

INFORMATION SYSTEMS EDUCATION JOURNAL

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The **Information Systems Education Journal** (ISEDJ) is a double-blind peer-reviewed academic journal published by **EDSIG**, the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois). Publishing frequency is six times per year. The first year of publication was 2003.

ISEDJ is published online (<http://isedj.org>). Our sister publication, the Proceedings of EDSIGCon (<http://www.edsigcon.org>) features all papers, panels, workshops, and presentations from the conference.

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the conference. At that point papers are divided into award papers (top 15%), other journal papers (top 30%), unsettled papers, and non-journal papers. The unsettled papers are subjected to a second round of blind peer review to establish whether they will be accepted to the journal or not. Those papers that are deemed of sufficient quality are accepted for publication in the ISEDJ journal. Currently the target acceptance rate for the journal is under 40%.

Information Systems Education Journal is pleased to be listed in the 1st Edition of Cabell's Directory of Publishing Opportunities in Educational Technology and Library Science, in both the electronic and printed editions. Questions should be addressed to the editor at editor@isedj.org or the publisher at publisher@isedj.org. Special thanks to members of AITP-EDSIG who perform the editorial and review processes for ISEDJ.

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Course Design and Technology For Synchronous Interaction in an Online Course

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Abstract

Online course offerings in higher education continue to grow because of the strong demand. Though many online courses are based on an asynchronous model, there are courses that require real-time interaction between students themselves and between students and the instructor, which means synchronous interaction is necessary. The technology exists to support this mode of instruction but there are challenges to how to structure an online synchronous meeting. This paper presents the approach taken for an online business course about enterprise resource planning (ERP) and the techniques applied to help ensure successful student interaction and learning. The added challenge in this course was the use of a simulation that runs live during synchronous class meetings. From the outset the design of this synchronous online ERP course was based on the Quality Matters (QM) Program standards to help ensure the course structure was effective in guiding students through the course requirements and content. The article summary has some feedback from students and gives suggestions for improvements to future course offerings.

Keywords: Online Education, Synchronous Online Interaction, Quality Matters Rubric, Course Design, Enterprise Resource Planning, ERP.

1. INTRODUCTION

Online course offerings are common at most universities today. A quarter of students at post-secondary institutions enroll in online courses (The National Center for Education Statistics, 2012). Most of these online courses are taught in an asynchronous format. However, there are some online courses that

use a synchronous component to facilitate interaction among students and between the instructor and students. Synchronous interaction in an online course has been shown to increase student success in terms of grade and satisfaction (Duncan, Kenworthy, & McNamara, 2012; Strang, 2012; McBrien & Jones, 2009). For some courses a synchronous component is not a design choice but

absolutely necessary. For example, if students must interact and coordinate actions during a simulation, then synchronous meetings are necessary.

The college of business at a university in the Southwest made a commitment to offering both undergraduate and graduate programs online though there were concerns that some courses might be difficult to teach online. For example, one course in the program uses a simulation that runs live during class and teams of students interact directly with the simulation during that time. The simulation is a core component of the course and is used several weeks during the semester. It would be necessary to design the online version of this course so that students would still work in teams and use the simulation. One of the instructors of the course agreed to develop an online offering to support the online degree programs.

From the beginning the teacher based the course design on the standards of the Quality Matters Program because prior experience had shown these standards provide a good framework for guiding students through the course material.

The Quality Matters (QM) Program is often recognized for its faculty-centered process for improvement of online courses (Loafman & Altman, 2014; Finley, 2012; Westerfelt, 2011; Shattuck, 2007). In 2003 the QM program began as a consortium of colleges in Maryland that received a FIPSE grant (Fund for the Improvement of Postsecondary Education) from the U.S. Department of Education to develop a program for the design of quality online courses. The QM Program is now a self-sustaining organization that provides faculty training and a formal course review process (<https://www.qualitymatters.org/research-grants/fipse>). Quality Matters has received national recognition for its peer-based approach and continuous improvement model using the Quality Matters Rubric.

The QM Rubric has eight standards: course overview and introduction (1), learning objectives (2), assessment and measurement (3), instructional materials (4), learner interaction and engagement (5), course technology (6), learner support (7), and accessibility (8) (MarylandOnline Inc.). The Quality Matters rubric provides a foundation that academic institutions can use for guidance in the course design process as well as a

measurement for quality assurance of online courses. This rubric does not evaluate the instructor or the teaching of a given course. Instead, it is used to evaluate courses in regards to navigation, alignment of learning objectives to activities and assignments, assessment, and accessibility. The Quality Matters (QM) process is a "collegial, faculty-driven, research-based peer review process" (MarylandOnline, Inc.).

This paper describes the course design done for the synchronous class meeting as well as explanations and examples of some of the Adobe Connect Meetings features which was used for the synchronous sessions (<http://www.adobe.com/products/adobeconnect/meetings.html>).

2. INFORMATION ABOUT THE COURSE

The course is taught by faculty in the department of accounting and information systems. It is one of three choices as part of the core requirements for all business majors. The course title is Enterprise Resource Planning. This course covers concepts in enterprise resource planning (ERP) and the information systems that enable integration of business processes. The main focus of this course is to learn how ERP systems integrate business processes across functional areas and support performance monitoring and decision making. This course uses a complex simulation of manufacturing companies. The simulation is called ERPSim (<https://erpsim.hec.ca>). It runs in SAP, which is the industry leader in ERP software (<http://go.sap.com/training-certification/university-alliances.html>).

The traditional face-to-face course format already included extensive use of the learning management system at the university, which is Canvas (<https://www.canvaslms.com>). Assignments were delivered and submitted online. All the course material was available in Canvas, including a large number of videos created by the instructor about the course concepts, the simulation and the software used for data analyses (Tableau [<http://www.tableau.com>] and Microsoft Excel (<https://products.office.com/en-us/home>)). This would not change for the online course.

Because attendance during "simulation" days is essential the course syllabus clearly explains that attendance is required on days when the simulation will run and there is a significant

penalty of half a letter grade for being absent on these days. A quiz at the beginning of the semester asks questions from the syllabus, especially about attendance. Appendix A has excerpts from the syllabus that explain the attendance policy.

Students work in teams throughout the semester. Teams are formed by the instructor before the first synchronous meeting by sorting the student names by major and sequentially assigning each student to a team. This serves to spread the majors across the teams.

3. ONLINE COURSE PREPARATION

Plan for Assistance

The instructor believed assistance is needed to manage the software environment during a meeting. The instructor requested five hours of time from two graduate assistants.

Set Meeting Schedule

The challenge to offering the course online is the use of a simulation that runs live while student teams monitor their business (sales, inventory and industry data) and make decisions that require completing transactions in SAP during the simulation run. In the traditional face-to-face setting sections of the course meet either two or three times a week. The instructor felt, however, that one weekly synchronous online session could work and might be easier for students to fit into their schedule.

A day and time needed to be chosen for the weekly meeting and was scheduled for one hour and fifteen minutes. For the first semester Friday at noon was chosen because the instructor thought students who were truly distance students might have some leeway in their work schedule to take an extended lunch on that day. Also, many regular courses on campus are offered twice a week, either Monday and Wednesday or Tuesday and Thursday. Far fewer classes meet on Friday so a schedule conflict would be less likely.

Alert Students

It was clear that students should know right away what the requirements for this particular online course are. To alert students the following steps were taken:

Registration: A note about a required weekly synchronous meeting was added to the course description in the online registration system.

Syllabus: The syllabus explained in detail the requirements for the course, which included an explanation of the required synchronous meeting and the concomitant technical requirements: a headset with microphone and a fast, reliable Internet connection (Adobe Connect has a program online that checks Internet speed). To help ensure students know the expectation of attendance and reduction in grades if absent, a syllabus quiz at the beginning of the semester covers these topics.

Direct communication: Shortly after registration for the coming semester was done, the instructor emailed the registered students with an explanation of the course requirements. Another email was sent about a week prior to the start of the semester.

Promote Attendance

As in the face-to-face sections, attendance is absolutely required on days when the simulation runs and the same penalty applies. In addition, the instructor felt attendance for any weekly session was very important so the instructor thought about giving points for attendance. However, rather than giving points just for logging in the instructor settled on having something submitted by the teams at the end of every synchronous session.

A team submission at the end of each session served two purposes. First, a student received points (or not) attending and working with his/her team. Second, the short assignment gave the teams something to work together on each week and, hopefully, encouraged better communication and team interaction. In the first meeting of the semester, for example, the assignment was for teams to create a Word file that lists all the team members and gives a little information about each person, such as major, outside interests, etc. Teams are formed in the same manner as in the traditional class (spreading majors across teams) and students meet their teammates in the first synchronous session.

Apply Quality Matter Standards

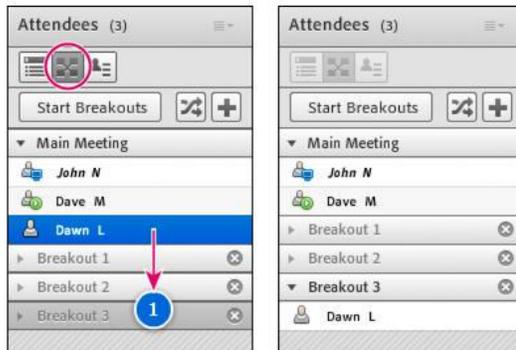
The course design was based on the eight general standards of the Quality Matter Program (Crews & Wilkinson, 2014). The instructor relied heavily on support from the instructional consultants in the university's department of instructional innovation and quality. They provided important guidance in the course design and technical support for

Adobe Connect (AC) features the instructor had not used. At the instructor's request they also provided a training session for the instructor's teaching assistants.

After the course design was completed it was submitted for a formal review through the university's Online Course Improvement Program and it met the expectations of the Quality Matters review process.

Prepare Synchronous Meeting

Use breakout sessions. The synchronous class is conducted using Adobe Connect Meetings and breakout sessions are used for team activities. There is a breakout session for each team and the students in that breakout group interact privately with teammates. An example screen is shown in Figure 1 (taken from http://help.adobe.com/en_US/connect/8.0/using/WS372813bbb4178f2417094f9e12b308681ed-8000.html, 2016). Students in a breakout session can share computer screens and enable their mics for discussions. While teams are in their breakout groups, if someone has a question they can use the *raise hand* icon in AC which appears by the student's name and the instructor can join the group and talk with the team.



Before and after dragging attendees to different breakout rooms

Figure 1 AC Breakout Session

The instructor used the *main meeting* area for general class instruction and interaction. For team activities, including the simulation run, breakout sessions were used.

Display an agenda. An agenda was displayed in AC for each meeting so students could see what would happen that day as soon as they logged on to AC. An example is depicted in Figure 2 and listed in Appendix B. At the beginning of a class the agenda was shown in the main meeting area and also in the teams'

breakout session because there are times when students immediately began working in their teams when they logged in.

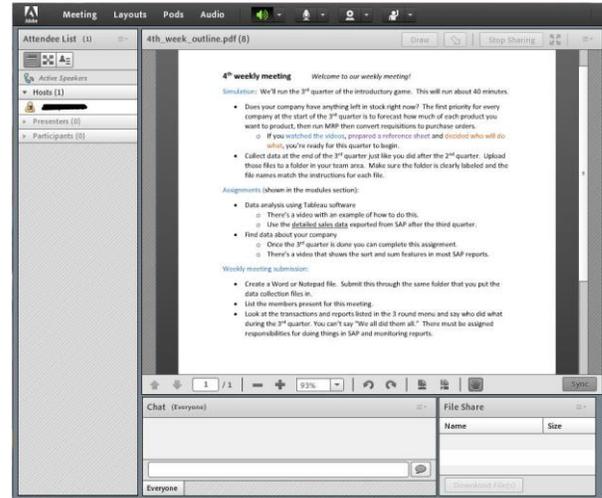


Figure 2 Example Weekly Agenda

Use a teaching assistant. The original plan was to have two teaching assistants attend each meeting. The assistants received AC training before the first class meeting. Their main role is to put students into their respective breakout sessions. Because people sometimes lose their connection to the AC meeting, when they rejoin the meeting they must be put back into their breakout group. Assistants can also answer some questions by participating within the chat pod during an AC session when the instructor is occupied.

From a technical perspective, here are a few other things about using AC in the weekly session:

The instructor used the same AC session for all the weekly meetings and the link to this was readily available in the Canvas course.

- The instructor and teaching assistants started the AC session about 30 minutes prior to the official start time and kept the session going for about 30 minutes after the end because many teams continued to work together.
- A few sessions that were primarily instructional were recorded with AC's built-in recording utility and posted in the in Canvas.
- The use of a headset with microphone is necessary for all participants in a session because this eliminates echoes and other background noise. (This was clearly stated in the syllabus.)
- From the beginning students must learn to mute their own mic when someone else is

talking. Though the instructor can individually mute/unmute a participant's microphone there are many other things that require the attention of the instructor.

4. AC FOR STUDENTS

This course has numerous team activities. To be successful teams they must meet outside of regular class times. Students have the option of creating their own AC session from within Canvas. The instructions for how to do this were included in the course material listed in Canvas. Though many students in the online section could meet face-to-face there are some students who are truly at a distance but they can participate in a team's special AC session.

5. FEEDBACK FROM STUDENTS

In the fall of 2015 there were two sections of the ERP course—one was traditional and the other was the first offering online. Both sections were taught by the same instructor.

Table 1 shows the scores from student evaluations from both the online and traditional, face-to-face sections of the course. The ratings are from 0 (poor or strongly disagree) to 5 (excellent or strongly agree).

Item	Traditional (Mean Median) n = 28	Online (Mean Median) n = 29
Instructor communicated effectively.	3.8 4.0	4.2 5.0
Instructor's rapport with students.	3.9 4.0	4.1 4.0
Course is well organized.	4.1 4.0	4.1 4.0
The instructor has high standards in this class.	4.4 4.5	4.4 5.0
Overall this instructor was ...	3.8 4.0	3.9 4.0
Overall this course was ...	3.8 4.0	4.0 4.0

Table 1 Student Evaluations from Fall 2015

It was somewhat surprising to see how close the evaluations were for the two different formats, especially because the online course was offered for the first time. The instructor was pleased with how well the teams worked together in the online section after the first couple of synchronous meetings. They adapted quickly to the software and modes of

communication. Overall student performance was similar for both formats. The average student score was 89% in the traditional section and 85% in the online section.

Below are a few comments from students in the online section.

Favorable:

- As much as I disliked the online meetings, they did help teach the subject and it was neat to be able to run the simulation and learn more. I ended up enjoying the meetings.
- Since we were an online course I thought it was helpful to have each agenda up before we met online. The online course material was very interactive and easy to follow along with all the course material.
- The class was fun and very well organized.

Not as favorable:

- Group work outside of the meetings is very difficult. I take online classes because I do not have time to go to classes throughout the week. So group projects and papers are very difficult.
- The class ran too long.
- Team assignments are hard to do. Allow enough time to complete assignments during the online class.

6. SUMMARY AND SUGGESTIONS

An online section of a course that required synchronous meetings was designed using the QM standards but, otherwise, had the same coverage of material. After the first semester student performance and evaluations were very similar for the traditional and online course sections.

Based on the instructor's experience teaching the online course with synchronous meetings, a few comments and suggestions for future course offerings are given here.

- For the students, give clear directions and links to the software that will be used for synchronous meetings, such as Adobe Connect.
- For the instructor and assistants, create a to-do list for the start of an AC session, such as "enable mics" or "start

recording." It is easy to forget things in the rush to get the class started.

- The first meeting can be difficult since everyone is working through technical issues and getting use to the synchronous environment. Don't plan to cover much content during this meeting. Spend the time acclimating students to the online synchronous tool being used, including practice going into breakout sessions and returning to the main meeting session (with microphones muted).
- One teaching assistant is probably sufficient but some assistance is important so the instructor can focus on the students and course material, not the software.

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Appendix A
Explanation of Attendance Policy
And Other Course Requirements

Excerpts from syllabus:

Taken the section named "Course Information and Course Delivery Method"

There is a required, synchronous online meeting each week.

- Attendance is required. There are points for attendance and participation and there is a penalty for being absent. (See the attendance section below.)
- You must connect using a **computer** because you will need to run software during some meetings. You must have a **fast Internet connection** and you must have a **headset with a microphone**. (Note: A headset with a **USB connector** has proven far more reliable than one with a one or two-prong connector. Plus, every computer has a USB connection but it varies between computers whether a one or two-prong connection is available.)
- You cannot attend this meeting via a hotspot or free Wi-Fi in a public setting. This simply isn't reliable enough. If you lose connection repeatedly during a meeting that will count as an absence.
- The online meeting will be through Adobe Connect. There are instructions about using Adobe Connect on the Resources for Course page.
- You have the option of coming to the main campus for this meeting. At the start of the semester I will post an announcement in Canvas about which computer classroom we will meet in. This is a good option if you want a reliable Internet connection but the student and teacher will still communicate through headsets.

Taken from the section named "Attendance."

There is a required synchronous, online meeting each week. There are points for attendance/participation and penalties for absences.

- There will be a 5% penalty of the overall course score if you are absent during the simulation runs (i.e. half a letter grade).
- Attendance is required during company presentations at the end of the semester. Presentations are made during an extended online meeting. There is a 10% penalty of the overall course points for being absent during the time your company's presentation is done.

Appendix B

Example Weekly Agenda Displayed in Adobe Connect

4th weekly meeting *Welcome to our weekly meeting!*

Simulation: We'll run the 3rd quarter of the introductory game. This will run about 40 minutes.

- Does your company have anything left in stock right now? The first priority for every company at the start of the 3rd quarter is to forecast how much of each product you want to produce then run MRP and convert requisitions to purchase orders.
 - If you **watched the videos**, **prepared a reference sheet** and **decided who will do what**, you're ready for this quarter to begin.
- Collect data at the end of the 3rd quarter just like you did after the 2nd quarter. Upload those files to a folder in your team area. Make sure the folder is clearly labeled and the file names match the instructions for each file.

Assignments (shown in the modules section):

- Data analysis using Tableau software
 - There's a video with an example of how to do this.
 - Use the detailed sales data exported from SAP after the third quarter.
- Find data about your company
 - Once the 3rd quarter is done you can complete this assignment.
 - There's a video that shows the sort and sum features in most SAP reports.

Weekly meeting submission:

- Create a Word or Notepad file. Submit this through the same folder that you put the data collection files in.
- List the members present for this meeting.
- Look at the transactions and reports listed in the 3 round menu and say who did what during the 3rd quarter. You can't say "We all did them all." There must be assigned responsibilities for doing things in SAP and for monitoring reports.