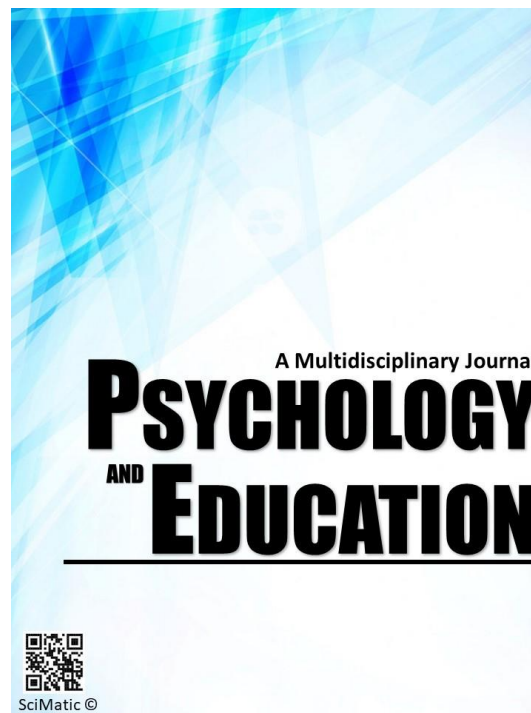


**INTERVENTION MATERIAL UTILIZING KOTOBEE
APPLICATION AS AN AID FOR MODULAR
DISTANCE LEARNING FOR GRADE 10
MATHEMATICS**



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Intervention Material Utilizing Kotobee Application as an Aid for Modular Distance Learning for Grade 10 Mathematics

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Abstract

This study focused on development of intervention material utilizing Kotobee Application as an aid for Grade 10 students as they dealt with modular distance learning at Lagundi-CCL National High School. This study utilized descriptive- developmental, and experimental research design utilizing assessment test and adopted questionnaire-checklist. In addition, the study used two groups of respondents. The first group was composed of thirty (30) Grade 10 learners who were chosen purposively based on the results of Learning Outcome Assessment during the first quarter. The second group was comprised of five (5) Mathematics experts who had evaluated the developed intervention material. Based on the result, the student- participants performed Very Satisfactory in geometric sequence, factoring polynomials, polynomial equations, and problem solving involving polynomial equations after exposure to the intervention material using Kotobee application. Moreover, the teacher-respondents evaluated the developed learning material Very satisfactory with respect to its content quality, instructional quality, and technical quality, and other findings. The results of this research may serve as basis of Mathematics teachers in Lagundii-CCL NHS to continue the provision of intervention material to improve students' performance. More so, other subject teachers can use the findings in developing their own material.

Keywords: Kotobee, Intervention Material, Mathematics

Introduction

Education is an essential avenue of one's life. It may serve as foundation in molding the 21st century learners by providing them knowledge and skills to be locally and globally competitive individuals. It may be along life's process, hierarchically structured, chronologically graded education system or any organized educational activities outside the established formal system.

However, the country and the world at large are currently facing global health crisis which put everyone's life at risk and led to great alterations in the system of all the sectors in the government. Undoubtedly, Covid-19 pandemic brought big impact and paved the way to the birth of the so called 'new normal'.

In the field of education, the effects of the unseen enemy are very evident. Elsewhere in the world, schools are starting to reopen for students with social distancing regimes to keep infection rates down. Some offers distance learning and homeschooling as alternatives in the traditional face-to-face classroom interactions.

A concerted effort in the Department of Education gave birth to a bigger framework known as the Learning Continuity Plan, that serves as the guiding

principles of the whole K12 Educational System. The Learning Continuity Plan is the major response & commitment in ensuring the health, safety & well-being of learners, teachers, personnel in time of COVID 19 while finding ways for education to continue amidst the crisis for the upcoming school year. This educational framework is composed of different important pillars such as: School Readiness, Human Resources, Infrastructure readiness, Transition Program, Building Partnership, Teaching and Learning Modalities and Assessment centered on the Development of the Most Essential Skills and Values of the learners (DepEd, 2020).

It was explained in DepEd Order No. 012 series of 2020, Adoption of the Basic Education Learning Continuity Plan for School Year 2020-2021 in light of the Covid-19 Public Health Emergency, paragraph 3 letter B that:

"The BE-LCP ensures learning continuity through K-12 curriculum adjustments, alignment of learning materials, deployment of multiple learning delivery modalities, provision of corresponding training for teachers and school leaders, proper orientation of parents or guardians of learners".

Because of the modification in educational community due to the health crisis, BELCP serves as a package of education interventions that will address the challenges brought about by Covid-19.

For many children, school is a safe haven and protective environment. But because of the pandemic education is shifting children's learning from school to home setting. The abovementioned provisions are some of the initiatives which were done by the DepEd to make sure that children's right to learn is supported even on a household situation.

To adhere with these aspirations and goals of the education sector in the country, Lagundi-CCL National High School included in its LCP the learning modality of best-fit as per consolidated and evaluated data on the Learner's Enrollment and Survey Form. Based from its result, the learners' most preferred modality was printed modular distance learning.

After the evaluation of the implementation of SLCP, it was reflected on the data that most of the learners experienced challenges in their self-paced learning environment. Some of these limitations are difficulty in independent learning, lack of assistance from family member, and conflicts with other household activities. These problems resulted to poor academic performance of the learners as shown in the results of their written works and performances tasks.

With these reasons, the researcher opted to conduct this study to develop and validate a learning material utilizing the Kotobee application that would aid the students as they have Self-Learning Modules.

Kotobee is an ultimate digital publishing platform for education and training. It gives the users the keys to create rich interactive content that runs in different format or even in one's very own branded app. Also, using this allows other users like students to access the content online or offline depending on their capacity and availability of the means. In this new normal of scheme in education Kotobee would be of great aid to help learners especially those who preferred modular distance learning.

As a Grade 10 teacher, the researcher developed a learning material using the Kotobee author application focusing on the least mastered topics in first quarter which are parallel to prescribed most essential learning competencies. This served as the learners' learning aid as they deal with their learning tasks in Mathematics 10.

Research Questions

This research aimed to develop an intervention material utilizing Kotobee as an aid for modular distance learning for Grade 10 Mathematics during the School Year 2020-2021. Specifically, this sought to

answer the following research questions:

1. How does the Kotobee intervention material developed?
2. What is the level of performance of Grade 10 students after being exposed to the developed intervention material with respect to:
 - 2.1 geometric sequence;
 - 2.2 factoring polynomials;
 - 2.3 polynomial equations; and
 - 2.4 problem solving involving polynomial equations?
3. What are the strengths and weakness of the developed learning materials?

Innovation, Intervention and Strategy

This action research focused on the development of an intervention material utilizing Kotobee as an aid for modular distance learning for Grade 10 Mathematics. The teacher-researchers developed a learning material which prime objective is to provide assistance to the learners who had difficulties in their modular distance learning.

Bunagan (2012) defined 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). It is a multifaceted approach to help students to become independent and successful learners. This intervention material focuses on the skill not mastered by the students during regular class. It involves pretest and posttest and includes fun activities.

At present, in the Philippine education system, intervention materials are highly regarded as tools for remediating poor achievements of the learners due to the limitations brought by the new normalcy in education. Likewise, these materials would be of great teachers for the learners to cope with the competencies in Mathematics 10 that they did not master during the first quarter period.

The development of the intervention material will anchor to the simplified process of ADDIE (Analysis, Design, Development, Implementation, and Evaluation). The ADDIE model is an instructional design methodology used to help organize and streamline the production of your course content. It is

still the most commonly used model for instructional design. More so, this model relies on each stage being done in the given order but with a focus on reflection and iteration (Quigley, 2019).

Furthermore, the researcher used the Kotobee application as the main tool in implementing the intervention material. This application could be used even without internet connection which make it more accessible for the learners.

Methodology

Participants and/or other Sources of Data and Information

The researcher gathered information and necessary data through conducting an observation and gathering important figures and facts. Likewise, the data in this study were obtained from two groups of respondents. The first group of respondents was composed of five (5) Mathematics experts from different secondary schools in the Division of Rizal. These experts are the Master Teachers in mathematics who are teaching the subject in this current school year. They were asked to evaluate the developed intervention materials with respect to its content quality, instructional quality, and technical quality, and other findings. The second group of respondents were the thirty (30) Grade 10 learners who have failing grades in Mathematics 10 as reflected in the results of Learning Outcome Assessment (LOA) during the first quarter. The researcher utilized the purposive sampling technique in choosing the student-participants in this study since they are teachers in Grade 10.

Data Gathering Methods

The study utilized the descriptive-developmental, and experimental research design utilizing assessment test and adopted questionnaire-checklist involving the development of intervention materials in Mathematics utilizing Kotobee application for Grade 10.

There were two sets of instruments that this this action research used. The first instrument was the adopted evaluation and review form for development of new non-print materials provided in the Guidelines and Process for LRMDS Development and Production System (DepEd, 2009 pages 138-142) to assess the developed materials. The first part of the evaluation form included the profile of the respondent. The second part was the checklist on assessment of the materials in terms of content quality, instructional

quality, technical quality, and other findings. The last part reflects the other comments and recommendations of the respondents.

The second set of instruments was the objective type of test in the form of assessment to measure the level of performance of Grade 10 learners in Mathematics with respect to geometric sequence, factoring polynomials, polynomial equations, and problem solving involving polynomial equations. These were validated by Grade 10 Math teachers.

In developing the intervention materials, the concept of ADDIE was utilized. Phase I refers to the preparation stage includes the administration of pre-test with respect to the least mastered skills of Grade 10. The contents and components of the intervention materials will be based on their performance in first quarter. The development stage, Phase II, involves the following: deciding on the format of the materials, the process of creating the materials and the initial revisions needed to improve the first draft of the intervention materials. The last phase, the validation stage, Mathematics-experts were asked to assess the intervention materials in terms of the aforementioned variables.

The researcher-made test which were validated by the experts were administered to the respondents. The result of this was then used to determine the level of performance of the students before exposing them to developed intervention materials utilizing Kotobee application.

The learner-respondents were then exposed to the developed intervention materials for three (3) weeks focusing on the target lessons: geometric sequence, factoring polynomials, polynomial equations, and problem solving involving polynomial equations. After being exposed to the developed material, they were given an assessment to determine their level of performance with respect to the aforementioned topics.

Results and Discussion

This presents the results and analysis of data gathered relative to the aim of the study which was to develop an intervention material utilizing Kotobee as an aid for modular distance learning for Grade 10 Mathematics during the School Year 2020-2021.

Development of Intervention Material utilizing Kotobee



The intervention material utilizing Kotobee application was developed to improve the performance of the learners in Mathematics 10.

During the implementation of Modular Distance Learning, there were students who were lagging behind because they could not answer independently their learning tasks in Mathematics 10. Due to this reason, the intervention material using Kotobee was developed.

The researcher reviewed the results of the Learning Outcome Assessment in first quarter period and identified the competencies in which the students lagged behind. Lessons with respect to geometric sequence, factoring polynomials, polynomial equations, and problem-solving involving polynomial equations included in the intervention material were based on the identified Most Essential Learning Competencies in Grade 10 Mathematics as prescribed by the Department of Education.

In developing the intervention materials, the concept of ADDIE was utilized. Phase I refers to the preparation stage which includes the administration of pre-test with respect to the least mastered skills of Grade 10. The contents and components of the intervention materials were based on the result of performance of the learners in first quarter. The development stage, Phase II, involved the following: deciding on the format of the materials, the process of creating the materials and the initial revisions needed to improve the first draft of the intervention materials. The last phase, the validation stage, Mathematics-experts were asked to assess the intervention materials in terms of its content quality, instructional quality, technical quality, and other findings using the adopted questionnaire-checklist. They also consulted other mathematics teachers to further improve the developed intervention material.

Evaluation of Experts on the Developed Intervention Material with respect to Content Quality, Instructional Quality, Technical Quality, and Other Findings

Table 1 presents the evaluation of the experts on the developed intervention material utilizing Kotobee application with respect to content quality.

Table 1. *Evaluation of Experts on the Developed Intervention Material utilizing Kotobee Application with respect to Content Quality*

Content Quality	Mean	Verbal Interpretation
1. Content is consistent with topics/skills found in the DepEd Learning Competencies for the subject and grade/year level it was intended.	4.00	Very Satisfactory
2. Concepts developed contribute to enrichment, reinforcement, or mastery of the identified learning objectives.	3.80	Very Satisfactory
3. Content is accurate.	4.00	Very Satisfactory
4. Content is up-to-date.	3.80	Very Satisfactory
5. Content is logically developed and organized.	3.60	Very Satisfactory
6. Content is free from cultural, gender, racial, or ethnic bias.	3.40	Very Satisfactory
7. Content stimulates and promotes critical thinking.	3.60	Very Satisfactory
8. Content is relevant to real-life situations.	3.80	Very Satisfactory
9. Language (including vocabulary) is appropriate to the target user level.	3.40	Very Satisfactory
10. Content promotes positive values that support formative growth.	3.80	Very Satisfactory
Weighted Mean	3.72	Very Satisfactory

It can be seen on the table that the mathematics experts evaluated the developed intervention material using Kotobee application with respect to content quality as Very Satisfactory with the weighted mean of 3.72.

Likewise, it can be noted that with regard to content quality, the teacher respondents believe that the scope, range and depth of the content are appropriate to the target learners, the material promotes the achievement of learning goals, and it includes identified desirable values. The result implies that the developed lesson exemplars contain appropriate details suitable to Grade 9 and reinforce, enrich, and lead to the mastery of target competency in Mathematics 10.

Table 2 presents the evaluation of the experts on the developed intervention material utilizing Kotobee application with respect to instructional quality.



Table 2. Evaluation of Experts on the Developed Intervention Material utilizing Kotobee Application with respect to Instructional Quality

Instructional Quality	Mean	Verbal Interpretation
1. Purpose of the material is well defined.	4.00	Very Satisfactory
2. Material achieves its defined purpose.	3.80	Very Satisfactory
3. Learning objectives are clearly stated and measurable.	4.00	Very Satisfactory
4. Level of difficulty is appropriate for the intended target user.	3.80	Very Satisfactory
5. Graphics / colors / sounds are used for appropriate instructional reasons.	3.40	Very Satisfactory
6. Material is enjoyable, stimulating, challenging, and engaging.	4.00	Very Satisfactory
7. Material effectively stimulates creativity of target user.	3.20	Satisfactory
8. Feedback on target user's responses is effectively employed.	3.20	Satisfactory
9. Target user can control the rate and sequence of presentation and review.	3.80	Very Satisfactory
10. Instruction is integrated with target user's previous experiences.	3.40	Very Satisfactory
Weighted Mean	3.66	Very Satisfactory

It can be glanced on the table that the mathematics experts evaluated the developed intervention material using Kotobee application with respect to instructional quality as Very Satisfactory with the weighted mean of 3.66.

More so, the teacher-respondents agreed that the intervention material is well designed and is likely to achieve its defined purpose containing the target competencies to mastered by the students, and presents an innovative pedagogy. This suggested that the developed intervention material using Kotobee application scaffolds and challenges students' level of understanding through its engaging and interactive design, presentation and representation of information.

Table 3 presents the evaluation of the experts on the developed intervention material utilizing Kotobee application with respect to technical quality.

Table 3. Evaluation of Experts on the Developed Intervention Material utilizing Kotobee Application with respect to Technical Quality

Technical Quality	Mean	Verbal Interpretation
1. Audio enhances understanding of the concept.	3.40	Very Satisfactory
2. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	3.60	Very Satisfactory
3. There is complete synchronization of audio with the visuals, if any.	3.80	Very Satisfactory
4. Music and sound effects are appropriate and effective for instructional purposes.	3.40	Very Satisfactory
5. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	3.20	Satisfactory
6. Visual presentations (non-text) are clear and easy to interpret.	3.20	Satisfactory
7. Visuals sustain interest and do not distract user's attention.	3.40	Very Satisfactory
8. Visuals provide accurate representation of the concept discussed.	3.80	Very Satisfactory
9. The user support materials (if any) are effective.	3.60	Very Satisfactory
10. The design allows the target user to navigate freely through the material.	4.00	Very Satisfactory
11. The material can easily and independently be used.	4.00	Very Satisfactory
12. The material will run using minimum system requirements.	3.60	Very Satisfactory
13. The program is free from technical problems.	3.20	Satisfactory
Weighted Mean	3.55	Very Satisfactory

It can be gleaned on the table that the mathematics experts evaluated the developed intervention material using Kotobee application with respect to technical quality as Very Satisfactory with a weighted mean of 3.55.

This means that the teacher-respondents believe that the developed material provides adequate and clear instructions for using the material, and visualization of ideas and concepts is used to attract attention, aid retention. It can be reflected from this result that the material enhances understanding or create context and allows and encourages learners to work independently.

Table 4 presents the evaluation of the experts on the developed intervention material utilizing Kotobee application with respect to other findings



Table 4. Evaluation of Experts on the Developed Intervention Material utilizing Kotobee Application with respect to Other Findings

Other Findings	Mean	Verbal Interpretation
1. Conceptual errors.	4.00	Very Satisfactory
2. Factual errors.	4.00	Very Satisfactory
3. Grammatical and/ or typographical errors.	3.80	Very Satisfactory
4. Other errors (i.e., computational errors, obsolete information, errors in the visuals, etc.).	4.00	Very Satisfactory
Weighted Mean	3.95	Very Satisfactory

It can be seen on the table that the mathematics experts evaluated the developed intervention material using Kotobee application with respect to other findings quality as Very Satisfactory with a weighted mean of 3.95.

From the data, it can be noted that the teacher-respondents found that the developed lesson exemplars have no conceptual, factual and computational errors. In addition, they agreed that the materials contain new and recent information. The result implies that the developed intervention material utilizing Kotobee application for Grade 10 Mathematic comprises correct and relevant information that may contribute to its effective utilization.

Performance of Grade 10 Learners after Exposure to the Developed Intervention Material

Table 5 presents the performance of Grade 10 learners after exposure to the developed intervention material with respect to the identified least mastered skills.

Lesson	Mean	Standard Deviation	Verbal Interpretation
Geometric sequence	7.97	1.08	Very Satisfactory
Factoring polynomials	7.58	1.16	Very Satisfactory
Polynomial Equations	7.53	1.20	Very Satisfactory
Problem solving	7.27	1.12	Very Satisfactory
Total	7.59	1.14	Very Satisfactory

It can be glanced on the table that the Grade 10 students performed Very Satisfactory in all the

identified lessons in Mathematics with an overall mean of 7.59. The result signify that the students really leaned on the given topics after they were exposed to the developed intervention material. However, it is important to note that since they have obtained Very Satisfactory performance only, they still need more exposure to other learning tasks using the intervention material for further improvement.

The findings indicate that utilizing an interactive and self-paced application like Kotobee as intervention material contribute to the good performance of the learners especially when they are given activities that are interactive, engaging, and self-navigating.

Conclusion

Strengths and Weaknesses of the Developed Intervention Materials

Based on the comments and suggestions of both student participants and teacher respondents, the following strengths and weaknesses of the developed intervention material utilizing the Kotobee application were identified.

Strengths

- The lessons were concise and compacted which allows the students to review and obtain mastery of the lesson by repetitive studying through viewing.
- The material is accessible even the students have no internet connection.
- The students could bring the learning material everywhere and may answer their learning tasks.
- This may lessen the printing of learning materials since it is digital and can be uploaded in the gadget of the learners.
- The intervention material aids the learners to master the competencies in which they were lagging behind.

Weaknesses

- Since it is an application, it only runs if the students have gadgets.
- Students should have been thoroughly oriented on how to use the application.
- Teachers and students are not yet familiar with the Kotobe application.
- Learning tasks are not related to real-life situations.



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