Turn/Team Teaching - 20/20 Hindsight Experiences and Tips

David McDonald, Ajay Mahajan, Mohamad Qatu
Lake Superior State University

Abstract

Interest in cross-disciplinary courses for general education and in innovative introductory and capstone courses for majors has resulted in an increase in the team teaching method of instruction. This paper discusses the rationale for team teaching and presents three models based on current team-taught courses at Lake Superior State University. The discussion then contrasts the effectiveness of the team-teaching method in each model. The authors conclude that team teaching requires additional coordination and communication between faculty that is time consuming, but that team taught courses are rewarding for both the students and the faculty.

Introduction

The recent development of courses that integrate a number of disciplines and project-based courses has created a need to use the special skills of multiple instructors. This need for multiple instructors is especially true for new general education courses and unique freshmen and senior level courses. As a result, the instructors often come from different disciplines. This team instruction approach has both strengths and weaknesses depending upon the course needs and the style of team teaching that is employed.

In recent years, a renewal of general education has resulted in an increase in both the quantity and quality of the general education programs.' Two specific areas of interest to engineering educators are an increase in courses that integrate ideas from a variety of fields[2] and engineering-focused courses that non-majors take for general education credit.[3,4,5] Engineering faculty involvement in both types of courses has been encouraged by the recent American Society for Engineering Education (ASEE) report, “Engineering Education for a Changing World."[6] These courses, however, frequently require the special expertise of multiple instructors in a team-teaching format.

The team-teaching format is also frequently necessary to meet the demands of engineering courses that cover a wide range of topics, especially introductory courses and senior level capstone project courses. Engineering educators are concerned today about helping first-year students to succeed. As a result, there is an emphasis on the development of introductory courses designed to support and encourage entry level students in engineering.' These courses usually involve discussions on such topics as study skills and goal setting, as well as activities that develop a sense of community and exercises that introduce a variety of engineering fields. Due to the range of topics, these courses naturally lend themselves to a team-teaching format.

Capstone project courses are also fairly common in engineering curriculums today. A recent survey investigated the nature and extent of the offering of capstone project courses. [8] Of the 360 departments from 173 schools that responded to the survey, 65% indicated that 20% or more of their faculty are involved in capstone courses.

These types of courses lead to various team teaching arrangements. The organization and interdependency of the faculty in a specific course will depend upon the instructional requirements of the course. The following sections of this paper will first discuss the rationale for team teaching, and then describe and contrast three unique team-taught courses that the authors have participated in at Lake Superior State University (LSSU).

Rationale for Team Taught Courses

Universities, schools, and departments use team teaching for various reasons. These reasons may be dictated by the course content, goals, and outcomes; or they may be based on faculty knowledge and expertise. This section will discuss how the course requirements influence the need for team teaching and the relationship of the faculty to each other.

The need for multiple instructors may be driven by the goals and objectives of the course. Such a course can be single-discipline or cross-discipline in nature, but needs to provide the students with a variety of knowledge or skills. The course might require the integration of different types of knowledge, or a need to present different viewpoints on the same knowledge. The unique nature of the material, however, requires several experts or individuals who can most enthusiastically and efficiently communicate that information. The faculty might be quite independent of each other, or closely dependent upon each other. The amount of interdependence can vary significantly depending upon the dynamics of the course and the amount of feedback that the faculty require from the students and each other. In some courses, the faculty might a limited amount of contact with each other, while in other courses the faculty might meet and discuss course issues on a regular basis.

Each team taught course requires one faculty member to act as a facilitator or coordinator. The responsibilities of the coordinator will vary significantly depending upon the structure of the course. If the faculty merely present a given body of knowledge and grade the students independently of the other faculty, then the coordinator's role might be as simple as structuring the order of presentations, collecting individual grade information, and assigning grades. However, if the design of the course calls for regular meetings of all the course faculty and corresponding adjustments to the course material based on how the course is progressing, then the coordinator's role can become quite involved.

The following section illustrates three models of team teaching. These models are based on team-based instruction in courses that the authors have helped teach at LSSU.

Three Models of Turn/Team Teaching

Team teaching is an innovative approach to the educational curriculum in a university environment. This section first describes the differences between turn teaching and team teaching, and then outlines three models within this paradigm that are currently being used to turn/team teach three courses at LS SU.

Turn teaching naturally follows from a course organization that calls for units of knowledge to be presented in a sequential order. The order or arrangement of the units may or may not be significantly important. In a turn-teaching arrangement, the faculty are relatively independent of each other and merely take their turn teaching their own material.

Team teaching is a more highly structured teaching arrangement that occurs when the course organization requires several instructors to concurrently instruct separate groups of students, or to provide the different material to one group of students. This structure requires significant interdependence among the instructors, and involves ongoing feedback from each instructor to the faculty team to make ongoing adjustments to the course.

Consecutive Instruction - Turn Teaching

This model uses independent modules taught by different faculty members. The modules themselves are sufficiently independent and can be taught in any order. The critical decision in this model is the selection of various faculty members for the individual modules. The content requirement of the modules is left to the discretion of the individual faculty member. It is then easy to substitute faculty who may make adjustments to the content of their module as long as it fits into the general module sequence and structure.

An example of a course that is structured in this manner is *Exploring Technology* (ET 100). This course is offered by the School of Engineering Technology and Mathematics at LSSU to both engineering and non-engineering majors. The course was developed through the aid of a course and curriculum development grant from the National Science Foundation.[9] The course is organized into 14 modules, one for each week of the semester. The first module serves as a mini freshman experience course that entails problem solving sessions, team building exercises and tours of the engineering laboratories. The second module is dedicated to basic computer literacy. The remaining modules are divided among electrical, mechanical, and robotics and automated manufacturing areas.

Six faculty teach the various modules, which require the use of six different laboratories throughout the course. The instructor for each module reports student grades for that module to the course coordinator, who assigns the final course grades. There is minimal coordination among the individual instructors. It is important that the four mechanical, electrical, and manufacturing modules are coordinated within each area, but the sequencing of the three areas is relatively unimportant.

Concurrent Instruction - Team Teaching

This model uses a team of faculty members to teach various topics that have a pre-defined aim. The instruction is dynamic since the content as well as the sequence may change due to feedback from the students as well as the faculty. The faculty meet each week to discuss the problems as well as the direction of the course. The faculty are selected based on their respective expertise, and topics are covered by the faculty member who is best able to teach that topic.

The *Senior Design Project* (ET485/AM485) *is* an example of this style of teaching. This is a required course for all seniors majoring in automated manufacturing, electrical, and mechanical engineering technology. Interdisciplinary student teams are formed and given actual, solicited projects from industry. A sequence of lectures cover topics such as problem solving, timelines, responsibility charts, internet knowledge, formal meetings, memo writing, and presentation techniques. The sequence is fluid and can change based on the needs of the students and the availability or specialization of the faculty.

Six faculty teach the course. Each faculty member advises one or more student design teams, and several of the faculty teach the lecture classes. One or two faculty members serve in the role of coordinator, and are responsible for finding the industrial projects and keeping the course on schedule. The student grades represent team grades for lecture assignments, oral presentations, and written design proposals.

Sequential Instruction - Turn Teaching

This model uses a fixed outline that may encompass various disciplines represented throughout the school or the university. The outline is fixed due to the chronological or sequential aspect of the material itself. The faculty are selected based on their knowledge of the different portions of the course. Faculty meetings would be beneficial in this model for the sake of continuity, but are not crucial.

An example of such a course is *The Universe, Earth, and Humans (NS* 100) offered as a natural science elective to all students. This course was developed under the new General Education requirements being implemented at the university. The course was designed to track the birth of the Universe, its evolution, the birth of Earth, its geologic evolution, the origin of life, the evolution of humans, our current status, and the prospect for the future. Its aim was to take the students on a journey through the history of time itself, and to give them a broad understanding of the process of which they as humans are a component.

Six faculty members were selected from Physics, Chemistry, Geology, Biology, History and Engineering Departments to teach the different portions of the course. Each instructor gave individual or group assignments and one quiz.best for his/her material. Each instructor then handed over the students' grades in his/her portion of the course to the coordinator of the course. The students were also asked to write a paper which was submitted to the coordinator. The coordinator was responsible for the overall grade for the students.

Strengths and Weaknesses of the Different Models

All three models presented above have their strengths and weaknesses. The first model, ETIOO, was a pioneering course presented by the School of Engineering Technology and Mathematics. Its strongest points were its informal setting that was far different from the intimidating nature of traditional freshman technology courses, and the broad spectrum of topics from the field of engineering that were presented by various faculty. Both the engineering technology majors and non-majors were extremely impressed by the course. The weak point was a lack of faculty meetings, therefore no feedback, and hence little continuity in the transition periods from one module to another.

In contrast, the *Senior Design Project (AM485/ET485),* has weekly meetings of the Senior Projects Faculty Board (SPFB) to discuss the course contents and make changes to the lecture material. This is the strongest point of this course, and lends itself extremely well to positive interdependence between the faculty. These weekly meetings and the corresponding follow-up activities for the faculty are quite time consuming and involve extra effort from the faculty. In spite of this extra effort, the faculty enjoy the collegial atmosphere of their team and support the course because it benefits the students.

The third model, NS100, has an outstanding outline and course sequence, but it creates the problem of finding the appropriate faculty that can do justice to the course content. The other weak point in this course was the sometimes abrupt transition from one faculty member to another. It is the same problem as with the ET100, and arises out of a lack of periodic faculty meetings as well as the inability of all the involved faculty members to attend all of the classes outside of their module.

Conclusions

Continuous or periodic communication between the faculty and from students is vital to the success of a collaborative course. The requirement for communication can be minimal or extensive depending on the course goals and objectives. In team teaching, faculty should be aware that communication to calibrate faculty with course objectives can be time consuming, but immensely rewarding. Our experience has been that faculty members involved with turn/team teaching find themselves professionally developing in areas outside of their expertise. In conclusion, turn/team taught courses seem to be extremely rewarding to students as well as faculty.

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DAVID MCDONALD is a Professor and the Chair of the Electrical Engineering Technology Department at Lake Superior State University. He received BSEE (1969) and MSEE (1971) degrees from Michigan Technological University. He is a registered professional engineer in Michigan, and an active member of ASEE, IEEE, and ISA. His technical interests focus on power conversion, intelligent motion control, and data acquisition and instrumentation systems. His teaching interests include techniques to enhance teaching effectiveness, and strategies that influence the recruitment and persistence of technical students.

AJAY MAHAJAN received his Ph.D. Degree in Mechanical Engineering from Tulane University, New Orleans, in 1994. He was a member of the Laboratory for Research in Intelligent Sensors (LaRIS) at Tulane University. He joined the Department of Mechanical Engineering Technology at Lake Superior State University in 1994, as Assistant Professor. His research interests include robotics, controls, intelligent systems, automated vehicles, and machine learning. He is a member of ASME, SAE, and IFAC. He is currently developing the Autonomous Systems Laboratory (ASL) at Lake Superior State University.

MOHAMAD QATU is an Associate Professor of Mechanical Engineering Technology at Lake Superior State University. He received his B.Eng. degree from Yarmouk University, Jordan in 1985, and his M.S. " and Ph.D. degrees in Engineering Mechanics from the Ohio State University in 1986, and 1989, respectively. He worked as the director of the mechanical engineering technology program at Franklin University from 1992-1995. His industrial experience includes full-time employment or consulting for Dresser Industries and Honda of America. He has published more than thirty refereed papers on vibrations, finite elements, composite materials and other areas. He is a member of ASME, ASCE and AAM.