Do-it-yourself Learning: 
Case Studies of Gaming as Education in Virtual Worlds

András Margitay-Becht 
Dana R. Herrera

Abstract
Fun is learning; this radical approach to education incorporates students’ extracurricular computer and videogame play as the gateway for exploring anthropological and economic theory in higher education. Our initial assumption was that students with thorough experience in multiplayer games have much easier time understanding the basics of micro- and macroeconomics, anthropology and sociology. They do not only seem quicker to understand, but their learning is much more thorough, enabling them to perform better on tests and excel in student competitions. We designed a series of classes where we explored the potential for using engaging virtual realities as the means to address and convey social concepts and overcome educational challenges. Over the span of two winter semesters, we held a joint economics-anthropology class, a computer science class and a finance class, all utilizing virtual realities. This allowed for tying together real world institutions with their descriptive theoretical models, and theoretical models with the in-game equivalents of the real world institutions. Our conclusions will discuss how successfully the students were able to engage these goals, examine the implications of utilizing students’ extracurricular fun to inform teaching and discuss the viability of such a program in other environments.

Key Words: Education, Pedagogy, Ludology, Gaming, Anthropology, Economics.

1. New Challenges in Higher Education
Make Over the course of the past few decades, educators worldwide are experiencing a new wave of challenges in higher education. These challenges come in many form, but are usually centred on two things. One recurring issue seems to be that the set of basic skills freshmen have are changing. Previously unknown skills like typing, document editing and managing/searching large amounts of data are becoming more and more commonplace, as the necessary tools for these activities are becoming readily accessible. At the same time, a set of rudimentary skills educators take for granted are not always at the disposal of the students. Whereas issues of lexical nature would already be alarming, the ever deteriorating levels of
The other, maybe even greater issue with higher education seems to be that of motivation. Students are increasingly viewing colleges not as a source of knowledge, but as a necessary evil towards a better paying job. This shift in goals and attitudes drastically change both the tone of the education, and the potential outcomes.

According to our colleagues from various countries from around the globe, these phenomena seem to be global. Teachers from various parts of Europe, South Africa, Australia, South America etc. are reporting the same. In this article we would like to introduce a method that revitalizes classrooms, increases student involvement and thus allows covering more material, deeper in depth.

2. The Roots of Challenges

It is our firm belief that there is no single cause for this new wave of challenges. We feel that the three dominant reasons are social changes, the ever-growing tendency of commercializing education, and the fact that the world is becoming more entertaining.

A. Social Changes

Probably the most noticeable change in higher education is the new mindset of the students. Historically education was a privilege, accessible only to a wealthy few. This privileged status made sure, that those who had the chance of taking part understood, or were expected to have a clear idea of what they want to do in life, what skills they need to learn to be able to do so, and understand the importance and the connection between the courses and their goals. Based on surveys conducted among our students and on our experiences as advisors we feel that today’s students have a deep understanding that “they need an education” in order to “make something of themselves”, but this need is not strongly connected to any particular field or direction they want to take.

With this change came the shift in the perceived role of institutions of higher education. The original role of colleges and universities was to convey information in the form of useful or needful skills and knowledge, and teaching a way of thinking. Lately this role deteriorates to that of a simple signalling mechanism: large multinational corporations hire the well-educated, but start by re-training them.

B. The Influence of the Market

In an earlier research, we expanded Jane Jacobs’ structures of ethics to explore the peculiarities of education. Jacobs’ system is based on contrasting the guardian ethics with the commercial ethics. The guardian ethics is centered on group formation, and focuses on the protection of the group, whereas the commercial ethic aims for efficiency. Our argument was
that since knowledge can be shared without losing it, what’s more, by sharing it knowledge can even expand, using the commercial ethic for education will lead to suboptimal results, since many of the costs the commercial ethics takes for granted do not even arise, while the immense benefit of learning-by-sharing is not taken into consideration. Similarly, the guardian ethic is also unsuitable for governing education, since the focus on avoiding dangers is not beneficial for sharing ideas or developing new research.

The result of applying commercial ethics to education in some cases lead to a kind of downward-competition of schools. Because of the above discussed drastic changes in the expectations of prospective students, it is in the best interest of universities to focus more and more on quantity instead of quality, getting large number of students and making them feel good instead of compelling them for hard work, since commercially that is feasible. This led to a situation when schools alone cannot develop higher requirements and more thorough education, since the multitude of competing schools offering the same degree with less work would put them out of business.

C. The Leisure-challenge

The last, but in our opinion greatest cause for the present day challenges in higher education is the drastic change in how we have fun. Traditionally fun, just as education, was originally more readily available to a privileged, upper class, not only because they had more time available for leisure activities, but also because traditional media of fun were hard to access. Technological progress slowly eroded these differences: books became cheaper, music became available for the public and movies appeared targeting the masses. With the advent of computer games and later the Internet, the availability of engaging, immersive fun activities greatly increased.

Basic economic theory explains that rational individuals make choices according to the cost-benefit principle, where costs include the full opportunity cost of a decision. Opportunity cost is defined as the value that must be forgone in order to undertake an activity, and since we saw that more and more fun activities are available to individuals, the cost of attending school greatly increases, even if the actual monetary costs remain the same.

3. Solution: Change the Focus in the Classroom

Whether explicitly realizing it or not, institutions of higher education have been dealing with the increasing opportunity cost using one of two approach. The traditional and easier way is targeting the cost of the activity to make it more “affordable” in the cost-benefit approach by lowering the other components of the overall costs to the students. While these approaches produce the intended result, making the given institution or program desirable, this approach has a serious drawback. In the face of reduced required effort, the overall gain from attending will also decrease;
the students will learn less. If they face lower financial costs, that will lead to budgetary constraints in the institution, usually leading to similar reduction in the benefit of education. Since various levels of education build on each other, the problems caused by this const-centric approach go beyond the individual, and it also causes cascading issues, lowering the potential attainable skill level of all subsequent layers. In essence, it escalates undergraduate level issues to a graduate level.

An alternative approach is not to reduce the cost, but increase the benefit of being part of a program. The most logical way of doing so is to focus on the issues which gave rise to the problem in the first place: the increased prevalence of leisure activities. These activities not only increase the opportunity cost of attending school, but also divert the attention of the students, so traditional education approaches have to fight this influence. Our suggestion is simple: since the students are immersed in these fun activities, they have great knowledge and intimate understanding of them, and can relate to them. If the classes are constructed in a fashion that embraces and focuses on these activities, the students can make their fun activities work for them, allowing them to teach themselves. Example courses could be “Musical calculus”, where the basics of function analysis could be discussed through an analysis of how music is created, performed, changed. Another sample course could be “Physics in sports”, where the basics like momentum could be discussed with relation to, say, playing tennis. A “Theatrical economics” course could discuss the roles of needs, wants and choices while preparing a theatrical performance.

![Figure 1: The Cost-Benefit Structure of Education](image)

It is our firm belief that re-structuring the introductory level courses around leisure activities would enable the students to understand the importance of a certain field, since the application of said field would be introduced to them in a familiar environment. This would not only lead to better performance and deeper understanding of the introductory material,
but would also help the students chose a profession or re-evaluate their chosen path in life, and would create enough interest in the field that would help internalize the more complex material presented during upper-division courses.

The introduction of this approach would provide some minor challenges for the institutions, as they would have to be ready to offer themed introductory courses for the students, but the instructors could (and should) use their own leisure activities and focus to develop the material, creating an enjoyable and immersive experience for all parties involved.

We find it important to stress that this approach is not suggested to replace the conventional goals of education. Many educators warned of the dangers of focusing on fun at the expense of covering the material, a practice that we ourselves try to fight. We are going to show, however, that internalizing the students’ interests can lead to a deeper, more thorough understanding of the classroom material, and also allows more complex issues to be tackled.

4. Changes in Games

Computer games (or as they are sometimes referred to, video games) started developing in the mid-1960s. Since then the genre experienced a spectacular boom, to what today is a multibillion dollar business. The games themselves have evolved: the first commercially successful game was the legendary PONG, a simple ping-pong simulator, while today’s games offer immersive and interactive artificial three-dimensional realities. New sub-genres sprung up merging computers as a technological platform, science fiction/fantasy as an art form and role playing as a leisure activity, first into the adventure games, then the so-called CRPGs (computer role-playing games). Parallel to these, the first networked virtual environments, the MUDs (multi-user dungeons) appeared, allowing participants for real-time social interaction while immersed in an alternate reality. The new trend in social gaming is the MMORPG (massively multiplayer on-line role-playing game) genre, with 3D environments, thousands of people being on-line at the same time, competing and cooperating to perform shared or conflicting goals. These games are so large in scale that they can create their own set of recreational activities that can keep millions entertained for years.

A. Are Computer Games Addictive?

Although the mainstream media frequently reports on the dangers of computer game addiction, professionals seem to agree that the phenomenon when individuals spend 2 or more hours a day playing various computer games is not an actual mental health disorder. According to Keith Barker, who runs Europe’s only clinic to treat gaming addicts:
These kids come in showing some kind of symptoms that are similar to other addictions and chemical dependencies, [...] but the more we work with these kids the less I believe we can tell this is addiction. [...] this is a social problem."

The latest report created by the American Medical Association on the issue discusses both some potential positive and some negative effects. The report concludes that there is no conclusive relationship between computer games and violence, and even the most extreme cases can’t be called addiction, instead the report uses the term “video game overuse”.

These reports seem to indicate, that video game overuse does not happen because of some kind of psychological deficit, but simply since they provide a preferable alternative to the physical world. The fact that long-time overusers of computer games frequently voluntarily quit playing citing “boredom” seems to underline this assumption.

B. Can this Immersion be utilized to teach?

The visionary Edward Castronova states, that the large-scale migration to the virtual worlds are caused by the simple fact that the physical reality, and their characteristic foci of power, the corporate and political systems are unable or unwilling to provide the quality of life and feeling of justice that virtual worlds can. The inevitable response of the population will be retreating into virtual existences. The authors suggest that this heightened level of “fun”, easier access and great immersion can turn MMORPGs into the ideal tool to teach students about the principles of social theory: anthropology, economics, political science and sociology.

C. Why not use Educational Games?

The cornerstone of our approach is to utilize the students’ pre-existing knowledge on their own leisure activity of choice to enhance the learning experience. If teaching a group of computer gamer students, we believe we can attain great results if we use the jargon and examples that are close to them. Using educational videogames can be productive at times, but they run the risk of not being fun enough. Edward Castronova cites the failure of his own educational MMORPG to the fact that the game was simply too boring. For this reason we decided to focus on recreational computer games and their utility in education.

5. Educational Experiment: Use recreational Games to teach

The motivation for us to start this project was simple: both of us used examples from computer games in our everyday classroom practices, and the students seemed to enjoy this approach. If it works as stand-alone examples, why should we not build an entire class around this idea?

MMORPGs are, because of their very nature, comprised of thousands, tens of thousands of people playing together, interacting with each other on a very high level. During these interactions they build a lot of social
constructs that parallel entities in the real world. A computer gamer is familiar with these constructs, uses or even forms them every day, but most of them fail to realize that these entities are shadows of physical-world institutions around them. Since most social sciences attempt to understand and explain these real-world social constructs, a lot of the theory, arguments and reasoning used in these fields can be applied to the virtual social constructs appearing in the synthetic worlds.

Figure 2: Using Virtual Worlds in the Education of Social Sciences

One great advantage of using MMORPGs for social modelling, simulation and education is the fact that they are closer to the actual physical world situations than most economic or social science model. The reason for this is simple: in order to simplify, most models start out by first simplifying humans and the humanoid decision making systems, usually expecting a near perfect mechanism uncharacteristic of humans. In the virtual worlds the decisions are made by real humans, with all the inherent flaws associated with it. Thus using virtual worlds in education we are not only teaching the students the theory of social sciences, but we can also pinpoint the failings of the introduced models, inspiring further thoughts and discussions.

Our experiments were planned to encompass three semesters: the forerunner was a joint anthropology-economics class in St. Mary’s College of California during the winter of 2008, then a follow-up course focusing on finance and production basics with a companion course in programming. The third attempt was a distance-education project with the Budapest University of Technology and Economics, which gave rise to the issues of the exportability of the method.

A. The Structure of the Courses

As stated above, we did not want to use the excuse of using virtual realities to reduce the workload on our students. For the four-week-long
winter semester we selected a healthy dose of economics and anthropology from introductory textbooks, covering half a semester’s worth of material in both fields. All students were required to use not one, but two virtual worlds. Popular choices were World of Warcraft or Second Life, and the then freshly released Hellgate: London (the producers of Hellgate, Flagship studios gave us gratis copies and free access to the game). As we were exploring the basics of anthropology and economics, the students identified the parallel institutions in both virtual worlds, which made it easier to connect their in-game experiences with real-life scenarios. All students were also required to lead an on-line journal that contained not only their assignments but also their in-game achievements. By the end of the semester members of the class engaged in shared virtual adventures, and the course also lead to the formation of a computer gaming club on campus. To spice things up, we had three invited lecturers, discussing the implications of running a gaming website and socializing on-line. The guest of honour was game designer legend Bill Roper, who discussed the behind-the-scenes processes involved in creating World of Warcraft and Hellgate: London.

B. Results
The goal for the course was twofold. On the one hand, we wanted to make the learning experience more pleasant for our students, on the other we wanted to create an environment where they learned things easier and more in depth than before.
To be able to measure improvement objectively, we prepared a detailed questionnaire about various topics in anthropology and economics. This survey then was given to the students at the very first and the very last class as well, and we analyzed how they performed. The improvement was great in both subjects. As we had students who studied anthropology and economics before we could also assess how those new to the subjects performed compared to those who were already familiar with the field, and we found that in both subjects, without exception, those who never studied the field performed better by the end of the semester, than those who already studied the field did at the beginning. We find this proof that our approach leads to deeper understanding than the traditional methods.
The raw data alone does not do justice to the improvement we witnessed. Students were always on time, they were attentive, and really pushed themselves to perform well. They turned in their large projects ahead of time to be able to do revisions on them, and their final papers clearly showed both their deep understanding of the topics discussed and a thorough mastery of the material. 10% of the students performed so well that we could send them to an undergraduate conference, where they got their own session to present their research. 17

C. Follow-up Course and Results

The following academic year one of the authors held a similar class, this time focusing not on introductory economics but finance and production economics. Initially this task looked more challenging since the math involved in these fields is more complex, so the course became more academic in nature. In the new format the first week was devoted to introduction to calculus, the second week focused on finance, the third on production and we held student presentations on the fourth. The basic focus remained the same: the initial target of inquiry was always a phenomenon in a virtual world, and we introduced the theory in order to solve these virtual issues, following up with the connection to real-world scenarios.

The results were very similar to what we experienced a year before. Students who came in to the class with only a very rudimentary understanding of math were generating N→M functions and point-set mappings with relative ease by the end of the first week. Complex market mechanisms and optimal market behaviour was discussed by the end of the second week; knowledge that the students put to immediate good use in in-game situations. The complexities of the production mechanism could be illustrated using advanced math, and during the presentations at the end we witnessed some truly spectacular demonstrations. One student went so far,
that instead of the suggested PPT format he showed a small video, held an in-game speech and also prepared a small flash-game to demonstrate the economic and social effects of gold farming.

The course also had a companion class, a quarter-credit programming course. The challenge there was to take a handful of people, most of whom never written a single line of code in their life, and in 4 two-hour long sessions teach them to be able to produce software (a micro program, called add-on, to be run within World of Warcraft). All submissions surpassed our expectations, the programs ran without any errors, and some of them are actually being used by the gaming community.

6. Expansion: The Example of Hungary

Seeing the immense success and popularity of our classes, we decided to expand the program internationally. One of the authors has good connections to the Budapest University of Technology and Economics, so we planned to put together a similar course there. The offering would have been an introductory level economics course that would have been accepted as the mandatory introduction to economics course. The entire course would have been held within Second Life, a non-game virtual reality, and we would have explored the economics of this synthetic world alongside the class material.

During the planning phase of the project we were afraid that there would be problems getting the class through the institutional resistance. Much to our surprise we got full support from the department of Economics, and the class officially started. The surprise came from the demand side: out of two thousand potential students only four chose to take the virtual class, and none of them ever showed up or even responded to our e-mails inquiring their whereabouts.

In an attempt to find out what could be the reason for this, we created a questionnaire that asked people their predisposition about education in virtual worlds. This questionnaire, alongside with an interview with one of the authors, was posted on a prominent Hungarian World of Warcraft website. Much to our surprise we found, that even those actively engaging in WoW, who spend most of their leisure time in that virtual reality, were very negative or at times even openly hostile towards taking classes based on their game of choice. So while Americans welcomed the opportunity to combine the pleasant with the useful, the Hungarians seem to resist putting all their hard-earned knowledge of a non-existent world to actual use.

7. Conclusions

Based on empirical evidence we found, that it is possible and extremely beneficial to construct introductory courses around a topic students are familiar with and enthusiastic about. This approach leads to not only a more pleasant classroom experience, but also enhanced learning outcomes for the students. The only requirement seems to be the willingness of the students to take part in a program like this, then many of the motivational and
performance issues that plague higher education these days can be circumvented.

Notes


2 Read the testimonials of our co-authors in the anthology C Nygaard and C Holtham (eds), Understanding Learning-centered Higher Education, Copenhagen Business School Press, Copenhagen, 2008.

3 At the beginning of each class, we like to present our students with an extensive survey assessing their background, interests, skills and goals to help tailor classroom experience to their needs. These surveys are anonymous, since we find it is more important that they feel free to honestly tell us what they like to do and what their focus is, than being able to connect this information with the individual.


5 This process can also be seen in tourism: from something unheard of it developed to be the de-facto recreation and recuperation activity, something that is not only desired or accessible, but even morally required for “properly” having rest. See V L Smith, Hosts and Guests: The Anthropology of Tourism, University of Pennsylvania Press, Philadelphia, 1989, pp22-23 or E. Chambers, Native Tours: The Anthropology of Travel and Tourism, Waveland Press, Long Grove, 2000.

6 This technological challenge is older than most would believe. Already in 1973, Richard Simms, Harold Sunderman, Reginald Hinley and Dale Young warned, that “... students have grown up in an audio-visual world in which youngsters watch television for countless thousands of hours”, a practice that both makes them more informed, and expect more of schools. R Simms, H Sunderman, R Hinley, D Young ‘Making School Fun Again’ Theory into Practice, Vol. 12(4), Oct., 1973, pp. 238-241.

7 Definition from R H Frank and B S Bernanke, Principles of Microeconomics, McGraw-Hill Irwin, New York, 2009, but similar definitions can be found in most introductory economics textbooks.
Technically speaking the availability of more recreational activities does not mean that they are actually of higher value to the individuals engaging in them, so the correct statement should be that the cost of attending school is non-decreasing. However, if the newer recreational activities were of lesser value than older ones, nobody would engage in them, instead they would spend time doing what was available before. So the fact that the newer forms of recreation (blogging, tweeting, playing computer games, etc) are steadily spreading show, that these activities are indeed higher value activities for the individuals, who, in turn, perceive an increase in the cost of school attendance.

An example for such opposition can be found in E Daasstol and C Jango ‘One Person’s Opinion: Should School Be Fun?’ The English Journal, Vol. 84(2), February 1995, pp 15-16

R H Baer, Videogames in the Beginning, Rolenta Press, New Jersey, 2005

According to a report released by the PC Gaming Alliance, a nonprofit corporation dedicated to driving the worldwide growth of PC gaming states, that the PC gaming market alone grew nearly 20%, by 1.9 billion dollars in 2008. Original press release can be found at: <http://www.pcgamingalliance.org/imwp/download.asp?ContentID=15911>.

The largest western MMORPG, the four-year-old World of Warcraft, reached 11.5 million active subscribers before the Christmas of 2008. Official press release was accessed on June 4th, 2009, and can be found at: <http://www.blizzard.com/us/press/081121.html>.


András Margitay-Becht and Dana R. Herrera


Bibliography


Baer R. H., Videogames in the Beginning, Rolenta Press, New Jersey, 2005


