

Experiences Teaching Collaboration for Game Innovation to Computer Science Students

Todd Shurn
Systems and Computer Science
Howard University
shurn@scs.howard.edu

Ingrid Sturgis
Department of Journalism
Howard University
isturgis@howard.edu

ABSTRACT

We discuss experience from collaborative assignments between an upper level computer science game programming course and a journalism new media course. Our objective was to improve original game and interactive media product quality through cross-disciplinary student teams. We encouraged students to create Microsoft Imagine Cup, The Entertainment Software Association (ESA) National STEM Video Game Challenge and Associated Press Style games. We expound on success, failure and lessons learned.

Keywords

Computer Science Education, Curriculum, Games, Interactive Media, Scratch, Microsoft XNA, Kinect Sensor API, Microsoft Imagine Cup, ESA National STEM Challenge, multimedia storytelling, journalism, new media, communications.

INTRODUCTION

Traditionally Howard University computer science students graduate without ever enrolling in a course requiring software development as a member of a team that include non-computer scientists. This exclusively computer science perspective does not prepare students for the cross-disciplinary approach adopted by creative organizations. It is especially unrepresentative of the game industry where programmers are just one element of a creative team. We attempted to advance student innovation through collaborative class projects between computer science game course, SYCS 422 “Game Engine Programming” and a Journalism course, JOUR 455, “Special Topics New Media”.

Game Engine Programming is a computer science technical elective course emphasizing the coding constructs, framework and assets necessary to create an original game. Course pre-requisites are computer science III and junior standing. Students are familiar with Visual Studio, Eclipse, C++, C# and Java. The course curriculum contains some ABET accreditation computer science core and advanced content for algorithms, data structures, programming languages and software design.

Journalism new media is a special topics course open to journalism majors with sophomore standing and instructor permission. Course emphasis was Associated Press writing style guide and developing interactive applications to teach AP writing style to others.

Game Engine Programming course met for 90 minutes twice per week with typically one class per week conducted jointly with Journalism students. There were six male game engine programming students, four students were able programmers who had participated in programming competitions while the other two were less capable. One student was a struggling computer science major and the other was a senior mechanical engineering student with limited programming skill. All the students were motivated by their game play love.

Course Goals

Students completing Game Engine Programming course should be able to:

- recognize the value in collaborating with script writing and graphic arts students
- efficiently work creatively with students from other majors
- Seek students from relevant non-CS majors to participate in game projects and competitions
- Collaborate across disciplines to develop game and interactive products superior to those developed solely by computer science students.

Curriculum

Games and interactive media are story driven as defined by a script. Collaborative projects with journalism students emphasized interactive scripts. There were 3 game engine course assignments. 1) Game Play Review Event 2) Original game created for a competition 3) Kinect Sensor Routine.

Students in both classes were required to participate in the game review, “HU Roast and Toast”, a scripted live event for students, faculty and interested gamers conducted in the school of communications screening room. Students reviewed selected console (PS3, Wii, Xbox) games for their story, graphics\audio, controller interface, and future extensions. Among games reviewed were Batman: Arkham City, Soul Caliber 5, Call of Duty: Modern Warfare 3, Elder Scrolls V: Skyrim, Dance Central 2 and Assassin's Creed: Revelations, Just dance 3 and Dance Central 2.

Game Engine students were to create a game for submission to the Microsoft Imagine Cup or the Entertainment Software Association National STEM Video Game Challenge. Journalism students were tasked to create an engaging Scratch game teaching players how to write news

articles conforming to the Associated Press style guide. Associated Press style writing is an essential skill for journalism students as it is the standard for articles published in major newspapers, magazines, and websites across the United States.

Game Engine students were tasked to create an original routine using the Microsoft Kinect Sensor API. Routines are a sequence of motions captured by kinect sensors that have scores associated, but are not complete games or game concepts. Game Engine students were introduced to the Kinect Sensor API through Visual Studio using examples discussed in detail during class sessions. These examples were extended to become the basis for their Kinect Sensor routines.

Results

Game review event, dubbed “HU Roast and Toast”, was well received by an almost evenly split male/female audience. Event emcees were a telegenic broadcast media student (TV news intern) and a capable programmer with the gift of gab . The emcees were effective narrating gameplay demonstrations, describing game assessment criteria and keeping the audience involved.

Journalism females elected to review the dance games while the computer science males elected to review fighting games. There were male participants in the dance game demonstrations, there were no female participants in the fighting game demonstrations. The dance game reviews significantly involved the audience. The audience was particularly interested in the kinect sensor’s ability to differentiate movements and score accordingly. Audience was engaged by demonstrating the exact motions that receive maximum points in game. Some dance games were shown to be trivial after the maximum scoring movements were identified, mastered and repeated at will. Fighting game reviews didn’t hold female audience attention even though male gameplay demonstrators enthusiastically explained unfolding interaction sequences and story.



Game Engine students divided themselves into a four student Imagine Cup team that created an XNA game for Imagine Cup submission, and two individuals who each created a Scratch game submitted to the National STEM Challenge. The Imagine Cup team created original XNA game with one operational level. The game lacked a compelling storyline and visual appeal. The Imagine Cup team made nominal effort to produce high quality required Imagine Cup submission components: game storyboards, game instructions, and game play video. The Imagine Cup team compiled three mediocre storyboards, wrote trivial game play instructions and shot a poorly lighted non-scripted video. As the Imagine Cup deadline approached, the Imagine Cup team recognized their entry would be non-competitive and opted not to submit.

Students were reluctant to collaborate inside and outside the classroom environment. Yet it was clear all the students would have benefitted. We encouraged the journalism students to receive one-on-one Scratch training from the computer science students, but they did not and their Scratch projects made it apparent. Imagine Cup students were not skilled writers or media producers and that was obvious viewing their entry's shortcomings.

Conclusions

Even though cross disciplinary collaboration was promoted and encouraged it did not positively impact any of the original student games. Other than game reviews, computer science students didn't collaborate with the journalism students in a meaningful way for any project. Computer Science students didn't seek the journalism students input about their XNA game or even producing the video when journalism students had video expertise. Computer Science students "Go it alone" approach resulted in a poorly conceived and executed Imagine Cup submission. Collaboration failures were not solely related to discipline differences as journalism students didn't collaborate with each other.

Students satisfied the Game Engine Programming course objectives through development of original games and Kinect sensor routines. Cross disciplinary teamwork was not a defined percentage of the game engine programming course grade. As a result some students did receive "B" grades. None of the students received "A" course grades not due to collaboration failure but because their original games were not outstanding.

A fundamental lesson learned is graded purely team building exercises are needed to facilitate teamwork at semester beginning. Computer science and engineering students regard collaboration as unnecessary unless it directly impacts their course grade. Team exercises should include specific roles assigned to students. It should not be assumed students will "figure out"

their roles on a cross disciplinary team. Instructors should provide guidance for cross disciplinary interaction.

Overall, a cross disciplinary teamwork development course work should be incorporated early in the computer science/engineering curriculum. Promoting teamwork to computer science students after they have developed strong programming skill is challenging. There is a better opportunity for computer science students to embrace cross disciplinary teamwork value when they are underclassmen. Teamwork should be emphasized in problem solving exercises in freshman courses rather than being introduced in upper level game programming courses.

REFERENCES

Wolz, U., Cassel, L., Way, T., Pearson, K. Cooperative Expertise for Multidisciplinary Computing, Proceedings of the 42nd ACM Technical Symposium in Computer Science Education, (Dallas, Texas, USA) March 9-12, 2011.

Thomas Way, Lillian Cassel, Kim Pearson, Ursula Wolz, Deborah Tatar, and Steve Harrison. A Distributed Expertise Model for Teaching Computing Across Disciplines and Institutions, in The 2010 International Conference on Frontiers in Education: Computer Science and Computer Engineering 2010: Las Vegas, Nevada.

Shurn, T., “*Programming Fundamentals and Innovation Taught through Windows Media Player Skins Creation*”, ACM SIGCSE'06, March 1–5, 2006