Creative Coursework Development using a Creative Problem Resolution Process

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Abstract - The development of university coursework requires holistic approaches that develop courses incorporating sound structures, creative problem solving techniques and a creative learning environment. Prerequisite materials and standards for course development are drawn from many sources around the educational institution. Participants to course development processes may include state and local educational officials, accrediting bodies, professional organizations, and the home institution. Guidelines and standards must be met in the course development process to address all constituencies. Prerequisite courses must be determined and new material must be aligned horizontally and vertically within the individual program. In this discussion, guidelines will be developed and presented for developing a course with the use of a Creative Problem Resolution Process. This systems based approach identifies the participant's individual thinking styles, and missions, goals and objectives that must be met in the course development process. Creative course development processes and problem solving techniques will be reviewed.

Key words: course development, coursework, program development.

DISCUSSION

The Creative Problem Resolution Process

Development of coursework in professional higher educational programs in construction management, construction science, engineering, or any program must address issues and guidelines. This is provided by industry, governing bodies, accrediting associations, professional organizations, and the institution where the course is developed.

Industry is currently seeking employees who possess creative problem solving and critical thinking abilities, and teaming skills. The need for this type of skilled employees may be found in newspaper employment advertisements as well as monthly publications of professional societies.

Creativity may be defined as building upon an existing or new ideas and the generation of pertinent possibilities related to an issue. Critical thinking is the use of knowledge and wisdom specifically identifying relevant issues to eventually arrive at a problem resolution [Miers, 6]. Figure 1 represents the creative process that develops a path for a systems approach to problem solving.

Figure 1. Creative Problem Resolution Process (Miers, 2002).

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The process above may be used for problem resolution when developing courses at the collegiate level. The dotted lines in the illustration depict the openness of the process. The participants in the CPRP need to be open-minded and not be critical of suggestions or the people presenting these suggestions. A freedom to express ones self is essential throughout the process. Comments by peers need to be presented in a professional manner and people need to be treated with respect (unabated by negative assumptions). This course of action is applicable, as demonstrated in the following pages.

Systems Structure Identification is the first element in the process. Structure identifies the surrounding influences at work in a given environment [Senge, 7]. These influences could include educational systems, industry systems, or student systems (see Figure 2).

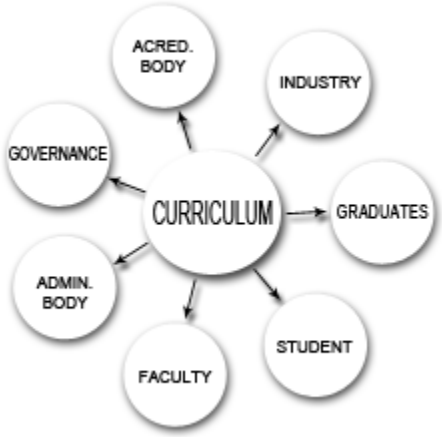

Figure 2. Systems Structure Participants.

Creativity is the second element. This step in the process is where creative ideas are generated. It is a crescendo (building) in the development of approaches that will lead to problem resolution [Miers, 6]. The environment should encourage suggestions and change. The creative environment allows ideas to be produced unabated by negative assumptions [Hanks & Parry, 1; Kline & Saunders, 5]. Thinking styles and team vision generates efforts for the development of creative concepts [Harrison & Bramson, 3; Kline & Saunders, 5].

Creative problem solving techniques define the acceptable or probable ideas that will best lead to resolution. Creativity in idea generation takes into account many techniques, some of which are brainstorming, brainwriting, and visual synectics [King & Schlicksupp, 4; Harrington & Hoffherr, 2]. In course development, idea generation may take place at faculty meetings, administrative board meetings, gatherings of outside administrative groups, and at joint functions of any of the above groups. There are many different techniques which may be found in the literature, but not every technique presented may be undertaken in every problem-solving endeavor. However, by implementing as many techniques as time and energy allow, implications and conclusions will lead to the best ideas being generated.

Critical thinking is then used to assess and evaluate the ideas generated, compare strengths and weaknesses, refine and identify the process and its impact, and advisement on strategies for implementation.

Action Plans & Implementation Strategies is the final element in the process and is the most difficult to achieve. This stage allows all the previous process parts to be reflected on and strategies developed for the introduction of a creative concept. Alignment of mission and goals, and the participants must share in the overall scope and mission of the systems structure or overall environment, as well as having a shared vision and direction for the departments [Kline & Saunders, 5].

Problem Resolution in Course Development

Course development using creativity, creative problem solving, and problem resolution may employ the techniques and skills described in the Creative Problem Resolution Process (CPRP). This process may be included in the development of a course structure. The following illustration depicts participant relationships in course development and the critical areas where the CPRP may be used:

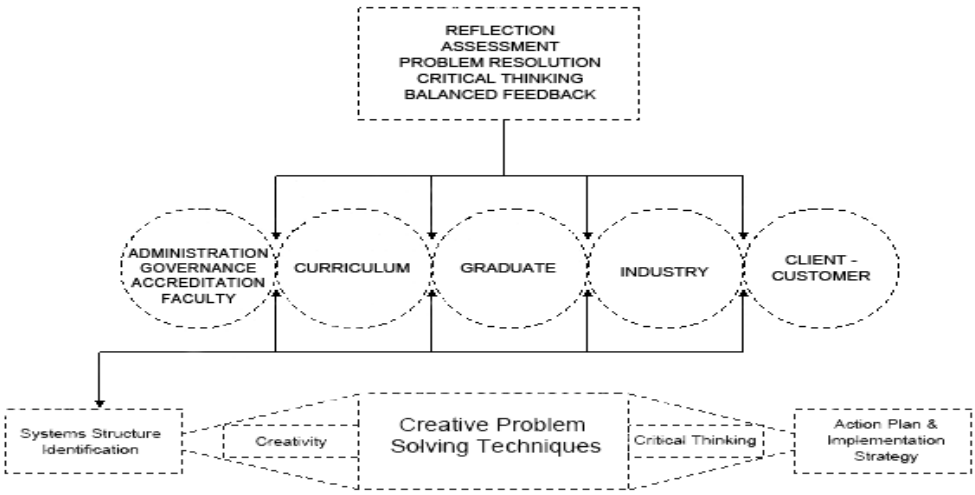

Figure 3. Participants and CPRP application (Miers, 2002).

The CPRP may be applied when curriculum goals need to be met in courses taken by students. Course development may parallel with the same processes initially introduced in the CPRP. Identifying the relevant elements, concepts and applications are accomplished through correlation to the original CPRP model, Figure 1.

In the CPRP, the environment for course development relies on an open atmosphere for the generation of creative ideas in the classroom. Faculty and students need to drive the process to produce creative thoughts. Feel free and safe in the introduction of related and unexpected ideas that might evolve in the classroom [Hanks & Parry, 1]. This can be achieved by closely defining the objectives and applications directions of the course. Student feedback is especially helpful in providing direction at this point in the process. Balancing feedback allows the faculty member and students to collaboratively produce courses that cultivate the learning and comprehension level of students [Senge, 7]. Assessment of work produced by students may provide opportunities to identify areas in the current coursework that are lacking strength.

In understanding the structure around the curriculum, the faculty and students visually review figures presented and assess or evaluate the pertinent elements, constituencies, and directions as present in the model. The faculty member, as facilitator, may use the matrix below. Figure 4, illustrates the criteria and range of parameters that may be presented throughout the student's time at the university or within their coursework. Assumptions for course involvement can be made from inspecting the alternative chosen (alternative option 2). The parameters provided in the matrix will direct the process towards the ultimate goals of the course. Faculty can show where the course originated and the criteria used in the design of the curriculum and coursework. The faculty can also show the direction in which new coursework is going, the driving factors, and the criteria used to make the change in the courses.

CRITERIA	OPTIONS AND IDEAS GENERATED			
Planned Enrollment Growth	Same as last five years	Consolidation	Average of department	Simulate other institutions
Planned rate of Loss in % of Retention	Same as last year	Same as other divisions	Between 4-5%	More than 5%
Structure of Curriculum	Emphasis on creative problem solving	Mix of curriculum related courses available	Mix of innovative courses available	Mix of accrediting & governance recommendations
Targeted Cross Curriculum Mix	Component Courses	Groups of component courses	Subsystem related courses	Complex combinations
Technology Level	Low-tech	Middle-tech	High-tech	Demand & trend oriented
Targeted Curriculum Market Strategy	Management leadership	Technology leadership	Problem solving leadership	Critical thinking leadership
Future Implementation Strategy	Today's market	Environmental management	Construction management	Accreditation organization based
Curriculum Strategy	Cost based	Value added	Synergy with other construction education curriculum	Based on current curriculum
Curriculum Delivery Method	Stand-alone operation	Alliances with governance	Alliances with accrediting bodies	Alliances with other institutions
Status in Construction Education Market	Divisional as is	Innovative expansion	Spin-off to new curriculum	
	Alternative #2	**Alternative #1**		

Figure 4. Alternative Option Matrix (Miers, 2002).

Curriculum costs and time (see Figures 5 & 6) may provide faculty with the additional groundwork for course development. Monetary costs may be determined and time costs developed to fit the number of allowed hours of coursework.

Faculty may use these charts to develop their own time frames. Program budget cost determinations can be developed using these matrix illustrations. These factors can be used to develop course guidelines. Many benefits may be derived from the incorporation of the "Creative Problem Resolution Process" in course development. Overruns on laboratory costs, supply costs, and faculty and student time are only a few of the items realized when reviewing the matrix. Minimal and extensive amounts are based on each institutions budget, constraints, and time allotment.

	Govern.	Accred. Body	Prof. Orgs.	Industry	Administr.	Faculty	Students
Curriculum Dev.	Minimal	In Progress	Consult	Input	Extensive	Extensive	None
Publication Articles	None	Minimal	Extensive	Minimal	Minimal	Extensive	None
Correspondence Materials	Minimal	Minimal	Extensive	Average	Extensive	Extensive	None
Course Development	None	Extensive	Average	Average	Average	Extensive	Minimal
Books & Supplies	None	None	None	None	None	Average	Minimal
Course Intro & Application	None	None	None	Recommend	Min. Review	Extensive	Extensive
Curriculum Annual Review	None	Minimal	None	Assessment	Average	Extensive	Minimal
Course Annual Review	None	None	None	Assessment	Average	Extensive	Average

Figure 5 Time Matrix for Course Development (Miers, 2002)

	Govern.	Accred. Body	Prof. Orgs.	Industry	Administr.	Faculty	Students
Curriculum Dev.	Minimal	Minimal	Average	Minimal	Extensive	Extensive	None
Publication Articles	Minimal	Minimal	Extensive	Minimal	Minimal	Minimal	None
Correspondence Materials	Minimal	Minimal	Extensive	Average	Extensive	Extensive	None
Course Development	None	Extensive	Average	None	Average	Extensive	None
Books & Supplies	None	None	None	None	None	Avg./Ext.	Avg./Ext.
Course Intro & Application	None	None	None	None	Average	Extensive	None
Curriculum Annual Review	None	Minimal	None	None	Average	Average	None
Course Annual Review	None	None	None	None	Average	Average	None

Figure 6. Cost Matrix for Course Development (Miers, 2002).

CONCLUSIONS

A common theme was developed as we started the new millennium, one that calls for major shifts in thinking about creative problem solving and critical thinking in educational development programs. Many articles, books, lectures, and seminars have been produced describing this topic.

Themes in paradigm shifts run parallel amongst educators, institutions, professional organizations, accrediting organizations, and industry leading to the acceptance of creativity and innovation products. The systems structure approach for coursework development is facilitating change. A foothold needs to be established regarding problem solving and the introduction of innovative concepts. Innovation in education leads the way by producing students who can quickly assimilate into the key elements of the industry, not merely through time-consuming indoctrination and orientation programs. Educators and institutions must step forward in adopting new strategies in order to maintain acceptable levels of retention, recruiting, and enrollment figures.

As presented, this discussion is an application of the concept of a creative problem resolution methodology. Incorporating this concept into course development will produce students with creative problem solving skills required for immediate assimilation in industry. Expenditures of time consume resources with less time spent on transition and orientation will provide programs which are better from the standpoint of industry as a whole. Training costs and time can be reduced through education programs. The introduction of the Creative Problem Resolution Process model gives students and faculty members a conceptual tool that can be transferred across a curriculum into current coursework as well as subsequent coursework.

This process was used to create courses by this facilitator and was useful in the creation of a construction management program in the Northeast. This new program and support documents were presented to the Board of Directors of the College and the State Department of Education. It was unanimously accepted and the new program started in the fall 2008 semester.

This process can be used by instructors that are looking to re-engineer their courses and update materials that they bring to their syllabi. A creative approach to finding new projects and course materials is an ongoing process in academia. When using this process faculty discover new exciting approaches to the course. They can also assess the amount of time to create, deliver, and set budgets for the course.

The Creative Problem Resolution Process was also used outside of academia [Miers, 6]. An alliance of hospitals (teaching hospitals) in upstate New York needed additional funds for laboratory and teaching facilities. The CPRP process was used and a wide range of new ideas for fund raising developed. Examples of these ideas range from cell towers on the roof to boxed supper takeout for administration and hospital personnel, to service related associates taking your vehicle for inspection. A fee would be charged for the services and hospital personnel that did not have alternative ways to complete these tasks, avoided taking time off from their jobs. These are only a few of the ideas generated. The ideas were presented to the hospital board and many are in active use today.

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