

Development and Acceptability of Training Module in Switching Logic

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Abstract- The study aimed to develop a Training Module in Switching Logic as instructional material in the teaching of students of Bachelor of Technology in subjects such as Industrial Design Process and Control, Industrial Electronics and Industrial Motor Control. This was conducted at the University of Rizal System-Morong Campus during the First Semester of School-Year 2007-2008. Professors and Instructors of the College of Industrial Technology and College of Engineering as well as the fourth year students of Bachelor of Technology major in Electrical technology served as the respondents –evaluators in the study. The researchers used an adopted and modified questionnaire-checklist to determine the level of acceptability of the module with respect to its objectives, Contents, Pretest and post-test contents, Illustrations/photos and Usefulness.

To determine the level of acceptability of the developed training module in switching logic as perceived by the evaluators in terms of objectives, contents, pre and post-test contents, illustrations/photos and usefulness, weighted mean was used. To test if there is significant difference on the level of acceptability of the developed training module in switching logic as perceived by the two groups of respondents, t-test was utilized.

Based from the result of the study, the developed training module was very much accepted as evaluated by the two groups of evaluators, thus, it can be used as instructional material in the teaching of Motor Control and Industrial Design Process and in Industrial electronic subjects. In addition, the developed training module is also suitable and fitted for use by the students who are enrolled in BT and BS Engineering courses major in electrical technology and can be utilized as an effective instructional material in accomplishing competency-based subjects.

Index Terms- Instructional Materials, IM's, Switching Logic, Training Module

I. INTRODUCTION

Teaching is considerably one challenging but meaningful job an individual person can choose out of hundreds of professional careers. It is really a difficult work yet a challenging one. Educators don't just teach, impart and discuss lessons from course outline or syllabi, they also share their times to share their talents and other skills to their students.

An ideal teacher gives concern to the effective delivery of the lessons and put high values on the learning capabilities of his learners. Hence, teacher employs a variety of methodologies and teaching strategies to give to the students the hundred percent learning and acquisition of new skills.

One of the concerns that a teacher has to employ is the initiative to conceptualize, prepare and utilize instructional devices and materials that are beneficial to students' effective and creative learning. These instructional materials may be originally designed and customized according to the preference and teaching style of the teacher.

Instructional materials are devices that assist the Instructors in the teaching-learning process. These materials are not self-supporting; they are supplementary training devices. These are materials that are used to aid in the transference of information from one to another. For example, a teacher may use instructional materials to aid in the learning of subject matter for a class. These instructional materials could include Power Point presentations (visual aids), Books, Articles and Materials for project development.

There are many reasons why teachers use Instructional devices or material. One of the reasons is that it helps the students remember important information, tasks or ideas. They help gain and hold the attention of students. Audio or visual aids can be very useful in supporting a topic, and the combination of both audio and visual stimuli is particularly effective since the two most important senses are involved.

Instructors should keep in mind that they often are salesmen of ideas, and many of the best sales techniques that attract the attention of potential clients are well worth considering. One caution-the instructional aid should keep student's attention on the subject; it should not be a distracting gimmick. Good instructional devices also can help solve certain language barrier problems. Consider the continued expansion of technical terminology in everyday usage. This, coupled with culturally diverse backgrounds of today's students, makes it necessary for instructors to be precise in their choice of terminology. Words or terms used in an instructional aid should be carefully selected to convey the same meaning for the student as they do for the instructor. They should provide an accurate visual image and make learning easier for the student.

Another use of instructional materials is to clarify the relationships between material objects and concepts. When relationships are presented visually, they often are much easier to understand. For example, the subsystems within a physical unit are relatively easy to relate to each other through the use of schematics or diagrams. Symbols, graphs, and diagrams can also show relationships of location, size, time, frequency, and value. By symbolizing the factors involved, it is even possible to visualize abstract relationships. Clearly, a major goal of all instruction is for the student to be able to retain as much knowledge of the subject as possible, especially the key points. Numerous studies have attempted to determine how well instructional-aids serve this purpose. Indications from the studies

vary greatly-from modest results, which show a low percent increase in retention, to more optimistic results in which retention is increased by high percentage level.

Instructional-aids should also be reviewed to determine whether their use is feasible in the training environment and whether they are appropriate for the students' use. In practice, the choice of instructional-aids depends on several factors. Availability, feasibility, or cost may impose realistic limitations. The number of students in a class and the existing facilities are other considerations. In some school situations, the designers of the curriculum determine the use of instructional aids. In this case, the instructor may have little control over their use. On the other hand, an independent facilitator of learning may have considerable latitude, but limited resources. Often, teachers improvise and adapt to the existing circumstances in order to incorporate quality instructional-aids.

The researcher believes that developing an instructional or training material is worth pursuing as these are truly beneficial particularly among students of Bachelor of Technology, who, in spite of the unavailability of the Programmable Logic Control [PLC] still wish to be knowledgeable and adept in the design and programming of circuit controls. This was the inspiration that urged the researchers in the conduct of this study.

As educator, the researcher also believed that the development of a training module in switching logic will help students realize the importance of the subject relative to technology management. Also, with the use of the training module, the students will be able to direct and focus their learning towards a comprehensive and scholarly understanding and practice of their skills in the subject as prescribed by the BT program especially in the conduct of industrial design process and control subject.

The study was anchored on "Instructional Conceptualism by Bruner. Bruner believes that mental processes such as perception, concept attainment and reasoning depends upon an imaginative process of construction. He points out that in order to present a lesson teacher should give a concrete visual presentation to motivate the eagerness of the pupil to learn.

Bruner's theory points out four significant concerns applicable to learning situation which is acquisition of the basic relationship in the structure of a subject matter, Readiness, Development of the Independent Learner and Motivation.

The theory of Bruner was related to the present study since the study was primed with the development of an instructional material.

II. OBJECTIVES

The main purpose of this study is to develop a training module in switching logic and test its acceptability using an adopted and modified questionnaire-checklist.

Specifically, it aimed to:

1. Design and write a training module in switching logic.
2. Determine the level of acceptability of the developed training module in terms of:
 - 2.1 Objectives;
 - 2.2 Contents;
 - 2.3 Pre-test and Post-Test;
 - 2.4 Photos/illustrations; and
 - 2.5 Usefulness.
3. Determine the significant difference on the evaluation made by the two groups of respondents-evaluators with respect to the acceptability of the developed training module in switching logic in terms of Objectives, Contents, Pre-test & Post-test, Photos/Illustrations and Usefulness.

III. REVIEW OF RELATED STUDIES AND LITERATURE

Instructional materials are used by teachers to facilitate effective teaching and better quality of learning among students. Instructional materials are created to suit the different ways that students learn. While some students learn and retain information that are fed to them through a lecture, others learn better by reading. Other students however absorb information with the aid of visual cues in addition to the lecture and reading. The use of different instructional materials assures and provides the student with different learning aids to maximize learning and retain the information given to them. (Bone. n.d.)

Along this context, Lardizabal et.al stated that the effectiveness of testing process can be increased greatly through the use of instructional materials. In connection to this, learning is made easy through the utilization of a variety of instructional materials, hence, students are more likely to learn as they are motivated to acquire knowledge and skills.

This really calls for the teachers to employ varied methodologies in presenting their lessons for their students to attain the set objectives out of the lessons and to satisfy the needs of the students to acquire knowledge and skills in order to improve and grow in their chosen career.

As mentioned by Hughes, modular instruction is a unique kind of individualized instruction which provides the basis for close interaction between the learners and subject matter. He further stressed the modernization of the teaching process using a module suited to every student who is given a chance to advance at his own rate¹.

Laron stated that a variety of instructional materials has been proven to produce more effective and efficient learning.

According to Flores, instructional materials in the classroom are most effective tools to catch up the interest and understanding of the students and help teachers to teach better.

Victorio, et. al. said that teaching aid device is a faithful companion of a teacher in lessons because it enables the teacher to discuss the lesson more accurately and it gives the student a better insight on the content of the lesson.

Brenda Corpuz believed that the use of different types of graphics in teaching learning process promotes better retention of learning.

The guideline in the use of instructional materials emphasizes that they should be based on the fundamental concepts and principles involved in the specific subject or course that is taught. The purpose of this is to align the students understanding of the topic with current knowledge. It also teaches them to control and monitor their thought processes to facilitate learning. (Van Hooser, 2010) The method of instruction also determines the choices of instructional materials. The

teaching methods can be divided into mass instruction techniques, individualized learning techniques, and group learning techniques. For mass instruction, audiovisual and instructional materials are used, worksheets, hand-outs and visual aids. They are illustrative and supplementary material to increase motivation or to integrate the lesson. In individualized learning, the material is the vehicle where instruction takes place. This material should be designed and created with utmost care as it facilitates exercises or used for diagnostic purposes. Group learning on the other hand, requires no specialized instructional learning because the emphasis on this avenue of learning is on the approach and technique. Nevertheless, booklets, worksheets and briefing materials are used. Like individualized learning they should be designed carefully to make sure that the learning exercise runs smoothly. (Ellington, 1987)

There are seven types of instructional materials: printed and duplicated materials, non-projected display materials, still-projected display materials, audio-materials, link-audio and still video materials, cine and video materials and computer-mediated materials. Printed and duplicated materials consist of hand-outs, assignment sheets, individualized learning materials, and resource materials for group exercises. Non-projected display materials are chalkboard displays, marker board displays, feltboard displays, flipcharts, hook and loop, magnetic board, wallcharts, charts, posters, photographic prints, mobiles (3D objects hung on the roof), 3D models, dioramas, and realia. Still-projected display materials are overhead projectors, slide shows, film strips, microforms. Audio materials are radio, gramophones, and audiotapes. Link audio and still video materials include tape slide programs, tape-photograph programs, film strips with sounds, radio-vision programs, tape-text, tape-model and tape realia. Cine and video materials are cine films, loop-films, tape-films, television broadcasts, videotape recordings, video-disk recordings. Computer-mediated materials are number crunching and data processing package, substitute tutor packages, data base systems, computer-managed learning systems, and interactive video systems. (Ellington, 1987)

The method of teaching and student learning styles determine the type of instructional materials used. Further, the use of different instructional materials designed within the 5E model is most effective in enhancing student learning. The 5E instructional model is based on the constructivist approach to learning. This model approaches learning by constructing new knowledge and skills by building on prior knowledge and experience. The 5E model follows five stages: engage, explore, explain, elaborate, evaluate. Studies have shown that there is a high statistical link between the use of the 5E model and high achievement of students. (Van Hooser, 2010) The use of the 5E model is associated with high test scores and positive attitudes and feelings among first graders towards science. (Edey and Gomez, n.d.)

IV. MATERIALS AND METHOD

This study focused on the development of training module in switching logic as an instructional material. This was conducted during school year 2007-2008. The respondents of the study were the selected Bachelor of Technology electrical professors/instructors and selected fourth year Bachelor of

Technology students major in Electrical Technology of the College of Industrial Technology and College of Engineering of University of Rizal System- Morong Campus.

Development of Training Module in Switching Logic

The instructional material entitled Training Module in Switching Logic was developed following the systematic procedures to make it appropriate to the learning capabilities of the students who are enrolled in advanced major subject Industrial Design Process and Control. Procedural steps were considered and followed in its development.

Main topics in Industrial Design Process and Control such as types of switches, gates such as AND, OR, NAND and NOR were chosen for reasons that these topics are vital in all circuit designing for industrial electrical controls that BT-electrical students need to learn.

Validation of the developed instructional material was conducted. The developed material was shown to experts in the field of English, Technology, Electricity and Electronics and Drawing for content validation. Suggestions and recommendations from experts were accepted and incorporated, thus, an improved and validated module was printed.

With this in mind, the researchers administered an adopted and modified questionnaire-checklist to selected respondents to test the acceptability of the output to find out whether such instructional material can help in the training/ learning process and can be used by the BT electrical technology students.

To determine the level of acceptability of the developed training module in switching logic as perceived by the respondents in terms of objectives, contents, pre and post-test contents, illustrations/photos and usefulness, weighted mean was used. To test if there is significant difference on the level of acceptability of the developed training module in switching logic as perceived by the two groups of respondent-evaluators, t-test was used.

V. RESULTS AND DISCUSSION

This part presents the analysis and interpretation of data with regards to the acceptability of the developed Training Module in Switching Logic.

Level of Acceptability of the Developed Training Module in Switching Logic with Respect to Objectives.

Table 1 presents the computed weighted mean on the level of acceptability of the developed instructional material as perceived by two groups of respondents with respect to objectives.

The expert-respondents perceived that the "Objectives" set for the training modules as very much accepted as it earned an average mean of 4.83.

As for the 4th year BT students, they find the "Objectives" as very much acceptable too as indicated by the average mean of 4.59.

Over-all, the "Objectives" designed for the training module is found very much acceptable as it gained an average mean of 4.71

The findings describe that both groups of the respondents accepted the "Objectives" of the developed training module in switching logic very much.

This implies that the objectives of the developed control subject are simple and very attainable. instructional material in teaching of industrial design process and

Table 1

Computed Weighted Mean on the Acceptability of the Developed Training Module in Switching Logic with Respect to Objectives

Objectives	Experts		4 th yr. BT students		Overall	
	Mean	VI	Mean	VI	Mean	VI
The objectives stated in the Instructional Materials						
1. are clear	4.74	VMA	4.66	VMA	4.70	VMA
2. are attainable	4.87	VMA	4.56	VMA	4.72	VMA
3. are based on the learning abilities of the students	4.80	VMA	4.50	VMA	4.65	VMA
4. are time bounded	4.97	VMA	4.64	VMA	4.81	VMA
5. are measurable	4.77	VMA	4.59	VMA	4.68	VMA
Average	4.83	VMA	4.59	VMA	4.71	VMA

Level of Acceptability of the Developed Instructional Training Module in Switching Logic with Respect to Contents.

Table 2 presents the computed weighted mean on the level of acceptability of the developed Training Module in Switching Logic as perceived by two groups of respondents with respect to contents.

The average weighted mean obtained from the teacher-respondents is 4.67 and is verbally interpreted as “very much accepted”. Item number 1 which is “based on the prescribed/expected learning competency got the highest rank and has a weighted mean of 4.75 and verbally interpreted as “very much accepted. Next in rank are items number 2 which is “arranged logically “ and 4 which is “presented with specific instruction”, both has a verbal interpretation of “very much accepted”. Third in rank is item number 3 and 5 “appropriate and relevant” and “are congruent to the objectives of the lesson” with

weighted mean of 4.63 and verbally interpreted as “very much accepted”.

The table also shows the average weighted mean obtained from the 4th yr. BT student-respondents is 4.63 and verbally interpreted as “very much accepted”. Item number 1 “based on the prescribed /expected learning competency got a highest rank weighted mean score of 4.72 and verbally interpreted as “very much accepted”. Next is item number 2 which is “arranged logically”, followed by the item number 4 “presented with specific instruction” with obtain the weighted mean of 4.62 and verbally interpreted as “very much accepted”. The fourth rank goes to item number 5 “are congruent to the objective of the lesson” which has a weighted mean score of 4.60 and “verbally interpreted as “very much accepted” and the fifth in rank is item number 3 “appropriate and relevant ” with a weighted mean of 4.52 and also verbally interpreted as “very much accepted”.

Table 2

Computed Weighted Mean on the Acceptability of the Developed Training Module in Switching Logic with Respect to Contents

Contents	Experts		4 th yr. BT students		Overall	
	Mean	VI	Mean	VI	Mean	VI
The content stated in the Instructional Material						
1. based on the prescribed/expected learning competency.	4.75	VMA	4.72	VMA	4.74	VMA
2. arranged logically.	4.67	VMA	4.69	VMA	4.68	VMA
3. appropriate and relevant	4.63	VMA	4.52	VMA	4.58	VMA
4. presented with specific instruction	4.67	VMA	4.62	VMA	4.65	VMA
5. are congruent to the objectives of the lesson.	4.63	VMA	4.60	VMA	4.62	VMA
Average	4.67	VMA	4.63	VMA	4.65	VMA

The findings revealed that both the student-respondents and expert-respondents perceived that the content of the developed

training module in switching logic is based on the prescribed /expected learning competency.

This may be due to the fact that both groups of respondents are more focused on the development of the learning competencies. Hence, they accepted the developed training module with respect to contents.

Level of Acceptability of the Developed Training Module in Switching Logic with Respect to Pre & Post Test.

Table 3 presents the computed weighted mean on the level of acceptability of the developed training module in switching logic as perceived by the two groups of respondents with respect to pretest and post test.

The average weighted mean obtained from the expert-respondents is 4.60 and verbally interpreted as “very much accepted”. Item number 2 and 5 got the highest weighted mean with a weighted mean of 4.67 and verbally interpreted as “very much accepted”. This was followed by item number 3 with weighted mean of 4.63. Third in rank is item number 4 with a weighted mean of 4.53 and verbally interpreted “very much accepted”. Least among the 5 items is item number 1 “is simple and easy to understand” which has a weighted mean of 4.50 likewise verbally interpreted as “very much accepted”.

The table also shows that the average weighted mean of 4.69 and verbally interpreted as “very much accepted”, item number 1 “is simple and easy to understand” got also the highest rank and weighted mean of 4.87 and verbally interpreted as “very much accepted”, followed by the item number 2 “provides technical term for easy understanding” with obtain weighted mean of 4.79 and verbally interpreted as “very much accepted”. The third in rank is the item number 5 “present clear direction” has a weighted mean of 4.67 and verbally interpreted as “very much accepted”. The fourth in the rank is item number 4 “provides appropriate font size for easy reading” with weighted mean of 4.57 and verbally interpreted as “very much accepted”. Least in the rank is item number 3 with obtained weighted mean of 4.55 and verbally interpreted as “very much accepted”.

The findings revealed that expert- respondents found that the pretest and post test were presented with clear direction. The student-respondents on the other hand viewed the pretest and post test as simple and easy to understand. This could imply that the developed training module in switching logic could be use by the students since it is simple, easy to understand and has a clear direction.

Table 3

Computed Weighted Mean on the Acceptability of the Developed Training Module in Switching Logic with Respect to Pretest and Post-Test

Pre and Post-Test	Experts		4 th yr. BT students		Overall	
	Mean	VI	Mean	VI	Mean	VI
The language and styles stated in the Instructional Material						
1. is simple and easy to understand	4.50	VMA	4.87	VMA	4.69	VMA
2. provides technical term for vocabulary development	4.67	VMA	4.79	VMA	4.73	VMA
3. are appropriate to the ability of the students.	4.63	VMA	4.55	VMA	4.59	VMA
4. Provides appropriate font size for easy reading.	4.53	VMA	4.57	VMA	4.55	VMA
5. present clear directions.	4.67	VMA	4.67	VMA	4.67	VMA
Average	4.60	VMA	4.69	VMA	4.65	VMA

Level of Acceptability of the Developed Training Module in Switching Logic with Respect to Illustrations/Photos

Table 4 shows the computed weighted mean on the level of acceptability of the developed training module in switching logic as perceived by two groups of respondents with respect to illustrations/photos.

As can be gleaned from the table, with respect to illustrations/photos, the average weighted mean obtained from teacher-respondents is 4.87 and verbally interpreted as “very much accepted”. Item number 1 “clearly convey the idea or thoughts in the illustrations and photos” and item number 5 “presented with vivid color” was the highest rank since it obtained a weighted mean of 4.98 and verbally interpreted as “very much accepted”. While descriptor number 2 “show appropriate schematic symbols for electrical devices and components” is least in the rank as it obtained weighted mean of 4.69 and verbally interpreted as “very much accepted”.

The findings describe that the expert-respondents have very much accepted the developed instructional module since it utilized appropriate illustrations and original pictures.

This implies that the developed instructional module can motivate the students of BT-electrical in their training on industrial design process and control.

Level of Acceptability of the Developed Training Module in Switching Logic with Respect to Usefulness

Table 5 presents the computed weighted mean on the level of acceptability of the developed training module in switching logic as perceived by two groups of respondents with respect to usefulness.

As gleaned from the table, both expert and student-respondents perceived that the usefulness of the developed module on real-life task is very much accepted since it obtained a weighted mean of 4.93 and 4.88 respectively. It was followed by item number 5 “creates opportunity for the students to learn and study with independency which has a weighted mean of 4.85 and

verbally interpreted as “very much accepted. Item number is last in rank with obtained weighted mean of 4.55 and verbally interpreted as “very much accepted”.

As depicted from the table, the student respondents perceived that with respect to usefulness the statement “can be

used at any particular learning time frame” ranks last with a weighted mean of 4.48 and is verbally interpreted as “very much accepted”.

Table 4
Computed Weighted Mean on the Acceptability of the Developed Training Module in Switching Logic with Respect to Illustrations/Photos

Illustrations/Photos	Experts		4 th yr. BT students		Overall	
	Mean	VI	Mean	VI	Mean	VI
The illustrations and photos in the Instructional Material						
1. clearly convey the idea or thoughts in the illustrations/photos	4.98	VMA	4.39	VMA	4.69	VMA
2. show appropriate schematic symbols for electrical circuits and components	4.69	VMA	4.58	VMA	4.64	VMA
3. use appropriate diagrams and drawings	4.86	VMA	4.79	VMA	4.83	VMA
4. are originally crafted by the author	4.84	VMA	4.59	VMA	4.72	VMA
5. are presented with vivid color.	4.98	VMA	4.60	VMA	4.79	VMA
Average	4.87	VMA	4.59	VMA	4.73	VMA

The findings describe that the student-respondents perceived that the developed instructional material provides opportunity for the student to acquire a real-life task which is a pre-requisite to the real job.

This implies that the developed instructional material can help the learner to study at their own pace and they can learn

with less assistance or supervisions of their professor in industrial design process and control subject. As a whole, average weighted mean of the experts obtained is 4.73 while from the 4th yr. BT student-respondents is 4.59 and with the same verbal interpretation of “very much accepted”

Table 5
Computed Weighted Mean on the Acceptability of the Developed Training Module in Switching Logic with Respect to Usefulness

Usefulness	Experts		4 th yr. BT students		Overall	
	Mean	VI	Mean	VI	Mean	VI
The usefulness stated in the Instructional Material						
1. provides real-life task applicable to the students actual work	4.93	VMA	4.88	VMA	4.91	VMA
2. adapts to any size of training groups	4.59	VMA	4.49	VMA	4.54	VMA
3. can be used at any particular learning time frame.	4.73	VMA	4.48	VMA	4.61	VMA
4. Is easy to use and is transportable to the place of training	4.55	VMA	4.56	VMA	4.56	VMA
5. Creates opportunity for the students to learn and study with independency.	4.85	VMA	4.54	VMA	4.70	VMA
Average	4.73	VMA	4.59	VMA	4.66	VMA

Composite Table on the Level of Acceptability of the Developed Training Module in Switching Logic.

Table 6 shows the composite table on the level of acceptability of the Developed Training Module in Switching Logic

On the level of acceptability of instructional material as perceived by the expert- respondents in terms of objectives, contents, pre and post test, illustrations /photos and usefulness, an overall average mean of 4.66 is obtained and interpreted as “very much accepted”.

On the level of acceptability of the developed Training Module in Switching Logic as perceived by the BT student-Respondents with Respect to Objectives, Contents, Pre and post test, Illustrations /photos and Usefulness, an average mean of 4.59 was obtained with verbal interpretation of very much accepted.

It can be seen from the table that it was statistically found that the two groups of respondents accepted the developed module very much as revealed by the computed average mean. that there is significant difference in the perception of the two groups of respondents in the developed Training Module in

Switching Logic in terms of the variables used in the study namely objectives, contents, pre and post test Illustrations/photos and usefulness.

The findings imply that the developed instructional material is useful because the respondents evaluated and perceived that the developed material has attainable objectives, appropriate contents, pre test and post test, provide good illustrations and photos which will help BT-electrical students to gain better training-learning scheme.

Table 6
Composite Table on the Computed Weighted Mean of the Respondents Level of Acceptability of the Developed Training Module in Switching Logic

Variable	Experts		4 th yr. BT students		Overall	
	MEAN	VI	MEAN	VI	MEAN	VI
1. Objectives	4.83	VMA	4.59	VMA	4.71	VMA
2. Contents	4.67	VMA	4.53	VMA	4.65	VMA
3. Pre & Post Test	4.60	VMA	4.69	VMA	4.65	VMA
4. Illustrations/photos	4.87	VMA	4.59	VMA	4.73	VMA
5. Usefulness	4.69	VMA	4.47	VMA	4.58	VMA
Average	4.73	VMA	4.59	VMA	4.66	VMA

Computed T-test Result on the Significant Difference on the Level of Acceptability of the Developed Training Module in Switching Logic.

Table 7 presents the computed t-test result on the level of acceptability of the developed instructional material Training Module in Switching Logic.

As shown on the table, both groups of respondents statistically found out that there is a significant difference in

terms of Objectives and Illustration/Photos having probability values of .007 and .042 respectively. The table also shows that there is no significant difference in terms of Contents, Pre-test/Post-test and Usefulness with probability values of .129, .308 and .082.

Table 7
Computed T-test Result on the Significant Differences on the Level of Acceptability of The Developed Training Module in Switching Logic

	VARIABLES	t	df	Sig.	Ho	VI
Pair 1	OBJECTIVES	5.015	4	.007	R	S
Pair 2	CONTENTS	1.907	4	.129	FR	NS
Pair 3	PRE-TEST AND POST-TEST	-1.168	4	.308	FR	NS
Pair 4	ILLUSTRATIONS/PHOTOS	2.951	4	.042	R	S
Pair 5	USEFULNESS	2.314	4	.082	FR	NS

It means that the two groups of respondents have different perceptions regarding the acceptability of the instructional material with respect to the variables used in this study.

The findings support the ideas of Bruner’s on “Instructional Conceptualism”. Bruner believed that a mental process such as perception and reasoning depends upon an imaginative process of construction. He pointed out that in order to present and discuss lesson, teacher should make use of significant

instructional materials to give concrete visual presentation and to motivate the eagerness of the students to learn. This is the reason why the researcher set his purpose to develop an instructional material in Switching Logic for use of the students of Bachelor of Technology major in electrical technology.

VI. SUMMARY, CONCLUSION AND RECOMMENDATIONS

From the analysis of data gathered, the following findings are hereby summarized:

1. The researcher who has been teaching the subject for quite a long time has thought of developing the Training Module in Switching Logic towards providing the learners the necessary competency and technical know-how in Circuit Control and Circuit Programming despite the non-existence of the Programmable Logic Control [PLC] equipment which is the primary instructional training material in the teaching of the subject. The researcher considered a number of features for the design of the Module. The content, particularly the design and statement of the learning objectives was based on the course syllabus. It followed a format prescribed by the University for most module writers. Illustrated pictures were considered in the final lay-out so as to make the learning material more interesting and friendly.
2. On the level of acceptability of instructional material as perceived by the expert- respondents in terms of objectives, contents, pre and post test, illustrations /photos and usefulness, an overall average mean of 4.73 is obtained and interpreted as "very much accepted".
3. On the level of acceptability of the developed Training Module in Switching Logic as perceived by the BT student-Respondents with Respect to Objectives, Contents, Pre and post test, Illustrations /photos and Usefulness, an average mean of 4.59 was obtained with a verbal interpretation of very much accepted.
4. The Training Module in Switching Logic was developed out of the ideas, initiative and effort of the researchers.
5. The Training Module in Switching Logic was developed based from the existing syllabus of the BT on Industrial Design Process and Control.
6. Due to the fact that there are no available references and module in switching logic, the developed Training Module in Switching Logic will be of help in the teaching of BT students.

From the summary of findings, the following conclusions were drawn:

1. The instructional material was developed out of the initiative of the researcher. It was crafted utilizing the researcher's simple knowledge in module writing.
2. The instructional material was developed based from the University's existing policy on Instructional Material development and preparation.
3. The instructional material was developed out of researcher's expense.
4. The developed instructional material was found very much accepted by the experts and students-evaluators.
5. The developed instructional material was found very useful in the delivery of lessons in Industrial Design Process and Control subject.

Recommendations

From the summary of findings and conclusion drawn, the following are hereby recommended:

1. Prepare instructional materials utilizing more attractive and colorful pictures to enhance students' interest towards the lesson.
2. A follow up study shall be conducted to determine the effectiveness of the developed Instructional Material.
3. The developed material shall be applied copyright and ISBN at the Philippines' National Library or Philippines' Intellectual Property Office.
4. Improve the instructional material with more circuit diagrams that will help motivate the students to do self-learning method to gain better understanding of the lesson ahead of the scheduled and regular class time.
5. A mass production shall be done for the developed Training Module in Switching Logic as instructional material for utilization of the students of Industrial Design Process and Control subject under Bachelor of Technology major in electrical technology.

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