## Course Information Website

Professor Elizabeth Sklar

Jamari Robinson

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The research interest of my mentor, Professor Elizabeth Sklar, involves interactive learning systems. Online academia is an increasingly popular facet of collegiate institutions and was the driving force of the project to be mentioned. In an attempt to understand these systems further and to discover its effectiveness we established a system to be observed. The system is based on the internet and will be populated with information from several different levels and flavors of computer science. The levels were named CS0, CS1, and CS2 and the flavors consisted of legal, medical, robotics and simulation, graphics and multimedia, and business technologies.

Before starting we did research by investigating and grading other similar systems using a standard rubric. The categories which we used to grade each system included appearance, functionality, and structure and each was rated on a scale of one (1) to three (3).  Each category was broken down into smaller components which were explained for each level. For example the appearance category was composed of color scheme, fonts, and distraction.

The sites that were graded included MIT's Open Course Ware, The Educator Reference Desk, Internet 4 Classrooms, and many more. MIT's and a few other sites got a perfect score. Consequently the site we built takes aspects of the best and incorporates them.

The site is built upon a PHP framework called CodeIgnigter. The software is open source and made it easy to create the designs we desired. The design we choose was very simple and in accordance with the Bridges site which we expanded upon. The design included expandable sections, small image

icons, and plain black text. The overall design is very neat and clean. One student was to oversee the designs while the third student and I collected information from the original sites, stored and uploaded them to the database.

The original course sites were scoured for lecture notes, labs, and assignments. If the information was already in the PDF format we saved them in folders on the server. Any information in another format was converted using a Macintosh or a special windows programs. This way was chosen as to have one set format for all information displayed and to ensure that if the original course site was removed that our site would remain. The collected information was stored in a MySQL database on the server. We managed the database using the PHPMyAdmin interface.

We decided that a standard format was necessary for each class. This format consisted of six sections, description, textbooks, lecture notes, assignments, labs, and a printer friendly version of it all. The first section gives a brief description of the course and information such as the professor who taught the course and his contact information. The information for the textbooks, lecture notes, assignments and labs were put into their own collapsible sections. Each collapsible section includes links to the PDF files containing all pertinent information that was taken from the original websites. Finally there is a link to a more printer friendly version of the page, which we labeled as the syllabus, which is the same site without the collapsible sections.

After we neared completion of the course sites we began to create a similar examples page. The examples page was created to organize the examples given in the classes into easy to access sections. The examples are organized into the class levels, CS0, CS1, and CS2, then into topics such as for loops, conditional statements, and classes. Each subsequent example was then labeled with an icon that represents the examples flavor such as legal and medical applications. The examples are pages from the PDF files that have the

The site is generally complete. Some classes that are to be entered into the database are being given during the upcoming semester. We will try to increase the popularity of the Bridges program and its website and consequently the course pages.

## JCAT Research

Professor Simon Parsons

Jamari Robinson

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There have been many different stock markets over time. Many have failed and few have succeeded. What is the formula for creating a successful stock market? What factors are important? How do we measure the success of an individual market?  The research interest of Professor Simon Parsons is multi agent systems and JCAT is a market simulation program that uses agents to represent the elements that affect the success of a stock market. The goal of the software is to discover what the factors that make a successful stock market. Success, in this system,  is measured by the amount of money the market makes. Money made results from the amount trading done by traders on the market over a set period of time.

A game, as defined by Eric Zimmerman and Katie Salen, is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome. The JCAT software is a game in this sense. The players are the different markets and there are several rules as well as restrictions. The quantifiable outcome is money made which can be understood as having the most traders, trading on a market, for the longest period of time.

Time is measured in days which can be set for any period of time in the parameter files. The days were set to be ten seconds and each game a hundred days. Each experiment ran one hundred identical games.

The traders in the JCAT games are agents that migrate from one market to the other trading securities. Traders are classified as both sellers and buyers of stock. What is traded is irrelevant. The traders spend their allotted funds at the market they choose for the day and then their funds are

refreshed. The way traders trade during the experiments is uniform. Traders attempt to make the most money possible during the game.

The markets that are used in the JCAT games all have fees which they charge the traders. The fees are then adjusted based on the markets success or failure throughout the game. The important factor in the experiments is how the markets adjust and which method of adjustment is most successful.

The methods which were tested include the following:

**Bait and Switch** – The bait and switch markets lower their fees to attract traders. When a substantial amount of traders are acquired then the fees are raised to make the most amount of money from the traders.

**Fixed Charging** –Fees are set and don't change throughout the game.

**Price Cutting** – The fees are cut to attract the most traders.

**Momentum Charging** –Also known as the learn and lure market. Learns how traders trade during the day. The fees are the adjusted to attract the most traders.

In order to run an experiment the parameters must be set for each market and each set of traders, the time for the days, the amount of days for the game, and the amount of games per experiment. The experiments that were run during the ten weeks had these parameters fixed. The only parameters that were changed were the fees for the markets and which markets were competing. The experiments had one hundred traders and five markets. One market is always fixed and does not charge fees. The different types of experiments that were run were as follows for every possible combination yielding a maximum of seventeen (17) sets:

**Homogenous** – Four of the same markets with the range of change for the fees are slightly different. These experiments are run to find out the optimal range for the specific market.

**Isolated** – One special market is competing with four fixed markets. This is also to find out which of the markets perform best.

**2 vs. 2** – Two of two different types of markets competing against one another. The highest and lowest ranges are used for each pair of markets. This was run to find out

**Range Match**– Each of the four markets run against each other with the same degree of ranges. This is run to find out which market runs best at the set range.

**One vs. Many** – One market, preferably an optimized one, against three identical type markets with varied ranges.

I ran my experiments on a desktop setup in an office. There were some hitches running the experiments. There were some new parameters that made the experiments run faster. Also, I did not know to set up a CSV file for the results to go to when I was finished running the experiments which forced me to run all them again. I do not have nor know how to use MatLab which is used to chart the results from the experiments. I send my results to the graduate student and Professor Parsons and they make the graphs and interpret the information.