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# Communicating with Multimedia: A Capstone Experience

**ABSTRACT:** As communication technology in the workplace becomes more complex, students need to learn how to evaluate and develop applications for that technology. This article describes a team-taught, interdisciplinary multimedia development course created to address such technology issues. Included in this description

is a rationale for the course, an overview of the topics covered, and the development projects assigned in this capstone course. Based on our belief that high-quality multimedia applications are the result of team-based development, the class reflects a collaborative learning model.

Undergraduate students from two academic disciplines, Management and Information Science and Communication, shared their expertise in computing, electronic media production, and group communication and presentational skills.

**KEYWORDS:** Multimedia Development, Authoring, Editing, Capstone, Collaborative Learning

**INTRODUCTION** applications is also critical [8]. However, This article describes a senior-level, the development of high quality multi-interdisciplinary multimedia development applications is seldom an individual course designed to address the total effort. The MIS professional of the effects of communication technology in future will more than likely form part of the workplace. This team-taught course meshes with any number of other specialties was developed to serve as one of the specialists when working in the area of multimedia development. These specialists city-wide liberal education curriculum. will come from a variety of fields,

We felt that multimedia development, including communication and the arts. by its very nature, necessitated a collaborative approach and that a collaborative computing expertise to the multimedia learning environment was the ideal media enterprise. However, effective use teaching/learning model for this kind of some multimedia applications as a of course. We arrived at this conclusion communication tool requires other because of several important trends in skills in addition to computer expertise the business world which are having an impact and literacy. It requires the ability to

significant impact on the preparation of integrate communication skills with students. increasingly sophisticated computing These trends include an increasing skills. To illustrate how and why a team emphasis on team-orientation; skill in approach is most appropriate for a multimedia development course, the philosophy and the specifics of the course are and new communication technology outlined below. First, we provide a brief description of the collaborative learning of skills (continuous improvement) [2, model and our general approach to the 3, 4]. One outcome of these trends is course. This is followed by a detailed that students entering the business course description. Finally, some of the world must be able to effectively use outcomes from offering the course are multimedia applications in the workplace.

They must also be able to assess **COLLABORATIVE LEARNING MODEL AND 6, 7].**

**APPROACH**  
The development of multimedia As a team-based class, the course was

**Dr. Susan Brown Zahn** Department of Communication **Dr. T.M. Rajkumar** Department of Decision Sciences and MIS

**Dr. Christopher J. Zahn** Department of Communication Miami University  
Oxford, OH 45056

guided by a collaborative learning model; our specific approach was adapted from the Group Investigation model [9]. In this paradigm, the emphasis is on higher-level learning as student groups must apply and synthesize ideas and draw inferences.

Groups, assigned a task, must decide how to approach and organize their work to accomplish their goals. Their work is then shared with the entire class. This approach also allows for the active learning that has been shown to be fostered by a collaborative learning environment [10,11].

Students representing a variety of academic backgrounds were expected to bring to the class special sets of skills and areas of expertise. This background provided each student with the ability to contribute something unique to each team project. For example, while the MIS students could oversee and explain the computer requirements of each project, the Mass Communication students could do the same for the media requirements. The Speech Communication students were expected to bring oral and written communication skills and the ability to facilitate work in and between groups. Working collaboratively, students from the three majors would identify and solve the problem represented by each project in the course.



Peer teaching/learning was expected to occur with each project. "While it would be unrealistic to expect that the MIS student would complete the course with a full understanding of the intricacies of video production or that the Communication student would become a programmer, it was expected that the students would have a deep appreciation of the skills and expertise offered by their classmates. This appreciation enables students to recognize more than what the equipment and software requirements might be for the development of multimedia applications; it enables them to recognize the amount of planning and execution time required to complete the various tasks which contribute to multimedia development. It also enables each student to recognize the scope of a colleague's contribution to such a project. This recognition stems from an appreciation for learner differences; the collaborative nature of the development teams fosters this type of recognition and appreciation.

During and after each project presentation, students were encouraged to ask questions, provide criticism, and make suggestions for improvement. This interaction provided students with opportunities to learn from the experiences of the other groups. This provided the main, formal opportunity for collaboration across the entire class. For example, one group worked on the Macintosh platform. This generated a great deal of discussion of the advantages and disadvantages of each platform. As noted in the collaborative learning literature, cooperative learning in and of itself motivates students [13]. The sense of ownership or learning in this type of course is stronger than in traditional classes where students are evaluated solely on the merits of individual performance.

**COURSE DESCRIPTION** This section includes a description of the objectives, topics, methods of assessment and evaluation, projects, and facilities. A typical multimedia application might include two or more of the fol-

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lowing elements: text, audio, video, graphics, or animation. To develop a high-quality multimedia application, a complex set of skills is required. The philosophy and objectives of this course emanate from these facts.

**OBJECTIVES**

The basic objectives of the course were that the students would do the following: learn how to analyze, develop, and evaluate multimedia applications for specific audiences beyond the group or class; integrate the concepts of intra-group and inter-group communication, audio and visual production, and authoring; learn how to supplement multimedia information with appropriate oral presentation techniques. More specifically, the various complementary skills and expertise students from the different majors brought to the course are listed in Table 1. Table 2 provides a summary of the skills and knowledge we expected students from each major to have when leaving the course. Every student was exposed to all of the

skills and concepts. Depending on the level of interest and motivation, however, individual students varied in the degree to which they pursued and acquired specific skills.

**TOPICS**

The topics covered in such an interdisciplinary course are many and varied. The requisite technological topics were covered, as were the companion topics in human communication. Societal implications, such as the effects of communication technology in the workplace, were the central focus of many discussions.

The first two topics of the course, Technological Concepts and Issues and the Multimedia Development Lifecycle, enabled students to grasp the basic concepts of multimedia. These topics stemmed from the first objective for the course.

The lifecycle of multimedia applications [12] was described with a slant toward the audio/video production process in an attempt to provide com-

**TABLE 1 Entering Skills and Knowledge**

Skills and Concepts MIS majors

Mass Communication majors

Speech Communication majors

Presentation	Yes
Software	

**Introductory**

**None**

**None**

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*Audio*

*Video*

*Graphics Design*

*Conceptual Design*

*Management*

*Presentation*

Work with existing digital clips

None

Minimal

Computer software design

Knowledge of cel- based animation concepts

Analog production and editing

Analog production and editing

Minimal

Storyboarding

Project management Copyright management

Limited computer- based presentations

Oral with traditional media

None

None

None

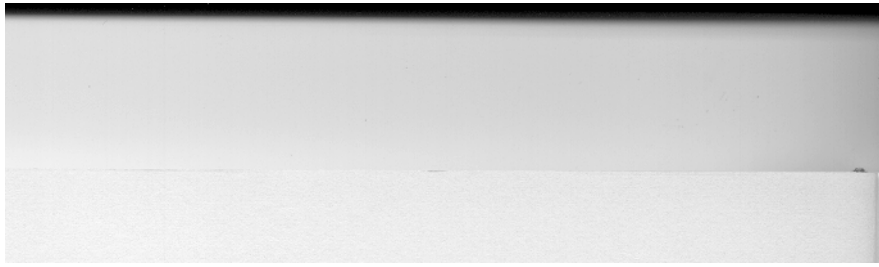
Visual aids

None

Group management

Extensive oral with traditional media

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munication students, with limited com- puting background, an entree to the course. This also served to familiarize MIS students with the system develop- ment life cycle as it applies to multime- dia applications.

The next three topics of the course, Audio and Video Production, Digital Audio and Video Editing, and Group Communication, addressed our second course objective. The last topic, Presentational Communication, covered the ground identified in our third objective. Legal and ethical concerns were addressed throughout the course. Specifically, formal discussions were conducted on copyright of creative work or intellectual property as it applies to audio clips, video clips, men- uing systems, and graphics.

**ASSESSMENT**

Just as all students or majors clearly do not enter the course with the same skills and knowledge, all students do not exit the course with the same level

of skills or knowledge (see Tables I and 2) .With this in niind, course assess- ments were used to monitor student progress.

The first day of class, students answered a series of open-ended ques- tions in order to provide a description of individual expectations and the expe- rience they brought to the course.

These descriptions provided the instruc- tors with a means of assessing whether or not their expectations, as presented in Table 1, were accurate. A midterm and final assessment were employed to track student development of the expected exit skills and knowledge. The assessments provided both the student and the instructors with opportunities to reflect on and to articulate expecta- tions associated with the course and understandings of the course material at each point of assessment.

**EVALUATION**

The course was developed around three group projects. Each was evaluat- ed in terms of how well each group met the objectives of the assignment. The quality of the technical aspects of the

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multimedia elements included in the application was also evaluated. Projects were evaluated on the following criteria: planning/purpose, message, content, navigability of interface, consistency in interface, overall organization, continu- ity, transitions, media use and quality, identifying credits, and interactivity. Individual student learning was evalu- ated through essay examinations and student portfolios.

One section of the essay exam was designed to test student mastery of the common core of concepts, while the second section tapped expansion of more discipline-specific knowledge.

The student portfolio included the essay examinations, peer evaluations from each of the group projects, three

course assessments, and all docu- mentable project work completed by the student. The peer evaluations were ratings of the quality and quantity of contributions made by each group member.

**PROJECTS**

The projects were designed to embody the course objectives in an increasingly more sophisticated fashion. The broadened scope of each successive project required students to build on the knowledge and skills previously acquired; the project goals reflect this hierarchical Each project provided students with an experiential vehicle through which they, as a group, enacted the roles of

**TABLE 2** Entering Skills and Knowledge Skills and Concepts MIS majors

Mass Communication majors

Speech Communication majors

<b>Multimedia</b>	Yes	Yes	Yes
<b>Presentation</b>			
<b>Software</b>			
<b>Authoring</b>	Yes	Introductory	Introductory
<b>Animation</b>	Simple		
<b>Audio</b>			

*Video*

Digital waveform production

Introductory digital editing

Digital editing

Digital capturing

*Graphics Design*    Minimal    Minimal    Visual aids

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*Presentation*

*Multimedia Distribution*

*Evaluation*

multiplatform design Lifecycle knowledge Lifecycle knowledge

Client and project management

Client and project management

Client and project management

Extended to computed-based media

Extended to computed-based media

Knowledge of CD- ROM mastering and packaging for distribution

Limited knowledge of CD-ROM mastering and packaging for distribution

Limited knowledge of CD-ROM mastering and packaging for distribution

Critical viewing skills

Critical viewing skills extended to multimedia

Critical viewing skills

and engaged in the multimedia lifecycle development process. The initial project, designing and developing an information kiosk, introduced students to digital video and audio editing and allowed them to compare analog and digital editing techniques. Students incorporated digitized material into a simple presentation using an authoring package such as Compel or Multimedia Toolbook. Each group had to identify the intended audience for the kiosk application and the major points of their intended message(s). It was expected that the mass communication students would provide group leadership during this project due to the heavy emphasis on audio and video. The second project was an application development project. Students applied stages of the multimedia lifecycle (through the testing stage) to the development and execution of a multimedia application for a specific audience. Teams generated concepts and planned, designed and prototyped an application for a specified purpose or use. While students were expected to use text more than any other element in these applications, audio, graphics, video, and simple animation were required. The applications ranged from information kiosks to interactive storybooks to a foreign-language tutorial. Each team determined which platform and which authoring software would be most appropriate for the development of their application. The MIS majors were expected to provide group leadership during this project because of their knowledge of and experience with authoring software. The final project involved working with an external client who was a multimedia developer in a large Midwestern city. The client wanted an interface for a tutorial for an authoring program. This project represented a complex, open-ended problem for the students to solve. It was similar to the types of problems discussed by Vanderbilt University's Cognition and Technology Group; the project would require total immersion in multimedia development [4]. Further, this project required the

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students to use their repertoire of group communication skills along with their computing skills. The students operated under an inquiry-based model of learning. They had to interview the client, then decide on the specifics of the project. This helped them to determine their information needs for planning and execution [9].

#### **FACILITIES AND EQUIPMENT**

The primary lab was equipped with two IBM/compatible multimedia PCs with video capture capability. Students also had access to high-end multimedia equipment in other campus labs. They used multimedia presentation and authoring software. The use of the digital editing software required a controllable S-VHS deck and large SCSI hard

drives. Optical drives were used to capture and edit video files. Additional equipment used by the students included microphones, a light kit, a S-VHS camcorder and a tripod.

#### **DISCUSSION**

We presented the students with a very ambitious syllabus for this course. Many of the topics were introduced in the early part of the semester in hopes that

Concept and planning
Design and prototype
Production
Testing
Mastering, duplication and distribution
Follow-up

## Projection and Skills Practiced

Goals

### 1 *Initial*

Analyzing audience Writing Editing

Digitizing

Oral presentation

### 2 *Application Development* Analyzing audience Writing

Audio & Video Acquisition Editing

Animation Authoring

Oral presentation

Comparison of Analog and Digital editing through the selection and editing of prerecorded analog video interviews; Creation of appropriate text for stated audience; Integration of text and digital video into Presentation Software; Creation of Information Kiosk for MIS major; Presentation of kiosk to class

Specify audience and content; Creation and Manipulation of Ioriginal audio and video elements; Opening animation to stimulate audience interest; Integration of multimedia elements

Iin 'an easily navigable hypermedia environment; Presentation of application to class

### 3 *Client*

Interaction Interviewing Negotiation Analyzing audience Writing

Interface design Editing

Animation Authoring

Oral presentation

Emphasize market research; Needs analysis; Project and client management skills; Graphic design and authoring skills; (User analysis dictated no audio or video elements); Presentation of application to class and client

these concepts would be revisited and more deeply understood as the projects became more complex. Because of the ever-changing nature of computer technology, we attempted to stress the development process more than the actual hardware and software used in the course. The students enrolled in this course were exposed to a variety of authoring environments and platforms. Students used Compel, Multimedia Toolbook, and Authorware on the Windows platform, and Director and Authorware on the Macintosh platform. Students were also exposed to different software and editing equipment, including

Photoshop, Premiere and Avid systems. They came to recognize the current limitations of digital audio and video and the difficulties associated with multiplatform development. For example, students were able to understand the need to develop device/drive-independent media clips in their authoring environment.

In the future we plan to address a number of areas requiring improvement. This is a labor-intensive type of course and students need to realize the type of commitment required. The success of the collaborative learning model hinges upon student involvement and a recognition, on the part of students, of their responsibility in the course.

We also intend to improve the presentational skills needed to complement multimedia applications. Applications typically must be presented to clients or potential investors. If poorly presented, even the most well-designed and executed multimedia application can fail to achieve its intended purpose.

Additional student skills we would like to focus on in the future include animation and three-dimensional graphics design. Students could design opening screen animations, but did not seem to be able to integrate animation into the body of the presentation itself. We want to impress upon students that given the current limitations of digital video, animation is an attractive alternative. A greater familiarity with three-dimensional design will allow communi-

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cation students apply to their knowledge of production values (lighting, shading, and screen direction) to graphic design.

Students should be required to systematically use scripting and storyboarding in presentations before beginning application development. We found that students would plunge into a project without really thinking things through. Requiring this type of documentation should enable students to better manage their time and improve the managed use of resources and facilities.

Finally, the client project highlighted the need for project management and resource coordination skills. When the student teams divided their labor, they failed to coordinate their efforts. For example, the authoring team was waiting on the project design team who in turn was waiting on the research team. Groups were always waiting on other groups and so little progress was made. Project management is a formal, necessary skill that students need ample opportunity to practice. Resource coordination presented similar problems. The graphics team would want to render a three-dimensional graphic on the PC with the video capture capability while the video production team wanted to digitize at the same time. Better use of project management techniques would have alleviated this kind of problem.

## CONCLUSION

This course represents the culmination of the combined efforts of three faculty members. It was an ambitious undertaking to design an interdisciplinary course and to apply for funding of the required technology. The feedback students provided through the course assessments, student portfolios, and standard course evaluations made it

clear that the students recognized the value of working together to develop high-quality multimedia applications. They felt that there was no way their own, singular efforts could have created the multimedia applications they developed and they were very pleased with the results of their collaborative efforts.

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## AUTHORS' BIOGRAPHIES

Susan Brown Zahn is an Assistant Professor of Communication at Miami University. Her teaching and research interests center on new communication technologies, their place in the university curriculum, and assessment of student learning.

T.M. Rajkumar is an Associate Professor of Management and Information Systems at Miami University. His teaching and research interests include multimedia and database systems.

Christopher J. Zahn is an Assistant Professor of Communication at Miami University. His teaching and research interests are focused on the uses of information technology in the communication curriculum, the role of language in communication, and research methodology.

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