

**SPUD's - A Computer-assisted Interactive Project for use in
Intermediate Accounting Courses**

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I. Overview

This paper explains a new teaching tool that has been developed by three professors at a western university to enhance the effectiveness of the first Intermediate Accounting course. This teaching tool centers on an integrated project that can be combined with any traditional textbook.

First, we discuss the need for such a teaching tool. We then briefly describe the objectives and features of the package and discuss the results of pilot testing. Next, we evaluate the package by mapping it to the AICPA's Core Competency Framework (AICPA 1999). Then we offer our observations and concerns. Finally, we indicate intended future development plans and potential related research projects.

II. Introduction

For over a decade accounting educators have struggled with curricula design in an effort to develop graduates more appropriate for modern accounting and business professional careers. During the 1990s several prestigious universities were awarded significant grants to develop accounting curricula that would meet the objectives set forth by the Accounting Education Change Commission (AECC 1990). These objectives expanded the traditional teaching of accounting terminology, rules, and concepts by including enhanced personal and professional skills in communication, critical thinking, and systematic structuring of complex situations.

In August 2000, the American Accounting Association issued a report indicating that the profession still has a long way to go to meet those objectives (AAA 2000). In fact, the report implies that accounting education may be in a more perilous position than ever

before. While significant changes have been made to include more conceptual understanding of accounting and its place in the business environment, students still focus on short-term memorization of rules and problem-solving techniques.

As educators with many years of teaching experience, the conclusions do not surprise us. We, along with most of our colleagues, constantly bemoan the fact that accounting majors seem to be less interested in learning than in getting a degree. Many accounting programs and recruiters emphasize the need for technical knowledge of obscure accounting rules and students seem to be happy to memorize those rules, hopefully to pass a certification exam, and then to move into the “real world.”

One solution to this problem is to structure classroom activities and accounting curricula to enhance the students’ abilities to handle complex situations when presented with ambiguous data. In our experience, most students, particularly those attracted to a major in accounting, are very concrete learners. They are used to learning facts and terms, and solving structured problems that have clear, non-ambiguous solutions. Our function, as educators, is to move these students from that black and white world into more abstract learning where they will be able to respond effectively to complex issues in a competent and professional manner.

Although students seem most comfortable with passive learning approaches such as lectures and structured homework assignments, it is widely accepted that they will learn more and retain knowledge longer if courses are designed to include active learning exercises. As a result, accounting educators at many schools have changed their curriculum and teaching approaches to encourage active learning. Course design has changed to include more case work, group work and oral presentations. In addition,

written communication skills have been more greatly emphasized. Course content has been changed to integrate more business applications while teaching accounting methods. In a study commissioned by the Accounting Education Change Commission and the American Accounting Association, Francis, Mulder, and Stark list the five attributes of “intentional learning” (AAA 1995) quoted below.

Intentional Learning Attributes

Questioning. Facts, theories, experiences; wanting to learn; asking independent questions about what is to be known.

Organizing. Ideas, meaning, knowledge; developing understanding of what is learned.

Connecting. New knowledge with old; integrating what is learned into a broader pattern of understanding.

Reflecting on what and how and why one is learning; understanding one’s learning needs and strategies.

Adapting. To new situations and needs; using what is learned in a changing world or profession.

The changes in course design, already incorporated into many accounting courses, address these attributes. However, they still fall short. In our experience, accounting graduates persist in narrow thinking patterns that emphasize correct solutions and short-term memorization of rules. Students seem to feel that they will learn how to deal with complexity on the job, after graduation. We believe that a properly structured learning project that addresses all five intentional learning traits will teach students to think critically and systematically.

As an example, professors teaching Intermediate Accounting often require the completion of a practice set as a requirement of the class. This assignment, while

somewhat useful, frequently is lacking in certain aspect of skills development and does not address many of the pedagogical issues that we describe below. We believe that many of the deficiencies exhibited - even by good students in accounting - are caused by the typical course or project design. Several examples of problems that we perceive with current, textbook-oriented teaching approaches are:

1. Students tend to work with provided, structured data and have great difficulty identifying solutions to unstructured, complex situations. Exercises and problems included in textbooks present the data and the student merely has to figure out how to use that data. Students have difficulty even when a few irrelevant facts are included in the problem data set.
2. Students often solve exercises and problems in the textbook by looking up a similar solution in the chapter and copying it. The student learns schedules and reinforces copying skills, but does not understand how to structure a solution starting from scratch.
3. Students can solve specific problems, but lack understanding of the underlying systems or the purposes of system procedures. Homework assignments tend to be isolated, independent fact situations that seldom require the student to understand the system underlying collection of the data.
4. Students fail to develop skills of good documentation. Systematic design of workpapers that would be maintained for review by others or future

explanation of the solution process is generally covered, if at all, only in an auditing course.

5. Students are weak in their use of deductive and inductive reasoning. Because most problems focus only on small situations with the limited data given to the student, the reasoning necessary for a solution is limited to combining the given data into a reasonable answer.
6. Students have weak research skills and lack the ability required to interview clients thoroughly to obtain information critical to successful problem solving.
7. Students often "consult with" (copy from) one another when completing projects. Many students do not perceive that copying a solution or relying on someone else for a solution cheats them out of a meaningful, long-lasting learning experience. Students tend to focus on getting the answer and then believe that they have learned.
8. Prior semesters' practice set and textbook problem solutions are often available to students. Unless a conscious effort is made to change problem assignments, many students seem to find it difficult to resist the temptation to find and copy old answers.
9. Intermediate Accounting textbooks tend to look at "big company" issues, e.g. discontinued operations and earnings per share, and ignore issues that are critical to the success of start-up and small-to-medium size companies. Graduates cannot "hit the ground running" when faced with very pragmatic issues encountered on their first job.

10. Students view projects as tasks to be accomplished (hurdles) rather than interesting learning experiences. Once the task is accomplished (and an exam has been taken) they quickly forget the material. Problems are perceived as irrelevant to longer-term objectives of the student.

III. Goals of the SPUD's Project

In order to overcome these issues, two accounting professors and an information systems professor at a medium-sized university have developed an integrated, computer-assisted teaching tool, called SPUD's. Developed for the Intermediate Accounting series, the project was designed so that it can easily be adapted for use in a basic principles course, an advanced accounting course or auditing courses.

The goals of this project, as outlined to the students, are as follows:

1. To simulate a "real world" experience.
2. To review and understand accounting concepts.
3. To review the basics of the accounting cycle and the preparation of financial statements, including necessary disclosures through footnotes
4. To develop the ability to handle complexity that comes from missing, erroneous and/or unstructured data, and to develop the ability to think "outside the box" so that the student will look beyond the information that has simply been provided.
5. To develop the skill of interviewing others to obtain information.
6. To develop information research skills.

7. To develop a systematic approach to planning and documenting a project or client engagement.
8. To develop team management skills.
9. To develop time management skills.

IV. The Project

Tom Tater and Lennie Laguna, two mythical university students started a business, called SPUD's, during the most recent semester. Wanting to expand, but short on cash, Tom and Lennie have approached a local bank to inquire about a loan. The bank asks to see a financial report for the business entity. Tom and Lennie are honest, hard-working students but they know almost nothing about accounting. They therefore approach a small accounting firm, represented by teams of students in the class, and ask them to develop a financial report for the bank. Tom and Lennie have generated, collected, and saved many business documents that are stored in a shoe box and now submit these unorganized documents to the accounting firm (student teams) so the firm can develop a complete set of financial reports.

The shoebox contains documents that have some inconsistencies (errors) that must be clarified. In addition, some transactions are not included, but are discovered through other means such as interviews or the analysis of the bank statement. Finally, some issues relate to improper valuation by Tom, such as a barter transaction or improper timing of revenue recognition.

As the accounting students wade through the documents, many questions arise. When presented with the boxes of data, they are told that they may interview Tom and Lennie

to get answers to most of their questions. In addition, certain accounting issues must be researched and the students must arrange interviews with real members of the business and professional community to gather sufficient information with which to complete their financial reports.

During the first week of the project, students organize their team responsibilities and design an accounting system that they will use to analyze and record transactions and other events. Students are given a sample chart of accounts that includes many extra accounts that will not be needed. This chart lends some standardization that is essential later when the students use the interactive feedback software to evaluate and refine their solutions. Students are told to design a system starting from a blank Excel spreadsheet. They are prohibited from using bookkeeping software since we are asking them to think through and understand the process.

As students complete the project, they are asked to assume three different roles. First, each student is a member of an accounting firm and should focus on how to operate the organization systematically. This involves planning an engagement, dividing the workload, assisting and teaching others, and client billing. Second, as an accounting professional, each student is interacting with the client and with other, real-world business professionals whom the student must interview to obtain needed information. Third, in the role of student, each team member has the responsibility to learn from this experience and to convince the professor that he or she has achieved this goal. The student must effectively demonstrate to the professor that learning has occurred. The project begins about three weeks into a 15-week semester. During that week, the class is visited by the business owner, Tom, and his associate, Lennie. Tom and Lennie

describe the business and then outline their problem – business seems good but cash is getting scarce and they need financial reports for the bank so that they might obtain a loan. Tom and Lennie assure the teams that they are willing to meet with them to discuss issues as the teams begin their work. After Tom and Lennie depart, the professors return to class and provide each class member with a closed shoe box that contains checks, invoices, business cards and miscellaneous other documents that the business has collected during its first month of operation. Initially, each student is responsible for analyzing the data. During this first session, students are asked what they expect to find in the box. After this class discussion, the boxes are opened and the students take some time to analyze the documents. Each student must individually analyze the data, then develop a list of issues to be pursued and questions to be asked. Shortly thereafter, students are organized into teams and each team becomes an accounting firm.

The professors provide each student a hand-out that briefly reviews the business situation, defines the objectives of the project, then gives general directions as to the type of accounting system to be used, the level of materiality, the general process that the student should follow to maximize learning, and an outline of due dates for certain aspects of the project. Throughout the process of analyzing the documents, interviews with Tom and Lennie must be conducted, research must be done (using FARS or other resources) and interviews with real-world community members must be undertaken. The students must also develop an accounting system, record basic transactions and adjustments, and develop a set of financial reports. As students conduct their interviews, each interviewee electronically checks what issues have been addressed during the interview session. These reports serve as a basis for grading the project. Each team

member also submits, via WebCT, a status report to the professor. The status report is monitored and is used as part of the grading system.

After a given period of time, each student team enters its adjusted trial balance into a computerized system. Beginning with a test as to whether the trial balance actually balances, students are given feedback as to the likely correctness of their account balances, procedures followed, and hints about how to identify errors that might have caused differences between the professor's (hidden) solution and theirs. For instance, after the cash balance is checked, students are asked if they have prepared a bank reconciliation. If not, the team is logged off the system until it has completed one, and then enters it for testing against the "correct" bank reconciliation. Presumably, the student team will progress further through the trial balance each session until they have successfully finished the computerized feedback process. The computer system monitors the number of log-ins, time spent each session and the point at which mistakes were found or processes not performed. Mistakes are discovered by comparing the student answer to an automated answer key that is updated each time any document or event is changed, added or deleted by the professor. This automated system enables the professor to update document dates each semester, change various amounts, add or delete documents, and create a unique case for each student group if desired.

If all teams are given the same data set, the teams receive a report near the end of the project that compares their account balances against the balances of all the other teams. A class discussion is held as to why differences may have occurred and teams are then given a bit more time to "sharpen" their numbers and their documentation.

Each “firm” may decide to fire one of its members during the semester. The “fired” member must then find another firm or “hang out her/his shingle” and go it alone. Peer reviews are submitted by each team at the end of the project and serve as input to the final grade.

V. Faculty Involvement and Grading

The SPUD’s project, as currently used, requires considerable role-playing, both by the student and the faculty member. As currently implemented, the instructor literally wears two hats. The students schedule interviews with the client, Tom, who is played by the instructor wearing a baseball cap with the SPUD’s emblem. The student can obtain some information by sending an Email to Tom, but complex issues must be discussed in a structured face-to-face interview. The instructor can remove the SPUD’s cap and reassume the role of professor at the request of the student. When playing the role of Tom, the instructor is limited to answers that would come from a typical client who does not have knowledge of accounting, but who does understand the business. Students are often frustrated when Tom will not provide them with answers to accounting questions such as “which depreciation method should we use?” When playing the role of professor, the instructor must be careful not to shortcut the learning process by giving too many hints about the solution. The professor provides guidance about where the students might look for information or enters into discussions with the student team about the concepts that underlie a particular issue or what goals Tom is attempting to achieve. We have enlisted some members of our local business community to play a role in the game as well. For example, the small business advisory person at our local department of

labor has generously agreed to accept interviews from the student teams. Where we do not have a real businessperson who has agreed to participate in the game, we designate graduate assistants to play a role (e.g., banker, lawyer, TV station representative).

Grading primarily focuses on student process rather than on correct answers. In early trials, the practice set was treated as a project with results due near the end of the semester. We discovered that it was difficult to assess student process because many students procrastinated and the project became a tremendous burden for them right at the end of the semester. Subsequently, we added structure by having weekly assignments. The students are required to respond to an electronic survey each weekend (hosted on a WebCT site) where they are asked questions ranging from lists of activities performed to assessments of their group process for the week. Students submit a time report showing billable hours and nonbillable hours spent during each week. In addition, students report difficulties encountered and evaluate the game weekly.

At the end of the semester, the instructor considers these weekly surveys along with student peer evaluations of the teams and the report from the interactive feedback software. When combined with the actual financial statements generated for the bank and other report items generated for the client and the professor, it is fairly easy to assess the student process and results.

VI. The Software

The software contains three different modules. The first component is used by the instructor prior to the beginning of the game. It allows the instructor to make parameter changes for different transactions and to print updated source documents with corrected

dates and amounts for each team. Thus, the source data can be changed each semester and the documents are all modified electronically to be consistent with the new parameters. At this point in the development there is just one set of transactions, but future development will include different transactions so that the instructor can specify a subset of events with different issues each semester. Also in the future, the software will be modified so that the source documents generated for each student team can be different.

As noted earlier, the shoebox of documents provided to the students contains checks, invoices, business cards and miscellaneous other documents. In early testing phases the project was administered manually and the professor generated each of these documents. The automated system now generates and updates the documents. The document set that is generated consists of a series of checks written by the company, deposits slips, invoices submitted to the company by various vendors, invoices from the company to customers, contracts with customers, and various other items. All documents are linked, so that values are consistent throughout the document set, unless the program intentionally generates inconsistent values (which it can be instructed to do). For example, if Tom ordered 10 computers and was billed for them, the quantity of computers and/or the related dollars should appear on: 1) the invoice from the vendor, 2) any related shipping document 3) the check written to the vendor, 4) the bank statement (if not outstanding at the end of the period), etc. The document set is accompanied by an answer key, financial statements, and bank reconciliation that automatically reflect the values contained on the documents.

Efforts were made to make all documents resemble original, real-world documents as closely as possible. For example, if there were handwritten notations in the original document, they were scanned and then embedded in the new documents, giving them a more “genuine” appearance. Further, documents such as a State Certificate of Assumed Business Name were duplicated right down to the seal of the State. A letter from the Dean of the College of Business acknowledging a donation required a duplication of the College of Business letterhead.

Once the document set was finalized, various program modules were developed to make the document set dynamic. The professor has the following options:
Revise/update dates on all documents to correspond to the current semester. Safeguards are included to insure that the dates cannot exceed the current semester.

- 1) Individually change designated modifiable fields in the documents. For example, the number of printers sold or the price of a printer could be changed if the instructor so desired. This insures that the documents sets vary from semester to semester.
- 2) Increase or decrease designated modifiable fields in the documents by a certain percentage. This allows all documents in the document set to be changed at once. Again, this insures that the documents sets vary from semester to semester.
- 3) Produce checks that are realistic in appearance. A routine is included that writes, in script, the amount of each check, based upon the numeric representation of the check. Thus, \$425.25 would also appear in the appropriate place as Four Hundred Twenty-Five and 25/100 Dollars. In addition, each check includes a scanned signature. A routine was developed that groups three checks or deposits on a

page so that checks can be printed three to a page on perforated paper so that they more closely resemble actual checks.

- 4) Generate a bank statement that reflects the current transactions, and even provides an “installoan” feature that is triggered whenever the balance in the account drops below zero dollars.
- 5) Print all documents quickly and easily, including checks in the three-per-page format, deposits in the three-per-page format, and then the remaining documents.

The second module is the weekly online survey. The instructor can change questions each week. After the weekend due date expires, the software automatically generates an email message to any student who missed the deadline. When that student does respond to the survey, the time of response is recorded and reported to the instructor. A summary of questions and answers is generated for the instructor when responses are entered.

The third module is the interactive feedback program. It is critical to the success of the game because it provides timely feedback to each student team to allow them to recognize when they have made errors or failed to recognize an issue. It gives hints to the students about possible causes for differences between the student solution for a particular account and the hypothetical best solution generated by the instructor. The software also records each attempt made by a student team and reports the results back to the instructor.

VII. Value of the Project

Not all students have the same style of learning. Some prefer to learn visually while others prefer learning through reading and writing. Still others learn best by hearing,

while some learn best by “doing.” SPUD’s enables students to utilize all of these learning styles to develop their professional skills. Researching an issue that needs resolution may be done through reading. Weekly progress reports require students to use writing to assess their progress, to describe problems, and to offer solutions to problems and issues that have been encountered. Interviewing requires writing questions that need to be asked, as well as a great deal of listening, questioning, and then listening some more. Finally, throughout the whole process, the student is involved in hands-on work – getting very close to real-world work situations.

Many of the professional skills that the students are learning through this project are identified as critical in the “*Core Competency Framework for Entry into the Accounting Profession*” (AICPA, 1999). The framework first identifies three broad areas of competency that all students entering the accounting profession should possess at graduation, namely functional competencies, personal competencies and broad business perspective competencies. The framework then defines those skills that are integral to each competency area. This full framework can be viewed at the following web site: <http://www.aicpa.org/edu/corcomp.html>. One of the professors, in developing a course concept map for his students, used this framework and indicated how the SPUD’s project was intended to help students develop those skills outlined in the framework. A portion of his concept map is reproduced below:

The AICPA has identified three broad competency areas that individuals who enter the accounting profession are expected to possess. Listed below are those competencies (labeled here as I, II and III), and the subcategories (labeled here as A,B,C, etc.). Those that will be emphasized for student development in this course are listed in **bold print and are underlined**.

Only those descriptions and elements that will receive emphasis in this course are expanded upon. A complete discussion of these competencies may be found at the AICPA's website www.aicpa.org/edu/corecomp.htm

I. Functional Competencies

- A. Decision Modeling, which includes identifying problems and potential solution approaches, evaluating the cost/benefit of solutions, organizing information, and linking data, knowledge and insights together for decision-making purposes.**
- B. Risk Analysis
- C. Measurement, which includes relevancy and reliability of what is to be measured, Both quantitatively and qualitatively. Includes GAAP, OCBOA and Tax reporting.**
- D. Reporting, which includes communicating the scope of work and findings or recommendations.**
- E. Research, which includes employing relevant research skills, accessing relevant standards and rules, and evaluating different sources of information.**
- F. Leveraging Technology to Develop and Enhance Functional Competencies, which includes accessing appropriate electronic databases and using technology-assisted tools.**

II. Personal Competencies

- A. Professional Demeanor, which includes growth in personal conduct and capabilities, diagnosing the need for change and taking action to gain competencies, measuring oneself against evolving standards and meets or exceeds those standards, accepting professional development as a life-long process, conducting oneself with honesty and committing to quality and efficiency.**
- B. Problem Solving and Decision Making, which includes making valid and reliable**

evaluations of information evaluating the significance of evidence or facts.

C. **Interaction**, which includes the ability to work with others to accomplish objectives and interacting and cooperating productively and maturely with others.

D. **Leadership**, which includes being able to effectively lead in appropriate circumstances, motivating others to achieve excellence, rallying the support of others to accomplish objectives and valuing the inputs and points of views of others, facilitating compromise, and persuading others.

E. **Communication**, which includes communicating financial and non-financial information so that it is understood by individuals with diverse capabilities and interests, being able to listen, and making presentations.

F. **Project Management**, which includes determining project goals, prioritizing and allocating resources.

G. **Leveraging Technology to Develop and Enhance Personal Competencies**, which includes exchanging information using appropriate communication technologies.

III. Broad Business Perspective Competencies

A. **Strategic/Critical Thinking**, which includes the ability to link data, knowledge and insight from various disciplines to provide information for decision-making.

B. Industry/Sector Perspective

C. International/Global Perspective

D. Resource Management

E. **Legal/Regulatory Perspective**, which includes describing the legal and governmental regulatory environment, the significant costs/benefits of regulation and the political and environmental forces impacting accounting standard setting and regulation.

F. Marketing/Client Focus, including the ability to anticipate and meet the changing needs of clients, customers and markets.

G. Leveraging Technology to Develop and Enhance a Broad Business Perspective

Thus, while the SPUD's project does not develop all the broad business perspectives, it does address most of the functional and personal competencies including:

1. Use of technology
 - Students use FARS to research issues brought up in the case, such as accounting-for-barter transactions.
 - Students design an accounting system starting with a blank spreadsheet.
 - Students interact with a computerized system in order to learn and to successfully complete the process and the project.
2. How to work as a member of a team
3. Need for analytic skills
4. Need for documentation skills – The first submission of financial reports reveals that most students have not adequately documented how they selected the accounting principles to use or how their numbers were derived. Follow-up discussion and “round 2” enable students to sharpen their documentation skills.
5. Communication skills – SPUD's uses both oral and written communication skill development
6. Listening skills – The interview process is critical to a successful completion to this project
7. Research skills – Using FARS or another research source, students explore what is available to enable them to make sound decisions. They also learn about resources

available to small businesses that are not typically part of an intermediate accounting course, such as payroll tax requirements or reporting of sales taxes.

Therefore, the SPUD's project enables students to use a variety of learning styles and allows them to begin to develop many skills that are outlined as critical by the AICPA.

VIII. Professor Issues

The development of the SPUD's project has been lengthy and costly. Initiated in 2002, a great deal of faculty time was needed to develop the original project and modify it to incorporate computer-based learning and grading. As currently used, the project continues to use a significant amount of professor time to achieve the desired results in the classroom. Ongoing development of the project has enabled the professor to spend less time grading the project and interacting with the students, but there is still a high-level of professor involvement. While some schools could choose to use graduate assistants to play the role of Tom and Lennie, we have chosen not to do so.

Our pilot studies indicate that students spend approximately 40 hours during on SPUD's during the semester. The Intermediate Accounting course is already very demanding without this extra project assignment and it is difficult to see exactly how it can fit into the curriculum unless something else changes in the course design. If SPUD's is to be used broadly, the time and other demands on busy faculty members must be reduced. We believe that continuing software development should enable the professor to spend less time while enhancing the project for students. We feel that the end result is well worth the time and effort spent on this project. Feedback from both students and graduates who are familiar with the project has been extremely positive.

IX. Future Research

Future studies will be conducted to assess the impact of the SPUD's system on student learning and retention. The system continues to undergo enhancements to automate professor tasks, and eventually will not only generate standard document sets, but will generate individual document sets for each team, accompanied by an associated solution for the professor. While the system currently grades student work and provides advice to students when errors are detected, future iterations will provide more detailed advice and will also provide a consulting feature that the students can access to get answers to commonly asked questions.

X. Conclusion

While there is little doubt that Practice Sets are a useful teaching tool, they have historically been very time consuming for the professor and beset by a host of drawbacks from the student perspective. The SPUD's project automates many of the tasks associated with practice sets, and incorporates a "real-world" element into the exercise. Short of turning unprepared students loose in an actual business, this approach provides students with the most realistic accounting experience possible.

We believe the SPUD's project will be an effective teaching tool that directly responds to the AECC recommendations as stated in the Learning to Learn discussion:

"The process of learning should focus on developing the ability to identify problems and opportunities, search out the desired information, analyze and interpret the information, and reach a well reasoned conclusion. Understanding the process of inquiry in an unstructured environment is an important part of learning to learn." (AECC 1990 Appendix A)

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