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Analysis of Existing Products as a Tool for Engineering Design Education

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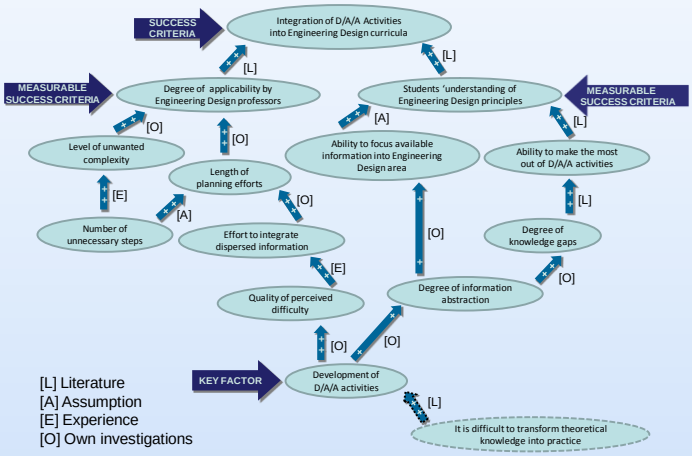
PROBLEM STATEMENT I

To teach and study Engineering Design can be difficult sometimes, especially when transforming theoretical knowledge into practice. Existing studies show that D/A/A *(Disassemble, Analysis, Assembly)* activities can become a popular pedagogy to provide students practical experience in the classroom, however the information available on how to prepare, conduct and evaluate these activities is abstract, sketchy and dispersed, there are no standardized guidelines on how to make the most out of these activities leaving this task to the experience of the professor at work.

REFERENCE MODEL II



GOAL III

To develop an assimilable and readily applicable manual for the systematic and effective development, execution and evaluation of D/A/A activities to support the teaching of Engineering Design.

RESEARCH QUESTIONS IV

1. What are the major obstacles Engineering Design professors perceive in order to implement D/A/A activities?

2. How can D/A/A -based educational materials be developed in a systematic way?

3. How can D/A/A activities' effectiveness as an educational tool be measured?

4. What are the characteristics of D/A/A -based educational materials that are favored by the students?

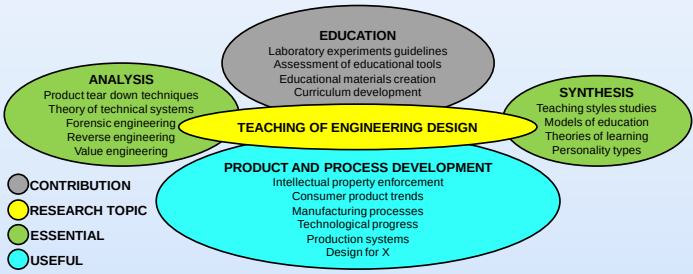
5. What are the tradeoffs in design education between Reverse Engineering and traditional Forward Engineering?

6. Are there any legal boundaries to the use of Reverse Engineering in education?

THEORETICAL FOUNDATION V

the process of discovering the technological principles of a device, object or system through an analysis of its structure, function and operation, taking it apart and analyzing its workings in detail is theoretically founded on the Reverse Engineering methodology proposed by authors Otto and Woods (2001) and the Product Tear Down Analyses conducted by Yoshihiko Sato (1972). Kolb's model of learning (1984) states that practical experience can be obtained through product dissection and influential authors on curriculum development to support the need for hands-on experience in the teaching of Engineering Design include Sheppard (1991), Lamancusa 1994, Otto and Woods (2001).

ARC DIAGRAM VI



RESEARCH APPROACH VII

1. Clarification of the task

2. Preliminary descriptive studies (Literature review, Identification of the state of the art)

3. Prescriptive studies (Development of educational activities, Generation of tools , Aids, Databases and Methods)

4. Final descriptive studies (Field tests , Experiences , Results analysis, Feedback)

EXPECTED RESULTS VIII

The contribution of practical knowledge to develop a manual that helps professors to integrate educational product dissection activities into their Engineering Design curriculum easing their preparation, execution and evaluation tasks by reducing knowledge gaps, unwanted complexity and unnecessary steps.