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MODULE DESCRPTION FOR IMPLEMENTING: TOWARDS INTERDISCIPLINARY SKILLS APPROACH ON MODERN AUTOMOTIVE TECHNOLOGY SUBJECT

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ABSTRACT

This module describes various skills for improving students' performance on modern automotive technology subject in the Department of Mechanical Technology Education at the King Mongkut's University of Technology Thonburi. The Automotive Technology Education involves the practical application and use of science, mathematics and code of honors. The module is emphasizing activity-based, hands-on activities, practice integration and problem-solving with the interdisciplinary skills approach. Furthermore, the students gain a practical understanding of many interdisciplinary skills. The students are implemented in this module by integrating science skills, mathematics skills, problem-solving skills and code of honors.

Keywords: *Interdisciplinary Skills, Modern Automotive Technology Subject, Module Description*

INTRODUCTION

The Department of Mechanical Technology Education (MTE) at the King Mongkut's University of Technology Thonburi (KMUTT) is performing a review of the current MTE program in order to design interdisciplinary skills and develop a new pedagogy in modern automotive technology subject. This project outlines our initial the needs assessment that forms the basis of the curriculum development, learning activity design and assessment development. We are describing the instructional system design that is being used to provide form and identify to it through a consultative process within in the new features. It means corporate between automotive industry and academia by focusing the students' performance. The project outcomes include module description, and adapt the interdisciplinary skills approach in the new pedagogy.

In the recent year, the evolution of automotive technology is changed by many car automobile makers. The major branch of the evolution is focused on computer technology which is represented by embedded microcontroller systems [1]. Electronics use in automobiles has been increasing steadily to improve reliability and add more functionality. For example, car model in the 2001 year electronics increased for 19% of the cost of mid-sized cars and is expected to reach 25% by year 2005 for mid-sized cars and possibly 50% for luxury models [2]. Modern automotive technology can describe by adapting microcontroller-based processing systems which we divided as follow as six modules: 1) Gasoline/diesel engine control system; 2) Automotive suspension systems; 3) Automotive transmission systems; 4) Automotive electricity and electronics control systems; 5) Navigation system; and 6) Communicating via standard protocols through the Controller Area Network (CAN).Therefore, the interdisciplinary skills approach focus on designing a subject that is relevant, knowledge meaningful and competency-based (knowledge, skills and attitudes) for students. The subject illustrates challenge students and skills to solve real time problems both to moral and ethics.

PERSPECTIVES

The interdisciplinary approach shifts from an emphasis on applying the themes to subject areas to focusing on the commonalities across disciplines (Figure 1). Given today's educational technologies and the emphasis on metacognition, most teams turn to critical skills as the organizing principle for order and structure. Here, the content and procedures of individual disciplines are transcended: for example, decision-making and problem solving involve the same principles regardless of discipline. This makes intuitive sense to teachers [3].

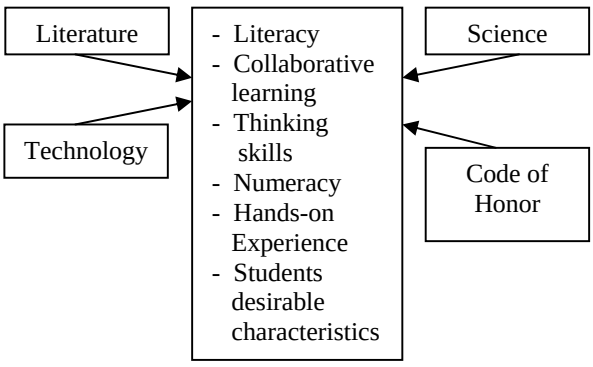

Figure 1 Interdisciplinary Skills Approach

The interdisciplinary approach can describe an emphasis on metacognition and learning how to

learn. Content lessens in importance. In integrating the subject areas, students learn that higher-order thinking skills and higher-order competencies are generic and can be used outside the classroom. Learning outcomes are less concrete in the interdisciplinary approach. The differentiation among cognitive, expressed as "blended". Many learning outcomes are identical across subject areas.

Asessement becomes more performance-based and beyond the boundaries of disciplines. The emphasis begins to shift to process rather than product; yet process can still be evaluated sequentially as in "benchmarks" or levels of growth that measure a student's performance [4].

MODULE DESCRIPTION

Most effective pedagogy that we see daily was designed and developed by automotive industry and KMUTT instructors as a concept mapping in the modern automotive technology subject areas. It may be difficult to communicate ideas and thoughts as contents. MTE program is shifting from teaching approaches that emphasize faculty transmission of knowledge to approaches that emphasize student construction of understanding. We can design student success through faculty development that:

- Promotes the modern automotive technology instructional package for using in work place study, curriculum renewal and transformation.
- Encourages faculty and staff to develop and demonstrate innovative approaches to teaching and learning that use technology and global information resources.
- Enables faculty, staff, and students to develop information, communication, and technology capabilities for successful learning in the subject areas.
- Fosters and disseminates research and scholarship that encourages the rigorous assessment and evaluation of technology and information based teaching and learning.

In the module, students complete six activities learning basic techniques. Students interact with instructional manual, text book, tools and equipments, instructional package, instructional multimedia, hands-on activities through competency-based performance improvement and counseling with assessment join with MTE instructors and experts of the excellent car automobiles company. They complete hands-on activities through a portfolio of these modules, and must pass a module post-test to assessment what they have learned. They must pass each a module for across in new module with to rubric of faculty.

INTERDISCIPLINARY SKILLS

The interdisciplinary skilled implemented in this module are:

Science Skills are: 1) Knowledge of global science in physical, chemical education and etc., that support to Autotronics concepts; 2) Express ideas of basic science with autotronics experimental; and 3) Understanding the scientific process of observation, visual check, decision-making and collecting data observed.

Mathematics Skills are: 1) Read measurements and calculation measured instrument on numerical technique with analog/ digital multimeter, test circuit equipment, automotive oscilloscope, digital engine analyzer, and advanced diagnostic tool; 2) Recognize and calculation Kirchhoff's circuit Law by applying linear algebra and differential equation to solving problems; 3) Identify and sketch geometrical graphs for presentation and report; and 4) Design the autotronics circuit by applying mathematics subject.

Problem Solving Skills are: 1) Understanding to explorer the document, fix manual, advanced tools for inspection and guideline to solve problems; 2) Understanding to applied science, mathematics and engineering relevance to solve problems; 3) Knowledge and competency requires students to engage in complex thinking and reasoning processes as they complete long-term, meaningful tasks to solve real time problems.

Code of Honors are: 1) Habit minds based on ethics and moral by Integrated desirable characteristics; 2) Professionalism role; 3) Desire for life-long learning; 4) Openness to new ideas; 5) Positive attitudes; 6. Have the public minds in energy conservative and environmental care; and 7) Have discipline itself.

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