Times, 2020). However, during the implementation of the said strategies and approaches there are raised issues faced by some teachers' and parents during the preliminary conduct of this study. Based on some teachers' perceptions some learning modules are subjective designed only to advance and/or average learners.

Some of students' belonging in the low-income category or poor families, are students that do not have parents to help their studies (The Filipino Times, 2020). Relevant to this, The Philippine Statistics Authority (PSA) reported & revealed the results of the 2008 Filipino functional literacy and Mass Media Survey. The article says that for every 1 out of 10 Filipino ages 10 to 64 years old are simple literate (i.e., can read and write but cannot compute) and/or functionally illiterate (i.e., actually deficient in numeracy, or approximately 13.4% of total

*corresponding author: jesussantillan@cncs.edu.ph

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population of 9 million Filipinos out of 67 million were considered functionally illiterate (PSA, 2010). Thus, studies on developing learning modules should also consider the aforementioned factors & conditions of the expected target users. Learning modules are designed not only for advanced or average students, but also to the slow-paced learning students.

In addition, by observations, experiences, and according to some studies, students' learned when the teacher captured their interest to learn a certain subject matter. They enjoy the learning process when they are in a team sharing ideas to perform a particular task (or collaboration and peer tutoring) (Moliner & Alegre (2020). Collaborative & blended learning, peer tutoring, and other modern teaching strategies in this 21st century is more effective compared to the traditional teaching methodologies. Some studies also show positive impacts of Information Communication Technology (ICT) integration in education and other online and web learning platforms (Moliner et al., 2020); (Asyraf et al., 2020); and (Mahizer et al., 2016). However, some of these strategies were not suitable to some students who have no gadgets and no internet access, because of financial matters. On the other hand, collaborative and cooperative activities, peer tutoring, and other face-to-face activities and usual conventional teaching and learning processes are not also allowed due some restrictions and health protocols amidst pandemic. Lastly, there are reported cases in the Philippines-news that the contents of the learning modules issued by the Department of Education were too difficult and cannot be answered by young students (Adonis, 2020). Consequently, these would not be also suitable to the lower grouped or slow-paced students. These gaps are used by the researcher to come up with alternative differentiated learning materials with unique features applicable to address the applicable learning modalities and different levels of learners or their pace of learning.

This crisis challenged the education sectors particularly the public schools under basic education (Department of Education), which have the existing problems in terms of lack of school facilities and learning materials intended for the distance and remote teaching and learning process. In the period of this pandemic, some usual face-to-face teaching strategies and approaches will not be applicable (UNESCO, 2020) and (Adnan et al., 2020). Because of these, there is a possibility to increase the number of students who have difficulties learning the core subjects like Mathematics and Sciences. Online platforms and flexible blended teaching approaches would really describe the teaching and learning set up in this new normal situation. However, as explicitly discussed a while ago some possibilities and issues might be affecting the majority of the learners particularly to some remote areas or far-flung areas of the country.

This study aimed to develop an intervention-learning

material for middle grade students in Mathematics subject accessible and applicable this new normal teaching and learning process, which also cater the students' differences according to their paced of learning (i.e., advance-paced, average-paced, and slow-paced learners).

The following were the research objectives of the study.

1. Determine the least mastered learning content in Mathematics 8 in one selected far-flung public secondary school in the Department of Education in the Philippines.

2. Develop intervention-learning materials based on the least mastered learning competencies of middle grade students in Mathematics subject of one selected far-flung public secondary school in the Department of Education in the Philippines.

3. Determine the level of acceptability of the developed intervention learning materials, along:

- a. instructional design
- b. organization of material;
- c. layout;
- d. readability of the material;
- e. appropriateness of material.

4. Enhance the proposed learning modules based on the comments, modifications, and recommendations of the selected evaluators and experts.

2 MATERIALS AND METHODS

The descriptive-exploratory with developmental research design was used in this study. Descriptive research design aims to describe an existing information or topics of the study, while exploratory research design usually conducted to deeply understand qualitatively the information that has been investigated as cited by Scientific Inquiry in Social Work (n.d.). Through this design the researcher determined the least mastered content (competencies) and used them as bases for proposing an intervention learning modules for grade 8 learners amidst pandemic (Saclao, 2016) & (West, 2016) the use of self-learning modules depends on the level of ability of students. This modular approach is appropriate to middle school (or grade-8 students) (Sacramento, 2016). The present study employed the grade 8 students, as respondents because it is the crucial stage among other grade levels, all the contents and competences in this grade level are very important foundations and basics to master the other fields of Mathematics (i.e., Number, Algebra, Geometry, and Data and Chance). That is why grade 8 students are also the target respondents (or examinees) of Trends in International Mathematics and Science Study (TIMSS) (Balagtas et al., 2019). In addition, middle school is a great time to foster independent learning wherein students are capable of doing advanced study enthusiastically with other learners (Saclao, 2016).

To determine the least learned competencies, the

researcher requested the latest and updated consolidated Least Mastered Learning Competencies (LMLC) in Mathematics 8 of Sta. Cruz National School, located at Sta. Cruz Jose Panganiban Camarines Norte. This was considered a remote area of the Department of Education of this province, because of the following considerations: (1) its distance (i.e., approximately 60 kilometers away from the DepEd Office); (2) unstable internet access, and; (3) limited means of transportation. The research also used the related reports of least learned contents that exist on the National Achievement Test (NAT) as support qualitative data to the expected findings in the first objective of this study.

The researcher also utilized the coding technique (survey questionnaires and interview), and reanalyzed different literature to determine the additional input features in developing an intervention learning material in Mathematics 8. These were evaluated for acceptability and modified along with the following; instructional design, organization of learning modules, the layout of the learning modules, readability of material, and appropriateness of material. The selected evaluators are master teachers, Mathematics head teachers, and mathematics teachers from the Department of Education, Philippines, have at least one (1) year experience on developing learning modules, and have a very satisfactory performance rating. Then, the researcher used the feedback, suggestions, and recommendations given by the evaluators to modify the developed intervention learning materials.

Likewise, after determining the least mastered learning competencies, the researcher conducted survey interview students regarding the different difficulties they encountered in the said learning competencies as qualitative data supplement to the aforementioned consolidated LMLC. The students were selected based on quantitative data, the research used previous average grade on previous periodicals (1st & 2nd grading) and using quartile deviation to determine the lower class (or the slow performing students), table I shows the quartile deviation results.

As support to the quantitative data above, the researcher also considered teachers' selected students with difficulties in Math subjects. The researcher also seeks for the permission and consent of the parents of the selected and identified students for interview before the conducted survey interview, this is for ethical consideration for the target participants. The researcher also utilized an analytic rubric to evaluate and validate the developed intervention material in Mathematics 8 to

determine the acceptability level of the proposed intervention learning material. The panel of experts first evaluated it, and their suggestions were incorporated in the development of the said instrument.

The researcher sought the expertise of five (5) Mathematics teachers, three (3) Mathematics Master Teachers, and two (2) Department Head Teachers to determine the level of acceptability of the proposed learning material. They were selected from different public schools in the Department of Education Division of Camarines Norte, Philippines. The evaluators must be currently teaching or have experienced teaching junior high school students, particularly middle-grade students, and trained module developers. Two (2) Mathematics teachers were from Tuaca National High School, Philippines, and one (1) head teacher. The other three (3) Mathematics teachers, two (2) master teachers, and one (1) head teacher were from Vinzons Pilot High School, Philippines. All of them are knowledgeable about the formats and the procedures on how to create a Strategic-Intervention-Material, particularly in Mathematics subjects. They were also competing for the regional and National level in Strategic Instructional Material in Mathematics.

3 RESULTS AND DISCUSSIONS

3.1 Least Mastered Content (Competencies) in Mathematics 8, for the past consecutive school years 2016-2020

The table 2 shows least of learned competencies/content in Mathematics 8 for the previous three consecutive school years from 2016 to 2020.

The result showed that solving problems involving linear inequalities in two variables was the most challenging content (competency and skill). It required students' mastery of prior mathematical knowledge necessary for solving problems. To solve problems involving linear inequalities, the students should perform the computational procedures, analyze, evaluate, and apply the concept in real-life scenarios. Students likewise had low mastery in graphing linear inequalities in two variables. These meant that students found it hard to perform the graphing procedures for the given equations and the manipulation of the rules and properties for inequalities needed. Differentiating linear inequalities in two variables from linear equations in two variables is another area for which students showed low mastery. Students had some difficulty distinguishing linear

Table 1. Selected Slow-paced Learners using Quartile Division Test (N=50)

Rating	Frequency	Grouped Category	Description
80-95	13	Upper Class	Advance-paced Learners
76-79	22	Middle Class	Average-paced Learners
73-75	15	Lower Class	Slow-paced Learners

Table 2. Least Mastered Learning Competencies (Content) based from the previous three consecutive school years, 2016-2020

Least Mastered Learning Competencies in Mathematics 8	% of students got the correct answers	Remarks
School Year 2017-2018		
Illustrates linear inequalities in two variables	31%	Low
Differentiates linear inequalities in two variables from linear equations in two variables	29%	Low
Graphs linear inequalities in two variables	17%	Low
Solves problems involving linear inequalities in two variables	10%	Very Low
School Year 2018-2019		
Illustrates linear inequalities in two variables	33%	Low
Differentiates linear inequalities in two variables from linear equations in two variables	32%	Low
Graphs linear inequalities in two variables	19%	Low
Solves problems involving linear inequalities in two variables	13%	Very Low
School Year 2019-2022		
Illustrates linear inequalities in two variables	28%	Low
Differentiates linear inequalities in two variables from linear equations in two variables	17%	Low
Graphs linear inequalities in two variables	9%	Very Low
Solves problems involving linear inequalities in two variables	8%	Very Low

inequalities in two variables from linear equations in two variables, in terms of concepts, procedures, and their applications. Finally, students had low mastery of illustrating linear inequalities in two variables. It can be gleaned from least mastered competencies that students had difficulty visualizing or graphing linear inequalities in two unknowns, solving application problems, and differentiating equations and inequalities.

It is worthy to note that these competencies mentioned were part of the National Achievement Test (NAT). Low mastery of these competencies could probably be one of the reasons students perform poorly in Mathematics on the previously held NAT (Capate & Lapinid, 2015) and poor performance from TIMSS (Balagtas et al., 2019). To improve students' performance, is to "allowing for more practice, drill or giving activities to help students rectify errors and misconceptions." (Sci-Dost & Mathted, 2011). "As teachers in the 21st Century, we should update with the recent studies and modern effective learning strategies and teaching styles, rather than fixed ourselves on usual conventional teaching methodologies. Self-paced Blended learning activities and materials might be time consuming and effort to create and develop, but the effort is worth it for both teaching and learning process (West, 2016). To determine why students had low mastery of the said competencies mentioned, the researcher interviewed the selected 15 slow students regarding their poor performance in these competencies. The following were some of the reasons:

They found it difficult because of its abstract concepts and procedures of computations. One of the students interviewed said that:

Solving and graphing system of linear inequalities are needing a lot of procedures that makes it too difficult"

"I forgot to remember the steps and process because

of more procedural requirements with abstract processes of computations.

Some students reasoned out that they did poorly on the said competencies because they had no review materials. Two of the students interviewed said that:

I don't have study materials like notebooks & pen and most of the time I am feel bored writing and note-taking; "We have learning modules and books in the library but it cannot accommodate the whole class.

Another reason that transpired in the interview was the students' lack of prior knowledge of the subject matter. One of the students interviewed said that:

I have least prior knowledge about inequalities, so maybe that is the reason why I have difficulties in Mathematics today particularly in solving and graphing systems of linear inequalities.

Another reason that came out was the swift manner by which the teacher taught the lessons. One of the respondents revealed this by saying:

"I cannot understand the lessons because of fast way of teaching."

In middle-grade, Mathematics students explored that taking control of their learning affects their attitude and understanding, by observing student behaviors, conversations, and interactions" (Highland, 2015). Similarly, the researcher found out that the low performers felt inadequacy when they are grouped with fast learners during class activities. One of the interviewees commented:

I feel that I do not belong when I am grouped to the brighter ones for the reason that no one listens and consider my suggestions and ideas in a group activity, so I have a tendency to not participate with them.

Consequently, collaborative activities, and peer tutoring have positive impacts to the individuals' learning

process (Highland, 2015). However, there are cases and considerations in grouping learners to avoid such discriminations, like homogenous groupings with learning materials appropriate and designed to them, which was also the idea of proposing this study. On the other hand, there is at least one advanced student in a group, a task of mentoring to his/her members. Anyway, these would not be applicable due to pandemic. Hence, the alternative is to conceptualize and design a learning material applicable to independent and self-paced learning or learning modules for students not for teachers (i.e., learning modules with simplified content for slow-paced and explorative for average/advanced learners).

3.2 Developed Differentiated Intervention Learning Modules with Blended and Scaffold-Based Instruction in Mathematics 8

Compared to other existing learning materials, the proposed learning modules have its unique features. There are three (3) learning modules designed to three groups with blended learning materials (provided tutorial videos in Tagalog discussion) and a scaffold based-instruction (i.e., guided instructions, presentation and activities). Figure 1 shows the actual output of this study and its differences.

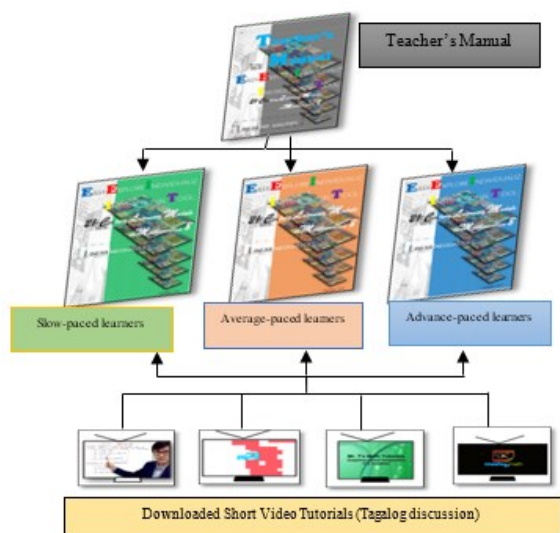


Figure 1. Features of the Differentiated Learning Modules with Blended and Scaffold-Based Instructions in Mathematics 8

The conception that students differ in various aspects such as motivation, attitude towards teaching and learning, and responses to a classroom environment and practices the idea that instruction must be suited to the ability of the students for optimizing learning served as the basis for grouping the students in terms of their pace of learning. The following are feature descriptions of

developed differentiated learning modules in Mathematics 8. These learning materials for each group of learners are categorized by color-coding to avoid discriminations.

3.2.1. Green Module – Learning Module intended for Slow Paced Learners

The learning and instructional procedures for slow-paced learners are the most guided and detailed among the three learning materials developed. "The defined phase that the array of proof as proven in the process" is based on the Instructional Design Theory (E-learning Industry, 2014). It means that the learning process will be easy to solve by the learners if it contains specific instructions throughout from the very beginning of a given problem. "It identified methods of instruction, such as ways to support and facilitate learning, as well as the situations in which those methods should and should not be used. Also, the methods of instruction were to be broken into more detailed component methods" (instructional-design). Thus, the author provided an example for each problem that served as patterns for students and step-by-step instructions (Scaffold-based instruction) aim of this is to move learners from slow-paced to average or advanced paced learner, which lead students to self-regulation & autonomy (Moliner & Alegre, 2020). Such as in evaluating algebraic inequalities wherein the instructional procedures and deepening process were shown.

Subsequent are the students' analysis based on the previous activity. At this point, the learners make conclusions and generalizations individually or collaboratively based on what they did previously. It is believed that knowledge is constructed when learners can draw ideas from their own experiences and connect them to new ideas; while cooperative learning puts a premium on active learning achieved by working with fellow learners as they all engage in a shared task (Braza & Supapo 2014).

Since the lower group provided a "Because" of the detailed procedure for the discussion, slow-paced learners would find it easy to finalize their ideas since "constructivists, learners interpret information from the unique personal perspective of their previous experience" (Ernest, 1994). Next will be the evaluation part, as Jerome Bruner's theory states that one of the best practices in teaching and learning the subject is using scaffolding to support the learners and teachers. In the same idea, the authors applied the same scaffolding procedure in terms of step-by-step instructions in evaluating mathematical problems. In this evaluation activity, lower group learners will not perform if they are not guided, so each mathematical problem is provided by guide steps to follow.

3.2.2. Orange Module – Learning Module intended for Average-Paced Learners.

The learning procedures and activities for the moderate-paced learners are still provided with guided instructions but different from how the learning procedures are presented for slow-paced learners (see in figure 8 and 9). These are likewise anchored on the Instructional-Design Theory, which “provides detailed and scaffold instructions to guide individuals to develop the self-confidence to learn by their own” (Reigeluth, 1999). In this category of learners, the lesson proper is less guided, unlike the first group. Less guided steps in evaluating algebraic problems are provided. The target users of this learning module are moderate learners. The levels of constructing conclusions and generalizations are also average levels. In other words, it is not a super scaffold approach. It has fewer sequences of computations pattern procedures since they already have adequate prior knowledge to perform a given task. Under the constructivist theory, the “nature of learners is to learn things through observations together with the stock knowledge they have” (Ernest, 1994). Thus, the author of this learning module practices the learners to provide examples applying the learning procedures they acquired. It will be practiced in the deepening process of the learning module.

It is quite similar to the sequence of the learning procedures and evaluations in the other two groups. This study also employs the scaffold approach, but moderately, unlike with the other classified groups. A moderate scaffold in such a way that the proponent expects to apply the prior knowledge that the average learners have, dissimilar with the slow-paced learners who need more specific patterns and procedures before they perform. It is different from the abstraction procedures or generalization part presented in the slow-paced learners; the presentations in the moderate-paced learners are leveled up. The evaluation part of this is slightly comparable to the easy-level module since each item of the given problem was also provided clues and hints to calculate. The difference is that the tips or clues itself on each question are incomplete for which the learners need to complete and determine, e.g., “Isolate () by subtracting __ both side”; “Multiply both sides by __”; and “Simplify (the order will _____)” until the learners come up to the expected and correct answer. The said examples were also called the set of objectives in the procedural computations (Reigeluth, 1999).

3.2.3. Blue Module – Learning Module intended for Advance-Paced Learners

Fast-paced learners are the most advanced among the three groups. The researcher created learning activities suited to their ability level to avoid fast learners from losing interest if they find the lesson concepts too easy. Therefore, the researcher also leveled up the learning procedures, and activities are also leveled up. In this learning module, the target learners are expected to

discover something and learn independently based on the provided recall concepts and other input devices before the learning activity is presented. There are fewer clues, and the procedures for the activities are not detailed. The idea of not providing the details to the learners is anchored on the Discovery Learning and Inquiry-based Learning (E-learning Industry, 2014) which states that students learn when they use personal experiences to discover facts, relationships, and concepts. Therefore, the learning module provides recapitulation that will serve as their initial information to answer the activity next to it, lack of clues, unlike the other classified groups. These activities are more challenging, exciting, and enjoyable for them since they have strong foundations in the subject matter and are already knowledgeable in linking prior knowledge to new ones.

3.2.4. Black Module – Teachers Manual

This will serve as a teacher's guide on how to utilize the proposed learning materials to the learners. It also includes the different instructions like (1) the methods of categorizing students from advance, average, and slow learner groups; (2) instructions on when to present/view the video tutorials; and, (3) the answer keys of the learning activities & exercises on the learning modules. Looking at the present features and format of the teachers and learners' materials of the Department of Education in the Philippines, the books integrate ICT by citing websites such as "www.youtube.com," which are videos related to the topic. But if the learner has no internet connections or the school is located in far-flung areas, the video presentation links will not be accessible and useless. The author provides CDs with downloaded videos related to the contents of the learning modules for the fastest execution of the lesson, which is also a feature of the flipped classroom setup (Alquarin, 2018).

This learning material will be a form of self-instructional package and thus regarded as a relatively recent phenomenon (Charles et al., 2014) It enables the learner to have control over his learning and accept greater responsibility for learning. Along with the instructional design, the learning material, for slow-paced learners, was elaborately detailed. It provided patterns for each assessment problem and scaffold by step-by-step instructions and procedures of the computation. For moderate-paced learners, the material was semi-detailed with step-by-set instruction. The researcher omitted the details for fast-paced learners. The materials are differentiated because instruction must be suited to the learners (E-learning Industry, 2014).

The results obtained from the interviews conducted were used as bases for the other features of the learning modules, such as the integration of self-paced blended learning with the help of video tutorials in the learning modules. These are due to the obtained data that most grade 8 respondents prefer that the teacher integrate video

tutorials/presentations related to the learning contents. It provides them with detailed explanations (step-by-step teaching procedure) and repetition whenever they proceed with activities/tasks, collaborative or grouped activities, or games activities. These will be their inputs to boost their prior knowledge to perform the set of actions. It is the unique feature of this developed intervention-learning module.

3.3 Sample Contents & Activities of the Proposed Learning Modules in Mathematics 8

The developed three (3) learning modules for advance, average, and slow learners were common in terms of the used learning competencies. Figure 2 shows sample contents and Activities of the differentiated learning modules.

Though there are different styles, approaches and strategies used in the proposed modules that makes it differentiated, its expected learning outcomes are similar as expected to achieve by the advance-paced, average-paced, and slow-paced learners. The content and activity format of the proposed learning modules begin with the contextualization of the topic, followed by the presentation of a tutorial video facilitated by the teacher, then a review of the needed context. The teacher will provide the students with videos they can view before their classes. An initial activity follows these, later students' reflections and analysis. A collaborative activity follows, and the last part is evaluation. The organization of the learning material fits the "flipped classroom" format. In a flipped classroom, students watch or listen to lectures at home before the start of the class and utilize the time to do the assigned activities. In this way, teachers help them become self-directed learners (Alquarin, 2018).

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In terms of the layout of the learning material, the researcher used different colors to categorize the learning materials for the different types of learners: green for slow-paced learners, orange for moderate-paced learners, and blue for fast-paced learners. For slow-paced learners, the pictures, graphs, and layout of images used in some activities were logically easy to determine/answer. For moderate-paced learners, the photos, graphs, and layout of images used in some activities were reasonably average to decide on/answer. For fast-paced learners, the pictures, graphs, and layout of images used in some activities were logically abstract and challenging to determine/answer. Likewise, the researcher performed these to suit the material to the different learning modes (E-learning Industry, 2014). While in terms of its readability, the researcher utilized terminologies and words that are easily understood by the target users. While in terms of appropriateness, the learning material for slow-paced learners contains easy-level examples, problems, and exercises. The learning material for moderate-paced learners contains average-level examples, problems, and exercises, whereas the ones for fast-paced learners contain examples, problems, and exercises that are difficult.

The development of learning material is essential since it enhances and trains learners to learn independently (Saclao, 2016). It also allows students to achieve higher analytical performance by addressing the

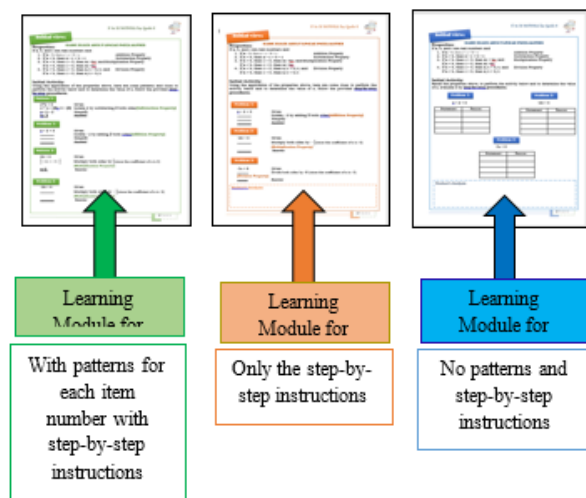


Figure 2. Sample Contents and Activities Differentiated Learning Modules with Blended and Scaffold-Based Instructions in Mathematics 8

Though there are different styles, approaches and

students' learning styles to show greater confidence in a written post-test. This feature employs the self-paced modular approach or the structured lecture-demonstration based approach (Paspasan, 2016). It will be a great contribution to the lower class or slow learners to allow them to enhance their self-confidence and learning style since one of the research projects "revealed that the innovative technique (Modular Approach) affects the attitude and self-confidence of the students as passing through the self-learning environment promotes various positive changes in them" (Nardo, 2017).

3.4 Level of Acceptability of Differentiated Learning Modules with Blended and Scaffold-Based Instruction in Mathematics 8

The researcher utilized this kind of instrument to validate the proposed intervention learning modules in Mathematics 8, according to the following indicators: instructional design and organization of material, layout, and presentation, readability of the material, and appropriateness of material. The evaluators are individuals that have gained expertise and are qualified persons to validate a proposed or developed product.

As shown in Table 3, the evaluators Highly Accepted the developed learning modules, based on the computed overall mean of 3.84. The instructional design and appropriateness of the learning modules have 3.90 computed weighted means, followed by the organization and readability of the learning material. Both have 3.80 computed weighted means. Furthermore, the layout of the learning modules had a 3.70, computed weighted mean. All the stated indications are Highly Accepted based on its computed weighted mean. The developed intervention materials were highly acceptable to the jurors because of their applicability to the remote school areas, wherein the distance from the students' residences to their school is the focal issue (Braza & Supapo, 2014). The same problem encountered by Sta. Cruz National High of Jose Panganiban Camarines Norte, Philippines, as stated on the SCNHS SRC of 2013 to 2015.

Based on the results, all presentations and learning procedures, and activity instructions per lesson are clear

and easy to understand by the target learners (Instructional Design). The researcher also arranged all learning procedures and activities from simple to complex. Its layout and designs are stimulating, eye-catching, and suitable for the target user. Modules contained illustrations, images, graphs/maps to facilitate comprehension, and all are consistently clear in the content and details. The vocabulary level is appropriate, all directions and questions are clear, and the length of sentences is suitable to the target users. All ideas and activities from the lesson flow logically. All the contents and activities are aligned to the learning competencies of the learners' grade level. All texts and visual contents are suitable for the target Filipino users—the intervention learning materials catered to the diversity of learners and their various paces of learning. Also, the integrated applications are appropriate for the lessons.

3.5 Some Modifications of Developed Differentiated Learning Modules

Modification refers to the change to enhance something. Upon validating the learning material, the evaluators were likewise asked for their suggestions and recommendations to improve the learning material further. The comments made by the jurors were taken into consideration to enhance further the contents and features of the developed learning material. Furthermore, the comments made by the research committee were also considered. Regarding the instructional design, the evaluators recommended that the learning material provide additional features to engage students in the learning process.

Regarding the organization, the evaluators suggested that the learning material should show reflections and collaborative works of students after the activities in the learning procedure. Regarding the layout, the evaluators recommended that images, pictures, and diagrams found in the learning material must have some connections to the learning activity. Regarding the readability, instructions should be clear, brief, concise, simple, and understandable. Finally, regarding the appropriateness, the evaluators recommended that real-life sample

Table 3. Level of Acceptability of the Evaluators for the Differentiated Learning Modules with Blended and Scaffold-Based Instructions in Linear in two Variables

Indicators	Weighted Mean	Interpretation
Instructional Design	3.90	Highly Acceptable
Organization of Learning Material	3.80	Highly Acceptable
The Layout of the Learning Material	3.70	Highly Acceptable
Readability	3.80	Highly Acceptable
Appropriateness of Learning Modules	3.90	Highly Acceptable
Overall Mean	3.84	Highly Acceptable

Legend: (3.50 – 4.00) Highly Acceptable; (2.50 – 3.49) Acceptable; (1.50 – 2.49) Fairly Acceptable; (1.00 – 1.49) Poorly Acceptable

Table 4. Modification Integrated to the Developed Differentiated Learning Modules with Blended and Scaffold Based Instruction in Linear Inequalities in Two Variables

Criteria	Modifications
Instructional design	<ul style="list-style-type: none"> a. The learning material should encourage the students to be responsible enough to perform the activities and apply what they have learned. b. Provide review activities before introducing the entire topics. c. Modify some questions to be more specific to attain the particular target goals and learning objectives.
Organization of the learning material	<ul style="list-style-type: none"> a. The modules should show reflections and collaborative works of students after the activities under the learning procedure in the learning module. b. Make contents and directions clear and understandable.
The layout of the learning material	Avoid using unconnected images and pictures in the learning activity presented in the learning modules.
Readability of the learning material	Instructions should be clear, brief, concise, simple, and understandable.
Appropriateness of the learning materials	Provide real-life sample applications.
applications in the learning material must be provided. See table IV for other indicators, including the instructional design (specified modifications).	Mathematics would enjoy and motivate the slow-paced learners, but not maybe by average and advance-paced learners. Likewise, hard and difficult problems may be interesting for advanced learners in contrast to the other groups of learners. Therefore, the developed three differentiated learning modules of this study were designed to advance, average and slow-paced learners.

Students responded that the typical difficulties they had encountered prior knowledge on foundations in Mathematics subjects such as incorrectly applying the formula, properties, theorems, and laws. With these, the author includes the review activities and recapitulation discussions on the developed learning modules as recommended by the evaluators. These learning materials are useful for practice exercises, enhancement materials for advanced & average students, while intervention materials for the slow learners, these are some of the concepts and strategies recommended in the study about assessing mathematics performance of Grade 8 Students to enhance instruction and aligning with K to 12 Curriculum (Capate & Lapinid, 2015). In addition, the material developed appropriately addresses the problem identified in the implementation of the K to 12 curricula, such as lack of modules/learning materials (Braza & Supapo, 2014).

4 CONCLUSION

Mastery of the foundation topics prior to the System of Linear Inequalities are required and necessary to perform the problem solving related to this content. While, the low performing students had a feeling of inadequacy when they are grouped with the fast learners during class activities, because the students are differed in terms of their prior knowledge in the content. Further, simplified learning activities/problems and detailed (step-by-step) content presentation of a certain lesson in

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