Final Report

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II. Introduction

IPRO 329: Edutainment is an IPRO that invests all its efforts into the education and entertainment of today's youth. We derive our name by combining "Educate" and "Entertainment." The way in which we accomplish both these goals is through computer games. Currently, we are working a game called *Scholars of the Lost Exhibit.* This game is a supplemental learning tool for fourth graders. It introduces children to different topics in such subjects as math, science, social studies, and language arts. 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.

III. 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, *CreditSafe,* was published on the Illinois Secretary of State's web site. In addition, 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. Eventually, the IPRO plans to enter several additional competitions when enough work has been completed on *Scholars of the Lost Exhibit.* Overall, IPRO 329 holds high standards and has accomplished many goals.

IV. 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 in most intelligent states. This is an

avoidable problem. Our IPRO believes that our game may be able to help. In past semesters we tried to make a game that was at the level of fourth graders in our area. However this semester, we have decided to reach and challenge the students by putting in content that requires more cognitive ability. Currently, Vermont is the smartest state in the country. Our Design team has worked tirelessly to research the curriculum of a typical fourth grader in Vermont. By putting in harder material we hope to motivate students to learn more. We have also been working on other problems besides our general goal of educating and entertaining.

Another problem that we have encountered is within our IPRO. We have found that it is difficult to work in one large group. We were afraid that communication and exchange of ideas would be lost in the large group. However, we decided that we would break up into four sub-teams. The sub-teams are Management, Design, Development, and User Experience. This system works best to produce results in a timely and efficient manner.

Along the same lines each team had separate problems and goals for the semester. The Management team was faced with the problem of a grading, communication, deliverables, and marketing. The management team hoped to come up with a grading scale that is quantifiable. This includes developing new assessments in addition to the peer evaluations already used. They also had to deal with communication between and within groups. There are times when email is not enough and the management team needed to develop a way to overcome that obstacle. Management is in charge of all deliverables for IPRO, so it is especially important that they complete them while achieving their other goals. Finally, Management is responsible for the marketing for IPRO. This requires innovative ideas. In the past, we have done T-shirts and buttons. This semester we really need to come up with new and exciting ideas.

The Design team also has been confronted with numerous problems. The first problem is the level of content. The Design team has done much research for the games. However, with our new goal in mind, the Design team needed to start over and develop a new game that would keep Vermont's curriculum in mind. The major problem was understanding and acquiring the information about the Vermont school system. The Design team also worked closely with the User Experience team. This meant being able to correct any mistakes that the User Experience team found while testing in schools. The Design team has done an excellent job juggling their responsibilities and producing solutions to their problems.

The Development team had problems that have been typical for most semesters. It is difficult to jump into the IPRO but it is even more difficult to be a new member in the Development team. This semester none of the members knew Flash (the program that our game is programmed in). This meant that no new programming could be completed until everyone learned Flash. Another problem they had to endure was

working with other groups. If other groups did not have their materials ready, the Development team could do very little.

Finally the User Experience team had the problem of measuring the progress of the game. They went into schools to decipher what the pros and cons of our game were. It becomes a problem when they needed to decide on how and what to test. Testing in schools is the most useful tool we have and it happens on occasion. Therefore, we need to take advantage of opportunity. This means that the User Experience team must develop a test that satisfies everyone's needs. For example, the Design team needs to be informed about the content. On the other hand, the Development team needs feedback on playability. These clashing goals result in the User Experience team really working hard to produce a workable test.

There were numerous problems within our IPRO this semester. We feel that the only way to truly achieve anything worthwhile we need to set our goals high. The problems we encountered throughout this semester of IPRO challenged us to accomplish goals that we would not be able to otherwise. We think that this semester's IPRO has made major strides in educating and entertaining today's youth.

V. 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 third semester of implementation of this model, and it has undoubtedly proven to be imperative to IPRO 329's success. 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.

VI. Assignments

Task	Lauren	Callie	Matthew	Jeff	Javier	Carlos
Project Plan						
Meeting Minutes	X					
Content Research	X	X	X	X	X	X
Mid-term Report						
Website					X	
IPRO Day Poster	X			X		
Abstract						
Presentation Content	X			X	X	X
Presentation Slides	X			X		
Final Report	X					
CD-Rom						
User Testing	X	X	X			
Weekly Report						
Team Information						
Programming						
Data Analysis						
Children's Museum				X	X	X
Research Papers						
Marketing						
Created Testing Instruments	X	X				
Sub-team Leader	X					

Task	Deborah	Rick	Konrad	Adrienne	Sonia	Prateek
Project Plan				X	X	
Meeting Minutes				X		
Content Research						
Mid-term Report				X	X	
Website						
IPRO Day Poster				X		X
Abstract				X		
Presentation Content		X				
Presentation Slides		X				
Final Report				X	X	
CD-Rom				X		
User Testing		X		X	X	X
Weekly Report				X	X	
Team Information				X		
Programming	X	X	X			
Data Analysis				X		X
Children's Museum			X			
Research Papers				X		X
Marketing				X	X	
Created Testing Instruments				X		X
Sub-team Leader				X		X

Task	Sachin	Rohit	Yagna	Vishal
Project Plan				
Meeting Minutes			X	
Content Research				
Mid-term Report				
Website				
IPRO Day Poster				
Abstract				
Presentation Content				
Presentation Slides				
Final Report				
CD-Rom				
User Testing	X	X	X	X
Weekly Report				
Team Information				
Programming				
Data Analysis	X	X	X	X
Children's Museum	X	X	X	X
Research Papers	X		X	X
Marketing				
Created Testing Instruments	X	X	X	X
Sub-team Leader				

VII. Obstacles

The biggest obstacle this semester has been communication between sub-groups. IPRO 329 first created sub-teams because we wanted to increase the production of work for each person. Although this goal was definitely met, there are still aspects that need work. Communication is a big part of group work. However, this semester team members were having a difficult time communicating between each other. In order to solve this problem the management team will be observing this and making sure that communication will be flowing well. By bringing this problem up during the entire team meeting we were able to fix the problem slowly by opening the lines of communication.

VIII. Results

This semester our IPRO has accomplished much. Each sub-team has worked hard to produce results towards their goals. Overall we have made strides in our game and are that much closer to introducing it to the market. 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 companies and try to contact them with information about our game. In the end, they sent eleven companies a letter describing our game and purpose. We hope that companies will attend IPRO day or at least take interest in our game. Management team also produced T-shirts, business cards, brochures, and buttons in hopes of further marketing. In addition to marketing, Management team has created a new grading system. This grading system was based around various peer evaluations. Finally, Management completed quality deliverables in a timely manner. With only two people on the Management team, they accomplished an immense amount.

Design also worked very hard towards IPRO's goals. They focused on editing the content of the games to incorporate their research on Vermont curriculum. They began by developing the water cycle game, the last game in the science wing. The team has made tremendous strides and are almost ready to hand the game to Development to start programming. Design has also worked closely with User Experience. When the observations came back from the school, the Design was quick to fix any problems. This also meant working closely with Development to make sure the changes were implemented in the Constellation game. Design also edited the content for the Planet game and worked with Development to facilitate the changes. Finally, the Design team was very helpful in getting all their deliverables in at a timely manner.

The User Experience team was definitely an asset to the team this semester. They started off the semester by going to the Children's Museum on Navy Pier to gain greater insight into a child's learning patterns. After collecting observations from the Children's museum, the User Experience team turned its focus to school testing. This system they were able to collect information at two schools. At the first

school, they tested a computer version of the Constellation game. Their hypothesis was not supported but a significant difference was shown between pre and post-test scores. This means that the content is a good learning tool for students. The second game that was tested was the Planet game. However, only the content from the Planet Game was tested. It was presented in a lecture format and a pre and post-test were given. There was also a significant mean difference between those two scores. Both games were written up into a formal report. Lastly, User Experience worked closely with many other team members to accomplish their goals.

The last sub-team that contributed a tremendous amount was the Development. Without the Development team the IPRO would be at a stand still. This semester they vastly improved the Constellation game. Based on the response from the school study, the Development team made some changes to the Constellation game in order to make it more user friendly. They also almost completed the Planet game. It is so close to being finished that a demo will be playable for IPRO day. In addition, they really improved the museum world. They were able to make a new tool bar with new icons. They also added a new character so that a user can choose his/her character. Finally, they developed the technology to change the colors of the wall and the overall look and feel of the game.

IX. Recommendations

Edutainment, IPRO 329, attempts to entertain and educate children simultaneously. The team has been working on a game called the Scholars of the Lost Exhibit for the past two semesters. This is a computer game which is designed for fourth graders. This game teaches science, math, social studies, and language skills in entertaining method which will also be educational for the children. In the game, each of four topics represents a wing in a museum.

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 problems. We are not positive that our game will be the difference in changing this statistic. By doing the research, we hope to identify the problem within the Illinois elementary schools. The team members have been going into schools to perform user testing in different areas of Chicago. We have been focusing on the utility of our game when in schools, we also be testing hypotheses that test classic learning with children. In the end when all of the data is gather, we analyze the statistics and compare the control and the variable testing.

By following some of these key steps IPRO 329 will continue to succeed further in the future by developing new games for children:

- Continue to complete the high-level architecture of the development portion for each of the wings.
- Research the user experience testing for all other subject wings: Social Science, Mathematics, and Language Arts. With a special emphasis on mathematics.

- Conduct peer evaluations each month and distribute these evaluations to allow all team members to see where they stand with their teammates

X. References

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XI. Acknowledgements

329 would like to thank Douglas Stauber for putting the time and energy into further moving ahead this IPRO. IPRO 329 takes great pride in our achievements. We hope to get recognition not only from the IPRO office, but also from interested companies. We believe that the work we do is important to the future of the children of our great nation. We hope to help the leaders of tomorrow achieve more than we can even imagine.