Supply and Demand:
A problem-based learning approach

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According to the President's Advisory Council on Financial Literacy [PACFL], students in the United States do not have a good understanding of finance (2008). They recommend increasing education on such topics as personal finance and debt management, but fail to recommend a broader understanding of basic economics. Students need to understand topics like supply and demand to grasp how marketing, advertisements, and economic trends influence individual .purchases and the broader financial world.

Project Overview

My goal is to create a series of lessons to help students learn the basic concepts and terminology of supply and demand, and then apply these concepts in a public school setting. Ultimately, students will need to determine how to maximize the profits of a student-run school store. To accomplish this, students must determine what to sell, the appropriate quantity of merchandise to stock, the best places to acquire the goods, and the prices most likely to meet student demands while achieving a profit.

The concept of a student-run school store is not new; many high schools have done similar projects. Many of these tend to be very teacher-driven, with products and prices set by the suggestion or dictates of the instructor. Also, most of the foundational lessons on supply and demand tend to be traditional direct instruction. There are some cases of using problem-based learning (PBL) in secondary education (Wee, Alexandria, Kek, & Kelley, 2003) but little has been published about PBL in secondary schools. I believe that both the foundational concepts and the practical application of supply and

demand may be taught through principles of problem-based learning within a secondary-school environment.

These course materials are designed to cover a portion of a term or semester. They are not designed to be completely inclusive, nor inflexible. It is projected that students will run into additional problems as they adjust their plan for the school store. These problems will be addressed by the student group as needs arise. Also, as it is impossible to completely divorce public schools from traditional assessment methods, allowances must be made for grading and demonstration of learned knowledge. It is possible to have class-time divided between traditional instruction and this student-driven learning. Instructors who are uncomfortable with abandoning traditional methods may find this blended approach more accessible than a full problem-based class.

The materials I have created will include preliminary lessons designed to help familiarize students with terminology and topics included in supply-and-demand economics, and also guidelines on how an instructor may guide students through the problem of running an actual store. This two-fold approach should meet the demands of traditional instruction and practical application.

This project will include the following:

- Needs Assessment
- Goals and Objectives
- Audience Analysis
- PBL and Economics
- Suggestions and Ideas
- Instructional Plan
- Resources
- Materials
- References

Needs Assessment

As noted by Johnston, James, Lye and McDonald (2000), "to learn economics successfully, students need to have ability in both abstract thinking and in application. They also need to be able to express complex ideas logically and fluently " (p. 13). Public education fails in almost of these areas. First, terminology it taught separate from application, and students fail to connect the new vocabulary to real-world concepts. Also, many students in a traditional program do not get a chance to share ideas with other students. Expression is often limited to response in quizzes and tests, and therefore misconceptions may rarely be discovered until final assessments are made. Finally, abstract thinking may be limited due to the rote nature of traditional assessments. Because students traditionally receive little opportunity for expressing ideas, and even less opportunity for application, there is a need to change the way economics are taught to students.

Desired Performance

Students learning economics have national standards set for their education. The Council for Economic Education has outlined twenty standards students are expected to reach (2009). These are general concepts that students are need to understand and include price, trade, markets, profits, and money. These national standards are met by the student's ability to explain these concepts, but the ability to *demonstrate* these concepts would better fit the successful learning definition suggested by Johnson et al. Students can better demonstrate understanding through actual performance in a real scenario than on paper and through essays.

Current Performance

The current student performance varies greatly relative to both teacher and methods. Students are adequately instructed in terminology and rote knowledge. It is not well known if these skills transfer to performance. Students are proficient in explaining, but have no experience to back up this

knowledge with practical knowledge. Students' interest in the topic varies greatly, but frequently varies inversely with the amount of lecturing and rote knowledge. Students often report lectures on economics to be dry and uninteresting, although many do want to know what it's like to run a business and have their own money. There appears to be disconnects between instructional methods and the interest of the students. Because economics courses are generally electives, many students who take economics courses are self-selected and generally more interested, and in turn do fairly well in the course. However, by making the course more interesting and appealing, some students who are less likely to be interested may be persuaded to take the course and gaining a basic understanding of economics.

Goals and Objectives

My goal is to create the framework of a marketing or economics course which uses problem-based learning as a major component. This framework can stand alone, or be combined with traditional instruction as is preferred by the instructor. This plan is designed for a high-school setting, but may be useful with advanced middle-school students too. Another goal is to let the students experience real marketing and economic practices. This is done under the guidance of an instructor who will ensure appropriate practices.

Performance Objectives

1. The learner will demonstrate familiarity with the concepts and terms of supply and demand economics by the creation of a game. This will be done in small groups with all students being accountable through self and peer review.
2. Students will show marketing skills by "selling" these games to fellow classmates. Students must plan within their groups advertising strategies and the suggested price for their game.

They must determine the best way to either maximize sales or profits as these groups receive bonus points for their marketing.

3. Students will both review vocabulary and analyze product through a review of the games created by other students. A formalized review process will take place.

4. Students will analyze their group's success through discussion. This becomes iterative as student discussion will progress into a marketing discussion for the student-run store.

5. Finally, students will apply all they have learned by showing that a profit may be made in a school store. Groups will each be responsible for a different aspect of this store, and groups will rotate periodically. The nature of the store will be up to the students with adult supervision and guidance.

6. Students will show that adjustments within the economy can be made regularly by participation in "corporate" discussions. The class will need to decide periodically what changes need to be made to this store. Participation of the various groups will be required.

Audience Analysis

High school students are the target audience for this course, although this course may be used in some middle schools. Students generally range from ages 14-18 with both male and female students involved. Students self-select into the course, and often economics and marketing courses attract above-average achievers. All ability levels will need to be included into the plans, and special consideration may need to be available for students with learning disabilities or who have language barriers. Resistant learners may be present, and disruptions in the learning environment are always possible in a public-school setting. Both scheduling changes and student behavior may be potential obstacles to learning.

Strengths

Students of this age are generally inquisitive and willing to try new things. If allowed freedom and responsibility, most will rise to the challenge. Because this group is self-selected, interest is likely high. Teens are interested in buying and selling, and this lends well to the subject matter. Many students are also very social, and group-work fits well into the interpersonal skills present in most students. Also, because parts of the assessments are related to participation and profit, a variety of students should be able to feel engaged and integral in the marketing process.

Weaknesses

Many of the concepts learned will be new to the students. This may lead to confusion in learners, especially slower learners and those easily frustrated with different challenges. This learning group is so varied that it will be hard to allow equal engagement for all students. This group will bring preferences, likes and dislikes, personality challenges and abilities with them. While the group will be engaged in real-world activities for the second part of the course, there may be resistance to the preparatory activities contained in the first part. Also, the full-range of logic is not developed (Steinberg 2005). Because real money may be involved, special care must be taken to prevent poor choices and dishonesty. Accountability must be a part of this experience.

PBL and Economics

Problem based learning is not a fixed thing. There are many definitions and proscriptions, and every learning specialist defines it differently. With that noted, there are several facets common with all definitions of PBL. While all of these may not be present within this course, this does approach a PBL format for a public school setting. Each of these points will be examined as it relates to the proposed supply and demand course.

A summary of the main principles of PBL is outlined by Savery (2006). It can be summarized as:

- Students are responsible for their own learning.
- An ill-structured problem must allow for free inquiry.
- Learning must be integrated across disciplines.
- Collaboration is essential.
- The learning process must be iterative.
- Post-learning analysis is required.
- Self and peer assessment should be present.
- Real-world activities are required.
- Both knowledge and process must be assessed.
- PBL must be the basis of the learning and not an accessory.

This course involves several ill-defined problems, and each take place in a different stage of the course. One problem is given at a time, but with foreknowledge of what will be happening in the latter part of the class. In the early stages, the instructor administers the tasks to be completed, but does not need to give direct instruction. However, an instructor may choose a hybrid course as a mixture between direct instruction and PBL, and so how well this fits the PBL definition depends on the preferences of the teacher.

Other features which strongly reflect problem based learning include collaboration and iterative learning. Both of these are part of the course. There is also integration between multiple disciplines out of necessity; students will need to report, advertise, track money, and communicate. Assessment and analysis are a large part of this course, and the activities are most definitely real-world based.

There are discrepancies between this course as outlined and a pure PBL course. First, there is the option that the course is hybridized. This allowance is included because national standards must be met, and some instructors cannot anticipate how to teach the required vocabulary without direct instruction. There are ways around this, but in a public-school setting, having the option available is comforting. Also, it is difficult to determine the efficacy of the assessments. The ability to make a

profit is definitely testing the process and not just the knowledge. The trouble is how to make those assessments meaningful to the students. Self-analysis is always a possibility for determining learning, but students are not always fair or accurate in self assessment, even in adults (Tousignant & DesMarchais 2002). Assessments will likely be a blend between traditional and the assessments more commonly aligned with PBL.

Suggestions and Ideas

This course is not complete. It can be modified in numerous ways, and the assessments are lacking completeness. In the future, more specific assessments should be developed. It is also likely that unforeseen problems will arise in this course. It is expected that both students and instructors may need to change practices as experience grows. All of this can be used as part of the learning process.

Variations of this course may apply to other fields. The first part of the course which involves game creation could just as easily be applied to a history, science, or even a math course. The topics of marketing and economics could also be applied to those fields in various ways. Application specific would be determined by the instructor.

Courses such as this should be made available online and with other instructors. As I am a believer in hybridization between traditional and more unusual teaching techniques, I would like to see PBL principles adopted within regular settings. I believe that traditional classrooms are enhanced with newer techniques that students respond to better.

Instructional Plan

Finance: Supply and Demand
Problem/Project-based Course Concept

Goal: Students should gain a rudimentary understanding of supply and demand economics by creating a game about economics, and then by "selling" that game to fellow classmates.

Overview: This is a six-part course. As presented, this may be a complete course, or additional activities or instruction may be added between each section, or in conjunction with each section.

1. In the first part, pairs of students will be given the problem of creating a game that teaches supply and demand. The students will not be given prior information about the principles of supply and demand, but they will have time and resources to discover the topic for themselves. Before beginning, a list of resources (partial list attached) and a specific rubric for grading (attached) should be provided.
2. In part two, each pair will be responsible for marketing their game to the other students. Each pair will need to both sell their own game, and they will likewise need to purchase at least two other games to play at a later date. The more games purchased may equate to more points later. Pairs will have a limited amount of faux money to spend on purchasing the games of others. The pairs will be able to set and change their own prices, and teams will be awarded points based on sales. These points will be a bonus applied toward their grade, plus extra for which team makes the most money.
3. In part three, each team will spend a day playing the games purchased. The students should be encouraged to play as many as possible. This will allow for a more fair and comprehensive analysis. The students will be asked to individually rate the games they have

played. Each will use a rubric (attached), but will be able to use much individual judgment in the critique.

4. In part four, students will read the reviews of their group, discuss the findings with other classmates, and discuss what they learned within their small groups. Students should know by this time that they will be marketing to the entire school in a short amount of time. Then students will engage in a large group discussion on marketing, supply, and demand, considering how best to market items to a teen audience.
5. The main part of the class will involve opening a school store. Students will need to purchase initial supplies with a "loan" from the instructor. The students must earn back the money for the initial loan, and then show a profit from the store. Each day, accounting must be made and plans for the store updated regularly. What is sold within the store is determined by the students, with instructor approval required. Groups may choose to divide labor between purchasing, advertisement, management, sales, and research, but students may decide to rotate these groups.
6. Finally, as the semester or term ends, final reflection and assessment needs to be accomplished. Traditional assessments may be employed, but reflection in the form of an essay, blog, or alternate method should be present. Students will need to demonstrate what was learned throughout this course.

Team grading in parts 1-3 will consist of completion of the game, quality of the game, game sales, and number of other games reviewed. Parts 4 and 6 will be assessed through participation and reflection tools (such as essays or surveys), and part 5 will be assessed through participation, effort, and whether the business made a profit.

Performance Objectives:

1. Students will research supply and demand and use that information to create a game.
2. Students will market the game to classmates
3. Students will evaluate others' games.
4. Students will reflect on their experience in a discussion format
5. Students will use the experience to plan for upcoming marketing opportunities.
6. Students will create a successful store.
7. Students will be able to summarize their experiences.

Resources:

Texts, including in-class and library materials are available.

Web resources are available, including:

http://www.investopedia.com/university/economics/economics3.asp

http://www.netmba.com/econ/micro/supply-demand/

http://ingrimayne.com/econ/DemandSupply/Demand1.html

Videos are available, including

http://www.youtube.com/watch?v=f36Ia7ouE04

http://www.youtube.com/watch?v=Yr8LrZxjsw0

http://www.youtube.com/watch?v=IIV7Nqr4TmY

Games and tutorials are available, including

http://hadm.sph.sc.edu/Courses/ECON/SD/SD.html

http://www.primarygames.com/socstudies/lemonade/start.htm

http://www.mcwdn.org/ECONOMICS/SupDemand.html

Initial money, which may be taken from class fees, will need to be acquired. As students decide what they will sell, catalogs and websites can be found. Because these students will be working in groups, it is likely that students will only need minimal instruction on using the web, but specific searches, especially for discount or wholesale goods may need to be sought. Also, security devices such as cameras may be a wise idea.

Materials

Game_____ Team Member _____

Team Member _____

Grading Rubric

Completion of the Game

Game completed (up to 40 points)

All parts present, on time _____/20

Clearly teaches about topic _____/10

Instructions clear _____/10

Duplicate copies created (up to 10 points)

Parts present, on time _____/5

Quality similar to original _____/5

Quality of the Game (as scored by peer review)

Fun _____/10

Educational _____/10

Appearance/Appeal _____/10

Game Sales

Total number of games sold _____

Total amount of money made _____
(Attach money)

Games Reviewed _____
(attach review form for each game)

Rate the Game

Name _____ Name _____

Name of game being rated: _____

What made you buy this game? _____

_____

What parts of supply and demand were taught in this game? _____

_____

_____

What did you learn about supply and demand that was missing from the game?

_____

_____

On a scale of 1-10 (10 being best) how effective was this game at teaching principles of supply and demand to the player?

_____

What made this game fun? _____

_____

On a scale of 1-10 (10 being best) how fun was this game?

_____

Describe the overall appearance of the game. _____

_____

On a scale of 1-10 (10 being best) how appealing is the look of this game?

_____

Please put additional comments on back.

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