

Integrating Learning and Fun
Expanding the Educational Game Genre
By
Matthew Perrett

Learning is a vital part of human life. Intelligence and learning are among the multitude of differences that separate humans from other animals, and many would argue that they are the most important. Regardless, learning has a large place in our society and culture; most of us spend at least 17 years in formal education, if not more, learning what we need to know to earn a living and deal with the real world. The skills one possesses are a part of one's identity, which can be observed any time someone responds to the question of what they do for a living, and a great deal of time and effort go into learning and perfecting those skills. Some learning is an enjoyable experience, be it a desire to know more about an interesting subject or a burning passion to know everything about it. Much of this voluntary learning is focused on hobbies or subjects not explored in school, but many people choose their majors in college based on what fascinates them the most.

Sometimes, however, learning can feel like an enormous chore, especially during formal education. A large number of skills are important or necessary in daily life, and not every student is interested in learning calculus or reading the works of Shakespeare. For them, learning about a subject they dislike is nothing more than a lot of hard work, and encouraging them to learn things that are not required for class is difficult. Regardless of their level of interest, the material must still be learned to receive a passing grade, forcing the unhappy students to learn and remember what they have to know. To remedy the problem of learning unpleasant or difficult material, people have developed different methods to make learning the subject matter easier or more enjoyable. One way to make learning more fun involves using educational games, programs that try to teach a subject in a gaming environment, which are designed and programmed by companies in the game industry.

The purpose of this paper is to examine how one would go about making educational games something everyone could enjoy. To do so, I looked at what current educational games are like and how they are regarded. I bring up the point that not all game players are interested in educational games, due to the fact that they are primarily designed and produced for young children. After discussing some research on the subject of educational games, I describe the work I have done on my own project, which is an untitled game about memory. My goal for the project was to make an educational game that was meant for older audiences, not for children, with advanced cognitive science material that is presented in a subtler manner than current educational games use. Though the game is not complete at this time, I believe that the portion that is available is a useful demonstration of what I set out to do. It also serves as a useful example of the point I wish to make, namely that the educational game genre can be reinvented and made to include not just one age group, but everyone.

Educational Games

The game industry is huge and still growing rapidly, already out-selling the movie industry.¹ Companies have created thousands of games, and many genres have sprung up to describe and categorize the many different game types and playing styles.² Games cover an incredibly wide range of tastes and preferences, from lightning-fast reflex oriented games like shooters and fighting games to slower-paced puzzle and adventure games that focus on story and character development. Educational games are a part of this mixture, and span a number of genres, but are a relatively minor aspect of the industry.³ The attention of educational gaming is directed primarily at children, and the purpose of these games is usually to help them learn

subjects such as math or reading skills in a way that is fun and different from a school environment. Also, parents use educational games as a good way to occupy the time of their children, one that combines learning and play in a wholesome and non-violent manner.

Currently, educational games, or “edutainment,” focus almost entirely on this age group. The games are designed with the tastes of kids in mind, often resulting in bizarre situations that have little or no relation to the real world. Only in an educational game would one have to solve math problems to find pieces of a spaceship or break down walls, and odds are good that one will never encounter a cowboy in an Old West saloon playing Go Fish in French.⁴ Because of this emphasis on learning basic skills and the sometimes thoroughly ridiculous situations these games revolve around, older gamers tend to scorn them as being “childish” or “corny,” and generally have no desire or reason to play such games. Besides being based on skills they have already learned, educational games are designed to be fun for children, not teenagers or adults, and are thus not the sort of thing a more mature gamer would find interesting.

I do not mean to say that all educational games are poorly done. On the contrary, many games are well designed and appealing to both children and adults. Also, people have conducted research on how to design games for children by looking at what kids do and do not like in their entertainment. For example, “Designing for Kids: Infusions of Life, Kisses of Death” by Carolyn Miller states that many educational games are too preachy. They focus exclusively on what adults think children need and want, without giving them what is actually interesting. Some games, however, such as Jump Start and Math Blaster, are a skillful mix of entertainment and education, and are good examples of well-done educational games. Similarly, not all edutainment is educational in the sense that not every game in the genre teaches math or reading. Electronics Boutique’s edutainment page on their website lists many games, few of which make

any mention of education in their descriptions.⁵ These games still serve a valuable function, as they allow children to explore and learn about the world in an interactive, non-violent setting.⁶ However, it is still true that all these educational games are designed and marketed with children in mind, and are not meant to appeal to older gamers.

I believe that educational games have the potential to be a useful learning tool for older audiences, as there are many more things that could be learned through such a medium than math, language or child development. However, these days most older gamers would never purchase or play a game that said it was educational because they know what to expect – a product that is designed for people much younger than themselves. The “educational software” label is a powerful deterrent that hampers progress in this area; the target audience is very tightly defined, and few others will look past the label, so attempts to broaden or improve the genre would likely go unnoticed.

Despite this, I am confident that it is possible. The presence of the label makes it very difficult to expand the focus of educational games beyond elementary school learning openly, but in my opinion a more subtle approach is what is needed. Someone who would ordinarily never play an educational game might purchase a game in which the subject matter was well integrated with the setting and gameplay, and did not possess the label that would otherwise influence the opinions and perceptions of the players. In theory, the player would both learn and have fun without ever knowing it was an educational game they were enjoying so much. Though my project does not entail creating a professional-quality game and marketing it, if I were to do so the game would not claim to be educational. With the educational label attached, the audience I am trying to reach would be less likely to give the game a chance, and I would not be able to prove that an educational game can be made that appeals to a broad range of people.⁷

Project Details

My project is an attempt to solve this problem. By making an entertaining and educational game, I will prove that it can be done. To accomplish this, I have designed and created a role-playing game (RPG) that will, over the course of the game, teach the players about memory.⁸ I chose the RPG genre because I feel that it is the best one for the task of conveying advanced topics in cognitive science; RPGs place a strong emphasis on story and character development, so it is much easier to create a plot around a particular theme and make that the focal point of the game than it would be to do the same with a shooter game. Also, RPGs revolve around the situations the characters find themselves in, and the actions of the characters can serve as excellent real-world examples of information and show practical applications of knowledge. The genre suited my needs perfectly, and gave me the necessary tools to make a game so well integrated with the material that it looks and plays like a standard RPG, instead of standing out as an obvious educational game.

An RPG is a game about the story of a hero and his adventures in the world he inhabits. This adventure is typically a quest to defeat a powerful evil and save the world, though the specifics of the adventure vary from game to game. The hero is not alone in this endeavor; over the course of the game, he meets a number of people who join him on his quest and fight at his side. The player takes the role of the hero, controlling his movement on the screen and actions in battle as he wanders the world. Dialogue is important, as the player learns what he needs to know about the characters, story and quest by talking to people. The most important information is conveyed through what are called scenes, which are pre-scripted events and dialogue that

occur when the player fulfills specific conditions, such as when he moves the hero to a certain place at a particular point in the game. The scenes move the story forward by introducing conflict and character development, presenting plot twists, or by means of any number of other literary devices. RPGs are often described as interactive books because the players are playing through a pre-determined plot, much like one reads a novel. RPGs are slowly becoming more interactive and flexible, offering players more choice over the paths the hero takes, but many of the classic RPGs are very linear and only have one path to take.

An important theme common to all RPGs is the idea of increasing strength. Unlike many other games, in RPGs the characters get stronger as they get closer to completing their quest. This rise in power is due to the experience they gain along the way, turning them from novice fighters to master warriors. The characters get stronger by earning experience points, which are gained by defeating enemies. Once a certain number of experience points are accumulated they achieve the next level of power, giving them increased physical abilities and granting them new skills. Random battles are a large part of an RPG, and are sometimes a nuisance, but they are necessary if the characters are going to be strong enough to deal with the tougher opponents later in the game.

According to the research I have done, my project fits in well with the current studies on learning. Margaret Matlin's Cognition states in the chapter on memory strategies and metacognition that using vivid imagery is a good way to remember material, as it concentrates more attention and mental resources on the task. When using imagery to remember information, it occupies both the phonological loop and the visuo-spatial sketchpad, thus making two sets of mental connections and two ways of remembering the material. James Bader's Elements of Learning examined the various components that aid learning, and many of them corresponded

well with my ideas. For example, a student needs to have enthusiasm for the subject for him to want to learn it, and it needs to be presented in an interesting and engaging manner, which my game does. To have the desire to learn, a student must enjoy studying the subject and gain pleasure from it; my game is meant to be an enjoyable experience, and the format is intended to make the material seem more interesting. The game makes the players curious as to what will happen in the story and how memory will come up next, and they are motivated to finish it so they can see how it all ties together in the end. Lastly, the players will not need encouragement to play the game; they will take the initiative and play it without prompting.

One of the most important factors in learning is motivation. Without motivation, education becomes a tedious, frustrating enterprise in which learning is resisted at every turn. The primary advantage of using games in education is that games go hand in hand with motivation; in fact, they are designed with motivation in mind. Game designers have to make sure that the players are motivated to play through the entire game and finish it, and their work has to be captivating enough to keep them from losing interest along the way. By taking advantage of this fundamental design principle, games can be used to create a fun and relaxing learning environment. Marc Prensky, in his paper “The Motivation of Gameplay,” states that “relaxation enables learners to take things in more easily; motivation enables them to put forth effort without resentment.” So long as the game is well made, designed and appeals to the player, combining the intrinsic motivation to play a game with learning can boost the desire to learn and decrease the boredom associated with formal education.⁹

Using games in education has other noteworthy advantages. Games are interactive and keep the players engaged, getting them actively involved in what they are doing. This idea of active involvement is very important because much of what we learn comes from what we do,

rather than what we hear from others.¹⁰ Formal education is by nature passive involvement, and does not engage and motivate people in the same way that a game does, be it an educational game or not. Multiplayer and team-oriented games are excellent for developing teamwork and communication skills, and the virtual environment a game takes place in encourages curiosity and experimentation because the player can make mistakes without serious consequences. All of these qualities are important to learning, and for the most part formal education does not make use of them.¹¹

Some academics have conducted research on what makes a game fun and how to use games as educational tools. In a study similar to my own work in this paper, a group of professors at the University of Natal looked at the aspects of various games that their volunteers found fun and used that information to make an educational game of their own.¹² The volunteers played four different games and rated them according to a number of factors, such as how fun they were and how much skill was required to play them. Next, they designed an adventure game that focused on the material covered in the Environmental Biology 1 class, and had students taking the class play the game. They tested the students on their knowledge of the material before and after playing, and asked them what their motivation was to play the game. Overall, students performed better on the test after playing the game, and 80% felt intrinsically motivated to play the game; in other words, they wanted to play the game because it was fun and they were interested in the topic, not just because it was a course requirement.

The game I created differs substantially from the current educational game genre. No one has used the RPG format for this sort of game, and my game is designed with older, more mature players in mind. Also, my ideas emphasize a different kind of learning than what is presented in educational games. The focus of most educational games is remedial learning,

helping people who are having trouble with a particular subject. Regardless of whether or not an educational game tries to spark interest in the subject it teaches, its primary purpose is to help the players understand the material that was giving them trouble. My game is designed for casual, voluntary learning – learning for the sake of learning. It is intended to increase the player's interest in memory and make him want to know more, not help a cognitive science student understand his coursework better. While it may also succeed at helping a student do better in a class that deals with memory, this is not the primary goal of the game.

Some games are educational in a way that is not remedial, though this is typically unintentional or meant as a reference material. For example, it could be said that Sim City is educational because the players learn about city planning - where to place different types of buildings for the best effect, how to manage money and deal with disasters, etc.¹³ However, the purpose of the game is to make and run a city for fun, not apply that knowledge and experience to the real world. Another game with educational content on the sidelines is Civilization, in which the player picks a civilization in history and tries to make it the preeminent nation in the world.¹⁴ Civilization features an extensive database of information about the different civilizations, buildings, units and scientific discoveries, and should the players take the time to read through it they could learn quite a bit. Despite the presence of educational material in games of this type, there is no guarantee that the players will notice or take the time to learn from them. Also, all games involve some learning, though most of it comes from learning how to use the controls properly and function in the game's environment. My game is intentionally educational because the material I present relates to the real world and not just the game world, and because the players are certain to encounter the material while playing.

One objection to the views stated in this paper is that the nature of games conflicts with the ability to learn from them. If someone plays a game that teaches something and has a science fiction or fantasy setting, how can the player know if the educational material they encounter is true, or if the game designers simply made it up? Though this appears to be a valid concern, examining the way people learn and look at the world easily dismisses it. We are constantly comparing what we experience to our knowledge of the world, so as to see how well the things we have learned correspond to how things really are. Even when playing a game, this process does not stop. When dealing with a fantasy setting, we suspend disbelief over many things, but we do not at any point believe that magic, elves and dwarves really exist. When reading science fiction, we use our knowledge of science and technology to wonder how likely or possible a device is. A game can be fun without being realistic, but we acknowledge that lack of realism all the same.¹⁵

My project also differs from educational games in its style of learning and amount of content. Many educational games are essentially drills in a game format; they are not teaching the player new things so much as they are helping them practice what they already know. My game's purpose is to teach players new things about memory, as opposed to testing them on knowledge they already possess. Because educational games are, as the name suggests, educational first and fun second, they can present a great deal more material than a game in which the educational aspect is less apparent. Nearly everything in an educational game relates to the subject it is based around, and the learning is obvious and omnipresent because there is no reason to disguise it. My game is able to present relatively little information by comparison because of the need to make it seem like any other game. As a result, what the players learn from playing the game is closer to a brief introduction to memory, but since the purpose was to

make them interested in the subject this is not a large problem. If this type of game gained a reputation for being fun and high quality and grew in popularity, it might be possible to increase the amount of content because people might buy the games with the educational aspect in mind.

The Game

The players learn about memory through certain scenes in the game, during which it is brought up in the dialogue between the various characters. When memory does come up, it is typically the focus of the discussion and appears in a diverse number of forms, such as plot progression, comic relief or simply an interesting fact. In most educational games, the educational content is immediately apparent from the beginning, be it from the title of the game, the art on the packaging or the game itself. In my game, the educational aspect is worked into the game's story, and thus is an important part of the overall whole. Memory is the central issue of the story, as the characters are on a quest to restore the lost memories of the hero's father, and in the process both the characters and the players learn a great deal about memory.

Like in any good story, however, time is spent in the game getting to know the characters. We want to know what motivates them to continue their quest, and what happened in their pasts that made them the way they are. Without this important character development, it is much harder to identify with them, which in turn makes it more difficult to become interested in them and their story. My goal for this project was not only to make a game that was educational, but that also had an interesting and engaging story. To do this, I needed characters that were deep and intriguing – people the players would want to know more about – rather than shallow

stereotypes. They are important to the story, because through their actions and words the players experience the entire tale.

Because of the need to take all these things into consideration, in order to make the game not only educational but good and entertaining as well, the game can initially be confusing from an academic standpoint. The educational discussions are not the first thing one encounters when one starts playing, and do take some time to find. I could have made the educational part of the game be the first thing the players encounter, but this would have made for a weaker and less interesting story. I chose to postpone the material on memory to give the players time to explore the setting and get to know the characters better in the hope that they will be more interested in what happens later on. Also, the brief introduction shows the players what life was like before the troubles began, instead of thrusting them into a story they know nothing about.

The story begins early in the morning, with the hero, Geol, just waking up. After picking up and putting on his equipment, he walks out of his room and into the living room, where his father, Dienrick, is waiting for him. Dienrick is training Geol in his sword style, the Terra Sword, so that Geol can follow in his footsteps as a warrior and protector of Tenia, the small farming village they live in. The two spar for a while, and when they finish Geol heads outside to meet his best friend Maesris. Maesris greets him, then mentions that his father, Ydrian, asked him to go to the nearby cave to find herbs for him. Geol agrees to accompany him, at which point the two leave Tenia for the cave. Before leaving town, the player can also talk to Geol's mother and sister, Karen and Janet, Ydrian, and the other villagers for more information about what life in Tenia is like. Doing so is not vital to the story, but it does help the player understand the situation better and get involved with the characters.

Upon entering the cave, the players are treated to a humorous scene in which Geol and Maesris talk about the possible dangers inside. During the conversation, a monster creeps up around the corner and prepares to attack the young heroes. Unaware of the creature's presence, Geol boasts to Maesris about his fighting prowess, which scares the monster off before they even know it is there. Once the conversation ends, the players can choose to explore the cave fully or head right to the area objective of locating the special herb. Finding the other herbs will later be rewarded with items that will prove useful in the upcoming conflicts, but are not essential. Examining the special herb in the northeast part of the cave triggers the next scene, where Geol and Maesris discuss their find. Unfortunately for them, the monster seen earlier comes out of hiding and sneaks up behind Geol, who is not paying attention to his surroundings. A quick warning from Maesris gets him to turn around, and a fight breaks out seconds later. The battle is not especially difficult, as the creature is easily subdued by a combination of Geol's Feint and Maesris's Fire, but it can hit hard if given the chance. When the fight is over, Geol and Maesris quickly grab the herb and leave, fearing another encounter like the last one.

Returning to Tenia, the player can choose to heal up, either at the inn to the right of the entrance or at Geol's home, buy items at Bernie's Equipment Depot to the left, or continue advancing the plot. When ready, Geol and Maesris go back to Maesris's home and deliver the herbs to Ydrian, who tells them to wait in the main room while he examines the special herb they found. While waiting, the two wonder if the herb might be able to solve Ydrian's problem, something that comes up if the players choose to talk to Ydrian before leaving for the cave. However, their speculations are cut short by trolls, who rush inside and suddenly attack. After defeating the monsters, Ydrian comes out of his room to find out what is happening, and the group hears the sounds of clashing weapons. Ydrian gives the heroes their reward for bringing

back the herbs, and they hurry outside to deal with the threat. The villagers are terrified, but no enemies are seen, so Geol and Maesris make their way to Geol's home.

Approaching the house triggers another scene, in which two members of the Hell Knights, Sydon and Zald, accost the characters. The Hell Knights is an order of warriors who believe in gaining any possible advantage in a fight, and is the organization that Geol and his companions are struggling against in the story. They are not above using sneaky and dishonorable tactics, and they invented many of the techniques Geol knows. The two antagonists bicker back and forth, while also explaining that they are here for Dienrick, who was once a Hell Knight but left the order. They refuse to tell Geol precisely what they want Dienrick for, as well as denying him passage, so a battle begins. Sydon is a mage with strong magic, and Zald is a powerful warrior, so their team is very similar to the one the players control. However, they are easily beaten by putting one or both of them to sleep with Geol's Knock-Out Blow and then using Maesris's spells to deal damage, as magic will not wake them up. Alternatively, blinding Zald will cause him to miss much more often and make him a less effective opponent. After defeating them, Sydon and Zald run away, clearing the way to the house.

Geol and Maesris enter to find Dienrick weak and beaten at the hands of a man he calls Xander, the Hell Knight in charge of capturing Dienrick. Xander notices the arrival of the characters when Geol speaks up, and has his monster minions surround and trap the heroes. Informing them that his purpose here was to get Dienrick back in the Hell Knights willingly, Xander erases Dienrick's memory so that he will not remember leaving the order and becoming good. He then says that he has no intention of leaving Dienrick's family alive to cause trouble later, and taunts Geol's mother, with threats of imminent death. At this point, Ydrian bursts into the room and attacks Xander with magical fire, which severely weakens Xander but does not kill

him. Xander retaliates with magic of his own and mortally wounds Ydrian, who limps outside. Knowing that he is too weak to complete his task, Xander teleports away and has his minions attack the heroes. Once Xander's monsters are beaten, Geol hurries over to check on his family, while Maesris rushes outside to help his father. Geol follows after making sure that his family is not hurt, only to find that Ydrian has already died.

Here the players can choose whether or not to comfort Maesris about his loss, which is one of many similar choices in the game. Treating Maesris badly may cause him to abandon Geol's quest and become his enemy, and gives the players some measure of control over the fate of certain characters. After making a choice and engaging in one of two discussions, Geol leaves to give Maesris some time alone. Going back inside, Geol moves to check on his father, who responds to his son's inquiry with a sudden attack that Geol barely avoids. Dienrick has returned to consciousness, but does not remember anything about his family or who he is. Geol quickly talks Dienrick into staying and letting them take care of him while he recovers from his physical and mental wounds, and Dienrick leaves the room to rest. Karen tearfully mourns the loss of her husband as she knew him, but Geol promises to do everything in his power to help his father regain his memories. Maesris returns, and having overheard the conversation volunteers to accompany Geol on his quest. Geol accepts his friend's offer, and the next morning the two set out and begin their journey.

The next stop the heroes make is in Cerny, a town to the south of Tenia.¹⁶ There they find a sign next to a house, which reads "Home of Professor Drake, Academician of Mental Faculties." Curious as to what this means, and wondering if this person might be able to help them, Geol and Maesris go inside. There they meet Professor Drake, who is an expert on the sciences of the mind. After explaining their problem to Drake, he tells them that he does not

know how to cure Dienrick, seeing as how it was caused by magic. However, he takes this as a challenge, and offers to come with the characters and lend them his knowledge. They accept and Drake joins the party, though not as a fighting character like Geol and Maesris. Geol then asks Drake a question about his father's condition: supposedly Dienrick has lost all of his memory, but he is still able to talk, fight, and recognize objects. Drake informs him that there are three different types of memory – episodic, procedural and semantic – and because Dienrick is lacking his memory of people and events and nothing else, only his episodic memory is damaged.

This is where the prototype of the game currently ends, as I have not had the time to continue it further. However, much has happened in this brief introduction. The purpose of the game, that being to restore Dienrick's memory, has been established, and memory has been identified as an important topic in the story. The players have gotten to know the characters they control better, and learned about some of the history that made their lives the way they are now. Also, the players have learned that there are different kinds of memory, and this is information that many people do not know. Already the players have been taught something that is likely new and interesting, and with a little luck I will have instilled a desire to know more.

Memory retrieval is another important topic discussed in the game. One scene in particular explores the idea of state dependant retrieval, which says that if one learns something in a certain state, such as being drunk, one is more likely to remember it later if one is in that same state when trying to recall it. In this scene, the characters are in a bar, getting drunk and enjoying themselves. Overhearing a nearby conversation, they learn something very important about their next task, and are quite certain that they can remember what they learned later. The next day, however, the fact escapes them, and Drake jokingly tells them about state dependant retrieval. One of the characters immediately interjects, saying, "You mean all we have to do is

get smashed again? Hey, that's great! Time to go back to the bar!" The others, suffering from bad hangovers, reject that idea and try to remember the information some other way. Here, the players are given both the description of state dependant retrieval and an example of it in a humorous manner, and with luck they will remember it for some time to come.

The game tries to help the players improve their memories by discussing retrieval techniques, such as the method of loci, and by giving them a few subtle memory tests. The tests check the ability of the players to remember things about the game and what they have learned about memory, rewarding them with useful items to help them on their quest if they perform well. One such test occurs late in the game, near the final confrontation. One of the villains kidnaps everyone in Geol's hometown, and tells Geol that to save them he must distinguish the right people from the wrong ones when presented with a number of different people. An incorrect choice results in the death of the villager, but choosing correctly rewards the players with an item. The promise of a material reward may help motivate the players to do well on the tests, and having their choices affect who lives and dies can be powerful moral motivator as well.

Unfortunately, given the amount of time needed to complete the project, I did not have time to test the game's effectiveness as a learning tool. The people who helped me check the game for bugs and errors knew in advance what the purpose of the project was, so they would not work as a proper control group. Testing the game properly would be difficult, as hiding the educational aspect is part of the experiment, so asking volunteers to play it under certain conditions would let them know that it was not a normal game like I want people to believe. One method would involve uploading the game onto the Internet and letting people know about it, thus making it seem like any other amateur game. Anyone who was interested could play the game, and once they finished it they would be shown a web address to go to. This page would

have a questionnaire for them to fill out, which would then be sent to me. This method is still problematic, as there is no way to tell how many people would play and beat the game; players could lose interest at any point, or simply could not afford to take the time to finish it. Also, not everyone who did would want to answer the questions at the end, although it would at least prevent the players from finding out the true purpose of the game until after they were finished.

Another way to test my hypothesis would be to organize a group of beta-testers online or hire the services of a professional game testing company.¹⁷ A game tester's job is to explore every aspect of a game and find the errors and mistakes the programmers missed so that they can make corrections. As a result, they would see all of the educational material presented in the game, and would help to clean the game up and make it look more professional. After they finished examining and fixing the game, I could test them to see if their knowledge about memory increased. I could receive feedback about how well they thought the game would do and how effective my experiment was as well, and they would be much more likely to assist me in this way because I would be paying them.

However, this method does have its drawbacks, the most important of which is the monetary issue. A professional company would cost money to hire, most likely more than I could afford to spend. Online beta-testers might ask for a small repayment or none at all, but they would not do as expert a job as a company would. Finding qualified and skilled beta-testers willing to donate their time to my project might prove difficult, and they would make for a much smaller sample size than if I simply made the game available online. A combination of the two methods might work well, though, as I could have a large overall test group as well as a smaller group of skilled helpers.

Lastly, I could test the game using an experimental setting. Volunteers would play the game in a computer lab in one sitting, or on their own computers if the game was too long for that. Since RPGs are usually quite long, even a short one would likely take many hours, making the latter possibility the better one. While it would afford me less control over how the players viewed and played the game, trying to keep busy college students in a room for several hours while playing a game from start to completion might be difficult and potentially unpleasant for them. The point is that they are supposed to learn and have fun, and if they feel rushed then they may not have as much fun or pay as much attention to the educational material.

Testing the volunteers on their knowledge about memory before and after would show the level of improvement gained from playing the game, and would also give some indication of how effective the program was. Also, I could be fairly certain that they would provide me with feedback about the game and the experiment if I gave them a questionnaire to fill out after they finished, and volunteers would expect little or no payment for their services. The only major problem is that it would be difficult to test the label perception aspect of my research in this manner, as the volunteers would know they were participating in some form of research project beforehand. They would not necessarily know the purpose of the experiment, but the pre-game memory test and the game's theme of memory might make them aware of it. The true test of the game's effectiveness would require making a professional version, marketing and selling it as if it were any other commercially designed game, seeing how well it sells, and sending questionnaires to everyone who bought it asking what they thought of it. However, since that is far beyond my current means, it is not a viable alternative.

Education is an important and valuable resource, and it is unfortunate that so many people regard it as a chore and a bother instead of a privilege. Formal education does have both

good parts and bad, and not all of it is as enjoyable as we would prefer. As an avid gamer lover and a student who has learned many interesting things in and outside of the classroom, I believe that educational games similar to the one I described are an intriguing and plausible idea.

Learning is something that should be treasured and enjoyed, but sometimes we need a little push to get us motivated. I think it would be wonderful if eventually the reasons people chose and played a game included not only the quality of its graphics, gameplay and story, but also how much they could learn from it in the process. This paper is a small, though hopefully noteworthy contribution to that future, and to the improvement of both education and entertainment.

Bibliography

- Amory, Alan, Kevin Naicker, Jackie Vincent and Claudia Adams. "Computer Games as a Learning Resource." University of Natal, South Africa (www.nu.ac.za/nu). Online. www.und.ac.za/und/biology/staff/amory/edmedia98.html
- Banner, James M. and Harold C. Cannon. The Elements of Learning. New Haven: Yale University Press, 1999. Occidental College Net Library (<http://0-www.netlibrary.com.oasys.lib.oxy.edu/index.asp>). Online. http://0-www.netlibrary.com.oasys.lib.oxy.edu/ebook_info.asp?product_id=52896
- IDSA. "State of the Industry Report 2000-2001." Interactive Digital Software Association (www.idsa.com). Online. www.idsa.com/releases/SOTI2001.pdf
- Freeman, Tzvi. "Power to the Kids!" Gamasutra (www.gamasutra.com). September 29, 1997. Online. www.gamasutra.com/features/19970929/freeman_01.htm
- Kirriemuir, John. "The Relevance of Video Games and Gaming Consoles to the Higher and Further Education Learning Experience." The Joint Information Systems Committee (www.jisc.ac.uk). March 12, 2003. Online. www.jisc.ac.uk/uploaded_documents/tsw_02-01.rtf
- Krantz, Matthew. "Video Game College is 'Boot Camp' For Designers." USA Today (www.usatoday.com). December 3, 2002. Online. www.usatoday.com/money/media/2002-12-03-video_x.htm
- Lambert, Clayn and Shawn Rider. "Playing the Story: A Look at Narrative Game Genres." Narratech: Storytelling in the Digital Age (<http://www.class.uidaho.edu/narrative/index.htm>). Online. www.class.uidaho.edu/narrative/games/playing_the_story.htm
- Matlin, Margaret W. Cognition. 5th ed. Orlando: Harcourt, Inc., 2002.
- Miller, Carolyn. "Designing for Kids: Infusions of Life, Kisses of Death." Gamasutra (www.gamasutra.com). January 12, 2000. Online. www.gamasutra.com/features/20000112/kids_01.htm
- Pastore, Michael. "Video Game Industry Raises the Bar in 2001." Cyberatlas (<http://cyberatlas.internet.com>). February 12, 2002. Online. http://cyberatlas.internet.com/big_picture/applications/article/0,1323,1301_973421,00.html
- Prensky, Marc. "The Motivation of Gameplay." Marc Prensky.com (www.marcprensky.com/default.asp). 2002. Online. www.marcprensky.com/writing/Prensky%20-%20The%20Motivation%20of%20Gameplay-OTH%2010-1.pdf

Prensky, Marc. "What Kids Learn That's POSITIVE From Playing Video Games." Marc Prensky.com (www.marcprensky.com/default.asp). 2002. Online. www.marcprensky.com/writing/Prensky%20-%20What%20Kids%20Learn%20That's%20POSITIVE%20From%20Playing%20Video%20Games.pdf

Schank, Roger C. "What We Learn When We Learn By Doing." Cogprints (<http://cogprints.ecs.soton.ac.uk>). 1995. Online. http://cogprints.ecs.soton.ac.uk/archive/00000637/00/LearnbyDoing_Schank.html

Appendix

The game was programmed using a program titled RPG Maker 2000, translated from Japanese by Don Miguel and © 2000 ASCII Corporation and Yoji Ojima. The software comes with an existing database of images, animations and sounds, all of which belong to ASCII, though I am allowed to use them as I see fit. The time I spent working on the game was approximately 67 hours. 10 hours were needed to change the characters, monsters, spells, and abilities to suit my needs. The town of Tenia took a total of 42 hours: 4 to make the maps, 20 to set up the sprites and code the events, 12 to write, edit and insert the text into the events, and 6 to test the events for bugs and errors and make the corrections. The time estimates for Tenia also include time spent working on the Western Cave because the two areas are closely related; approximately 10 hours of Tenia's total were spent coding that area. My collaborator, Greg Uke, and I spent 8 hours on Cerny: 2 hours on the map, 6 hours to code the events, and 2 hours to test the area for bugs. An additional 1 hour was needed to make the world map, and another 6 hours were used to begin work on Tinabar's map and event scripting. Uke's contribution to the project was 2 hours on Cerny's map, 1 hour on the world map, and 3 on Tinabar's map, for a total of 6 hours.

Map work was done using RPG Maker 2000's built-in map editor. Using the tile set that game with the software, Uke and I placed grass, trees and designed houses, as well as the other aspects of the maps. For the event scripting I used the event editor. The various commands of the event editor let me display text, move sprites, make If/Then conditions, and track variables and switches, among other things.

¹ The total revenue of the video game industry in 2001 was \$9.4 billion, \$1 billion more than the movie industry. (Pastore, Krantz)

² See "Playing the Story: A Look at Narrative Game Genres" (www.class.uidaho.edu/narrative/games/playing_the_story.htm) by Lambert and Rider for additional information.

³ According to the IDSA State of the Industry Report 2000 – 2001, educational games earned \$365 million of the \$6.02 billion total for the year, approximately 6% of the industry's total revenue.

⁴ The saloon example comes from a game in the program Learn To Speak French: The Complete Interactive Course. © The Learning Company 1994-1996.

⁵ Electronics Boutique is a large chain that sells computer and video games, with a homepage at www.ebgames.com. A listing of educational games they sell can be accessed from the link "PC Education" on the main page, of which Edutainment is a subcategory. See Kids Click (www.kidsclick.com), a company based out of Texas, for a more extensive list of educational games.

⁶ Tzvi Freeman's "Power to the Kids!" (www.gamasutra.com/features/19970929/freeman_01.htm)

⁷ Unfortunately, I was not able to find a study that supported my claims in this section. I am certain that research has been done on this topic, but it escaped my notice.

⁸ Famous examples of RPGs include the Final Fantasy series by Squaresoft (www.squaresoft.com) and the Dragon Quest series by Enix (www.enix.com/home.html). There are eleven games in the Final Fantasy series, and eight Dragon Quest games.

⁹ Marc Prensky's "The Motivation of Gameplay" (www.marcprensky.com/writing/Prensky%20-%20The%20Motivation%20of%20Gameplay-OTH%2010-1.pdf)

¹⁰ Roger C. Schank's "What We Learn When We Learn By Doing" (http://cogprints.ecs.soton.ac.uk/archive/00000637/00/LearnbyDoing_Schank.html)

¹¹ John Kirriemuir's "The Relevance of Video Games and Gaming Consoles to the Higher and Further Education Learning Experience" (www.jisc.ac.uk/uploaded_documents/tsw_02-01.rtf)

¹² This study was performed by Alan Amory, Kevin Naicker, Jackie Vincent and Claudia Adams, and can be found at www.und.ac.za/und/biology/staff/amory/edmedia98.html.

¹³ © Maxis.

¹⁴ © MicroProse 1997.

¹⁵ See "What Kids Learn That's POSITIVE From Playing Video Games"

(www.marcprensky.com/writing/Prensky%20-%20What%20Kids%20Learn%20That's%20POSITIVE%20From%20Playing%20Video%20Games.pdf) by Marc Prensky for more information on this subject.

¹⁶ The credit for the world map and the map of Cerny goes to Greg Uke. He also began work on the map of Tinabar, which is not in the demo because it was not complete enough.

¹⁷ Beta Breakers (www.betabreakers.com) is one example of a professional game testing company that I found.