Instruction and Assessment of Multidisciplinary Teaming Skills in Senior Design

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Outline

- Background
- Phase I: Generic Teaming Module
- Phase II: Multidisciplinary Teaming Focus
- Phase III: Project Management, Outcome-Based Teaming Model
- Conclusions
Background

- Multidisciplinary (MD) teams
  - Important in industry
  - Assessed by ABET (Outcome d)
- NSF grant on teaming, writing, and speaking
- Capstone design course
  - Chemical Engineering, Computer Science, Food Science, Industrial Engineering, Materials Engineering, Economics, Aerospace Engineering, Pulp and Paper Technology
Phase I: Generic Teaming Module

- Spring 2001
- Teaming instruction occurred in a weekly module
- 6 MD teams, 22 non-MD teams
- 5 MD and 0 non-MD teams received instruction
  - Creating team ground rules
  - Stages of team development
  - Establishing team roles
  - Writing team minutes
Phase I: Generic Teaming Module

- Assignments/Assessment
  - Team minutes and logs
  - Peer review (Felder, 1997)
  - Written reflection
  - Pre- and post-course surveys: competence and confidence
  - Performance on written and oral reports
Phase I: Generic Teaming Module

- Conclusions
  - MD teams need a common time to meet for instruction
  - MD teams need instruction on integration of information into a coherent team voice
  - MD teams have difficulty addressing interpersonal issues with members from other disciplines
Adjustment After Phase I

- Teaming instruction focused on unique needs of MD teams
- Instruction model changed to consultation format so all team members can attend
Phase II: MD Teaming Focus

- Spring 2002
- Teaming instruction occurred via consultation 4 times during the semester
- 4 MD teams, 19 non-MD teams
- 4 MD and 4 non-MD teams received instruction
  - Creating team ground rules
  - Facilitating team roles
  - Establishing team cohesiveness and productivity
  - Addressing feedback as a multidisciplinary team
Phase II: MD Teaming Focus

- Assignments/Assessment
  - Team minutes and logs
  - Peer review
  - Written reflections were eliminated but reflection occurred in team meetings to address interpersonal issues
  - Pre- and post-course surveys: competence and confidence
  - Performance on written and oral reports
Phase II: MD Teaming Focus

- Conclusions
  - MD teams receiving teaming instruction found it difficult to manage multiple sources of input
  - MD teams struggled with project management issues
  - MD teams saw the project management assignments (minutes and logs) as “busy work” that detracted from “real” technical work
Adjustment After Phase II

- Adjust the focus of teaming instruction to develop project management skills
- Maintain consultation format and tailor training to the specific needs and experiences of individual teams
Phase III: Project Management, Outcome-Based Teaming Model

- Spring 2003
- Teaming instruction occurred via consultation 4 times during the semester
- 7 MD teams, 16 non-MD teams
- 3 MD and 7 non-MD teams received instruction
  - Phase II content
  - Developing a schedule, identifying critical path
  - Managing team-specific issues related to particular projects and deliverables
Phase III: Project Management, Outcome-Based Teaming Model

- Assignments/Assessment
  - Team minutes and logs
  - Peer review
  - Brief written in-progress reflections at the end of each consultation period
  - Pre- and post-course surveys: competence and confidence
  - Performance in written and oral reports
  - Teaming rubric completed by advisor(s)
Phase III: Project Management, Outcome-Based Teaming Model

- Teaming rubric – assessed by advisor(s)
  - Team Project Management
  - Team Productivity
  - Cohesiveness of Team

- Analysis
  - Relate advisor assessment to performance on oral and written reports
  - Relate advisor assessment to team self-assessment
Conclusions

- Students on MD teams face unique challenges
  - Processing feedback
  - Project management
  - Collaborative writing & speaking
- Iterative assessments led to a competence-driven model for instructing MD teams
- Preliminary results indicate MD outperforms SD on final oral and written reports
  - Teaming rubric to test connection between performance and teaming effectiveness
For More Information

- www2.ncsu.edu/unity/lockers/project/actionagenda/index.html
Teaming Rubric

- Team Project Management
  - Team set and followed collective goals and ground rules
  - Team set timelines for project completion and managed their work to meet critical path requirements
  - Entire team attended and participated in meetings with advisors/industry sponsors/consultants
Teaming Rubric

- Team Productivity
  - Team delegated work among members responsibly and appropriately
  - Individual team members contributed an appropriate amount of effort and time
  - Team coordinated effective information exchange between all members
  - Team collaboratively addressed feedback from multiple sources and successfully incorporated it into successive deliverables
Teaming Rubric

- Team Cohesiveness
  - Team members made efforts to understand, include, and respect other team members’ perspectives and ideas
  - Team addressed personality problems and conflicts as a constructive whole
  - Team oral presentations and written reports reflected integration of different members’ content into a coherent team voice