Undergraduate Thesis Prospectus

Poké Planner: A Web-Based Pokémon Team Builder

(Technical Research Project in Computer Science)

Educational Video Games as a Means of Promoting Interpersonal Skills

(Sociotechnical Research project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

How can digital games be optimized to promote both satisfying gameplay and improve personal development?

Digital gameplay can promote interpersonal skills. Besides scores and in-game achievements, game data can gauge players' decision making and reasoning. Such data can be used to optimize players' reaction times, organizational skills, strategic thinking, and problem solving. In some digital games, players' interpersonal skills can be studied and compared, disclosing opportunities to improve performance. To promote their personal development, players can practice emotional and environmental behaviors in the game. Game-based learning, while fun and interactive, can help individuals improve and foster skills, including logical decision making, conceptual knowledge, and ensures learning retention. Optimized for personal skill development, digital gameplay can be a valuable educational tool.

Poké Planner: A Web-Based Pokémon Team Builder

How can Pokémon players create balanced, cost-effective team compositions that'll boost synergy?

To simplify the team-building effort in Pokémon, I designed a new web-based team builder service based on the statistical analysis of all the Pokémon in the Pokédex from seven generations. My technical advisor is Briana Morrison, who is in the Computer Science department at UVA. The project is a capstone class project for CS 4750- Database Systems that was created in a team of four. Collaborators on the project include Darwin Khay, Darnell Khay, and Vivine Zheng. The goal of this project is to retrieve Pokémon data through the Pokedex page for analysis to enable users to create optimized teams using that data.

Many aspects of society, such as sports and business management, incorporate and emphasize the importance of team building. In a business, team building can be one of the most critical investments that lead to success of a product or project. Being in a team where one is comfortable is necessary since it builds trust, reduces conflict, increases productivity, and encourages communication. In some sports, such as Volleyball or Basketball, creating a team that encourages a healthy, positive environment, making sure that every player feels included, will benefit every player in the team. It promotes teamwork and the desire for each player to engage in the sport. Players become motivated to perform better and success is often displayed through the compatibility and trust of the players. It is never a battle alone.

Constraints for this project include scope and quality. The project being developed during the school semester meant that my team had to set realistic and attainable goals. Although we had many ideas we wanted to incorporate into the project, we risked a loss in momentum and resources if we chose to further expand our application. Our project's final result met the qualitative standards, but there were a few sustainable and qualitative control elements that we felt could be improved.

Creating an entire application from the ground up while learning about web-development at the time indicates that there were some obstacles when developing the project. The entire front-end and back-end framework was developed using PHP. The state of the art was limited to our understanding of other more adaptive frameworks and languages that could have been used to optimize the application. PHP is a programming language that is characterized by its back end development only. It is more ideal for our application to utilize JavaScript to be interpreted by the browser as it would have created a more powerful client-side experience.

Team building is fundamentally no different in Pokémon than it is in sports or businesses. It is necessary to create a team composition that consists of Pokémon that assist each other. A team of all offensive or defensive attributes, for example, will often not see success compared to a team that is balanced around synergy. To create balanced, cost-effective team compositions that'll boost synergy, the Poké Planner was developed that allows for users to check and analyze the weaknesses and resistances of your teams to observe if there are holes in your team's coverage. It was developed using technologies such as PHP, HTML, phpMyAdmin, deployed using UVA's CS 4640 server.

The result of the project was successfully implemented using the tech stack mentioned previously. Users are able to create balanced, cost-efficient teams and gauge how effective their team composition is from statistics retrieved from a dataset. Future work on the Poké Planner will include allowing for future Pokémon data to be added and improving the user interface to create better clarity and user experience.

Educational Video Games as a Means of Promoting Interpersonal Skills

How have companies and their clients (schools, employers, and others) promoted videogames as methods of training students, employees, or others in interpersonal skills?

Games often interfere with education, but can educational games motivate individuals and promote collaboration? For example, to develop interpersonal skills, children must form relationships through socialization with other children. A deprivation of these experiences can develop difficulties in their interpersonal skills. Digital games can promote learning as they "provide engaging environments for problem solving and meaning-making, and to create spaces for collaborative learning, both within and around the game" (Nicola, Maggie, 2017).

Categories of participants include gamers, game companies, and advocates and critics of game-based learning. According to Khalis (2017), augmented reality games "require players to have good social competence" (Khalis 2017). Gentile (2011) found that many gamers engage in compulsive behavior. Stresses, such as poor grades, may promote game addiction because gameplay can offer external validation (Gentile 2011). Proponents of game-based learning, however, contend well-designed games have much more to offer. According to Gee (2007), "digital games can have the power in principle to immerse learners in authentic environments and support them through meaningful activities."

A blend of conventional and game-based educational techniques can improve learning. Games can be designed to promote critical thinking, decision analysis, and problem solving. For some students, collaborative gameplay can improve interpersonal skills. Camilleri and Camilleri (2017) found that digital game-based learning promotes two-way communication, because "students are usually motivated to review their knowledge and exchange their knowledge with one another." One student reported that it "helped me to step out of my comfort zone" and "build a better relationship with my classmates" (Camilleri & Camilleri 2017). Another said, "I learned how to be critical and reflective" and "how to evaluate high quality content" (Camilleri & Camilleri 2017). Camilleri and Camilleri (2017) contend that learning through digital gameplay can help students "actively engage with their peers" and "share their knowledge and insights with others," thereby fostering an environment in which they engage, respect, and value each other's ideas.

Since the coronavirus pandemic, many businesses have welcomed E-learning systems that promote internal "knowledge flow" (Giannakos, Mikalef, & Pappas, 2022). According to Giannakos, Mikalef, and Pappas (2022), E-learning offers "opportunities for improving

organizations' learning flow and ... improving employees' outcomes." They argue that one E-learning system, called eQL, supports "networking opportunities for employees" better than "face-to-face formal training" (Giannakos, Mikalef, & Pappas, 2022). In practice, however, results have varied (Yoo & Huang, 2016).

Researchers have investigated the influence and implications of game based education. Whitton and Maclure (2017) admit that in educational settings, game-based learning "is by no means uncontroversial even among educational researchers"; indeed it is "a site of contestation and polarized opinion." Cerankosky (2010) found that video games can hinder children's learning and social development; boys who had a game system "immediately spent more time playing video games and less time engaged in school activities." Ensmann (2021), however, suggests that digital games can reach audiences that schools miss. Educators who adopt digital game-based learning techniques can open new growth opportunities for learners. Camilleri and Camilleri (2017) contend that together, "traditional and digital learning resources may provide the right arena for the advancement of quality education."

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