Mensuration and Calculation: A Worktext in Technology and Home Ecomonice

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Abstract

This study focused on developing Competency-based Learning Material in Performing Mensuration and Calculation and Evaluating the Effectiveness through the Performance Rate of Respondents. Specifically, the researcher aimed to determine the level of components and characteristics of the developed worktext; assess the students' performance through pretest and posttest; and identify the significant effect of the developed worktext on the student's posttest. The researcher used descriptive research method in gathering of the data. A total of fifty (50) Grade 8 Students enrolled for the School Year 2021-2022 with a grade in TLE lower than 80 is the respondents. The research instrument of this study utilized the pre-test and posttest. Moreover, the researcher also developed questionnaires assessing the level of components and characteristics of the worktext. The statistical treatment of mean difference, weighted mean, standard deviation, and t-test were used by the researcher.

Keywords: mensuration and calculation; worktext; studemts'perfomsnce

1. Main text

The Philippine educational system posed a challenge in implementing curriculum among Technology and Livelihood Education (TLE) teachers and thus strengthening the performance-based activities should be the primary objective of teachers in the delivery of lessons in the four components of the TLE subject, such as Home Economics, Agriculture, Industrial Arts, and Entrepreneurship. Hence, the four components aim every learner to grasp knowledge, processes as it geared toward technological development that they can apply and develop day-to-day life skills.

In many fields of work mensuration and calculation can be applied to real-life situations, and it is very important among the students to adapt the basic knowledge and concept of both. These concerns are stated in RA 10533, "Enhanced Basic Education Act of 2013", an act enhancing the Philippine Basic Education System by strengthening curriculum and presents different approaches that could be utilized especially in T.L.E. and these are Constructive Approach, Collaborative approach, Integrative approach, Inquiry-based approach and Reflective approach. (Asuncion, J., 2021)

As to the concern of this study is in line with Electrical Installation and Maintenance (EIM) as one of the specializations in T.L.E. This area primarily uses numerical skills in its learning content and thru this, the researcher is motivated to develop a worktext that will aid as an enrichment material for the student's

performance in measurement and calculation. Similarly, it is an objective-based materials to develop a worktext as a means of supplementary learning material to enhance measurement and calculations skills in EIM and other learning components in T.L.E.

1.1. Structure

As a TLE teacher teaching Electrical Installation and Maintenance, the common observance is that the learners poor understanding of how to apply, perform mathematical operations and computational weaknesses. In response with the learning needs, the researcher conceptualized to develop a worktext that will be supported by a weekly test card and learning activities. This material will help the to visualize, uplift their numeracy level and understand how mensuration and calculation goes on considering the need of competency-based learning materials. It indeed aims to allow learners to have practical experiences they will be used in TLE subjects. (DepEd). Furthermore, the views that the worktext as learning material will assist in performing practical tasks in Electrical Installation and Maintenance.

Conceptual Framework

Independent   Variable   **Dependent   Variable**

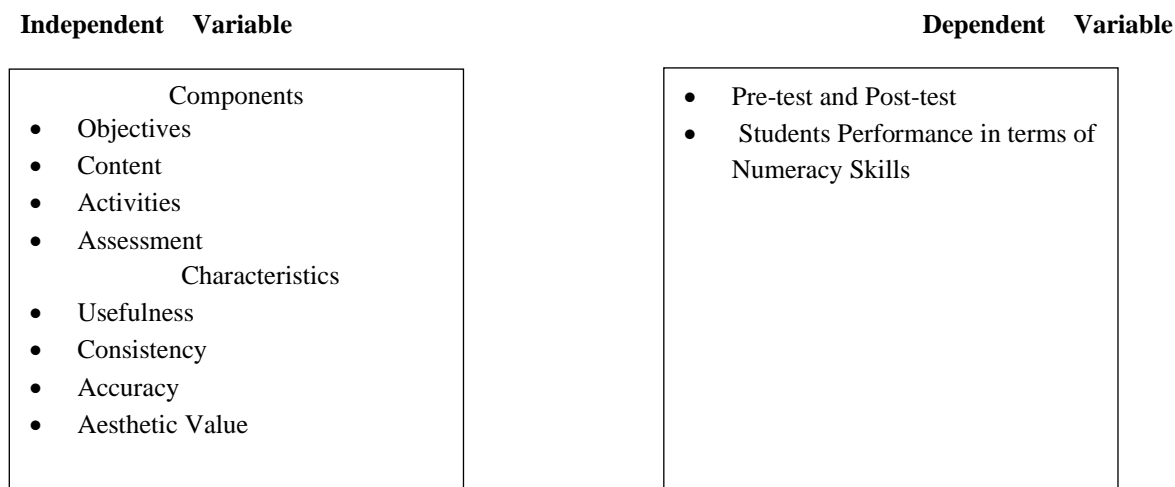|	
Components • Objectives • Content • Activities • Assessment Characteristics • Usefulness • Consistency • Accuracy • Aesthetic Value	• Pre-test and Post-test • Students Performance in terms of Numeracy Skills

Figure 1. Conceptual Framework in the Work text in Performing Mensuration and Calculation: A Competency-based Learning Material in TLE

1.2. Tables

Results and Discussions
Level of Components of Work Text

Apart from instructional modules, worktext is also one of the learning materials that are being used for the students to attain the desired competencies for a specific learning area.

Table 1. With Regards to Objectives

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation should clearly state the lesson objectives	3.68	0.47	Strongly Agree
2. The worktext in Performing Mensuration and Calculation should provide specific and achievable objectives	3.48	0.50	Strongly Agree

	Mean	SD	Remarks
3. The worktext in Performing Mensuration and Calculation presents the use of hierarchical objectives	3.24	0.43	Agree
Grand Mean	**3.44**		**Strongly Agree**
Interpretation	**Very High**		

In the table above, the components of the work text with regards to its objectives appeared to be at a very high level obtaining the grand (M=3.44). This further means that respondents strongly agree that the objectives in the work text conformed with its stated characteristics. The statement, "the worktext in Performing Mensuration and Calculation should clearly state the lesson objectives" was strongly agreed by the respondents supported by the gained the highest (M=3.68, SD=0.47). Though it obtained the lowest (M=3.24, SD=0.43), the respondents agree that "the worktext in Performing Mensuration and Calculation presents the use of hierarchical objectives". This indicates further the demonstration of appropriate objectives in the developed work text.

Table 2. With Regards to Content

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation has a logical arrangement of content	3.52	0.50	Strongly Agree
2. The worktext in Performing Mensuration and Calculation is arranged from basic to complex of content	3.58	0.50	Strongly Agree
3. The worktext in Performing Mensuration and Calculation should have unity and coherence of content	3.34	0.48	Strongly Agree
4. The worktext in Performing Mensuration and Calculation should have relevant content to the objectives	3.34	0.48	Strongly Agree
Grand Mean	**3.43**		**Strongly Agree**
Interpretation	**Very High**		

In the table above, the components of the work text with regards to its content appeared to be at a very high level obtaining the grand (M=3.43). This further means that respondents strongly agree that the content should provide efficiency provided by the developed worktext. The statement, "the worktext in Performing Mensuration and Calculation is arranged from basic to complex of content" was strongly agreed by the respondents supported by the gained the highest (M=3.58, SD=0.50). Though it obtained the lowest (M=3.24, SD=0.43), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation should have relevant content to the objectives". This indicates further the clarity and relevance possessed in the utilized worktext.

Table 3. With Regards to Activities

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation provides variety of learning activities	3.76	0.43	Strongly Agree
2. The worktext in Performing Mensuration and Calculation uses learning activities inciting the critical thinking of the students	3.48	0.50	Strongly Agree
3. The worktext in Performing Mensuration and Calculation uses activities in a spiral progression approach	3.36	0.48	Strongly Agree

Grand Mean	**3.54**	**Strongly Agree**
Interpretation	**Very High**	

In the table above, the components of the work text with regards to its activities appeared to be at a very high level obtaining the grand (M=3.54). This further means that respondents strongly agree that variety of activities are essential component of a worktext. The statement, "the worktext in Performing Mensuration and Calculation provides variety of learning activities" was strongly agreed by the respondents supported by the gained the highest (M=3.76, SD=0.43). Though it obtained the lowest (M=3.36, SD=0.48), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation uses activities in a spiral progression approach". This indicates further the application of spiral progression in preparing activities.

Table 4. With Regards to Assessment

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation includes guide questions	3.56	0.50	Strongly Agree
2. The worktext in Performing Mensuration and Calculation uses evaluation and feedback	3.20	0.40	Agree
3. The worktext in Performing Mensuration and Calculation presents a variety of assessment tool	3.64	0.48	Strongly Agree
Grand Mean	**3.40**		**Strongly Agree**
Interpretation	**Very High**		

In the table above, the components of the work text with regards to its assessment appeared to be at a very high level obtaining the grand (M=3.40). This further means that respondents strongly agree that assessment reiterated the effectiveness drawn by worktext. The statement, "the worktext in Performing Mensuration and Calculation presents a variety of assessment tool" was strongly agreed by the respondents supported by the gained the highest (M=3.64, SD=0.48). Though it obtained the lowest (M=3.20, SD=0.40), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation uses evaluation and feedback". This indicates further that feedback should be integrated for an effective assessment method.

Level of the Characteristics of Work Text

Table 5. Relative to Usefulness

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation provides performance-based activities in the TLE lessons	3.62	0.49	Strongly Agree
2. The worktext in Performing Mensuration and Calculation makes learning more interesting, practical, realistic, and appealing	3.34	0.48	Strongly Agree
3. The worktext in Performing Mensuration and Calculation increases the academic performances of students	3.50	0.51	Strongly Agree

Grand Mean	**3.44**	**Strongly Agree**
Interpretation	**Very High**	

In the table above, the level of characteristics of work text with regards to usefulness appeared to be at a very high level obtaining the grand (M=3.44). This further means that respondents strongly agree that their worktext used should be useful enough in their learning. The statement, "the worktext in Performing Mensuration and Calculation provides performance-based activities in the TLE lessons" was strongly agreed by the respondents supported by the gained the highest (M=3.62, SD=0.49). Though it obtained the lowest (M=3.34, SD=0.48), the respondents agree that "the worktext in Performing Mensuration and Calculation makes learning more interesting, practical, realistic, and appealing". This indicates further usefulness of a worktext in relation to its appeal.

Table 6. Relative to Consistency

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation follows simple to complex presentation of the lesson	3.72	0.45	Strongly Agree
2. The worktext in Performing Mensuration and Calculation is suited to the student's level of understanding	3.60	0.49	Strongly Agree
3. The worktext in Performing Mensuration and Calculation integrates classroom policies and procedures	3.36	0.48	Strongly Agree
Grand Mean	**3.52**		**Strongly Agree**
Interpretation	**Very High**		

In the table above, the level of characteristics of work text with regards to consistency appeared to be at a very high level obtaining the grand (M=3.52). This further means that respondents strongly agree in the consistency possessed by the worktext in learning. The statement, "the worktext in Performing Mensuration and Calculation follows simple to complex presentation of the lesson" was strongly agreed by the respondents supported by the gained the highest (M=3.72, SD=0.48). Though it obtained the lowest (M=3.36, SD=0.48), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation integrates classroom policies and procedures". This indicates the importance of establishing rules and regulations in consistency.

Table 7. Relative to Accuracy

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation has accuracy of the learning content/subject matter	3.62	0.49	Strongly Agree
2. The worktext in Performing Mensuration and Calculation has clarity of language	3.60	0.49	Strongly Agree
3. The worktext in Performing Mensuration and Calculation illustrates the accuracy of learning activities	3.52	0.50	Strongly Agree

Grand Mean	**3.58**	**Strongly Agree**
Interpretation	**Very High**	

In the table above, the level of characteristics of work text with regards to accuracy appeared to be at a very high level obtaining the grand (M=3.58). This further means that respondents strongly agree in delivery of accurate information needed in developing of worktext. The statement, "the worktext in Performing Mensuration and Calculation has accuracy of the learning content/subject matter" was strongly agreed by the respondents supported by the gained the highest (M=3.62, SD=0.49). Though it obtained the lowest (M=3.52, SD=0.50), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation illustrates the accuracy of learning activities". This indicates that respondents viewed the authenticity given by the activities.

Table 8. Relative to Aesthetic value

STATEMENT	Mean	SD	Remarks
1. The worktext in Performing Mensuration and Calculation should clearly state the lesson objectives	3.56	0.50	Strongly Agree
2. The worktext in Performing Mensuration and Calculation should provide specific and achievable objectives	3.62	0.49	Strongly Agree
3. The worktext in Performing Mensuration and Calculation uses SMART type of learning objectives	3.40	0.49	Strongly Agree
Grand Mean	**3.53**		**Strongly Agree**
Interpretation	**Very High**		

In the table above, the level of characteristics of work text with regards to aesthetic value appeared to be at a very high level obtaining the grand (M=3.53). This further means that respondents strongly agree in using the aesthetic value as part of delivering the intent of developed worktext. The statement, "the worktext in Performing Mensuration and Calculation should provide specific and achievable objectives" was strongly agreed by the respondents supported by the gained the highest (M=3.62, SD=0.49). Though it obtained the lowest (M=3.40, SD=0.49), the respondents strongly agree that "the worktext in Performing Mensuration and Calculation uses SMART type of learning objectives". This indicates that strategies given in declaring a SMART type of objectives in worktext.

Level of Students' Performance

Table 9. Students' Performance in terms of Pre-Test

Grading Scale	Frequency	Percentage	Descriptors
90 – 100	21	42%	Outstanding
85 – 89	11	22%	Very Satisfactory
80 – 84	4	8%	Satisfactory
75 – 79	5	10%	Fairly Satisfactory

Below 75	9	18%	Did Not Meet Expectations
Mean	**85.54**	**Interpretation**	**Very Satisfactory**

Table 9 revealed the student's performance in terms of pre-test. It can be seen that 7 out of 50 or 14 percent of the students obtained an outstanding performance, 5 out of 50 or 10 percent of the respondents got a very satisfactory performance, 3 out of 50 or 6 percent obtained a satisfactory performance, 7 out of 50 or 14 percent performed fairly satisfactory but unfortunately, 28 out of 50 or 56 percent were not able to meet expectations. The over-all mean of 74.74 indicates that the students did not meet expectations in the pre-test. This means that the majority of the students don not have pre-existing knowledge about the contents of the worktext.

Conclusions
Based on the findings of the study, the following conclusions are drawn:
1. The level of components Worktext in Technology and Home Economics signifies the high level of performance. The components such as objectives, content, assessment, and activities are crucial in the validity of the worktext materials.
2. The level of characteristics of Worktext in Technology and Home Economics possessed the student's involvement on how to utilize properly.
3. The level of student's performance was improved in pretest to posttest in using the validity of developed Worktext. Thus, the improvement of student's performance produced the increase learning.

Recommendations
Based on the findings and conclusions presented, the following recommendations are suggested:
1. The researcher recommended to encourage teachers in developing and organizing learning materials in all contents of the subjects. It is suggested that educators and teachers should have expertise in creating their own valid learning materials such as worktext.
2. The researcher recommended to utilize further the pretest-posttest experimental design which measure the characteristics of a worktext. The developed worktext should be subjected to scrutiny and educational assessment in the curriculum.
3. The researcher recommended that the developed worktext should be validated through actual use in the classroom and can also be utilized to learning materials catering primarily to the students' needs.

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