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Systems Analysis and Design: Know your Audience

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Abstract

Systems analysis and design (SAD) classes are required in both Information Systems and Accounting programs, but these audiences have very different needs for these skills. This article will review the requirements for SAD within each of these disciplines and compare and contrast the different requirements for teaching systems analysis and design to both audiences. These observations are based on both literature on the subject, and the authors personal experience with teaching SAD to these two audiences.

Keywords: Systems Analysis and Design, Curriculum, Education

1. INTRODUCTION

Based on the IS model curriculum, systems analysis and design is a core course in the Information Systems curriculum (Topi, Valacich, Wright, Kaiser, Nunamaker, Sipior & de Vreede, 2010). SAD is also a required course in many Accounting programs, particularly for Accounting Information Systems or Audit concentrations (Badua, 2008; Daigle, Hayes & Hughes, 2007). While these courses could nominally be the same, and may be taught from the same textbook, there are distinct differences in the needs of these two audiences on the subject of SAD. Making this more difficult, SAD is frequently hard to convey as a subject to information systems students (Clyde & Crane, 2003; Chen, 2006), and attempting it with two different audiences compounds this problem.

The observations and comparisons in this paper are based both on the authors' experience with teaching SAD in both curriculums as well as research into the area. It is the intention of this paper to assist other faculty in avoiding some of the problems encountered by the author when teaching what is nominally the same material to different audiences.

The paper is structured as follows: First, the presentation of SAD concepts in the IS curriculum is examined. Then, the same is done for SAD in the accounting curriculum. This is followed by a discussion of the commonalities between the two curriculums. Next a discussion of the differences and potential problems created by these differences is examined. Finally, some concluding thoughts are presented.

2. SYSTEMS ANALYSIS AND DESIGN IN INFORMATION SYSTEMS

Systems Analysis and design courses are required for Information systems majors, based on the model IS curriculum (Topi, et al., 2010). The IS model curriculum notes that the SAD course "…discusses the processes, methods, techniques and tolls that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized" (p 51, Topi, et al., 2010).

The 2010 IS model curriculum lists 13 specific learning objectives for SAD courses within the undergraduate IS curriculum (p51, Topi, et al., 2010). There is a great deal of latitude given to schools on how to meet these learning objectives to allow flexibility on how the goals are met and which tools are used in classes.

The guidelines do note that the SAD course should focus on the process of analyzing and documenting business processes and then converting these into systems requirements and design specifications. The methods and approaches used are left up to the individual institutions, but the guidelines state that it is important for students to be exposed not only to the Systems Development Life Cycle (SDLC), but to Object Oriented (OO) design using the unified process and Unified Modeling Language (UML) and to agile development methodologies as well.

The core SAD course is recommended for Application developers, business process analysis, project managers, User interface designers and web content managers (Topi, Valacich, Kaiser, Nunamaker, Sipior, deVreede & Wright, 2007). These jobs cover a wide range of professional areas that IS students may find themselves working in, particularly immediately after graduation.

The key concerns for IS students in this course is to master the skills required for them to become competent in the requisite skills to prepare them for the jobs listed above and, of course, to pass the course so that they can graduate.

3. SYSTEMS ANALYSIS AND DESIGN FOR ACCOUNTING

SAD courses for accounting have a slightly different set of standards. First, it is not a required course in all undergraduate Accounting curriculums. Rather, it is addressed in Accounting Information Systems programs (Badua, 2008) or in Masters programs (Masters of Science in Accounting or MSA), which many students take to meet the requirements of the Certified Public Accountant (CPA) exam for education (http://www.aicpa.org/BecomeACPA/Licensure/Requirements/Pages/default.aspx). In addition, MSA students are not being trained as developers, nor will they necessarily have any development training or experience. Instead, these students are generally training for careers in auditing and control. Because of this, the focus of the course will be slightly different for these students. However, there are a number of studies that have pointed to the importance of increasing the IS skills of accounting majors (Daigle et al., 2007).

Because of these differences, the key concerns of accounting students in SAD courses differ from those of the IS students in similar courses.

Pass the CPA exam

The primary concern for most accounting students, and virtually all MSA students, is to pass the CPA exam. This is not an easy task, and the focus of the CPA exam does not help with the course content for SAD.

There is very little on the CPA exam that would cover the concepts in a SAD course (Gleim, 2009). Accountants, after all, are not developers, but they are likely to act as business analysts and, of course, as systems auditors.

Some of the commonalities and differences caused by the differences in expectations between the two programs are discussed in the following sections.

4. COMMONALITIES

Clearly, despite the differences between the IS and Accounting majors, there are a number of similarities in the requirements between these two. There is also an overlap in the types of jobs that the students could be looking into, as MSA students who have followed a system/audit style track could very easily find themselves in the role of a business process analyst or systems consultant.

The discussion of the commonalities is structured based on the learning objectives from the IS model curriculum (Topi, et al., 2010), the American Institute of CPAs (AICPA) core competencies (Daigle et al., 2007) and the authors' observations having taught courses in both curriculums. Even though these areas are of common concern, there may be differences in the way they need to be addressed to the different student groups. Those differences are addressed in the next section of the paper.

The first area of common concern between the curriculums is understanding the needs of the business and how these might be addressed by information systems. This is a skill required by

business analysts, and these are positions that could be filled by students from either area. In fact, the ability to leverage technology is listed as one of the AICPA core competencies for accounting students (Daigle et al., 2007).

The second common area is the process of initiating, prioritizing and assessing the feasibility of information systems projects. Each group of students would bring different strengths to this process based on their training, but it is an area that is focused on in both curriculums.

The third common area is utilizing a methodology for analyzing a business problem and modeling it using a given technique. While this is very open in the IS model curriculum to give schools flexibility on which methodologies and techniques are used, there is significantly less flexibility on the accounting side. This is largely driven by the fact that the accounting students need to be concerned with both what is expected of them on the CPA exam and what is expected within the accounting profession. This is discussed in more detail in the next section.

The forth area that both disciplines are concerned with is project management. This has actually been an area of expanding concern within the IS profession for a number of years, and it is certainly one within the accounting profession for at least one of the same reasons: the cost of IS projects.

The fifth area of overlap is the examination of articulation of various systems alternatives to solve a given business problem. This could include assessing whether to use a packaged or custom solution for a given system. Again, students in each area bring different strengths to this area based on their training.

Related to the previous area, the sixth are is the comparison of acquisition alternatives. This would involve creating an assessment metric and the applying that metric to the various alternatives solutions that the company has selected for that problem.

The seventh area, based on the IS model curriculum, deals with system security. This is certainly a primary concern for system auditors (Walters, 2007), and is something that is emphasized at multiple points in an accounting curriculum in the form of audit controls, which are then coded into the system.

The final area of overlap is that of analyzing and articulated ethical, cultural and legal issues for the system and how these impact the feasibility of the system. Ethical behavior and the regulations surrounding financial reporting are two areas that are focused on in the CPA exam, and therefore in accounting curriculums. With the advent of legislation such as Sarbanes Oxley, these concerns are quite directly translated into systems concerns.

By reviewing this list, it can be seen that there is at least partial overlap for 8 of the 13 learning objectives for SAD between IS and accounting. While this is fairly extensive, it's also significantly less than 100%, which can lead to some issues between the disciplines, and certainly leads to a different focus when teaching these classes.

5. DIFFERENCES AND PROBLEMS

While there are a large number of common areas of learning within the two curriculums, there are a number of differences as well. This is where the potential disconnects, and potentially some problems exist. However, it is not just the disconnects that can cause problems. It is also the differences in the overlap that can create problems as well.

In this section, I explore some of the areas that are most likely to cause problems. The purpose of this discussion is to highlight those areas where disconnects can occur, and help instructors working with either group (or both groups) of students identify the topics in their curriculum that may need to be adjusted.

Financials and the importance thereof

Certainly, financial considerations for new systems are covered in IS courses on SAD, but this is frequently not given extensive consideration. After all, this topic is a subset of one of the 13 primary learning objectives for the course, so it is difficult for many instructors to spend an extensive amount of class time on it.

While this may not be a primary concern for many IT professionals and professors, it is the primary concern of accountants and auditors. These are students who have spent and extensive amount of class time on considerations of cost and cash flow. This could lead to a disconnect between accounting and IS students, and will certainly change the amount of time spent on a topic in class.

Scheduling, and the problems associated with same
Project management is an important topic to cover, at least in part, within an SAD course. One of the problems with planning for systems projects is the inherent uncertainty that can surround development time for a new project. This is particularly true if the technology being utilized is relatively new, or if the problem being addressed is one that the organization does not have extensive familiarity with.

Generally speaking, IS students can grasp this problem very quickly. They have all had to take programming courses, and they have all had a program take longer to code than they thought it would. The same cannot be said for accounting students, who are not trained as programmers. They have generally not had the experience of an "easy" programming problem occupying an entire weekend.

This can be somewhat addressed depending on the type of database course the students have had. MSA students generally have a DB course as a part of the curriculum, as everything they need to verify as an auditor is in a database somewhere, and if they have had to program in SQL, they can understand the difficulties of coding. If not, then it is an area that will need some additional attention in the class.

Differences in approaches to identification and roll out of new technology
Clearly, one of the functions of a systems analyst or IT consultant would be to identify new technologies that could be applied to the business. It should be expected that IS majors would have higher levels of technical skills, and likely a more technical bent, than accounting majors. It could also be assumed that the average accounting student will be more conservative when it comes to the application of technology, particularly new technology, than the average IS major. IS students do have a tendency to be enthusiastic about the use of technology, while accounting students are trained to be more focused on issues of cost and functionality. Thus, while both could be responsible for the identification of new technologies to apply to the business, it is entirely likely that they will have divergent views on which technologies are suitable for implementation.

This means that, when discussing this type of activity in class, the instructor may need to take a different tack with both groups of students.

OO vs. Business Process Diagrams
As more and more IS shops and programs move to OO design and build techniques (Satzinger, Batra & Topi, 2007), there is likely to be a larger disconnect, as the accounting programs do not tend to focus on these (Jones & Lancaster, 2001). Part of the reason is that the questions on this do not appear on the CPA exam, which tends to focus on much older technology. As an example of this, my MSA students have told me that practice questions on the CPA exam in the technology area include "What is the job title of the person who feeds the punch cards into the computer?", and there is still discussion in the CPA review books of the role of the Librarian in checking out code to developers (Gleim, 2009).

Business process design and documentation is one of the auditors primary focuses, which makes sense as it is their responsibility to audit these processes to ensure compliance with applicable regulations. While this is also an area which IS classes focus, this is an area that may get more attention in an MSA class simply because they will not be working on the development tasks that may be covered in an IS class. The disconnect lies with the fact that accounting classes generally do not focus on object oriented techniques, which capture business processes in a different way. They tend to focus on the "older" business process diagrams, rather than newer OO techniques.

Why do you care about the development environment?
Auditors can have a legitimate set of concerns regarding a development environment from a control perspective (Hall, 2011). From an audit standpoint, there is very little that is less desirable than people being able to make unrestricted changes to a system without a control in place. From an IS standpoint, this means that our students should be prepared for these types of questions from the auditors and understand that they have a legitimate interest. This would include potentially auditing which developers have access to which areas of the system.

This also means that, in an accounting class, this topic will need to be addressed. As noted in the previous section, the CPA exam has not exactly kept up with new developments in technology.

This means that the accounting students will need to be educated about what can be done to control code in a modern systems development environment. The same could be said for the information systems students, who would also need to understand the differences between a build and test and production environment, and why the two should be separate.

Why do you care about my systems documentation?

Auditors may be required to audit the documentation vs. the code in a production system (Hall, 2011). This means that every change in the production system must be logged and, more importantly, must match the changes that are actually in the documentation. This is a legitimate audit function, and one that could come up in a systems development project, particularly in the maintenance phase. This alone means that audit standards may not line up with some systems development methodologies that do not emphasize documentation of the system (i.e. Agile methods).

With regulations like Sarbanes-Oxley, it seems likely that this type of audit is likely to continue in the future. This emphasizes the importance of documentation practices for the information systems student's, but it means that we must also educate the accounting students about the types of documentation and how these are created. There is the possibility that accounting students would reject agile methods as a viable option out of hand because of the reduced documentation that can accompany such development techniques. It needs to be made clear that even using agile methods, it is possible to create complete systems documentation.

6. CONCLUSIONS

While both information systems and accounting programs have a need to teach systems analysis and design courses, the needs of the students in each of these classes can be distinctly different. It is certainly possible to teach to both of these groups, but it is best to do so using two different curriculums because of the differences. This paper has laid out some of the similarities and differences between these two groups as a reference point for faculty who need to teach the same course to these different audiences.

7. REFERENCES

Badua, F. (2008). Pedagogy and the PC: Trends in the AIS Curriculum. Journal of Education for Business, 83(5), 7.

Chen, B. (2006). Teaching Systems Analysis and Design: Bringing the Real World into the Classroom. Information Systems Education Journal, 4(84).

Clyde, S. W., & Crane, A. E. (2003). "Design-n-Code Fests" as Capstone Projects for an Object-Oriented Software Development Course. Computer Science Education, 13(4), 16.

Daigle, R. J., Hayes, D. C., & Hughes, K. E. I. (2007). Assessing Student Learning Outcomes in the Introductory Accounting Information Systems Course Using AICPA's Core Competency Framework. Journal of Information Systems, 21(1), 22.

Hall, J. A. (2011). Information Technology Auditing (3 ed.). Mason, OH: Cengage.

Jones, R. A., & Lancaster, K. A. S. (2001). Process Mapping and Scripting in the Accounting Information Systems (AIS) curriculum. Accounting Education, 10(3), 17.

Gleim, I. N. (2009). CPA Review: Business Environment and Concepts (2010 ed.). Gainesville, FL: Gleim Publishing, Inc.

Satzinger, J. W., Batra, D., & Topi, H. (2007). Analysis and Design in the IS Curriculum: Taking it to the Next Level. Communications of the Association for Information Systems, 20, 15.

Topi, H., Valacich, J. S., Kaiser, K. M., Nunamaker, J. F. J., Sipior, J. C., de Vreede, G. J., Wright, R. (2007). Revising the IS Model Curriculum: Rethinking the Approach and Process. Communications of the Association for Information Systems, 20, 14.

Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K. M., Nunamaker, J. F. J., Sipior, J. C., de Vreede (2010). IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. ACM / AIS.

Walters, L. M. (2007). A Draft of an Information Systems Security and Control Course. Journal of Information Systems, 21(1), 27.