

# Using Simulations in Economics to Enhance Experimental Learning

Neal Mannas

PO Box 24449, Doha, Qatar

Telephone: +974 6674-1893

nsmannas@yahoo.com

**Abstract**— This paper looks at economics courses taught at the college level. It finds that the typical method of teaching economics is the lecture format. This paper suggests there are better ways to teach economics to students using computer simulations. Computer simulations increase student learning through experimentation and build critical thinking skills. This paper then looks at the theory of experimental learning and how it relates to simulations. This paper also looks at barriers to implementing an effective simulation in the classroom. The barriers include time and resources available to the instructor, since a simulation normally requires more resources and time than a traditional lecture. If the barriers can be overcome, in the long-run it makes the economics instructor role easier and more rewarding. We find simulations are a good way of creating experimental learning and they also enhance various other skills that economics students should have.

**Keywords**— eLearning, Experiential learning, experimental learning, macro-economics, micro-economics, simulations.

## I. THESIS STATEMENT

Computer simulations can be used in economics to improve experimental learning and critical pedagogy learning, cognitive skills, and critical thinking skills. It is a better method of learning when compared to the traditional approach to teaching economics which is a lecture format.

## II. INTRODUCTION

In this paper, we will discuss the field of economics. Next, we will look at the general format for the delivery of economic courses. After, we will look at how simulations can better engage students and how it is related to experimental learning. Finally, we will look at barriers to using simulations in economics courses and how to overcome these barriers.

## III. THE FIELD OF ECONOMICS

Economics is a field in the social sciences. The purpose of economics is to use information to try to make important micro and macro economic policy decisions. Many economics courses are mandatory courses in business faculties. The field of economics plays an important role in our economy and effects things such as policy planning, government policy, housing, and even stock markets. Although, economics is considered a social science many of its theories are taken for granted without too much questioning. For example, fiscal policy and monetary policy are considered the tools used to solve economic problems. This knowledge is passed from instructor to student as theory most often through a lecture, so experimental learning by students is often little. Economists play such an important role in society and their decisions effect many people, it is important students develop their critical thinking skills and questioning attitude early. This should take place early at the college level, but is not.

According to Samah El-Shahat (2009) Aljazeera's Resident Economists, "As a development economist, I have seen many economics theories or so called 'magic bullets' for the world's ills come and go."

The economics instructors are considered *experts* and therefore the transfer of information is often taken at full value from the students. Yet, many economic theories simply do not work or solve real world problems, but the theories are being implemented without very little questioning. This lack of questioning begins at the classroom level.

According to Nassim Nicholas Taleb (2008), "experts who tend to be...not experts" According to Nassim Nicholas Taleb included, "economists, financial forecasters, finance professors, political scientists, 'risk experts'"(p. 146 -147).

According to Samah El-Shahat (2009), "The problem is some of them (economic theory) have been largely discredited but they still make a return because (sic) they serve the interests of those with influence and power."

Many of these discredited theories tend to come back in fashion if it meets the needs of the influential and powerful, yet very little questioning occurs.

According to Samah El-Shahat (2009), "Well, it is very relevant, because governments across the world, particularly the US and British administrations, are solving the financial crisis with a top-down approach."

She is referring to the large monetary and fiscal policies that are being used to combat the global financial crisis. This particular method was used in the 1980's to try and solve the poverty problems in Africa and South America, by giving money to people at the top of the society and watching the money trickle down to the poor. It was proven that it did not work and countries that followed these strategies became poorer. Yet, there is not much questioning about the

current economic policies of today. Could lack of questioning be a result of poor economic education? Is economic education providing the critical thinking skills, questioning, and cognitive skills needed for a field that is so unpredictable?

#### **IV. HOW ECONOMICS COURSES ARE DELIVERED**

The main medium of information exchange between economics instructors and students continues to be the lecture format. However, because economics has many theories that come and go very quickly, is lecture format the best method? Or is a more experimental student directed learning method better?

According to Robert S. Gazzale (2006), "We (i.e., economics professors, particularly those of us who teach undergraduates) spend a lot of time writing on the blackboard and lecturing" (p. 1). According to Robert S. Gazzale (2006), "probably more than most of our colleagues in other disciplines (p. 1).

According to Scott P. Simkins (1999),

An important element in the current focus on teaching within the economics discipline is the recognition that current teaching practices, which rely heavily on the lecture format, are not doing enough to develop students' cognitive learning skills, attract good students to economics, and motivate them to continue coursework in the discipline. (p. 278).

#### **V. SIMULATIONS IN ECONOMICS**

Simulations mimic a real world environment and allow students to make decisions based on short cases. Simulations require students to analyze situations, work in teams, and experiment with different variables. The teams have a limited time period for decision making, normally over a course of 8 weeks to input their decisions. Each week normally translates into a fictional quarter. Students normally compete against other teams and the team with the

highest “score” wins. Although, very few marks are assigned to the top team, the idea of experimenting with different variables increases cognitive and critical thinking skills. Students justify their decisions often through a report or presentation. It allows them to take responsibility for their decisions.

As students need to make team decisions in a limited time period, it requires them to communicate with group members, research economic literature, and support and justify their decisions. Simulations encourage experimentation and self-discovery.

Simulations have been used in business, but are still not common in economics, even though there is a close relationship between the two disciplines. Because there is a close relationship between the two disciplines there is an opportunity to use simulations in the field of economics. Although, many of the shelf economic simulations do not exist, many simulations can be done in house with programs such as Excel and later converted to a webpage.

According Linda M. Manning and Catherine A. Riordan (2000):

However, there are only occasional references (e.g., Greenlaw 1995, 1999;

Manning 1996a) to the planned use of computers in economic education for purposes other than computer-aided instruction or testing. This limited use means that the potential of computers and hence the promise of the technology to transform and significantly impact the process of learning has not been exploited fully. The use of groupware is one of the areas ripe for exploration. (p. 251).

Simulations can help students who learn well from experimenting with variables. They also help students that work well in groups or students that learn through visualization.

According to Scott P. Simkins (1999), “For example, students who learn best by

actively experimenting with economic concepts can practice those concepts via an on-line stock-trading game, macroeconomic simulations, or web based tutorials.” (p. 279)

Simulations allow learners to move away from a traditional classroom environment, which enables learners to take control of their own learning. It engages students and allows for problem based learning methods and improves collaborative learning. Since, many simulations are done online; learners can communicate with other members online in different regions which broadens their learning.

The field of economics is a very visual field. Courses include a lot of graphs, analysis, and scenarios. Simulations allow for graphs, communication, and quick decision making. Many of today’s business simulations have many of the same features and functionality as groupware. Therefore, the technology exists and can be transferred to economic simulations.

According to Linda M. Manning and Catherine A. Riordan (2000):

In contrast, some of the latest groupware releases include (1) more advanced means of electronic communication, (2) elaborate graphics, (3) control and monitoring of the group process and group members’ participation, (4) ways to structure tasks to enhance effectiveness of the group or reduce the time taken to accomplish a group goal , and (5) decision making aids, ranging from ways to increase the number of ideas to new ways to summarize or consolidate ideas expressed by group members . (p. 244).

## **VI. EXPERIMENTAL LEARNING**

Anchored learning is a form of experimental learning that encourages learners to make decisions over a sustained period of time to a number of scenarios. The methodology is that learners will be able to experience similar situations that experts

would have in real life. (Caffarella, Merriam, Baumgartner., 2007, p. 182). In our case in an economics simulation, situations would be created that real economists would need to handle. Students would solve the problems and progressively be introduced to more complex situations overtime.

According to the Cognition and Technology Group this is called “macrocontexts, which are complex problems explored over extended period of time and through multiple lenses.” (Merriam et al.,183).

As we know in economics, decisions are extremely complex. Economics being a social science, many variables are moving at once and decisions usually need to be made over the long-term. A decision on one variable such as inflation, affects other variables such as employment. There is never one right answer in economics and students could have different solutions according to the way they view the situation.

Because of the nature of the field of economics fits well with experimental learning, which fits well with simulations.

## **VII. BARRIERS TO SIMULATIONS IN ECONOMICS**

On August 26, 2009 at a business instructors’ workshop called “Developing Evaluations and Assessments”, instructors were asked one question at the start of the seminar. The question was “What do you think is the best way to assess students?”

The participants were divided into 4 separate groups of 4 – 5 people and each group was unable to view the other groups answers. The groups wrote down as many ways to assess students and then chose the top method. After about 15 minutes the participants shared their results with the other groups. All 4 groups without knowing the response of the other groups chose simulations as the best learning method for their students.

Even though the business faculty has over 60 instructors, only 3 instructors are known to have used simulations in their courses. This is even after the workshop.

On Tuesday November 3, 2009 at the Business Advisory Board meeting, the three instructors were asked to present their simulations and explain how simulations are engaging students. The Business Advisory Board consists of people from industry that hire students and act as an informal audit to the college. Two students were asked to talk about their experience with simulations in a Strategic Management course and both were extremely happy with the learning outcomes. It was also quite surprising that the Business Advisory Board asked very basic questions about how simulations worked, as it appeared they had little or no experience with simulations. After there questions, it appeared The Business Advisory Board was pleased with the use of simulations in the classroom environment.

So, the question needs to be asked, if instructors, industry and students believe simulations are an excellent way to learn, then why are they not being used more often? In our case, why are simulations not being used more often in economics? The theory seems to support using simulations as a better method of teaching economics and it will enhance student learning, yet the lecture format is still the most used method of delivering information in economics.

It appears a major stumbling block is simulations take time. First the simulation software needs to be compatible with computers, which means an effective

IT team must be available. Next, the simulation needs to be explained to students and how it works. And finally, instructors often shy away from simulations because their course outlines have too many learning objectives, so they find it easier to revert back to the lecture format, rather than use simulations. Although, the economics instructor covers all the learning objectives, the students usually retain very little from the

lecture. Therefore, it often more beneficial to teach less and the students gain more.

According to Robert S. Gazzale (2006), “that the goal of the macroeconomics principles course ought to be to ensure that students remember a small number of important macroeconomic concepts, and know how these concepts can be used to make sense of the macroeconomics they are likely to encounter after leaving school.” (p. 4).

Another, stumbling block related to time is very few simulations exist for economics. Therefore, instructors may have to develop their own simulations. This requires time and resources, two things that are not always available. Although, economic simulations are easy to develop with the latest technologies, the economics instructors may not have the computer skills to develop them.

Although, the implementation or development of an economic simulation could take sometime initially, in the long-run the simulation can be used again over and over again. The students will direct their own learning and the economics instructors’ role changes from an instructor to a facilitator - a role of simply keeping learners on track, probing for questions, and answering their questions. But the students through their curiosity of the simulation will teach themselves and each other and maybe at the same time pass some new information to economics instructor.

According to Scott P. Simkins (1999), “The challenge for instructors of economics is how to use effectively these new technologies to develop an active-student learning environment in economics courses.” (278).

## VIII. CONCLUSIONS

In conclusion, economics teaching tends to use a lot lectures which is not as effective as it should be in developing economics students cognitive learning skills. It is one of the few disciplines that continue to use the

lecture format. Simulations provide an opportunity to move a way from a lecture format and allow the students to experiment and make judgments based simulated situations. This enhances cognitive, critical thinking, and collaborative learning skills, skills that are relevant to the field of economics. These skills allow students to experiment more and allows for student centered learning. However, to encourage economics instructors to use simulations more often stringent learning objectives need to be reduced, to free time which will allow students to participate in the simulation. Although, in the short-term learning objectives may be reduced in economic course syllabuses, in the long-term simulations will create more engaged students, who question there decisions and those of others and thus students who are more likely to take responsibility for their own learning, which will translate into life-long learning.

## REFERENCES

- [1] Gazzale, R.S., edited by William E. Becker, Michael Watts, and Suzanne R. Becker (August 25, 2006). Review of Teaching Economics: More Alternatives to Chalk and Talk. *Journal of Economic Literature*, Vol. 44, No. 4, (August 25, 2006).
- [2] Manning, L.M., and Riordan, C.A., (Summer 2000). Using Groupware Software to Support Collaborative Learning in Economics. *The Journal of Economic Education*, Vol. 31, No. 3.
- [3] Merriam, S.B., Caffarella, R.S., & Baumgartner, L.M. (2007). *Learning in adulthood: A comprehensive guide.*(3rd edition). San Francisco: John Wiley & Sons, Inc.
- [4] Simkins, S.P., (Summer, 1999). Promoting Active-Student Learning Using the World Wide Web in Economics Courses. *The Journal of Economic Education*, Vol. 30, No. 3.
- [5] Taleb, N.N., (2007). *The Black Swan*. London, England: Penguin Books.
- [6] Samah El-Shahat, (2009, July 2). Banking Time Bombs. *Aljazeera Newspaper*. Retrieved from <http://english.aljazeera.net/focus/2009/06/200961881243654538.html>
- [7] (Renton, M., Developing Evaluations and Assessments, August 26, 2009)
- [8] (Samuel, N., William, J, Lockyer B, Discussion on Simulations in the Classroom, November 5, 2009)