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# Development and Validation of Worktext in Drawing 2

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***Abstract-*** This Study aimed to develop and validate Worktext in Drawing 2 for Technology students of College of Industrial Technology. It was conducted at University of Rizal System during the school year 2010-2011 with 50 first year BT students and 8 drafting professors as respondents. The study used the descriptive-experimental method to describe and evaluate the developed Worktext in Drawing 2 using the questionnaire-checklist and test results in gathering data. A pretest and posttest was administered to the student users to determine the performance in Drawing 2 of the two groups of respondents. They were asked to evaluate the worktext through the following: subject matter, organization and presentation, language and style and style and usefulness. Responses were tallied, tabulated and interpreted with the use of appropriate statistical treatment. The derived conclusions are as follows. Students exposed to the developed worktext in Drawing 2 performed better than the students taught without the use of the worktext. The developed worktext in Drawing 2 as instructional material is highly acceptable in teaching the subject. From the findings and conclusions presented, the study recommended the following: the developed worktext in Drawing 2 may be adopted for use by all Technology and Engineering students in different specializations, continuous revisions and modifications of the worktext may be done to suit the learning styles, needs and abilities of the students and development of worktext, workbook and the same materials in other drawing/drafting areas may be developed.

***Index Terms***- Drawing 2, Worktext, Instructional Materials, Drafting Technology

## I. INTRODUCTION

Drawing subject supplements area of specialization in technology courses. A good drawing is not an accident. It is the product of long period of trainings and experiences. Competencies must be achieved gradually. The subject carries a single unit, three hours a week and considered a laboratory. Lectures and demonstrations are constantly provided so with assignments and researches aside from the usual making of plates. Writing notes, copying drawn procedures and redrawing the given objects which are also vital in learning are usually left undone due to numerous routinary activities. The worktext in Drawing 2 could be beneficial to the students because it provides sufficient lectures and illustrations. This will not replace the drawing lessons to be prepared by the instructors/professors but designed to supplement and suggest uniformity of instructions.

The University guidelines on textbook/instructional materials development, pursuant to Republic Act 8293, encourage full-time faculty members to develop textbook/instructional materials that will develop competencies as required by the subject[1]. Moreover, the Presidential Decree No. 6-A, known as the Educational Development Act of 1972, explicitly stated one of the objectives of tertiary education in the following statement: "Develop the high level professions that will provide leadership for the nation, enhance knowledge through research, and apply new knowledge for improving the quality of instruction." This objective shall be attained through the design, utilization and improvement of instructional technology and development/production of textbooks and other instructional materials (http://www.lawphil.net/statutes/presdecs/pd1972/pd_6_a_1972. html)[2].

Instructional Design Theory of M. David Merill is a set of procedures for systematically designing and developing instructional materials. The emphasis is primarily on what to do, rather than on how to do it, or why it works. It involves five basic phases: analysis, design, development, implementation, and evaluation.[3]

Why do we need the instructional theories and models when we design an instructional material? According to Thompson, instructional theories and models will guide us as follows:

- Speed up the process - focusing the team and serve as foundation of project development.
- Assist in communication: Team members need to share expertise, intent, calendars, and so forth. By using ID Models, each of team members will know when and what to give or share with the other team member.
- Cover all phases of good instructional design: make sure that all elements of instruction are include, relate to and support each other.[4]

The stated theories and models distinctly emphasize the significance of developing materials for instructional purposes. They are related and relevant to the present study since the aim of the study is to develop and validate a tailored-fit instructional materials to supplement the teaching-learning conditions of the Drafting Technology Subjects offered as major and related subjects and assess appropriateness, accuracy and completeness of the training material considering contents, organization and presentation, language and style and usefulness.

Heinich regarded learning materials meaningful to master specific skills and acquire knowledge. According to him, instructional materials are not designed to become a substitute to effective teacher or to supplement the textbook but to supplement the

instructional process. The present study has the same intention of providing integral exercises to the instructional process that may lead to consistent and synchronize lessons and not to suppress one's academic freedom.[5]

According to Kelly, the most prevalent factors that facilitate heighten classroom interaction is the material availability and an adequacy of educational materials, which would be effective, suitable and adaptable to the nature or the kind of students the teacher handles without prejudice. Mixed ability classes hamper when these materials are inadequate and scarce, impediments in classroom interaction among students result and learning process.[6]

The literature is related to the present study for it uses customized worktext suited for different levels of Technology students in Drawing. Providing the students adequate educational material is also the ultimate goal of this study.

Castaniares in her study "Development, Validation and Acceptability of Worktext in Advanced Algebra" aimed to evaluate the effectiveness of modular instruction given to the experimental and controlled group. The experimental method of research was utilized using randomized pretest and posttest design.[7]

According to Bautista, pretest is a criterion reference test for knowledge and is given before the lesson. She used the group pretest – posttest experimental design. The first two groups were given before the utilization of the module, and afterwards, the posttest, while the control group was taught in a traditional method of teaching without a module.[8]

The researcher uses the pretest intervention and posttest approach of experimentation and somewhat similar the above mentioned studies.

## II. OBJECTIVES OF THE STUDY

The study aimed to develop a worktext that will expedite teaching-learning process, provide independent learning and a remedial tool to slow learners and enhancement for fast learners; furnish the students with customized and affordable worktext leading to immense comprehension of Drawing 2.; and, validate the developed worktext in Drawing 2 as specified in the course syllabus during the school year 2010 – 2011 in the University of Rizal System, Morong, Rizal.

Specifically, the research sought answer to the following problems:

1. How do the student respondents perform in pretest and posttest in Drawing 2 in terms of the following learning areas:
   1.1 Review on Orthographic and Pictorial Drawings;
   1.2 Dimensioning;
   1.3 Scaling;
   1.4 Sectioning;
   1.5 Auxiliary Views; and
   1.6 Pattern and Surface Development?
2. Is there a significant difference on the performance in Drawing 2 of the student-respondents as revealed by pretest and posttest on the six learning areas?
3. What is the level of acceptability of the developed worktext as evaluated by the student-respondents and professor respondents with respect to:
   3.1 subject matter;
   3.2 organization and presentation;
   3.3 language and style; and
   3.4 usefulness of the worktext?
4. Is there a significant difference between the evaluations of the two groups of respondents on the acceptability of the worktext with respect to the above-mentioned criteria?

## III. METHODOLOGY

This study used the descriptive method of research in analyzing the data gathered which will lead to realize the objectives which is to develop and validate worktext in Drawing 2 based on the requisites of the students and the curriculum. As stated by Best and Khan "Descriptive research simply seeks to describe particular phenomena which also include hypothesis formulation and testing. Also relevant variables for an independent analysis of their relationship and differences were selected"[9]. Experimental method utilizing two groups, experimental and control groups was also adapted to compare the conventional way of teaching with the application of the developed worktext in Drawing 2. According to Sevilla, the experimental method of research is the only method cause and effect relationship. It was further added that it represents the most valid approach to the solution of the problem.[10]

Pretest and Posttest were used as instruments in the study. The study made use of a 60 item multiple choice of test in Drawing 2 to find out the accomplishment of the two groups of student respondents. The original draft of the test was composed of 100 items. This was pre-tested to second year BT students with different area of specialization of URS Morong. The test was subjected to the process of item analysis procedure and revisions were appropriately made resulting to the final form of the test which is composed of 10 items each for Review of Orthographic and Isometric Drawings, Dimensioning, Scaling, Sectioning, Auxiliary Views and Pattern and Surface Development.

A questionnaire – checklist was also used as instrument in gathering the needed data. This was used to determine the acceptability of the worktext in Drawing 2. The questionnaire – checklist was adapted from the questionnaire of Melinda S. Jimenez in her study Development and Validation of Laboratory Manual in General Chemistry.[11] The criteria included in the questionnaire – checklist is subject – matter, organizations and presentation, language and style and usefulness.

The professor respondents and the student users were asked to evaluate the developed worktext in Drawing 2 following the given scale:

| Scale | Subject Matter | Organization and Presentation | Language and Style | Usefulness |
|---|---|---|---|---|
| **5** | Very Highly Sufficient | Very Much Effective | Very Highly Effective | Very Useful |
| **4** | Highly Sufficient | Much Effective | Highly Effective | Useful |
| **3** | Sufficient | Moderately Effective | Effective | Moderately Useful |
| **2** | Slightly Sufficient | Less Effective | Slightly Effective | Slightly Useful |
| **1** | Not Sufficient | Least Effective | Not Effective | Not Useful |

Topics stated in the course syllabus for Drawing 2 were basis for the various learning components integrated in the development of the worktext. Diverse learning materials were utilized in the different facts, ideas and rudiments of Drawing 2. Directions and information were made simple for better understanding and appreciation of the students. Sufficient illustrations were provided so that students can easily comprehend the concepts. Test items in Drawing 2 were constructed after the development of the worktext. Item analysis was done and after determining its reliability, the test was administered to two groups of respondents prior to lesson presentations. Conventional method was applied to the control group while the experimental group was taught using the developed worktext in Drawing 2 as instructional material.

The following statistical tools were utilized in the interpretation of the gathered data. Mean and standard deviation were used to determine the performance of the two groups of respondents in Drawing 2 as revealed by the pretest and posttest. To determine the significant difference on the performance of the students in the pretest and posttest, independent and dependent t-test were applied. To determine the level of acceptability of the developed Worktext in Drawing 2 as perceived by the professor and student respondents in terms of subject matter, organization and presentation, language and style and the usefulness, the weighted mean was used. Independent t-test was applied to determine the significant difference on the evaluation of the two groups of respondents on the acceptability of the developed worktext.

## IV. RESULTS AND DISCUSSIONS

### The Level of Performance in Drawing 2 of the Experimental Group and Control Group as revealed by the Pretest and Posttest in the Different Learning Areas

Table 1 presents the computed mean and standard deviation on the level of performance in Drawing 2 of the experimental and control groups as revealed by the pretest and posttest.

Table 1: Computed Mean and Standard Deviation on the Level of Performance In Drawing 2 of the Experimental and Control Groups as Revealed by Pretest and Posttest

| Learning Areas | Experimental Group | | | | | | Control Group | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pretest | | | Posttest | | | Pretest | | | Posttest | | |
| | Mean | VI | SD | Mean | VI | SD | Mean | VI | SD | Mean | VI | SD |
| Review of Orthographic Isometric Drawings | 4.36 | P | 1.80 | 8.80 | H | 1.41 | 4.64 | P | 1.55 | 7.28 | H | 2.07 |
| Dimensioning | 3.64 | P | 1.55 | 6.88 | A | 1.09 | 2.96 | NI | 1.40 | 4.96 | P | 1.54 |
| Scaling | 3.84 | P | 1.97 | 7.88 | H | 1.24 | 4.20 | P | 1.55 | 6.76 | A | 1.94 |
| Sectioning | 3.04 | P | 1.64 | 8.32 | H | 1.18 | 2.84 | NI | 1.47 | 6.56 | A | 2.09 |
| Auxiliary Views | 4.00 | P | 1.60 | 8.16 | H | 1.72 | 4.08 | P | 1.67 | 6.56 | A | 2.03 |
| Pattern and Surface Development | 3.56 | P | 1.72 | 7.48 | H | 1.81 | 3.60 | P | 1.35 | 5.04 | A | 1.88 |

*H – High, A – Average, P – Poor, NI – Needs Improvement*

As shown in the table, the experimental group obtained "Poor" performance in all learning areas in the pretest with mean scores of 4.36, 3.64, 3.84, 3.04, 4.0 and 3.56, respectively with standard deviations of 1.80, 1.55, 1.97, 1.64, 1.60 and 1.72. "High" performance was obtained by all learning areas except in "Dimensioning" with "Average" performance in the posttest of the

experimental group after their exposure to worktext in Drawing 2 with mean scores of 8.80, 6.88, 7.88, 8.32, 8.16 and 7.48, respectively.

For the control group, four learning areas obtained "Poor" performances and two "Needs Improvement" performances. "Dimensioning" and "Sectioning" obtained the lowest mean scores of 2.96 and 2.84, respectively and standard deviation of 1.40 and 1.47. With regards to posttest in "Review of Orthographic and Pictorial Drawings" obtained "High" performance with a mean of 7.28 and a standard deviation of 2.07, while "Dimensioning" got "Poor" performance with mean score of 4.96 and a standard deviation of 1.54. However, all other items obtained 6.76, 6.56 and 5.04 mean scores and interpreted "Average". The findings connote that performance in Drawing 2 of the experimental group improved immensely after exposure to worktext. Much the same, the control group's performance also gained with modest mean increases in favor of the posttest.

The Significant Difference on the Level of Performance in Drawing 2 of the Two Groups of Respondents in the Pretest and Posttest in the Different Learning Areas

Table 2 presents the computed t-values on the level of performance in Drawing 2 of the experimental group in the pretest and posttest in the different learning areas.

Table 2: Computed t-values on the Level of Performance in Drawing 2 of the Experimental Group in the Pretest and Posttest in the Different Learning Areas

| Learning Areas | Mean | | df | $t_{comp}$ | $t_{tab}$ | Ho | VI |
|---|---|---|---|---|---|---|---|
| | Pre test | Post test | | | | | |
| Review of Orthographic and Isometric Drawings | 4.36 | 8.80 | 24 | 6.857 | 2.064 | Rejected | S |
| Dimensioning | 3.64 | 6.88 | 24 | 8.538 | 2.064 | Rejected | S |
| Scaling | 3.84 | 7.80 | 24 | 7.439 | 2.064 | Rejected | S |
| Sectioning | 3.04 | 8.40 | 24 | 13.313 | 2.064 | Rejected | S |
| Auxiliary Views | 4.00 | 8.16 | 24 | 8.823 | 2.064 | Rejected | S |
| Pattern and Surface Development | 3.56 | 7.48 | 24 | 7.935 | 2.064 | Rejected | S |

As reflected from the table, the performance of the experimental group differs significantly in the pretest and posttest since the computed t-value of 6.857, 8.538, 7.439, 13.313, 8.823 and 7.935 exceeded the tabular t-value of 2.064 at .05 level of significance with 24 degrees of freedom. The findings imply that the use of worktext in the teaching of Drawing 2 contributed to the significant improvement in students' performance.

Table 3 presents the computed t-values on the level of performance in Drawing 2 of the control group in the pretest and posttest in the different learning areas.

Table 3: Computed t-values on the Level of Performance in Drawing 2 of the Control Group in the Pretest and Posttest in the Different Learning Areas

| Learning Areas | Mean | | df | $t_{comp}$ | $t_{tab}$ | Ho | VI |
|---|---|---|---|---|---|---|---|
| | Pre test | Post test | | | | | |
| Review of Orthographic and Isometric Drawings | 4.64 | 7.28 | 24 | 4.878 | 2.064 | Rejected | S |
| Dimensioning | 2.96 | 4.96 | 24 | 13.680 | 2.064 | Rejected | S |
| Scaling | 4.20 | 6.76 | 24 | 5.179 | 2.064 | Rejected | S |
| Sectioning | 2.84 | 6.56 | 24 | 7.307 | 2.064 | Rejected | S |
| Auxiliary Views | 4.08 | 6.56 | 24 | 4.731 | 2.064 | Rejected | S |
| Pattern and Surface Development | 3.60 | 5.04 | 24 | 3.106 | 2.064 | Rejected | S |

It could be gleaned from the table that in all learning areas, the computed t-values all exceeded the tabular t-value of 2.064 at .05 level of significance with 24 degrees of freedom, thus, rejected the null hypothesis. The findings disclose that the meaningful function of drawing professors in the teaching learning process cannot be refuted.

This may connote that a fusion of diverse strategies and the professors' capacity to inspire and stimulate well are significant factors for an enriched level of achievement. The findings are supported by the study of Bautista that the role of teachers in the

educational process is still the key factor in classroom learning situation. According to her, when suitable learning strategies are used coupled with teachers' competencies, success in the teaching learning process is ensured.[8]

Table 4 presents the computed t – value on the level of performance in Drawing 2 of the experimental and control groups in the pretest in the different learning areas.

Table 4: Computed t-values on the Level of Performance in Drawing 2 of the Experimental and Control Groups in the Pretest in the Different Learning Areas

| Learning Areas | Experimental | | Control | | Mean dff | df | $t_{comp}$ | $t_{tab}$ | Ho | VI |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | | | | | |
| Review on Orthographic and Isometric Drawings | 4.36 | 1.80 | 4.64 | 1.55 | .28 | 48 | 0.5553 | 2.021 | A | NS |
| Dimensioning | 3.64 | 1.55 | 2.96 | 1.40 | .68 | 48 | 3.8900 | 2.021 | R | S |
| Scaling | 3.84 | 1.97 | 4.20 | 1.55 | .36 | 48 | 0.6293 | 2.021 | A | NS |
| Sectioning | 3.04 | 1.64 | 2.84 | 1.47 | .20 | 48 | 1.0684 | 2.021 | A | NS |
| Auxiliary Views | 4.00 | 1.60 | 4.08 | 1.67 | .08 | 48 | 0.3756 | 2.021 | A | NS |
| Pattern and Surface Development | 3.56 | 1.72 | 3.60 | 1.35 | .04 | 48 | 0.2139 | 2.021 | A | NS |

*A – Accepted, R – Rejected, S – Significant, NS – Not Significant*

It could be gleaned from the table that with respect to "Dimensioning", the performance of the two groups of respondents in the pretest differs significantly with a mean difference of .68 and a computed t-value of 3.89 which exceeds the tabular t-value of 2.021 at .05 level of significance, thus the null hypothesis is rejected. The difference may be due to the different knowledge already gained by the students from encounters on "Dimensioning".

Contradictory, with respect to other learning areas, the null hypothesis is accepted having all computed t-values not exceeding the tabular t-value of 2.021 at .05 level of significance. The findings imply that the two groups of respondents have different entry knowledge on Dimensioning before the experiment but in all other learning areas in Drawing 2 they have similar knowledge before they were subjected to experimentations.

Table 5 presents the computed t-values on the level of performance in Drawing 2 of the experimental and control groups in the posttest in the different areas.

Table 5 : Computed t-values on the Level of Performance in Drawing 2 of the Experimental and Control Groups in the Posttest in the Different Learning Areas

| Learning Areas | Experimental | | Control | | Mean dff | df | $t_{comp}$ | $t_{tab}$ | Ho | VI |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | | | | | |
| Review on Orthographic and Isometric Drawings | 8.80 | 1.41 | 7.28 | 2.07 | 1.52 | 48 | 3.0498 | 2.021 | R | S |
| Dimensioning | 6.88 | 1.09 | 4.96 | 1.54 | 1.92 | 48 | 5.0821 | 2.021 | R | S |
| Scaling | 7.88 | 1.24 | 6.76 | 1.94 | 1.12 | 48 | 5.2830 | 2.021 | R | S |
| Sectioning | 8.32 | 1.18 | 6.56 | 2.09 | 1.76 | 48 | 3.6751 | 2.021 | R | S |
| Auxiliary Views | 8.16 | 1.72 | 6.56 | 2.03 | 1.60 | 48 | 3.0024 | 2.021 | R | S |
| Pattern and Surface Development | 7.48 | 1.81 | 5.04 | 1.88 | 2.44 | 48 | 4.6788 | 2.021 | R | S |

The table depicts that with respect to all learning areas, the performance in the posttest of the respondents significantly differs since the computed t-values 0f 3.00498, 5.0821, 5.2830, 3.6751, 3.0024 and 4.6788 exceeded the tabular value of 2.021 at .05 level of significance, thus the null hypothesis is rejected. The findings reveal that the group exposed to worktext and those were taught using the conventional method of teaching have different performance with the mean gains in favor of experimental group. This implies that the developed worktext n Drawing 2 is good instructional material for the enhancement of learning competencies ion the Drawing subject. This is parallel to the findings of Jimenez that the developed laboratory manual contributed to the improvement of students' performance.[11]

The Level of Acceptability of the Developed Worktext as Evaluated by Student Users and Professors

Table 6 presents the computed weighted mean on the level of acceptability of the developed worktext as evaluated by the two groups of respondents with respect to subject matter.

The table reflects that as perceived by students, they evaluated the subject matter of the worktext in Drawing 2 as "Very Highly Sufficient" with an average weighted mean of 4.32 and all item except Auxiliary Views and Pattern and Surface Development

were interpreted "Very Highly Sufficient". On the other hand, the professor respondents, all items are interpreted "Very Highly Sufficient" with an average weighted mean of 4.67. The findings reveal that the professors' evaluation of the worktext is higher than

Table 6: Computed Weighted Mean on the Level of Acceptability of the Developed Worktext as Evaluated by the Two Groups of Respondents With Respect to Subject Matter

| Subject Matter | Students | | | Professors | | |
|---|---|---|---|---|---|---|
| | $\bar{WX}$ | VI | R | $\bar{WX}$ | VI | R |
| Review on Orthographic and Isometric Drawings | 4.28 | VHS | 4 | 4.78 | VHS | 3 |
| Dimensioning | 4.44 | VHS | 2.5 | 4.78 | VHS | 3 |
| Scaling | 4.56 | VHS | 1 | 4.63 | VHS | 4.5 |
| Sectioning | 4.44 | VHS | 2.5 | 4.44 | VHS | 6 |
| Auxiliary Views | 4.12 | HS | 5 | 4.78 | VHS | 3 |
| Pattern and Surface Development | 4.08 | HS | 6 | 4.63 | VHS | 4.5 |
| **Average Weighted Mean** | **4.32** | **VHS** | | **4.67** | **VHS** | |

the evaluation of the students. This connotes that both groups viewed the developed instructional material as a useful instrument in acquiring desired competencies in Drawing.

Table 7 presents the computed weighted mean on the level of acceptability of the developed worktext as evaluated by the two groups of respondents with respect to organization and presentation.

Table 7: Computed Weighted Mean on the Level of Acceptability of the Developed Worktext as Evaluated by the Two Groups of Respondents With Respect to Organization and Presentation

| | Organization and Presentation | Students | | | Professors | | |
|---|---|---|---|---|---|---|---|
| | | $\bar{WX}$ | VI | R | $\bar{WX}$ | VI | R |
| 1. | The objectives of every chapter are stated in behavioral terms. | 4.40 | VME | 5 | 4.95 | VME | 1 |
| 2. | The topic headings are clear and well presented. | 4.88 | VME | 1 | 4.45 | VME | 5.5 |
| 3. | The topics are presented in a logical and orderly sequence that is from basic to advance. | 4.84 | VME | 2.5 | 4.45 | VME | 5.5 |
| 4. | The varied exercises are sufficient enough to realize the objectives. | 4.68 | VME | 4 | 4.77 | VME | 2 |
| 5. | The varied presentation of exercises effectively reinforces the students to solve drawing problems. | 4.08 | ME | 6 | 4.62 | VME | 3.5 |
| 6. | The illustrations, examples, figures and exercises serve as instruments to attain the learning process. | 4.84 | VME | 2.5 | 4.62 | VME | 3.5 |
| **Average Weighted Mean** | | **4.62** | **VME** | | **4.64** | **VME** | |

As reflected in the table, with respect to organization and presentation, as perceived by student respondents "The Topic Heading are Clear and well Presented" ranked first with 4.88 weighted mean while professor respondents ranked it last with 4.45 weighted mean, both interpreted "Very Much Effective". "Objectives of Every Chapter are stated in Behavioral Terms" ranked by professor respondents as first with 4.95 weighted mean. Ranked last by student respondents is item number 5 with 4.08 weighted mean and interpreted as "Much Effective". The average weighted mean of 4.62 and 4.64 were obtained by the students and professor, respectively with "Very Much Effective" verbal Interpretation. It could be deduced from the results that both respondents are satisfied with the organization and presentation of lessons in the worktext.

Table 8 presents the computed weighted mean on the level of acceptability of the developed worktext as evaluated by the two groups of respondents with respect to language and style.

The table depicts that in general, as evaluated by student respondents and professor respondents, the developed worktext in Drawing 2 is "Very Highly Effective" with an average weighted mean of 4.47 and 4.63, respectively. As a whole, both groups agreed that the developed worktext is an effective instructional material in the teaching of Drawing 2.

It indicates that drawings accompanied by technical terms explained extensively using plain and uncomplicated words would make Drawing 2 interesting and easily understood subject. Furthermore, the findings imply that the worktext possessed the

characteristics that would significantly aid in enhancing the performance of students in Drawing 2. This confirmed the findings of Jimenez that the simpler the language, the more it is acceptable and effective to use.[11]

Table 8: Computed Weighted Mean on the Level of Acceptability of the Developed Worktext as Evaluated by the Two Groups of Respondents With Respect to Language and Style

| | Language and Style | Students | | | Professors | | |
|---|---|---|---|---|---|---|---|
| | | $\bar{WX}$ | VI | R | $\bar{WX}$ | VI | R |
| 1. | The directions give clear information about the topic. | 4.52 | VHE | 2.5 | 4.79 | VHE | 2 |
| 2. | Language used is simple and easy to understand in terms of vocabulary and technical terminologies. | 4.64 | VHE | 1 | 4.47 | VHE | 4 |
| 3. | Language structure used avoids misinterpretations. | 4.28 | VHE | 5 | 4.79 | VHE | 2 |
| 4. | There are provisions for learning new meanings. | 4.40 | VHE | 4 | 4.30 | VHE | 5 |
| 5. | Language used is suitable to the ability of the students. | 4.52 | VHE | 2.5 | 4.79 | VHE | 2 |
| **Average Weighted Mean** | | **4.47** | **VHE** | | **4.63** | **VHE** | |

Table 9 presents the computed weighted mean on the level of acceptability of the developed worktext as evaluated by the two groups of respondents with respect to usefulness.

Table 9: Computed Weighted Mean on the Level of Acceptability of the Developed Worktext as Evaluated by the Two Groups of Respondents With Respect to Usefulness

| | Usefulness | Students | | | Professors | | |
|---|---|---|---|---|---|---|---|
| | | $\bar{WX}$ | VI | R | $\bar{WX}$ | VI | R |
| 1. | The worktext makes the students interested in applications based on theories gained. | 4.56 | VU | 4.5 | 4.82 | VU | 1 |
| 2. | The worktext is useful in developing skills and analysis, which are tools to effective learning. | 4.60 | VU | 3 | 4.67 | VU | 3 |
| 3. | The students can learn, understand and answer the exercises thoroughly by reviewing the examples and illustrations which are provided after each topic. | 4.56 | VU | 4.5 | 4.67 | VU | 3 |
| 4. | The worktext is useful to supplement and reinforce the transfer of learning. | 4.72 | VU | 2 | 4.67 | VU | 3 |
| 5. | The worktext encourages one to work efficiently at his pace. | 4.36 | VU | 6 | 4.33 | VU | 5.5 |
| 6. | The worktext answer the students' need to understand drawing. | 4.76 | VU | 1 | 4.33 | VU | 5.5 |
| **Average Weighted Mean** | | **4.59** | **VU** | | **4.58** | **VU** | |

As manifested in the table, both groups of respondents evaluated the worktext in Drawing 2 as "Very Useful" with a nearly identical average weighted mean of 4.59 and 4.58, respectively, and all are interpreted as "Very Useful". The findings imply that students and professors discern the worktext in Drawing as valuable instructional material in the teaching-learning process in Drawing 2. It also implies that the developed worktext is very useful in the unraveling of practical problems like inconsistency of the given objects, late or unsubmitted plates and low scores in written tests.

The findings of Maranan supports the present study that of the criteria such as content, clarity of presentation and usability was preferred by the respondents as the most important among factors considered as acceptable learning material.[12]

Table 10 presents the composite table of the average weighted mean on the level of acceptability of the developed worktext as evaluated by the two groups of respondents.

Table 10: Composite Table of the Average Weighted Mean on the Level of Acceptability of the Developed Worktext as Evaluated by the Two Groups of Respondents

| Aspects | Students | | | Professors | | |
|---|---|---|---|---|---|---|
| | Ave. $\bar{WX}$ | VI | R | Ave. $\bar{WX}$ | VI | R |
| Subject Matter | 4.32 | VHS | 4 | 4.67 | VHS | 1 |
| Organization and Presentation | 4.62 | VME | 1 | 4.64 | VME | 2 |
| Language and Style | 4.47 | VHE | 3 | 4.63 | VHE | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Usefulness | 4.59 | VU | 2 | 4.58 | VU | 4 |
| **Ave. Weighted Mean** | **4.50** | **VMA** | | **4.63** | **VMA** | |

It could be gleaned from the table, as evaluated by both group of respondents, the developed worktext in Drawing 2 is "Very Much Acceptable" with a general weighted mean of 4.50 for the students and 4.63 for the professors. The findings imply that the students and professors agreed that the developed worktext is adequate and suitable instructional material in teaching and learning of Drawing 2. The findings confirm the idea of Jimenez that the instructional material like laboratory manual could catch the interest and understanding of the students and will help the instructors teach better.[11]

The Significant Difference on the Evaluation of the Two Groups of Respondents of the Level of Acceptability of the Developed Worktext

Table 11 presents the computed t – values on the evaluation of the two groups of respondents on the level of acceptability of the developed worktext.

Table 11: Computed t-values on the Evaluation of the Two Groups of Respondents on the Level of Acceptability of the Developed Worktext

| Aspects | Mean | | Mean diff. | df | $t_{comp}$ | $t_{tab}$ | Ho | VI |
|---|---|---|---|---|---|---|---|---|
| | Students | Professors | | | | | | |
| Subject Matter | 4.32 | 4.67 | .35 | 31 | 1.088 | 2.042 | A | NS |
| Organization & Presentation | 4.62 | 4.64 | .02 | 31 | 0.3381 | 2.042 | A | NS |
| Language and Style | 4.47 | 4.63 | .16 | 31 | 1.0712 | 2.042 | A | NS |
| Usefulness | 4.59 | 4.58 | .01 | 31 | 0.0487 | 2.042 | A | NS |

The table reveals that no significant difference prevails on the evaluation of the two groups of respondents on the acceptability of the developed worktext in Drawing 2 since all the computed t-values did not exceed the tabular t-values at .05 level of significance. This accepts the null hypothesis stating that ther4e is no significant difference on the evaluation of the two groups of respondents on the level of acceptability of the developed worktext. The findings imply that for the student and professor respondents the developed worktext is acceptable to be utilized as instructional material in the teaching of Drawing 2. It can also be concluded that there is congruency on the appraisals made by the professors and students.

The findings further imply that both group of respondents considered the developed worktext in Drawing 2 as a supplementary material in learning as validated in terms of different criteria. The findings is confirmed by the idea of Tamonan when he stated that educational materials like workbooks when used properly in classroom may be the most effective venue to hold students' interests and understanding and may lead better teachings.[13]

## V. CONCLUSIONS

Based on the summary of findings, the following conclusions are drawn. Students exposed to the developed worktext in Drawing 2 attained better performance than students taught without the use of worktext. The developed worktext in Drawing 2 contributed to the improvement of students accomplishments in Drawing. The developed worktext is effective and acceptable for use as instructional material in the teaching of Drawing 2.

## VI. CONCLUSION

The following recommendations are hereby offered: Utilization of the developed worktext in Drawing 2 is strongly recommended in BT and Engineering Courses. Development of worktext in other Drawing or Drafting subjects maybe conducted to make teaching and learning more effective and productive. Revision and modification of the developed worktext should be done regularly to fit the learning needs and abilities of the students. Evaluation on the level of acceptability of the developed worktext may be conducted using other respondents in other schools. Further study is strongly recommended using other factors and other variables.

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