

DEVELOPMENT OF A COMPETENCY-BASED INSTRUCTION ON AUTOMOTIVE SUSPENSION SYSTEM SUBJECT

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ABSTRACT

The purpose of this study was to empirically establish a competency-based instruction on automotive suspension system subject. The research design was divided into three parts; 1) to construct the instruction material package, 2) to develop and validate the efficiency of instruction material package on automotive suspension system subject, and 3) to study the effectiveness of competency-based instruction on automotive suspension system subject. There were 40 samples student's used in this study. A purposive sampling technique was used to select the samples as follow as students in the undergraduate program (5 yrs) of mechanical technology education program at King Mongkut's University of Technology Thonburi. Pre-test and Post-test only group design was followed for the study. The samples were assigned to finish the practices and operation sheet on competency-based instruction. Then, evaluation forms were given to samples at the end of the studying.

Results indicated that the efficiency of instruction material package was at 81.25/88.46 achievement which was higher than the criteria set at 80.00/80.00. The effectiveness of student's learning achievement scores of the post-test were higher than the pre-test; it was significantly difference at .01 levels. Student's opinions toward on competency-based instruction were highly positive revealed by the means score at 4.73. The present study was a modest endeavor of the investigator to find out the effectiveness of teaching strategy concepts in Industrial education science through competencies for the students of mechanical technology education program at King Mongkut's University of Technology Thonburi that learning concepts through CBI method.

Keyword: Competency-based instruction, Instruction material package development, Automotive suspension system subject.

INTRODUCTION

The main purpose of the mechanical technology education program (MTE) at King Mongkut's University of Technology Thonburi focuses on develops various knowledge skills and attitudes among the student. At present they can construct more effectively and intelligently in the educational and technological demand. The traditional teaching method has emphasized the transmission of knowledge only. The important of teaching strategic is that the instruction material package has to be articulated effectively to the students to make them understand the fundamental knowledge. An innovative and dedicated automotive instructors should select to exploit the classroom environment in terms of successfully offer as resource for learning.

What then, is Competency Based Instruction (CBI) and how does it differ from the learning that we have been involved in previously? The word "competency" indicates that at the end of an instruction session the participant will be able to perform a task or use a set of information competently. That is the essence of CBI. It is designed and delivered in such a manner that participants will be able to apply what they have learned in a component fashion. Thus, the principles in this research work for improve an educational outcome on automotive suspension system subject for MTE program.

PERSPECTIVES

Kellie et al., (2002) proposed the stages in the components of competency-based instruction are:

1. Instruction is developed around started objectives that can be observed or measured.
2. Learning is measured according to how well the learner performs in relation to competencies (objectives) rather than in relation to other learners.
3. All learners have the opportunity to succeed.
4. Learners receive immediate feedback on how much they have learned.
5. Instruction is individualized and various types of assessments – written as well as observational – may be used to monitor progress.
6. Learners who have problems can obtain individual help from instructors.
7. Learners may take competency-based tests ("criterion checks") a number of times.
8. Learning outcomes can be replicated by other instructors in other locations or a later time.

Rather than assume that if a person sits in a classroom for a requisite number of hours he or she has "learned", CBI is an interactive process focused on a desired outcome and replete which checks and balances that help both the learner and the instructor monitor progress toward the desired outcome. At the heart of this interaction is a contract between the instructor and learner.

There are at least two critical conditions to consider in the best learning method. The first is the integration of the participant's life experiences into the delivery method. The impact of this condition can be summarized in the following chart from Dugan Laird (1985):

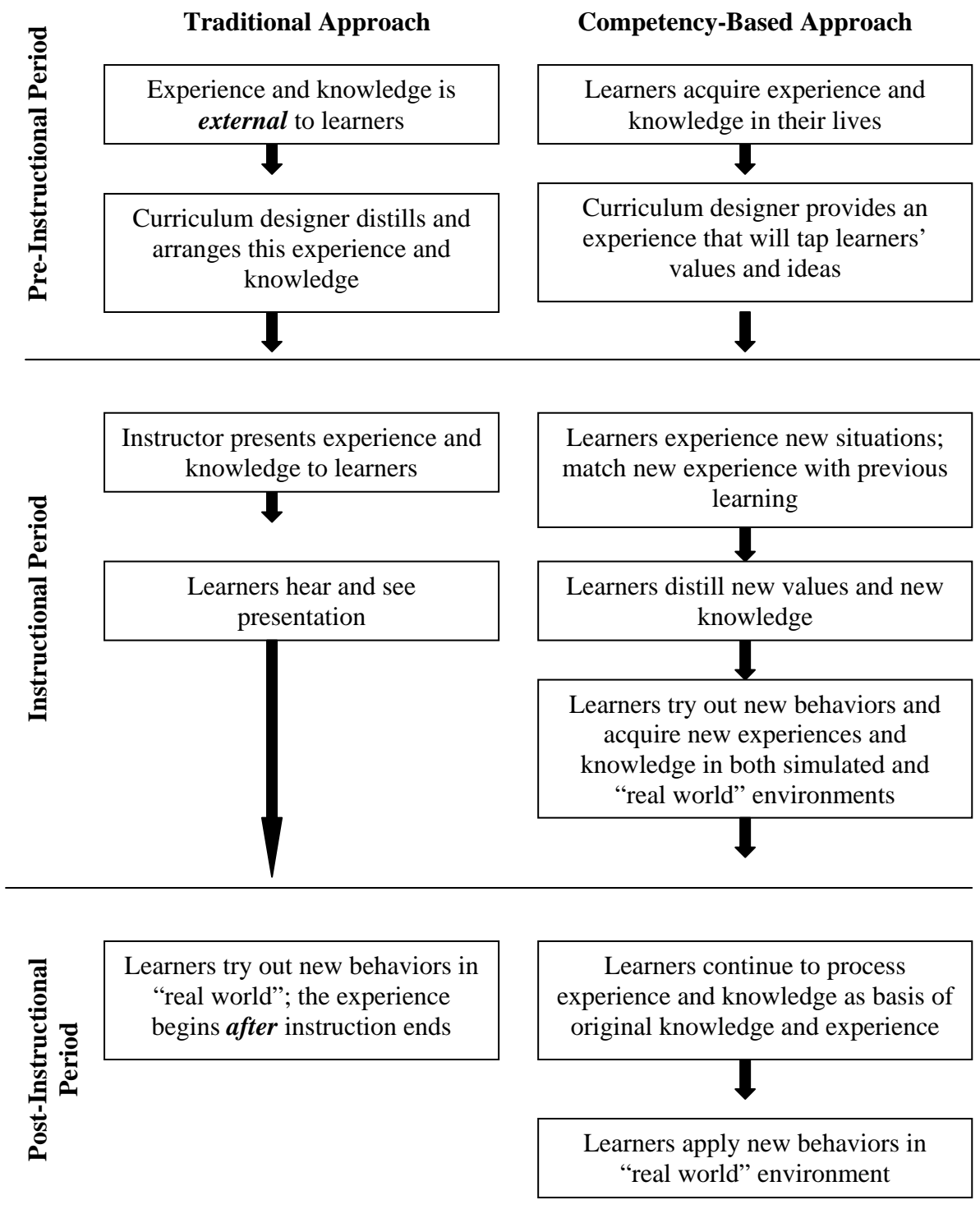


Figure 1

The comparative between Traditional Approach with Competency-Based Approach (Dugan Laird, 1985)

The second condition is the effectiveness of getting the learner to participate in the learning experience. As we have stated earlier, the higher the level of participation the more compatibility with adult learning tenets as follow as:

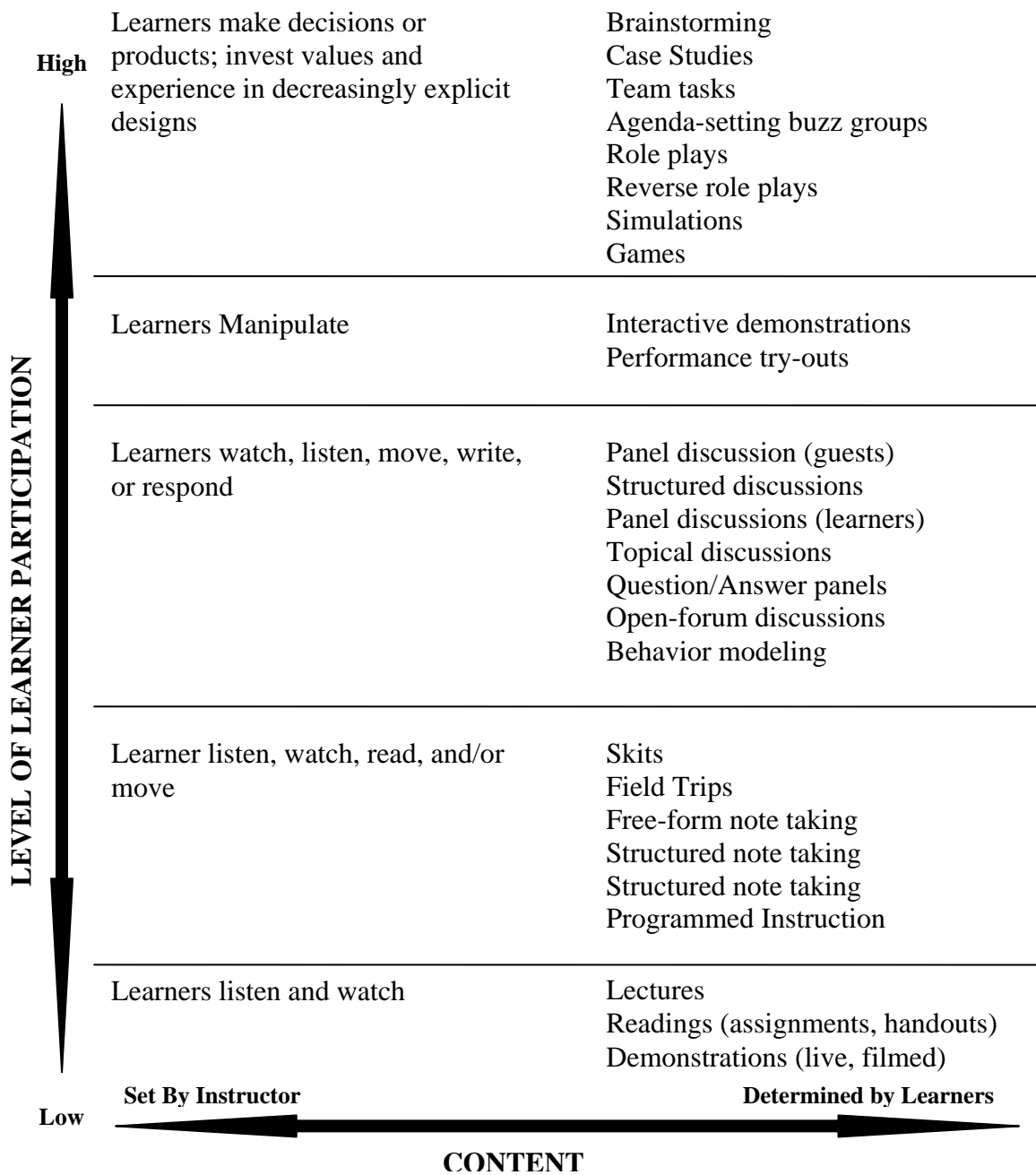


Figure 2
Delivery Methods Model

Fig 2 we don't overlook the opportunity for guided self-learning. Some authors argue that this is the only way to truly allow for individual needs and skill sets that each individual brings to the CBI learning environment. These opportunities, whether they be paper or electronic based, have clear advantages in rural areas. Learning using web-based technology has clear advantages and disadvantages but should not be overlooked. Likewise, two-way technologies such as video conferencing may allow for the effective use of resourced when delivering instruction to geographically separated or rural audiences.

OBJECTIVES

1. To construct the instruction material package on automotive suspension system subject.
2. To develop and validate the efficiency of instruction material package on automotive suspension system subject.
3. To study the effectiveness of competency-based instruction on automotive suspension system subject.

HYPOTHESES

1. The instruction material package has the efficiency as follow as 80/80.
2. The post-test performance of the experimental will be significantly greater than the pre-test performance.
3. Students have the good perceived in comment in the instruction material package.

METHODOLOGY

The methodology used for the studies which are: (1) the research design was one group pre-test and post-test that the sample of the study were ninety five students studying in MTE program (5 yrs) in 1st year semester 1/2006 academic year. There were selected 40 samples student's used in this study selected by purposive sampling technique; and (2) tools for the study were entry competency-based instruction test and pre/post-test common the instruction material package.

The content and items of the above tools were validated. While the automotive suspension system experts established the content validity, item validity was done using discriminative and difficult indices. The pre-test and post-test examinations consists of 30 multiple choice by evaluating from experts in relate fields consist of content expert, instructional design expert, and language expert among 5 persons. Then finding Index of Conjugate (IOC) is effective in terms of the content validity: ($IOC > 0.5$), the level of difficulty (p) = 0.2 – 0.8. And then try out with automotive technicians 30 persons to find reliability of test that tested by alpha coefficient = 0.6 -1.00. Discrimination of test = 0.2 – 1.0.

PROCEDURE

1. Students were matched by giving a pre-test.
2. Academic content in automotive suspension system was identified and sequenced.
3. A pre-test for each module was structured and administered before instruction.
4. Each unit was taught through competency-based instruction method.
5. A post-test for each module was structured and administered after instruction.
6. A criterion test for the whole content was administered after instruction.
7. Suitable statistical techniques were employed to analyze the data collected.

RESULTS

The discriminative and difficult indices of testing among of 80 multiple choice choose to statistical analyze has results the good 40 multiple choice and finding value the level of difficulty (p) = 0.2 – 0.8 which was in accept value. The results of expert's assessment in the quality side of instruction material package on automotive suspension system found means score at 4.42 install in the range of 3.50 – 4.49 which was in the good level, expert's assessment in the design side found means score at 3.88 install in the range of 3.50 – 4.49 which was in the good level, and expert's assessment in the utility side found means score at 4.19 install in the range of 3.50 – 4.49 which was in the good level.

The efficiency of instruction material package on automotive suspension system brought to test with sampling found (E_1) 81.25 % and (E_2) 88.46 % achievement which was higher than the criteria set at 80.00/80.00 which can implement to apply on teaching demand. And student's opinions toward on competency-based instruction were highly positive revealed by the means score at 4.73.

ANALYSIS

Analysis of one way t-Distribution dependent in pre-test and post-test 40 multiple choice in the experimental which the calculated 't' values are greater than the theoretical 't' values at .01 level of significance. The means score of pre-test was at 11.68 and post-test was at 26.48. Then, calculated from t-Distribution dependent of degree of freedom at 39 equal 2.426 at .01 level of significance. Considerate found the level of significance 't' greater than critical 't' value at .01 level of significance ($35.42 > 2.426$). It reveals that there was significant difference between pre-test and post-test performances of the experimental in mean scores in module tests as well as in global. The differences were in flavour of post-test performance. This proves that the competency-based instruction of automotive suspension system was more effectiveness method.

FINDING

The findings of the study suggest that:

1. Attainment of the mastery of competencies can be possible through power point techniques program for purpose to clear and motivate students.
2. Competency-based performance test provide increase interests to students and motivate to concentrate on the required competencies which help them to reach the mastery level.
3. Competency-based instruction method can retrieve the acquisition of difference performance knowledge skills and attitudes enhance the level of problem solving and assessment concept of automotive suspension system abilities among students.
4. This method was successfully on creates interest, attention and competencies among students.

LIMITATIONS

1. This study was limited to students studying in mechanical technology education program at King Mongkut's University of Technology Thonburi.
2. The experiment is limited to only automotive suspension system subject.

SUGGESTIONS FOR FUTURE RESEARCH

1. The experiment should be extended too many Technology University and Vocational and Technical education institutes.
2. The experiment should be conducted in other branches of academic subjects also.
3. The experiment should be conducted to study competencies profiles of students toward this method.

CONCLUSION

As a result, competency-based instruction involves more time, techniques, and effort. The instruction material package on automotive suspension system, which also may high cost a considerable amount. In generally, traditional method was not penetrative issue and unable to produce a desired results, as the students are passive practical. But competency-based instruction method students can learn more and retain because of the value of the instruction material package and learning process.

The instruction material package on automotive suspension system takes the students to the situation directly and they will be awareness and attempt on this subject which may be storm the individual's need skills to solve problem. The present study was a modest Endeavour of the investigator to find out the effectiveness of teaching strategy concepts in Industrial education science through competencies for the students of mechanical technology education program at King Mongkut's University of Technology Thonburi that learning concepts through CBI has been more effectiveness method.

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