

Leveraging Role Play to Explore Software and Game Development Process

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Abstract— Role play has a long history as a tool for learning. It is often used to simulate practices in the world in an environment where consequences can be mitigated. Despite its effective use by the armed forces, emergency responders, negotiators, and political campaign managers, role play is a tool seldom used in STEM classrooms. In this paper, we will describe the incorporation of certain aspects of role play in a game development processes course. This course, similar to courses in software engineering, focuses students on the entire product life cycle and engages them to complete a project from start to finish during the term. We used role play techniques to engage the students more fully in the processes of development by creating a scenario in which the students have suddenly become the owners of an independent game studio. During the semester, we engaged them as the owners on issues of business and legal concerns along with the typical production and process concerns of making their product. We had them face issues of missed deadlines and products that were not ready for production. We have informal evaluation in terms of feedback from end of the semester debriefs and classroom observations. We are using that for further refinements in the next course cycle.

Keywords—role play; soft skills; software engineering; game development lifecycle; business and legal concerns

I. INTRODUCTION

In our graduate level game development processes class, we spend considerable time working with the students to understand the process involved in the ideation, production, and release of games. Through the semester, we ask the students to participate in the process by ideating and creating their own games in small teams. While this course is serving the needs of our students as an introduction to the processes involved, we are constantly trying to look for ways to improve upon course delivery and student engagement with the material. Because we are trying to introduce and explain a process in 15 weeks that normally occurs over a timeline of years, it is often the case that we need to rely on explanation and short activities as opposed to full immersion in the process.

Using role play in this course seemed like a possible natural fit for such activities and explanations due its nature as a simulation of situations where consequences can be mitigated, or even forced. While being used as a tool for learning in some classrooms, particularly history [1], it is a technique that we do not see as often in the STEM classroom. However, we believe

that it has potential in this area to engage students with the material at different levels.

II. BACKGROUND

A. Role Play

Role play as a tool for learning has a long history. In practical education for military personnel [2, 3], business and legal negotiators [4], social workers [5], psychologists [6], and medical professionals [7] role play is often used to students and practitioners alike to develop skills within contexts that vary from symbolic and abstract to highly authentic. Within traditional education, role play is most clearly present in mock trials, model UN and other simulations of government practices, but it has also been utilized in every field including literature, mathematics, biological and physical sciences, and more [8].

Despite the variety of fields that have used role play in learning, role play is rarely discussed within or across disciplines as a tool for learning, so its constraints and affordances for learning design are underexplored [9]. Nevertheless, there are some notable examples which have discussed how to implement to role play [10] and theories that include cognitive affordances of role play in the context of epistemic games [11], cognitive and affective affordances of digital role play [12] and which show both the increased efficacy of role play and the need for additional efficacy research in the area [13].

While there is a promise for effectiveness of role play across the curriculum. The strongest current evidence for effectiveness of role play as a tool for learning continues to lie in understanding practice in context through simulation games, like the one we are discussing here.

B. Role Play in Computing Classrooms

Since it has been shown to be effective as a learning tool, it is not surprising to find role play popping up in contexts in computing and technology classrooms. Some use role play as a way to engage the student as the user of a technology to understand requirements of the system or how the user would see it, as in an HCI course [14, 15]. Börstler talks about using

role play and CRC cards to introduce object-oriented concepts to students [16].

In an Operational Service Management and Information Technology course, students were designers or developers in various scenarios to help them more deeply interact with the course material [17]. An interesting aspect to this work is that an assignment for the course asked the students to help contribute to future role play scenarios for subsequent course offerings.

While some role plays are in-person, there has been some work done in a course in Enterprise Resource Planning using Second Life as mechanism for enabling the role play and interactions where students are employed by a fictional company [18]. One of the challenges noted is the students' familiarity with Second Life as a platform made it at times difficult for a novice to fully engage. Toth and Kayler created a role play game (RPG) layer for courses in networking and operating systems. Students used the RPG to work their way through the course material, going on quests and doing assignments to earn their course grade [19].

However, what is perhaps more useful is to engage students more fully in the software development process using role play. It has been recognized for some time that real-world and/or community based projects give students exposure to software development in a meaningful way [20, 21, 22, 23]. They become more invested and see an actual use of the product they are building. Another aspect of the software engineering experience is the so-called "soft skills" and management that goes into the projects. There has been work done in creating an online system for enabling role play for a course in project management whereby the system controls the simulation based on user interaction and allows them to be a project manager and see the consequences of their decisions in that role [24, 25, 26, 27]. For requirements engineering, Zowghi and Paryani asked students to play the roles of both the customer and developer to see the multiple perspectives of the process [28].

Finally, we see role play and phenomenography used as a way to study the student understanding of these software engineering concepts. The students interact in a role play and instructors and observers record and analyze what the students do as a way to determine their understanding of the concepts of the course [29].

In our course, we are looking to leverage role play activities to engage the students more fully in the process of game development. We do not want to create a game layer for our course or utilize computer-based tools, but rather focus on face-to-face role play interactions to explore course content.

III. COURSE STRUCTURE AND ACTIVITIES

Game Development Processes is a course that is required for all graduate students in the Game Design and Development Masters' Degree program. The students take this course in the fall semester of their first year in the graduate program. For the past several years, we have worked on refining an approach in this course to improve student communication skills through in-class exercises focused mainly around the process of game

pitch [30, 31]. In the fall 2015 iteration of the course, we kept almost all of the same assignments and activities that allowed us to engage the students to improve upon their oral communication and presentation skills. However, we supplemented them and modified them to work within our role play framework created for the semester.

In the first week of class, we introduced the students to the main narrative for the semester, that is, they are now employee-owners of an independent game studio. The original owners have left with products in production and the employees have now taken ownership of the company. The company has enough money to stay afloat until the end of the calendar year (the end of the semester), but must get products out the door before then to ensure financial viability into the new year.

A. Emerging Themes

In week 2, we have an assignment due concerning emerging trends in the game industry. The conclusion of the assignment for this term was for the students to decide on trends to focus upon for the new products the company was going to launch. In this exercise, while the students could consider all possible trends for the industry, they were limited in their final choices by the budget, time, and skill constraints of the personnel they had on hand. There was no budget for the company to invest in new software or hardware and the timeline for the release of the new products was only a few months, so not a lot of time to learn new technology. Further, the only personnel available were the students in the class. With those constraints, they needed to focus on trends that fit, not just the trends they found the most interesting or exciting.

B. Brainstorming

In week 3, brainstorming and ideation were the topics and students were expected to begin forming the ideas for the projects that they would work on for the remainder of the semester. The students were broken into three groups (of four students each) and instructed that these groups would each need to produce a new game for the company by the end of the term. The games needed to incorporate the emerging trends that they identified the previous week as well as meet the requirement that they need to be complete and released within 12 weeks. After the brainstorming exercise, the students were required to create and present project pitches about their games.

C. Business Issues

In week 4, we shifted focus to business issues, including incorporating and taxes. We engaged them in discussion about business law and general business practices as well as advice. In this process, we asked them to consider the type of business they were currently in for the class and the pros and cons of being that type of corporation. We also discussed investors and raising capital, which dovetailed with our discussion of pitch from the previous week because one needs to pitch the product or business to investors. Once again, pitches were given for the company's new products as a way to iterate on their process and their ideas now focusing additionally on getting the funding from possible investors.

D. Marketing

The focus of week 5 was on the projects that the company currently had in production. These products were gathered from student projects that had been created in the previous academic year within our department. The students in our class were told to familiarize themselves with the products in advance of this week. Their assignment was to create a marketing campaign for the current products. The students had to decide where to market, how to market, and other decisions about the marketing of the products. The goal being that the launch of these products would set up the launch of the new products and the overall success of the company.

E. Software Development Methodologies

For weeks 6 and 7, the students were given an assignment to present descriptions of software development methodologies (e.g. waterfall, scrum, XP) with the goal being that the studio was going to pick a new methodology to follow going forward. The student groups were told to create presentations that explained the methodology and show how it could be used within the studio. During week 8, the students worked together to decide which methodology would be the new methodology for the studio going forward through the project.

F. Legal Crises

On the course schedule for week 10, the students saw topics and readings about legal concerns and risk analysis. However, what the students didn't know was that they were about to be presented with a legal crisis instead. Two, in fact. The first legal crisis dealt with intellectual property (IP) issues and one of the games currently in production. As the scenario was told, the original owners of our company held the IP for the themes of the game and when the original owners left, the IP did not transfer. Our company has received a cease and desist on the release of the game and we now need to work with the lawyers to broker a "solution" to save our product, which is ready for release.

The second legal crisis of the week dealt with contract and scope creep. The second of our "in production" products, which is also ready for release was created under contract with an outside group. This group is now coming back to us, on the eve of release, asking for changes that were not in the original contract and would require a large effort to complete. Time the company does not have. They are threatening not to release final payment for the product unless the changes are made. They are not offering additional money to cover the changes. The students were tasked with once again coming up with ideas and suggestions that would be used in conjunction with the lawyers to mitigate this situation and allow for release of the product and payment on our contract.

We inserted another legal crisis into week 12. This third crisis concerned a possible security breach and a competitor now advertising the release of a game that is remarkably similar to one of the games that is in production. That is, one of the games that the student groups are currently working on. We, of course, picked the game that was furthest along in production and was most likely to be the best product. The

students needed to decide if we were going to pursue legal action against the competitor. The alternative was to devise a plan of action if we were not able to release the game and our competitors did instead. Along with the legal issue, the student needed to consider what possible vulnerabilities to the security of the company's computer infrastructure existed to allow this to happen at all.

G. Next Great Idea

In week 11, we asked the students to look forward to the next project beyond the ones already in production to begin to chart a course for the next steps of the company. We wanted to make sure that the students felt the fact that the process did not end with simply producing one product, but that in order to keep the business going, there needed to be a next product in development. We had them engage in brainstorming techniques different from the ones introduced earlier in the course. In week 12, they prepared a pitch to potential investors for this next round of projects.

H. Postmortems

In week 13 & 14, we had final project presentations and postmortems on the current products in the pipeline that the students were developing during the term. After the postmortems, we engaged in a group discussion about which projects should move forward and which projects need to be pulled. The exercise involved a risk/gap analysis on the company's product base to help make the decisions. Further, we had the students determine how to move personnel from one project to another based on the cuts.

IV. OBSERVATIONS

For this first iteration of the course, we did not engage in formal data collection. Instead, we asked the students about their experiences in an informal debrief session at the end of the semester during the final exam period for the course (in lieu of a final exam). We asked the students about their experience with the role play scenarios in the course and their feelings about how those scenarios may have impacted their learning of the course material. We also asked for specific feedback about the scenarios and the way they were integrated into the course.

Students were positive in their opinion of the inclusion of the role play in the curriculum, indicating that it gave a sense of authenticity and focus to the exercises we asked them to complete. The open-ended nature of the role play, in which there was no correct answer but better and worse approaches, was considered a positive, as was the social interaction that came with working in teams.

Students differed in their opinion about which of the particular interventions had been most effective, and indicated that the instructor's level of engagement was a significant factor in the success of the intervention. The need for an instructor or facilitator to ensure the goals are clear and communicated was pointed out in Vold and Yayilgan's work as well [17].

The students universally encouraged our inclusion of these exercises in future iterations of the course.

V. FUTURE DIRECTIONS

We are encouraged by the responses of the students and feel that we have definitely created exercises and experiences that enhance the course for the student. We are looking to revisit and revise the exercises, paying particular attention to the comments about instructor engagement.

In looking at the work of Henry and LaFrance [32], who had exercises in requirements elicitation, risk assessment, turnover, review, and checkpoining/status review in their software engineering course, we feel that there is one thing we should focus on for next term. That is, we should focus on getting information about what the students learned from the exercises explicitly. In effect, what did they learn about the topics the exercise was trying teach them? Furthermore, we will implement a more complete data collection and analysis framework for each of the role play exercises and for the debriefs.

Given the nature of role play and of the practices we are teaching through Game Design Processes, the bulk of this data will be qualitative analysis of video recorded participation. It is also possible that the techniques described by Boustedt for applying phenomenography would be useful for us to explore [29].

We are interested in seeing how this work could be useful across other STEM disciplines in similar types of courses, particularly software engineering or other engineering project courses. These types of role play exercises could be useful in assessing ABET student outcomes [33]. Specifically, we feel the exercises described for our course could help satisfy the following ABET student outcomes:

- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (j) a knowledge of contemporary issues

VI. CONCLUSION

Overall, we were encouraged by our first experiment with role play in this classroom and believe it has enhanced our efforts to grow the communication and interaction skills of our students.

Of importance to us when we approached this project and saw how others were incorporating role play in their classrooms is that role play can be more than simply giving students roles, or tasks to perform for a project. The ability for students to engage in a full role play exercise and interact with others and “act out” the experience can allow students to explore different facets of an issue and allow them to experience aspects of a project that they may not have otherwise experienced.

We will continue on this path for integrating these exercises into our course because we feel it enhances one our original goals for this course, increasing communication and interaction skills for the students. We are hopeful that these exercises will continue to provide a meaningful exposure to these often complex ideas of development process.

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