A REVOLUTIONARY APPROACH TO INTRODUCTORY MIS: PROFESSIONAL, PROJECT BASED, DECISION FOCUSED, VISUAL AND ENGAGING

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ABSTRACT

We document a revolutionary design of the introductory management information systems (MIS) course. The course is designed to serve as a true first course in the major while providing a useful and rewarding experience for non-majors. The course teaches students to think like professionals in the field who utilize the Systems Development Life Cycle (SDLC). Students apply the SDLC to a series of projects to produce reusable information systems. Careful study is given to the design of the visual deliverables, both because they are important to decision makers and because students find them engaging.

Keywords: information systems instruction, project based learning, SDLC, decision-making, visual, information design

In order to demonstrate that the SDLC can be used to solve even "soft" problems such as course design, we have chosen to break with tradition and write this paper in the SDLC framework. The paper thus serves as a model of the type of deliverable that we expect from students. The following sections appear below: analysis, requirements definition, application design, application development, and implementation.

ANALYSIS

Since the dot com bust, enrollment in MIS programs nationwide has steadily decreased. According to one major textbook publisher, enrollment levels are down by one third from what they were in the late 1990’s. Our department’s enrollment fell by 50 percent over this period. We would like to reverse this trend.

Like most MIS departments, we have the opportunity to reach every student in the college of business early in their program of study through the required introductory MIS course. At our university and others, this course is a valuable resource for students early in their undergraduate education [5]. In the introductory MIS course students should obtain career-enhancing skills and abilities beyond the scope of productive software use [6]. After analyzing the current course, we concluded that the poor structure of our introductory course was potentially contributing to our decreased enrollment levels.

Foundation of Solution

To solve the poor structure and attract students to the major, we decided to restructure the course into a positive experience. We want a course that allows students to learn and apply concepts to
specific hands-on projects and understand the value of outputs. We want students to experience what it is like to be working as a systems or business analyst.

The restructured course should reinforce the connections between business majors (accounting, finance, management, and marketing) and information systems. Students should understand how information systems form the fuel that allows business functions to be performed. The course should emphasize how to appropriately represent information, whether it is a financial graph or new product’s Web site. According to research, it is also significant to explore the development of information systems that augment decision-making [7]. The uniqueness of this course is that students will be discovering and applying the true foundation of the MIS major while immersed in an active, inviting, and engaging environment. The discovery process and application can be customized to the level of the first year undergraduate student, while preserving the value and meaning of the MIS major.

We believe that the true model for the introductory MIS course should be an accounting or finance course. In both of these disciplines, the goal of introductory course is to teach students to think like an accountant or a financial analyst. Professors of these disciplines contend that the introductory course should develop the analytical skills required for the major. Accounting and finance classes teach students to approach the content as a professional in the field would. The advantages of this approach are that students already know how to think and what to expect as they enter more advanced courses in the major.

**REQUIREMENTS DEFINITION**

We set out to design a first course in the major that is professional, project based, decision focused, visual, and engaging.

**Professional Orientation—The SDLC**

So what does it mean to think like an MIS professional? The one framework that unites all professionals in the field is the systems development life cycle (SDLC) framework. While MIS professionals do not agree on the specific number of steps in the framework or even what they should be called, all professionals do agree that problems should be tackled in a systematic fashion. Most would agree that the SDLC includes analyzing the current situation, developing requirements, designing a solution, developing an application from the design, and implementing the application.

We have adopted some industry standard labels for the SDLC steps: analysis, requirements definition, application design, application development, and implementation.

The SDLC is a structured approach to solving business problems and developing information systems to support the solution. Wagner and Duncan demonstrated that first year students can successfully apply the SDLC to “soft” problems [10]. They document a class taught to first year students on how to develop their careers using the SDLC approach.
Project Based

According to Blumenfeld, project based learning motivates students via investigation [1]. Almost by definition, adopting the SDLC framework requires a project-focused orientation for the course.

Decision Focused

One way to make the projects attention-grabbing is to focus on the decision support function of information systems. A program that writes paychecks is not very appealing. However, constructing information that could be used for a go/no go decision on a space shuttle launch is very engaging. If a significant decision rides on the project, then it will stimulate student interest and enthusiasm.

Visual

Our solution should include a focus on the visual deliverables which are always alluring to students. The study of visual deliverables is called information design. We want the course to be fun and exciting. So what is it that MIS professionals do that is fun and exciting? There are those that would argue not very much. However, there is one area in which the field really is fun and that is in the design of the user interface—what some would call the presentation layer. Think for a moment of the number of hours your students are willing to put into designing a sophisticated interface. They do so because it allows them to express themselves in their work. Furthermore, they want the interface to look professional.

If we expand on this concept we can see that every MIS deliverable has a user interface. For example, a Web site, a spreadsheet, a diagram, a chart, a PowerPoint presentation, and a report all must be presented for end users. The quality of those presentations affects their acceptance and therefore their ability to influence decision makers [4]. As mentioned, this aspect is highly applicable to all majors. Examples of the integral role of MIS in all business activities are as follows.

- Management: There is evidence to suggest that both space shuttle accidents, Challenger and Columbia, might have been avoided if existing information had been more clearly presented to management. The information was so poorly presented so as to underplay the danger in both cases. We give students the raw data and challenge them to produce a more compelling presentation.
- Marketing: Marketing faculty are perhaps the best tuned into the necessity of good presentation. For years marketing faculty have looked to alliances with graphic design departments to support their visuals. Why not MIS? In the field of e-commerce the usability of a Web site directly correlates with its sales. Simply put, shoppers will leave a site they find too difficult to navigate. We ask students to study, quantify, and critique Web site usability on their way to a redesign.
- Finance: Financial analysts are bombarded with statistics that could be used to make investment decisions. However, some key performance indicators are more valuable than
others. Graphing trend lines of key indicators side by side allows for visual comparisons and better decisions.

So rather than trying to curb our students' natural enthusiasm for the format of deliverables, we design the course at least partially around what they already find engaging. With the works of Jakob Nielsen and Edward Tufte, this course allows students to love their work and to stay academically focused.

Jakob Nielsen is best known for his work on usability of Web sites. He has published books and articles on the subject. More importantly he has developed theoretical underpinnings as well as a quantifiable methodology for evaluating the usability of a Web site [8]. Using his methodology students are able to accurately critique existing sites as well as purposefully design usable sites.

Edward Tufte is a clarion voice for excellence in information design. He is most famous for his work on how to best display quantitative information. Tufte's reasoning is that even the best information poorly presented will be ineffective with decision makers [9]. If the presentation layer is poor, then even the most elegant information systems have failed in their task. Tufte has developed a theory of graphical integrity with clear academic principles. He has even created a measure of the degree to which a bad graphical presentation distorts the truth, known as the lie factor.

Engaging

Engaging the students is a common theme throughout our approach. In the classroom, engagement has been proven to be just as essential as effective communication [2]. In our experience, engaged students will work harder and find greater enjoyment in the work. They will take ownership of the material if they can tangibly feel its value. In the International Journal of Electrical Engineering Education, the ‘Mouse Organ’ project, which was developed as an engaging project based task to practice embedded systems design, improved the appreciation students had for steps involved in development—structured analysis, documentation, and mapping designs to requirements [11]. The results also note that the project promoted creativity and motivation. Furthermore, creating an engaging environment might even persuade some students to become MIS majors, which is always positive.

Summary

We have outlined the requirements for an introductory course: professional, project based, decision focused, visual, and engaging. In the next two sections, we will reveal how we designed and developed our solution.

APPLICATION DESIGN

Risk Assessment

How does one go about introducing SDLC and information design into an introductory course? The idea seems absurd on two counts. SDLC is used for large systems design whereas students
at the introductory level are creating very small systems. Would the additional steps seem gratuitous? Would this just kill student interest? Furthermore, focusing on the user interface at first blush seems to ignore data processing. What if students create great presentations of bad information?

Another risk concerns prior knowledge. Students will not have had the MS-Office suite background—more specifically they will not have been exposed to MS-Excel. Therefore, the students will need some exercise material on Excel concepts to solve the assigned problems. The model we have in mind is that of executive MBA programs which utilize just in time learning to help students problem solve.

We have identified three keys to overcoming the risks. The first is to simplify the SDLC. While there are only five major steps in the SDLC, each major step can have many sub-steps. We have eliminated almost all of the sub-steps, preserving only those sub-steps germane to each project. The second key is to reduce the algorithmic complexity of the problems. The goal of the course is to teach a process for solving problems and presenting solutions rather than any particular advanced analytic skill. The third key to overcoming the risk factors is to emphasize best practices in the construction of deliverables. Best practices help avoid many errors before they occur.

APPLICATION DEVELOPMENT

Projects

The entire course is structured around projects. Each project is designed to engage student interest. The course has been divided between quantitative analysis problems requiring MS-Office software for their solution (e.g. Excel, Word, and PowerPoint) and design projects requiring graphic design software for their solution (e.g., Photoshop, Visio, and Visual Studio).

Each project is presented in the SDLC framework. Students are required to produce one or more deliverables for each stage of the SDLC. Early on in the course, the analysis and requirements stages will be explicitly defined in the assignments. As time goes on, students will be challenged to develop these sections on their own. Stringent word and page limits will force students to be brief and concise in their writing and in their presentation of information. Information displays will be required to follow best practice principles of graphic theory—with a special emphasis on the works of Edward Tufte and Jakob Nielsen.

An Example Quantitative Analysis Project

Which Company is the Better Investment?—Design a system capable of collecting data comparing two companies from the same industry on key financial indicators. The system should automatically create a series of graphs on a single page comparing each of the companies over a five year period on each of the financial indicators. The graphs have high-information density and will be understandable by all readers.
An Example Graphic Design Project

What is the Best Brand Position?—Design a systematic approach for determining a new brand image for a business. Use aspects of your system to reposition the brand image for the client. Design a mockup of a Web site to support the new brand image.

Computer Skills

Completion of each project develops a specific set of computer skills. Many of these are the same skills taught in a traditional introduction to MIS course. However, the skills are taught in the context of solving the problem. Learning skills in context helps provide motivation for learning the skill and reinforces its absorption through application.

Connections

Each project is designed to provide linkages to one or more disciplines (e.g. marketing, finance, accounting, ethics, and so forth). The connections demonstrate the key role that MIS plays in each of these disciplines. They also help instill the idea of MIS as a good double major with one of the other disciplines.

Resources

Each project will be supported by one or more of the following types of materials:

- **Hands-on exercises**—The exercises focus on key concepts needed to solve the project. This is a form of just in time learning similar to that found in executive MBA courses.
- **Videos**—Whenever possible, short videos are introduced to engage the students. Marketers have known for years that videos provide high emotional touch. This theory is why they are used to market otherwise undifferentiated products such as soap. We use the videos as motivational material.
- **Readings**—Short readings covering key concepts are assigned. The readings are brief and on task for the current problem.
- **Software Reference Sheets**—Reference sheets serve as a good compliment to the exercises, allowing for a quick look up of how to complete a particular task.
- **Web Links**—Links provide further resources that students might want to explore in their solution of the project.

IMPLEMENTATION

Implementation Plan

We decided to rollout the curriculum change in two phases. In the first quarter we will offer both the old and new versions of the course side by side. Students have been given little information about the difference between sections other than the knowledge that the new model will require more contact hours (4 rather than 3). The professor will also employ two lab section assistants in order to provide an environment with readily accessible help.
Evaluation

After the first quarter, we want to compare student evaluations at the end of the quarter to see which version results in a higher perception of learning and interest. We would also like to measure potential interest in the MIS major under both scenarios. The entire class will be surveyed on their perceived role of MIS in their major.

REFERENCES


