Collaborative Learning via 3-D Game Development

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Abstract

The tremendous growth of the 3-D, first person video game genre provided a vehicle through which to create a one-year, upper level undergraduate experience in multidisciplinary, highly collaborative software design and implementation. We report on a team-taught course that encompassed concepts from the contributing disciplines of computer science, digital media, film, theater and music. The learning environment balanced individual experiential skills development with reflective analysis of media implementation as our students built a media-rich interactive game. This panel provides four perspectives on the design and execution of the course and resulting game from our contributing areas: computer science (Wolz), digital art (Sanders), music/sound technology (Nakra), and writing (Pearson). As moderator, Ault, whose own work is at the intersection of our fields, provides a unifying perspective.

1   Purpose and Premise

A problem in teaching game design and architecture at the undergraduate level is that to do it well requires cross-discipline expertise on the part of both the instructor and the student. Gaming is a strong motivator for students in a range of disciplines including computer science, digital art, communications and media studies, music and writing. But at a stage of their education focused on breadth rather than depth, it is virtually impossible to provide students with an experience in a single course that does justice to the complexity of game development. At The College of New Jersey, (TCNJ) programs from three schools (Art, Media and Music; Culture and Society; Science) in disciplines ranging from Communication Studies, Computer Science, Digital Art, Interactive Multimedia to Music include courses that touch upon video game development, but fall short of balancing art, computing, music and storytelling to develop cross-disciplinary appreciation for the collaborative effort.

From the computer science perspective, for example, students develop expertise in software engineering and artificial intelligence and can produce games with sophisticated underlying architecture. However the visual and auditory components, not to mention the story line, are often severely lacking in such projects. Complementary frustrations were heard from the faculty members collaborating on this project. Given the strong emphasis on broad liberal education at TCNJ, it is not realistic to expect students to develop advanced extra-disciplinary skills in all of the contributing disciplines. Consequently, we created a learning environment in which cross-disciplinary students collaborated on developing a large artifact, namely a 3-D, virtual reality game. Through this process they learned to articulate the essential concepts outside their areas of expertise, developing an appreciation for the skill set required for those components of game development, while they themselves developed advanced skills within those same areas of expertise.

In this panel we will present four perspectives on this two-semester experience: 3-D animation, interactive storytelling, AI agent implementation, and sound and music composition. We will comment upon the tension that developed between the competing needs for good story, rich visuals, emotive sound, and sophisticated gaming, as we came to grips with the fact that we did not have the expertise, financial and human resources, or time to do it all. We will also report on how we created an environment in which all students participated in the decision-making required to implement a process management system with multiple asset development pipelines in order to produce our sample game.

Chris Ault will provide an overview of the process as a whole. Chris frequently raises the question of how to focus on the gaming and the interactivity. He continuously reminds us that it is the play that makes the game. Phil Sanders, who has extensive experience with 3-D implementation has pushed the rest of us to consider the complexity of the 3-D pipeline and how little we really appreciate and understand it. The art is hard, not just technically, but aesthetically. Ursula Wolz, the abstractionist in our group, takes the perspective that if it can be coded, we can figure out how to do it. She raises the question of how we can define processes that will help us automate the various production pipelines, either through computing systems, human protocol or cheap tricks so that the game logic as well as the visual rendering, and the incorporation of sound and music will be of the highest caliber possible. Teresa Nakra has brought the world of sound, spoken dialog and music to our production. The auditory component, which can often get short shrift in a game, will make or break the mood. It can carry and enhance the story line when limited resources prevent full implementation of our vision for AI logic or highly realistic visuals. Kim Pearson continues to maintain that the story is everything. Without a powerful story line and a clear understanding of the non-linearity of game story, the art, the music and the AI logic are merely pretty tricks. She is also attuned to the cultural impact and ethical implications of particular storytelling techniques. Where we all agree is that our biggest