Mobile and web game development: Using videogames as an educational and outreach tool

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-Abstract-
Few tools reach out to capture the imagination and interests of children like videogames do. As such, the development of educational outreach applications that foster young minds interest in science and technology becomes of the utmost importance. To this end, the majority of my work consisted of learning to develop and deploy web-ready Flash and JavaScript applications to NASA’s SpacePlace. Scijinks and Climate Kids websites, which are managed by JPL’s Space Place team. I performed the programming aspect of the games with generous help from Austin Fitzpatrick, while Dianne Fisher - technical writer for the team- developed the educational content, and Alexander Novatj –technical illustrator, provided the art and graphic design. As such, my projects to collaborate with individuals of diverse academic backgrounds. My assignments enabled me to experience the entire cycle of software development, from project formulation to development, to quality assurance and the final release of the applications through the JPL software release system.

-Objective-
The objective of my research was to develop interactive outreach and educational applications to engage the minds of elementary and middle school aged children, so that through an early exposition to scientific concepts and facts they may develop an interest in science, technology, engineering and mathematics.

In order for my work to be useful and relevant for the Space Place team, it had to meet the following requirements:

- Implement common and preexisting algorithms to ensure the efficiency and quality of my code.
- Make use of procedural animation to enhance the attractiveness and interactivity of the game applications.
- Follow Object-Oriented design to allow for modular code that is easy to maintain and enhance.
- Maintain proper documentation for both code files and design documents to future-proof the applications.

-Results/Conclusion-
At the conclusion of my research internship, I had developed two Flash educational applications that are easy to maintain and enhance on part of the Space Place Team. The first application -Solar System Scrambled- was developed in collaboration with my fellow intern Joseph C. Meneses, while the second one –Stump the Displacifier: Animal Edition- was developed as a solo project. During this internship, not only did I significantly increase my programming skills, I also acquired a deep insight into the software production and release cycle. In addition, I learned the professional skills necessary to collaborate with individuals of non-technical backgrounds.

-Materials and Methods-
Development of the applications was achieved through the use of Adobe Flash Builder 4.5 and Adobe Flash CS6. ActionScript 3.0 was utilized as the primary programming language, though XML files were used as data repositories for each one of the applications.

The software architecture of the applications favors an “empty” main class file, which contains references to the other classes used but little else. The bulk of the logic and programming that makes the applications work was instead relegated to a secondary class with access to only the resources necessary for it to run. This approach was taken due to the fact that both games rely on screens to indicate the progress done in-game, and having a “game screen” class run the applications provides programmatic and organizational benefits. Thanks to this approach thinking about the screens, buttons, animated graphics and abstract classes as objects became an intuitive and natural process. Of particular importance to my work were the custom libraries provided by my mentor, which greatly facilitated the implementation of both repetitive and obscure tasks during both the development and debugging of the applications.

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