

Interdisciplinary Initiative Grant Application

A Case Study to Evaluate Math-Island, an Educational Computer Game to Foster Young Children's Mathematical Thinking

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In the first phase of this project, MATH-Island, an educational computer game to foster young children's mathematical thinking, was designed and developed as a result of collaboration between Computer Science and Teacher Education Departments. In this second phase, we are focused on evaluating the impact of this game. ClubView Elementary School has agreed to pilot Math-Island in four 4th grade Math classes which will give our students the chance to design and evaluate an intervention in a realistic setting. This project brings together the expertise of students from the Department of Counseling, Foundations, and Leadership and the Computer Science Department to work on designing and implementing a case study to evaluate Math-Island. This interdisciplinary project will be embedded in the existing classes of the cooperating departments and allow the participating students to deepen their knowledge through an authentic real life experience.

Students' Interdisciplinary Expertise

1. Students from Computer Science will learn how to design and implement a case study to evaluate educational games.
2. Students from Counseling, Foundations, and Leadership will apply their knowledge in educational psychology to help design the case study and analyze the data resulted from the study.
3. Students from both departments will learn how analyze the results of a case study using mixed methods, such as quantitative analysis of pre- and post-testing and qualitative analysis open ended survey responses.
4. Students from Computer Science will use the feedback from the results analysis to refine the game.

Creativity and Innovation of the Project

To the best of the applicants' knowledge, the proposed project is unique to the history of both collaborating departments as no similar interdisciplinary projects have been conducted before. The described interdisciplinary expertise are anticipated due to the original combination of the collaborative experience.

Evaluative Plan of Effects on Faculty and Students

The students and the collaborating faculty members will be encouraged to reflect on their experience upon completion. The reflection will be twofold: 1) perceived benefits of interdisciplinary involvement on the quality of the final product and 2) perceived benefits of interdisciplinary involvement for personal and professional growth of individuals involved. Students will be encouraged to submit presentations to research conferences and potentially to other venues of scholarly sharing.

Significance of the Project for Increasing Interdisciplinary Scholarship or Collegiality

This project provides a platform for collaboration between faculty of Counseling, Foundations, and Leadership and Computer Science and, the two departments that, based on our personal experience and reflections, rarely intersect in expertise and/or professional interests. This project would create an opportunity to highlight the strengths of these two fields of study through their unique symbiotic contributions. In particular, aspects of learning theory will be used as a means of evaluating educational games in realistic settings, with this interdisciplinary focus serving as an important contribution to the respective disciplines

Design Phase of the Project

The design phase will include the following components:

Counseling, Foundations, and Leadership (CFL Team):

- Guide the design of the case study to investigate the following hypothesis “Math-Island fosters the student’s understanding of the area conservation concept”
- Use mixed methods for data collection.
- Utilize statistics and qualitative analysis to analyze the results of the study.

Computer Science Team (CS Team):

- Design the case study with the help of CFL team.
- Conduct the case study.
- Refine the education game based on the findings.

Development Phase of the project

The game Evaluation phase will include the following components:

- Decide on data collection tools (CFL & CS Teams)
- Conduct the case study at ClubView Elementary School [permission has been granted from the school] (CS Team)
- Analyze the results using the appropriate methods (CFL Team)
- Interpret the results (CFL & CS Teams)

Interdisciplinary Collaborators and Timeline of the Tasks

Participant	Department/School/Department	Tasks	Timeline
Dr. Rania Hodhod	TSYS School of Computer Science	Guide students through the various evaluation phases of the educational computer game	Jan. 2016- June 2016
Dr. Andrea Frazier	Counseling, Foundations, and Leadership	Guide students through research on educational psychology and guide the analysis process of the study results.	Jan. 2016- June 2016

Special Request for Additional Materials (optional)

- Conference registration fees for our students (2 - 3 students/department) if they have an accepted paper for publication (\$150/student).
- Refreshments for the student interdisciplinary meetings throughout the semester (\$200).