Cross-Cultural Experiences in Video Game Development Projects with Collaborative Online International Learning (COIL)

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Abstract: This paper presents cross-cultural learning experiences between two groups of students from a Canadian and a Japanese university, participating in video game development projects in a Collaborative Online International Learning (COIL) approach. The paper also documents how those experiences were related to the development of cross-cultural and socio-technical competences. The students worked together in teams through the Discord online communication platform, overcoming time zone differences by collaborating asynchronously. Students successfully designed and developed adventure video games based on Japanese folktales. The paper describes lessons learned regarding our COIL experience conducting cross-cultural video game development projects.

Introduction

This paper documents computer science students' experiences from a Canadian and a Japanese University collaborating in video game development projects, with the purpose of developing adventure video games based on Japanese folktales. Adventure games conform to a genre where players need to solve problems presented in a fantasy-like video game in order to progress in them (Cavallari et al., 1992). The students made the video games in a Collaborative Online International Learning (COIL) approach. COIL connects students and instructors from different parts of the world and with different cultural backgrounds in pedagogical activities (Appiah-Kubi & Annan, 2020; Rubin, 2017), such as online discussions and development projects that foster learning, following common learning goals and often supporting intercultural awareness (Jie & Pearlman, 2018). COIL can be useful in promoting intercultural competence and enhancing communicative language abilities in learners (Pouromid, 2020).

Adventure Video Games and Learning

Video games have been proposed and applied in educational settings for a number of decades (P.-Y. Chen et al., 2021). Well-designed video games used as an educational component can motivate learners, allow them to fail, compete and collaborate, potentially enhancing learning (Gee, 2006). Interactive fiction in video games can be used to develop novel and engaging learning environments (K. Squire, 2003). Adventure video games have been applied in educational domains such as in second-language learning. (H.-J. H. Chen & Yang, 2013) reports in a study with twenty-two university students who played a commercial adventure video game motivated them to improve their second language vocabulary skills. Past literature also claims that adventure video games support students' narrative skill development (Bing, 2013), as well as video games are a vehicle for cultural expression (LaPensée, 2021). Adventure video games have also been successfully used to promote cultural heritage (Sapio et al., 2021). However,

little is known about how video game development with educational purposes using COIL could enhance learning and support cross-cultural activities among students.

International Collaborations in Educational Game Development Projects

Online collaborative game development in international settings has been recently applied in the Global Game Jam (GGJ), a yearly international teams gathering for developing video games within a common theme (Fowler et al., 2013), running in parallel in more than 100 countries. Participants in the GGJ are generally high school and university students who collaborate developing games in teams in less than 48 hours. With the COVID-19 pandemic, the event was moved to run fully online from the year 2020. Previous to that year, teams gathered either in physical venues (typically university or college facilities) or communicated online for developing the games. Kultima & Laiti (2019) report a Finnish game jam organized to promote Finland's indigenous culture and languages through making video games. The games made in the jam were based on Sámi storytelling, traditions and technology. International, Finnish, and local Sámi (an European indigenous culture from the Nordic and Baltic countries) students participating in this event met and collaborated to develop games at a local facility and online through Discord. Discord is a free and popular communication platform that allows exchanging video and text calls, files and text messages (*Discord | Your Place to Talk and Hang Out*, 2022). It is being used as a communication tool by video game developers worldwide and lately it has been used to support student collaboration (K. D. Squire, 2022).

Our COIL Activities

Students from the Canadian University developed adventure video games following a rapid-prototyping approach (Lotfi et al., 2014) using Godot (Dhule, 2022) and Unity (Unity Technologies, 2022), which are popular video game development engines. These game engines allowed the students to create playable video game prototypes in a short period of time incorporating graphics, music and sound effects that students tested and improved in an iterative process. The students were organized into teams composed of two Canadian and three Japanese students each, collaborating online for three months in video game development projects following some initial guidelines, such as designing and making adventure video games only, incorporating folktales. Each team was asked to choose either a Canadian or Japanese folktale and develop an adventure video game according to the chosen folktale. The design and development of the video games developed in the COIL activities were akin to the video game development phases described by Fullerton (2018):

- Concept: Define the game concept, atmosphere and theme.
- Pre-production: Creating initial prototypes, writing game design documents, defining what artwork is needed.
- Production: Game artwork and code development; playtesting game prototype.
- QA: Testing the game prototype looking for bugs (software/game defects).
- Maintenance: Doing final corrections to the video game using feedback from the team members after the game was finished.

Both the Canadian and Japanese students actively collaborated online on Discord defining video game concepts (a game concept is a brief summary describing what the game is about), the game theme (the game's unifying idea) and the atmosphere (how the game will look and sound). The Canadian students designed, tested and developed the video games made in the teams. The Japanese students provided Canadian students with valuable ideas on game design, such as the type of music and graphics that the video games should have. Although both the Japanese and Canadian students suggested Canadian and Japanese folktales intended for designing the video game themes, atmospheres and stories, both the Japanese and the Canadian students agreed to include just Japanese folktales in their game projects. All the students used Discord for communicating with each other, exchanging game design ideas, folktales, messages and media files there. All the communications on Discord were done asynchronously due to the large time zone differences between Canada and Japan. Discord was an invaluable tool for all the students and the two instructors who participated in the COIL project. This tool has proven to be a useful tool in educational settings and in online teaching and learning, allowing students to collaborate and learn together effectively (K. D. Squire, 2022).

Our Discord server contained a general chat/message channel (chat room) allowing all the students to write messages on it, and the instructors used it for communicating messages to all the students, such as the deadlines for the COIL project. The instructors created one channel per team, where the team members exchanged ideas and information and kept communicating on their own game development projects. The channels were private, meaning that students from one team could read and write messages in their channel, but could not read or write messages in other channels. Both the instructors from the Japanese and the Canadian universities had access to all the channels to monitor the students' progress. None of the students used Discord's voice messaging feature. We believe that they felt more comfortable exchanging text messages on the Discord server. Figure 1 shows a screenshot of a video game made by a team, loosely based on a Japanese folktale called Old Man Flower, or Hanasaka-Jiisan in Japanese (*Hanasaka-Jiisan*, n.d.). The game revolves on a dog spirit called Will that is always trying to remember his past.

Figure 1. A screenshot of an adventure game made by a team showing Will the dog at the center.

Students steered Will the dog through the game scenario using the keyboard arrow keys. The game objective was to expose the player to objects that may help Will remember his life. The game included a Japanese visual style, such as the house design.

Lessons Learned

We devised some learned lessons and suggestions that lead to best practices for carrying out future COIL activities integrating video game development. These may also support any COIL project that involves learning through multimedia design and development.

Before running the COIL project:

- The instructors involved in COIL should carefully plan activities for themselves and the students. A Gantt chart is a project planning tool that can be used for scheduling the COIL activities in it, updating it by marking the progress on each defined task (Bednjanec & Tretinjak, 2013).
- Create a concise PowerPoint presentation for the students, showcasing the COIL project objectives and its process. The presentation should also include intercultural communication and awareness, as suggested by Naicker et al., (2021) and Jie & Pearlman(2018).
- Define doable and clear video game development activities for the students, according to the COIL duration.

During the COIL project:

- The Discord platform is a useful online communication tool that students can use for brainstorming game design ideas, and to keep communicating in the game development process.
- The instructors should constantly monitor the student communications in the Discord server, giving feedback to them if necessary.

- Be very clear about what students have to do in COIL, explaining their tasks on the first day of COIL. Post the tasks list on the Discord server.
- Emphasize the importance of COIL for developing cross-cultural skills. Explain how this will happen during COIL.
- Ask the students to test out the video game developments as early as possible, as soon as the students develop the first game prototype. This has been proven helpful for developing usable and fun video games (Garcia-Ruiz et al., 2020).

After the COIL project is finished:

- Wrap up the COIL activities by allowing the students to present their video games they made during COIL. This can be done either synchronously via a live video conference, or asynchronously via Discord or other online platforms where the students can post screenshots and pre-recorded videos on their video games.
- Ask the students to conduct a post-mortem on the video game that they developed. A post-mortem is an introspective exercise that analyzes what went right, what went wrong and what can be possibly improved in a game development project (Garcia-Ruiz et al., 2020). Writing a post-mortem is a self-reflection activity on the game development process where students learn about their past mistakes and successes.

Conclusions

The Japanese and Canadian students who participated in the COIL projects developed valuable socio-technical skills by engaging in video game development projects, practicing soft skills including project management and team collaboration and working towards a common goal of incorporating folktales in the developed video games. In addition, the students gained technical skills such as designing video games by defining key adventure video game elements. Based on the COIL experience described in this paper, we devised recommendations for further COIL activities that include video game development.

As Naicker et al. (2021) point out, COIL supports and enriches multicultural and international student collaboration in defined projects and learning modules in a cost- and time-effective manner, supported by the right software tools and learning activities. We found that Discord was a very useful tool for supporting asynchronous communication among students in their game development projects. Future work will include planning more COIL endeavors involving video game development projects and combining different online platforms that include synchronous communications. We plan to conduct user research analyzing students' opinions and feedback regarding the use of COIL in video game development projects with educational purposes.

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