IPRO 329: Edutainment
Final Report

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I. Introduction

IPRO 329: Edutainment is an IPRO that invests its efforts into the education and entertainment of today's youth. This mission gives us our name with the combination of "Educate" and "Entertainment." The realization of these goals has come in the form of computer games. This semester we were able to complete the creation of the game called *Scholars of the Lost Exhibit.* This game is a supplemental learning tool for fourth graders. It introduces children to different topics in math and science subjects. We do not only create the game, we also user test it within local elementary schools. This user testing keeps us connected to our key demographic. We believe this semester has been especially productive for all of our groups within IPRO and we hope to continue this in the future.

II. Background

IPRO 329 has focus area of the need of educational games for fourth and fifth graders which will serve as supplements tools for the classroom, in helping the students in areas where they are having trouble. From statistics and observations, we see that sometimes students do not completely understand all the material that is being taught in the classroom within their specific subjects. This is why our team has decided to develop a game called *Scholar of the Lost Exhibit.* The team is solving this problem by using iterative design and development methods to enhance student retention of material learned in the classroom. In order to move the progress on the game, the development team will use Flash and Action Script 2.0 to program the game.

This particular IPRO had been very successful during its past four semesters. For instance, the team from Fall 2004 won an award from the Society of Technical Communications (STC) for their completion of *College Pursuit*, a computer game developed to teach high school students about college financial aid. Furthermore, this IPRO grew successful after its first game, *Credit Safe,* was published on the Illinois Secretary of State's web site. This game garnered an award from the same STC competition. In recent semesters, the games have been brought to local grammar schools and have been very popular. With the completion of the game this semester, IPRO 329 also entered *Scholars of the Lost Exhibit* to the STC, as well as the Independent Game Festival (IGF) Student Showcase, another competition that is being held this year. We are confident that *Scholars of the Lost Exhibit* will keep the tradition of the past semesters and win an award for our latest software.

III. Purpose

The purpose of IPRO 329 is simple, educate and entertain tomorrow's leaders simultaneously. There is a clear problem within the Illinois school system, children are not retaining the knowledge that their peers are in other regions of the United States. Illinois is ranked 32nd based on test statistics for states. This is an avoidable problem that IPRO 329 may be able to help. In past semesters we have tried to make a game that was at the level of fourth graders in the Chicago area. However this semester, we have decided to reach and challenge the students by putting in content that requires more cognitive ability. Currently, Vermont holds the best test scores in the country. Our Design team has worked tirelessly to research the curriculum of a typical fourth grader in Vermont. By putting in this challenging material we hope to motivate students to learn more.

We have also encountered and dealt with problems besides our general goal of educating and entertaining such as group functionality. We have found that it is difficult to work as one large group. Decisions were not easily made and communication was lost in the large group. To remedy this issue as well as increase our productivity, we decided to break up into four sub-teams:

- Management
- Design
- Development
- User Experience

This division is very similar to the business process used in the private sector and it produces results in a timely and efficient manner.

Along the same lines, each team had separate challenges and goals for the semester. The Management team was faced with the challenge of a grading, team communication, IPRO deliverables, and marketing. The challenge was to come up with a grading scale that was quantifiable, reasonable and fair to the student. This included developing new assessments instead of the previous peer evaluations. Management also needed to verify communications were going smoothly between and within groups. There were times when email was not enough and the management team needed to develop a way to overcome that obstacle. Management was in charge of all deliverables for IPRO, so it was especially important that members complete the deliverables while achieving their other goals. Finally, Management was responsible for the marketing of the IPRO. This required innovative ideas. In the past, we have done T-shirts and buttons, but this semester, we really needed to come up with new and exciting ideas. That innovation was found in the game itself. Management teamed up with the Design team members and created packaging for the game including CD Jewel cases, booklet inserts, etc.

During the course of the design, the design team was faced with several problems and challenges. Firstly, the prior class had designed the game in 2D however we decided that a 3D approach together with appealing graphics would be more appealing and interactive towards the user. Nowadays, with the advancement in gaming, appealing graphics are one of the key factors to the success of a game. We decided that we needed to design the game in with more appealing graphics especially graphics that would engage 4th graders. Secondly, we encountered the problem of adding sound into the game. This was difficult because we needed to find a voice resembling a robot and work on audio editing as well. As none of the designers had any prior audio editing experience, sourcing for sound and finally editing them became a major challenge.

One of the interesting challenges was that the design team wanted to create a CD package unlike most other CD cases. We chanced upon the discovery of JewelBoxing who specializes in small quantity production. Upon explaining our project to them, JewelBoxing was very generous in offering 50 jewel cases and templates for free. The templates allowed us to create our own design to fit the jewel cases provided. The result was an outstanding jewel case unique of its kind. We even placed nuts and bolts at the hinges of the jewel cases to make them resemble the nut and bolts needed when assembling a robot which closely resembled the goals of the game which was to collect and piece the stolen robot parts together. Coordination with the Development team was especially important to make sure that the teams were updated with each team's progress and also to minimize miscommunication.

The Development team was faced with the challenge of not only revising and completing the code that was inherited from the last semester, but also with developing additional games that hadn't been started by the previous development team. Several of the members had some familiarity with Flash, but only one had any significant experience. This posed an additional challenge. At the beginning of the semester the development team was able to divide the workload based on each developer's comfort level with programming Flash. Each member was given a specific section of the game to complete, and a framework was laid out so that each member's code would be compatible with the overall game. Throughout the development process each member of development team communicated their progress and made sure that other members of the team were getting the help they needed to finish the game.

The User Experience had the privilege of conducting the user tests of 14 children from Mark Sheridan Math and Science Academy Public School. This was done at the computer lab in IIT's Siegel Hall. An important element in this user test was that it was in a controlled environment in terms of technology because each user was using computers with similar software and specifications. This allowed the User Experience team to fully focus on the usability of the game instead of worrying about possible technical

difficulties. Therefore, the User Experience team was able to gather valuable comments and feedback about the game which will help the overall team to further improve on the game.

Although there were numerous challenges and issues within the IPRO this semester, the problems we encountered were not a detriment, as they might seem, but an asset because they challenged us to work together as a team in order to succeed. Through this adversity, we were able to not only accomplish our goals with flying colors, but also set our standards to a new level. We think that this semester's IPRO has made major strides in educating and entertaining today's youth.

IV. Research Methodology

There are a number of approaches to software development, each of which has a set of advantages and disadvantages associated with it. For our projects, we have chosen an approach that we call the ***Pipeline Process*** model and the ***Iterative Prototyping*** process model.

When using the *Pipeline Model*, the team follows three phases, each of which has particular tasks associated with them. The team can keep track of which level of development the problem is at and determine a plan of completion in an organized manner. Furthermore, these phases provide a great basic structure for problem solving because the phases make time for research, development, testing, and marketing. Within this model, the developers use the *Prototyping Model*. While using the *Prototyping* model, the developers will build a simplified version of the proposed system and present it to potential users for consideration as part of the development process. The users, in turn provide feedback to the designers and developers, who go back to refine the system to incorporate the additional information.

The ***Pipeline Model*** consists of the following phases:

- **Phase I -** Create, analyze, research, and select game ideas based on successful gaming criteria
- **Phase II -** Using aforementioned iterative methods, the game is brought from preliminary design to final development and then to user testing.
- **Phase III -** Through various outlets, the game is introduced to the public and any legal issues are resolved

This is the forth semester of implementation of this model, and it has undoubtedly proven to be imperative to IPRO 329's success. However, this method was put on a fast track due to the rapid approaching deadline date for submission to the competitions that the game was entered in this semester. As IPRO 329 continues to grow in size, this model provides one great advantage:

- Team members have a way to stay organized and know where each group (Development, Design, User Experience, and Management) is with the research, design, development, testing, and marketing of the project.

The ***Pipeline Model*** allows for even development and proper implementation of the *Prototyping Model.*

The ***Prototyping Model*** consists of the following looping steps:

- **Requirements Definition/Collection.** The information collected is usually limited to a subset of the complete system requirements.
- **Design.** Once the initial layer of requirements information is collected, or new information is gathered, it is rapidly integrated into a new or existing design so that it may be folded into the prototype.
- **Prototype Creation/Modification.** The information from the design is rapidly rolled into a prototype. This may mean the creation/modification of paper information, new coding, or modifications to existing coding.
- **User Testing.** The prototype is presented to possible users for review. Comments and suggestions are collected from the users and reported back to the team.
- **Prototype Refinement.** Information collected from the customer is digested and the prototype is refined. The developer revises the prototype to make it more effective and efficient.
- **System Implementation.** In the traditional model, the system is rewritten once requirements are understood. In the *Iterative Prototyping* process, the results of the tests are used to guide the changes to the system. As some parts or phases of the software are implemented, other parts are prototyped and tested.

The process model we use has proven successful to the needs of similar past projects of ours. There is one major benefit of this approach:

- Creation of the major user interfaces without any substantive coding in the background gives the users a “feel” for what the system will look like and uses their feedback to refine the system at a very early stage.

The iterative nature of development allows for parallel progress of several tasks – different system features are being designed, tested and implemented at the same time. As with the Pipeline Model, this process was hasted with the fast approaching due dates of the competitions. However, this model proved useful even at a faster pace.

V. Assignments

TASKS	SHOBY	KONRAD	MATT	DEBORAH	JOSEPH	MIKE M	KEITH	KURT	JAMES	MIKE S	YUN	ALMOND
Sub-Team Leaders		**X**	**X**	**X**								**X**
Project Plan		X	X	X								X
Meeting Minutes				X								
Mid-Term Report		X										
Website			X									
IPRO Day Poster				X		X						
Abstract		X		X								
Presentation Slides				X	X				X			
Presentation Content				X	X				X			
Final Report		X	X	X								X
CD-Rom		X		X								
Bi-Weekly Reports (Collecting)		X										
Storyboard							X	X	X			X
Programming	X		X		X	X				X	X	
User Testing			X		X	X	X	X	X			X
User Testing Analysis							X	X				X
T-Shirt Design											X	X
CD Book Design											X	X
CD Design											X	X
Sponsorship		X	X									X

VI. Obstacles

The biggest obstacle for the IPRO as a whole this semester has been the short time frame in which the software had to be completed. The semester started in late August and the teams didn't come together till the first weeks of September. However, with a deadline of October 14th for the STC competition and a deadline of November 14th for the IGF competition, the teams had a lot of work to do in order to complete the tasks on time. This was accomplished with good planning, great communication, and weekly meetings.

VII. Results

This semester our IPRO has accomplished much. Each sub-team has worked hard to produce results towards their goals. Overall, we were able to work through the rigorous schedule to complete the software title and market it to the extent of this semester. This could not have been possible without the help of each member and sub-team.

The Management team has accomplished practically all its goals. First, they devised a plan for marketing the game. They decided to research numerous sponsor companies and try to contact them with information about our game. In the end, they were able to get Jewelboxing INC to partially sponsor the software title. We hope that company will attend IPRO day or take interest in our game. Management team, with the help of the Development and Design team, also produced T-shirts and box covers with the intent to market the title. Next, Management team has created a new grading system. This grading system was based around various status meeting between the managers of each sub-team. Finally, Management completed quality deliverables in a timely manner. With only one person on the Management team this semester, the amount that was accomplished just shows the dedication, teamwork, and cohesion of this IPRO.

The Design team was delighted with the overall design and packaging that was produced. The design was able to attract the users and draw them into the game. The unique CD cases were an instant hit with the delighted children when they were each given a CD after their usability test. They were proud to own the covers and could not wait to show it to their families and friends.

The User Experience team gathered important suggestions and comments to allow further research into the game. The User Exp was able to gather that the children at the user tests enjoying playing the game very much and the replay value was high especially when the user was able to have a copy of the game.

The Development team knew at the beginning that completing the game in the given timeframe would be difficult. In the end, the team was able to complete and deliver a product that far exceeded the expectations at the beginning of the semester. While not every member produced an equal amount of code, every member of the development team put in a tremendous amount of work to get all of the games completed. Not only did the development team improve upon the code that the previous teams had developed, they also completed the additional games that needed to be finished. The final product produced by the IPRO was dependent on the ability of the development team to create the game that the design team had designed. The development was up to the challenge and created a professional grade game.

VIII. Recommendations

IPRO 329, Edutainment, attempts to entertain and educate children simultaneously. The team has been working on a game called the *Scholars of the Lost Exhibit* since the Fall semester of 2004. This is a computer game that is designed for fourth graders and teaches science and math in entertaining method, which will also be educational for the children.

By developing this game we hope to improve the education system. Through research we have seen that there are many problems with the material taught in elementary school. Illinois is ranked 32nd in a nation-wide ranking of schools. It is obvious that there are issues that need to be addressed. We are not positive that our game will be the difference in changing this statistic, but we will continue to educate, one game at a time.

In past semesters, the team members have been going into schools to perform user testing in different areas of Chicago and have been focusing on the utility of our game when in schools. In future semesters we will continue on this course of usability testing and this will enable us to continue to create educational and entertaining games for adults as well as children.

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X. Acknowledgements

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