STRATEGIES AND TECHNOLOGY FOR EFFECTUAL ENGINEERING EDUCATION

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Abstract

Engineering education today in India has achieved newfound respect and is enjoying growing demand. But less attention has been paid to incorporate technical skill and innovative teaching in engineering education. This paper discusses the need and possibilities of integrating strategies and technology for effectual engineering education. It also suggest some thoughts that create positive attitudes toward technology and constructive teaching/learning philosophy in engineering education by introducing the specific initiatives of several educational programs, and in turn, hopes to inspire new initiatives that will offer most value to students, the institute, and the community.

1. INTRODUCTION

Engineering education has been a- topic of the highest priority in socioeconomic policy. The conventional teaching/teaming methodologies usually adopted in the engineering colleges all around the country are found today no longer effective in fulfilling the real objectives of socio-economic policy. Moreover, the exiting techniques are less effective in fostering the career opportunities under stiff competitive environment for employment. The company and industries are not happy with simple specialization that is being offered under present technical educational system. The employment market demands specialized and skilled personalities in multiple domain areas. The intensity of the problem has become many folds because of poor performance of the medium and large manufacturing sector over the years. In general the students coming out with an engineering degree in core branches are facing uncertainty for career development. The present technical educational system is not well equipped to impart the necessary teaching/learning aids to build multi-skilled personality of a student (Deb, S.K, 2003). Technical skill and innovative teaching should occur simultaneously to influence technology integration. The purpose of blending strategies and technology in engineering education is to provide engineering teachers with constructive teaching strategies and methods for integrating a variety of technical modules into educational curriculum. This paper proposes that appropriate strategies and technology will directly increase the technical skill and teaching strategy of educators. That, in turn, will increase educators' positive attitudes toward constructive teaching philosophy. It is extremely difficult to evaluate the impact of training and teaching process on constructive uses of technology because of the large number of mediating variables. Technical skill, attitude toward technology, constructive teaching strategies, and constructive teaching philosophy

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all influence constructive uses of technology. The paper suggests some thoughts that create *professional development training for the* educators while also providing technical and instructional support along with resources and supporting tools. Controlling for such mediating variables will allow the current discussion to analyze the impact of integrating strategies and technology in delivering proper engineering teaching practice.

2. STRATEGIES AND TECHNOLOGY IN TEACHING

The primary objective of teaching/learning process is to acquire value based productive education that will increase the productivity and national growth of the country. The purpose of looking after strategies and technology from a single window is to provide engineering teachers with constructive teaching strategies and methods for integrating a variety of technical aids into educational curriculum. Teachers involved in technical manpower development need intensive training in problem-based learning and the effective integration of technology into the teaching and learning process. It is necessary to design training programs that will consist of a variety of continuous and concurrent sessions. The teaching/learning session can-be imparted focusing on primarily five : (i) Problem-based, learning, (ii) Instructional design, (iii) Technology tool (iv) On-line practical activities and (v) Continuing coordination.

2.1. Problem-based effort

This is a systematic approach based on group dynamics and experiential engineering. The participants in technical teacher's training program are divided into several teams depending on the nature and complexity of the problem. As members of a problem-solving team participants work together to critically analyze the problem and develop, present, and defend their solution to their peers. Teachers may refer respective web site as a model of problem-based learning. They interact with a team of real academician who are working on a similar

problem and have the opportunity to hear about personal growth, see their achievement, and share in success. This learning process provides participants the opportunity to acquire firsthand experience from both the distinguished educator and teacher perspectives.

2.2.. Instructional design

Teachers participated in the workshop need to analyze the components of sound instructional design and actively participate in a variety of cooperative and collaborative learning strategies. Participants develop their own standards-based instructional design incorporating best practices into the implementation. They identify alternative assessments and incorporate technology into a design that will turn their classroom into a training center for lifelong learners.

2.3. Technology tools, skills, and applications

Participants receive training in the use of a variety of productivity and technology tools. All training is conducted within the context of teaching/learning content, making the training meaningful and promoting technology usage.

2.4. On-line practical activities

The hands-on activities model a constructive approach that addresses a variety of learning styles and intelligences. Participants can realize how the simplest of activities can be adapted to challenge students to develop probing questions and to search for solutions.

2.5, Continuing coordination

This process of learning based on continuing coordination helps the teacher participants to generate confidence in development workshops in their region. Regional technical coordinators need to be available to provide technical, instructional and professional support throughout the session. These Coordinators can help-teachers with their courses and also with the professional development workshops they have to conduct.

3. INTEGRATED TEACHING METHODOLOGY

Integrated teaching methodology focus on improving constructive teaching strategies and technical skills. The factors responsible for the decision making of fruitful strategies and technology tool for effective engineering education are technical skill, constructive teaching strategies, attitude towards technology, constructive teaching philosophy, and constructive useful technology. It is expected that the different links in turn will positively influence constructive uses of technology. The attitude toward technology and constructive teaching strategies has a direct effect- on accurate uses of technology,-. Constructive teaching strategies are significant predictor of both constructive uses of technology and constructive teaching philosophy. Meanwhile, technical skills are not a direct predictor of constructive uses of technology but they are indirect predictor through attitude toward technology. Based on the above discussion the model proposed for the constructivist teaching strategies is shown in figure 1. The model shows, that it would lead to even greater constructive uses of technology.

Fig. 1. Model for integrating strategies and technology in engineering education.

4. PLANNING OF STRATEGIES AND TECHNOLOGY
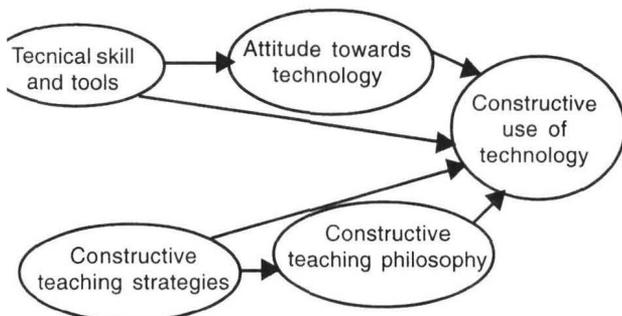
The different phases of strategies and technology planning are- based on problem-based experiential learning studies. It provides theory, modeling, practice, and feedback in problem-based learning instructional design and implementation techniques. Based upon the works the following problem-based learning certifications may be offered:

Level I: In this category workshops focus on the skills and strategies needed to create student- centered classroom through the use of inquiry, cooperative learning, hands-on experience, and the effective incorporation of technology. Teachers begin building the skills and experience needed to qualify as a problem-based learning instructor.

Level II: Here, workshops focus on the skills and strategies needed to create student-centered classrooms through the use of problem-based learning scenarios, alternative assessment tools, and effective incorporation of technology. Building on Step I experience, teachers acquire and apply the additional skills needed to qualify as a problem-based learning author/designer.

Level III: Under such cases workshops focus on the skills and strategies needed to develop web pages with instructional designs for teachers to create student-centered classrooms through the use of problem based learning scenarios, alternative assessment tools, and effective incorporation of technology.

Level IV : In this category workshops focus on the practice and refinement of technology and instructional skills and strategies. Teachers motivate others to adopt a problem-based learning approach.

5. CONCLUSION

This paper has discussed the need and possibilities of integrating strategies and technology for effectual engineering education. It also suggests some thoughts that create positive attitudes toward technology and constructive teaching/learning philosophy in engineering education. By integrating strategies and technology through experience, teachers acquire and practice the additional skills needed to qualify as a problem-based learning trainer

that in turn will help to develop specialized and skilled technical personalities in multiple domain areas of engineering education.

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Thus each classroom session can be metamorphosed into activity laboratory with language experiments performed by the students under the master guidance of the teacher through CONTINUOUS ACTIVITY PROGRAMME.

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