Interactive Accounting Simulation Environment for Accounting Education and Training

Andrew Milner, Andrew Hogue, Bill Kapralos, and John Friedlan

Faculty of Business and Information Technology
University of Ontario Institute of Technology
2000 Simcoe Street North,
Oshawa, Ontario, Canada. L1H 7K4.

andrew.milner@mycampus.uoit.ca {andrew.hogue, bill.kapralos, john.friedlan} @uoit.ca

ABSTRACT

In contrast to traditional teaching-and-learning environments whereby the teacher controls the learning (e.g., teacher-centered), video games present a learner-centered approach to learning whereby the student controls their learning experience through interactivity. Despite the many benefits of a learner-centered approach, the use of video game technology in business-related curriculums and accounting in particular, has been sparse. By and large accounting education has remained based on “paper and pen learning”. This paper describes an ongoing project that will see the development and evaluation of a strategy-based, learner-centered, interactive accounting simulation environment for undergraduate accounting curriculums. The interactive simulation is meant to place accounting education in a “game” environment.

Categories and Subject Descriptors

I.3.7 [Computer Graphics]: Three-Dimensional Graphics and Realism—*Virtual reality*

General Terms

Human Factors

Keywords

Accounting, serious games, interactive learning environment, game-based learning.

1. INTRODUCTION

Traditional teaching-and-learning environments are often quoted by millennial students (the generation raised in the sensory-flooded environment of digital technology and mass media e.g., the “internet generation”) as “boring” since they

do not address the unique learning needs of this generation. In order for knowledge and skills to become fully understood, integrated, and accessible for future situations, millennial students require reinforcement, application, repetition, and often practice in a variety of settings and contexts [4]. In contrast to traditional teaching-and-learning environments whereby the teacher controls the learning (e.g., teacher-centered), video games present a learner-centered approach to learning whereby the student controls their learning experience through interactivity. Video games provide students the opportunity to explore the inter-relationships of complex behaviors, sign systems, and the formation of social groups [1]. Video game technology has been adopted and applied to applications whose primary purpose is not entertainment. These are referred to as *serious games*. Serious games support the development of analytical and spatial, strategic, recollection, and psychomotor as well as visual selective attention skills [2]. Further benefits of serious games include improved self-monitoring, problem recognition and solving, improved short-and long-term memory, increased social skills, and increased self-efficacy.

Commercial games whose primary focus is business do exist. Examples of such games include *Theme Park World* whose focus is on making profit and attracting customers, *Hollywood Mogul* focuses on making deals, hiring stars, and creating a movie production. An example of a more financially oriented business simulation is *Mr. Bigshot* which is a simple stock-market simulation. That being said, the use of video game technology in business-related curriculums and accounting in particular, has been sparse. By and large accounting education has remained based on “paper and pen learning”. Students respond to written questions by writing responses. Cases, which are commonly used by accounting educators, tend to be done this way. Only through in-class discussions are students able to experience the interactive nature of a case study. Although technology has been used in accounting educations, it has not been used to develop critical thinking skills and judgment. For example, spreadsheets are widely used for facilitating data analysis. Educational versions of business accounting software are used in many business programs. These are beneficial for teaching bookkeeping and the mechanics of accounting but are very limited in value insofar as teaching judgment. Using accounting software at the introductory level is especially limited in value because most students enrolled in introductory

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

FuturePlay 2008 Toronto, Ontario, Canada. November 3-5 2008.
Copyright 2008 ACM 978-1-60558-218-4 ...\$5.00.

financial accounting don't go on to become professional accountants. An additional limitation to these software packages is that they do not allow students to see the impact of alternative treatments for a particular transaction (this limitation is appropriate for the software because in actual use, companies do not want their employees to have the ability to change the accounting records. However, for student learning purposes, there is benefit for students to see the impact of different choices on the financial statements and on the economic consequences for the stakeholders who use those financial statements. Textbook publishers have created on-line tools to support students but these tools tend to be mechanical in nature. For example, one publisher has a tool that provides students with repetitive quantitative problems. The same problem can be provided an infinite number of times so that the student can learn how to do a calculation. This process teaches students how to solve a particular type of quantitative problem but again, does not address critical thinking, problem solving, and judgment skills.

The proposed project will see the development and evaluation of a strategy-based, learner-centered, *interactive accounting simulation environment* (IASE) for accounting curriculums. The IASE is meant to place accounting education in a "game" environment. Accounting is a discipline that requires both the people who prepare accounting information and the people who use it to apply high-level thinking skills such as judgment, analysis, evaluation, inference, application, interpretation, and decision making to be successful. It is anticipated that the IASE will allow such skills to be developed in a fun and enjoyable manner.

2. OVERVIEW

Accounting case studies require that the students read and understand the facts involved in a particular scenario, develop ideas surrounding possible solutions to the accounting problems presented, and construct an argument to support their decisions. These types of scenarios are limited due to the nature of the paper medium it is presented upon. Interactive digital media fundamentally provides a richer medium to present information. As opposed to traditional textbook cases, interactive simulation is far more effective to engage the students in the task at hand. The standard evaluation method for such case studies are to have the student prepare a short argumentative essay explaining the choice of action and an argument supported by the case study facts. This is essential to hone the students' analytical problem solving skills as well as further develop their communication skills. Rather than replacing the standard evaluation methods, we focus on the content delivery mechanism. The simulation will provide a way to explore the accounting case studies in an effective and interactive manner. The simulation is being developed using Panda3D, a freely available 3D engine that allows for 3D rendering and game development [3].

The IASE will have the user represented as a *3D accountant avatar* (either their own customization, or as a forced choice from standard templates). The avatar is fully controlled by the user and is allowed to roam through a 3D cityscape. Each building in the city provides information related to the current scenario at hand. Simulation controlled characters walk the streets, work in businesses, and are all interactive. As such, the user's avatar can approach characters within the simulation and ask a set of predefined

questions or simply listen to their story. Using this method, the facts of the case study are presented in a non-linear fashion from possibly differing perspectives; for instance, the financial perspective of a CEO can be different than a desk clerk. The user has the option of tagging important information by attaching it to their "clipboard". When the user is finished the simulation, the clipboard can be utilized to formulate their opinion and arguments for the scenario.

The distribution of the case studies is performed through a server-based push update. When the simulation begins, it contacts a central server and submits a query for available scenarios. If any new scenarios are available (at the instructor's discretion), the case study is automatically pushed to the student's simulation. Multiple scenarios could be pushed to the student and triggered by events in the environment such as entering particular buildings or interacting with a particular character. The case study itself is represented as a set of scripts generated using a standard text editor or a custom built flow-chart-based tool. This tool enables the instructor to define his/her own scenarios easily and not have to resort to programming low-level code. The scripts define the facts of the case, which character will present them, any event triggered actions, and all dialogue associated with the non-player characters. The difficulty of the scenario will be fully controlled through the definition of these scripts. Possible adversarial or contradictory information could be presented through some of the characters to force the student to evaluate all of the possible data associated with the case.

3. SUMMARY AND FUTURE WORK

This paper has described an ongoing project that seeks the development of an interactive accounting simulation environment for accounting education and training. The simulation will address a large gap between traditional accounting teaching methods (which rely on "pen and paper learning"), and the needs of millennial students which dictates active learning through interaction. Future work includes completion of the simulation followed by focus group testing amongst students, educators, and accountant experts and finally, the incorporation of the simulation within a undergraduate accounting course in order to determine the effectiveness of the simulation.

Acknowledgments

The financial support of the University of Ontario Institute of Technology, in the form of a Teaching Innovation Fund award, is gratefully acknowledged.

4. REFERENCES

- [1] J. P. Gee. *What Video Games Have to Teach Us About Learning and Literacy*. Palgrave MacMillan, New York, NY, USA, 2003.
- [2] A. Mitchell and Savill-Smith. The use of computer and video games for learning: A review of the literature. *www.LSDA.org.uk*, 2004.
- [3] Panda3D. A 3D engine. Carnegie Mellon Entertainment Technology Center. *www.panda3d.org*.
- [4] B. D. Ruben. Simulations, games, and experience-based learning: The quest for a new paradigm for teaching and learning. *Health Education Research, Theory and Practice*, 30(4):498–505, 1999.