# Students as developers of educational tools

## What educational challenges do they address and which learning approaches do they implement?

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**Abstract.**
Although game development students typically lack a formal pedagogical education, they typically have clear opinions and ideas for improving higher education learning practice based with years of school experience. In the Centre for Excellent IT Education, game development students were invited to pitch ideas of educational tools to address and improve content and learning approaches within higher education. Six student teams were offered summer jobs to implement the ideas. The study has investigated their products, and through an explorative qualitative artefact analysis, a sample of 6 student-created educational tools have been analysed. The thematic analysis answered the research questions: 1) What educational challenges do the students address when creating tools to improve higher education? 2) What learning approaches do students implement when they develop educational tools? The findings show that the student-created educational tools address both soft and hard skills. The findings also reveal a wide variation in the complexity of the educational challenges, evident in the scope and depth of the learning objectives embedded within the tools, including vocabulary acquisition and understanding simple commands as well as simulating intricate processes navigating a multifaceted environment. The analysis shows that the students have developed tools focusing on content creation, exploration, competition, collaboration, articulation, but also research-based professional methods as pedagogical approaches and classroom-based tools. It shows how student involvement can be implemented through the role as developers of learning tools, hence addressing educational challenges, with learning approaches based on cognitive constructivism and socio-cultural learning theories.

**Keywords:** student involvement, educational approach, students as developers.

## 1 Introduction

In the European Standards and Guidelines (ENQA, 2015), student involvement is highlighted as a fundamental aspect of quality assurance in higher education (HE). The ESG guidelines emphasise the central role of students in shaping education, encouraging their active participation in learning processes (Standard 1.3), and involving them in programme design (Standard 2.2). Students are also key participants in external evaluations (Standard 2.4) and governance (Standard 3.1) (Stensaker & Matear, 2024).

Stensaker and Matear (2024) outline three perspectives on student involvement in quality assurance: participation in decision-making and governance, engagement as stakeholders, and partnership in the design and organisation of teaching and learning. Similarly, the SPARQS model of student involvement consists of four roles: information provider, actor, expert, and partner. Students offer feedback, analyse data, share experiential knowledge, and engage in dialogue with educators to improve educational processes (Varvell, 2021).

These frameworks for student involvement in quality assurance often fail to empower students to take a more creative and autonomous role in shaping the learning tools and environments they use. This study seeks to extend the SPARQS model by introducing a potential fifth step: student creation of learning tools. Specifically, the research investigates how game development students in HE address educational challenges when allowed to design and develop digital learning tools. Current gaps in the literature on student involvement tend to focus on students as feedback providers or partners, but there is limited exploration of students as creators of educational solutions. This is especially relevant in disciplines such as game development, where students possess unique design, problem-solving, and digital tool creation competencies. If harnessed in educational contexts, these skills could transform traditional student involvement and quality assurance approaches.

This study examines a unique initiative led by the Centre for Excellent IT Education in Norway (Excited), where students are partially involved in quality assurance processes. Game development students were invited to pitch ideas for educational tools to improve HE. Successful pitches were supported by three months of funding, during which student teams developed and implemented their tools. This research is situated within broader trends in Higher Education, like the shift towards student-centered learning and the integration of technology-enhanced education. This study contributes to ongoing discussions on innovation in educational practice by examining how students co-create digital tools.

The objective is twofold: first, to explore what game development students address when they are allowed to improve higher education courses, and second, to analyse how they approach these challenges through the development of digital tools. The findings are discussed in the broader context of student involvement, offering insights into the evolving role of students as creators and innovators.

The focus on students' roles as creators of educational tools addresses a gap in the literature, where most research has focused on students' perspectives on course content and team dynamics rather than their active participation in educational tool design. The following section reviews the relevant body of work on HE game programmes, highlighting key studies that address student perspectives on learning, team dynamics, and curricular development. While these studies offer valuable insights into student experiences in game education, they also underscore the need for research into more active forms of student involvement, such as the creation of digital tools.

# 2 Related work

## 2.1 Student Perspectives in HE Game Programmes

Despite the existence of HE game programmes for over two decades (Keogh & Hardwick, 2024; Hiltunen et al., 2024), there is a surprising lack of research focused on students' perspectives regarding the prerequisites, syllabus, and curricula. Nevertheless, insights can be gleaned from existing studies. Palmquist et al. (in press) used an exploratory focus group with HE students from diverse disciplines and backgrounds. The findings show that students with software development experience and postgraduate qualifications faced learning challenges due to low proficiency in game-related technologies. These challenges hinder their skill development and growth in game creation. The focus group data further revealed that less proficient students rely heavily on their more skilled peers, leading to frustration and negatively impacting team dynamics (Palmquist et al., in press).

## 2.2 Group Dynamics and Collaboration in Game Development Projects

Group dynamics play a crucial role in student game-creation projects. Palmquist et al. (in press) emphasised the importance of onboarding activities in preventing conflicts within game-creation projects. These activities are crucial for fostering collaborative group dynamics and promoting team cohesion. Similarly, to introduce new HE game students to the game creation process, Peng (2015) and da Rocha-Neto et al. (2018) suggest implementing introductory courses that help students understand the essential elements and frameworks and how these components must align to ensure a productive process. Munkvold et al. (2023), through an analysis of student reflections documented from a conflict management seminar, also underscores the critical importance of equipping students with conflict management strategies. They argue that introducing game students to the fundamentals of conflict management is essential, as it plays a vital role in determining the success of student-driven game projects.

## 2.3 Pedagogical Approaches to Game Design Education

Several studies explore pedagogical approaches in game design education. Based on interviews with HE students, De Paula (2024) argues that game design teaching should prioritise critical thinking over technological tools. De Paula (2024) argues for an approach that encourages students to think critically and independently about game creation tools and processes. De Paula's (2024) highlights that understanding game design is a gradual process, with students' perceptions of their educational experiences playing a crucial role in either facilitating or hindering their development of a critical and diverse foundation of knowledge and practice. The limited research on students' perspectives regarding the prerequisites, syllabus, and curricula of game courses, there is also a need for more comprehensive research on how to educate university students in game creation effectively (Wyeth et al., 2018). The presented research highlights the critical role of active learning techniques in cultivating students' competencies and skills within

the game creation context (Alphonce et al., 2016; da Silva, 2022; Jiravansirikul et al., 2017, Munkvold, 2017).

### 2.4 Extracurricular Support and Industry Connections

Zagal's (2020) interviews with educators highlight four key extracurricular initiatives: community building, professional identity, broadening experience, and industry relations The Broadening Experience category highlights workshops as a specific extracurricular activity. These workshops offer focused teaching and learning experiences designed to meet the particular needs of subsets of the student population. They provide opportunities for students to catch up on specific tools or techniques, supplement their coursework, or enhance skills that require further development (Zagal, 2020).

### 2.5 Integrating Industry-Relevant Practices into Game Curricula

Previous work highlights the need to integrate industry-relevant technologies into HE game courses to better prepare students for the demands of the game industry (Bidarra et al., 2008; Mikami et al., 2010). Familiarising students with collaborative, role-specific teams that mirror real-world game production is also crucial (Alphonce et al., 2016; da Silva, 2022; Munkvold, 2017; Timcenko et al., 2017). Moreover, studies advocate for aligning HE game curricula with game industry conditions and expectations. Such alignment creates a skill-oriented learning environment that effectively prepares students (Mikami et al., 2010; Jiravansirikul et al., 2017; Timcenko et al., 2017).

The existing body of research on HE game programmes reveals a critical examination of their effectiveness in preparing students for game careers. Studies highlight challenges students face, including difficulties in mastering game-related technologies and the impact of these challenges on team dynamics (Palmquist et al., in press). The literature also underscores the importance of introductory courses, conflict management strategies, and onboarding activities in fostering productive learning environments, supporting the importance of soft skills (Peng, 2015; da Rocha-Neto et al., 2018; Munkvold et al., 2023). Additionally, research advocates for a broader educational approach balancing technical skills with critical thinking and contextual understanding (De Paula, 2024). Furthermore, extracurricular initiatives are identified as crucial in enhancing students' development aligning education with industry demands (Zagal, 2020; Bidarra et al., 2008; Mikami et al., 2010). While the literature offers valuable insights into the challenges and opportunities in game development education, it calls for further research to inform best practices in this evolving field.

## 3 Research methods

The study aims to explore student-made educational tools through a qualitative artefact analysis, guided by the Digital Game Analysis Protocol (DiGAP) (Daneels et al., 2022). DiGAP consists of 31 items categorised into seven sections: 1. Rationale and objectives, 2. Researcher background, 3. Game selection, 4. Boundaries, 5. Analysis

approach, 6. Coding techniques and data extraction and 7. Reporting and transparency. Our artefact analysis is based upon student-made artefacts, to investigate the students' approaches to improve a game development study program.

### 3.1 Sample and Data collection

In Excited, one way to involve the students has been to hire students in summer jobs to create digital games to be used in their own educations. Students from the international study program Games and Entertainment Technology at Nord University were invited to apply for a summer job by pitching ideas of educational games during the spring, and based on the pitches, some teams were invited to interviews. Based on the application, interviews and a project plan, some student teams were offered summer jobs. Six educational tools have been developed, based on the educational ideas of the student teams. Four of the tools were games or gamification tools and two were general tools for game development students. The teams consisted of 2 - 7 students. All teams have been multinational teams, and two teams were granted funding in two rounds to improve and finish their tools. An overview and description of the student-made educational tools are provided below, see screenshots appendix 1.

Table 1

| Title & Year | Category | (Temporary) link |
|---|---|---|
| Cards of conflict (CoC) (2022) | Gamification tool | https://gamejolt.com/games/CardsofConflict/689375 |
| Bibliobluff (BB) (2023 & 2024) | Gamification tool | https://play.bibliobluff.com/credit/ |
| Component Lab (CL) (2023 & 2024) | Learning support | https://tusj.itch.io/component-lab |
| ModelMaster (MM) (2024) | Learning support | https://hengikken.itch.io/model-master (password:1234) |
| BlazeStorm (BS) (2024) | Brainstorming process tool | https://marzlars.itch.io/blazestorm |
| Monkey Business (MB) (2024) | Game | https://borari.itch.io/monkey-business (password: bananas) |

CoC was developed by a team of six students, where the funding for the summer job was used to start up their company, called North Camp Games. This tool is designed to equip students to manage and reflect upon conflict management, relevant to their team- and project-based learning courses. CoC presents 12 realistic conflict scenarios, each with possible solutions focusing on Thomas & Kilmann's (1974) five modes and strategies for managing conflicts. CoC requires students to work in teams to discuss and agree on the best conflict resolution strategies, with the teacher as the game master in a classroom setting.

BB was developed by a team of three students. The tool gamifies the reading of academic texts by making it an interactive experience where you compete with your peers in a social deduction game, trying to expose who is the imposter in the game through reading, presenting, and voting activities.

CL was developed by two students. CL teaches newcomers how they can program in Unity; learn what different components the game engine offers and what they do. CL gives the player the possibility of testing different functions and learning via trial and error, as a puzzle game which is fun to play and teaches the basics of Unity, as well as giving the players the opportunity of developing their own levels.

MM is a learning support tool developed by two students. MM is designed as a mobile app with structured chapters, simple explanations, and interactable visual examples where the user can easily access information about 3D modelling rules and terminologies that apply to most 3D software.

BS was developed by four students. It gamifies and streamlines the process of brainstorming game ideas into 4 steps in a local multiplayer setting. BS's main goal is to encourage students to think creatively and not being too hesitant about sharing their ideas in a group setting.

MB was developed by four students. MB is a single player top-down strategy and simulation game that teaches how to manage a game development team, in a stressful context, with a comedic twist.

Even though the six tools chosen for this study are functionable tools, five of the tools need or are still in development. The study is based on the versions of the tools by August 20, 2024. The walkthrough was done using mobile phones and PCs.

### 3.2 Data analysis

The data is analysed using thematic analysis (Braun & Clarke, 2006) of the tools. The analysis process is inspired by Eggebø's (2020) collective quality analysis approach to thematic analysis, including 4 stages: 1) Common walkthrough of the data, 2) Identifying themes, 3) Sorting and relating themes and 4) Creating disposition and a workplan for the writing process.

In the data walkthrough we collectively tried out each tool, to familiarize with the data. The initial coding was done by author 1 & 2 using post it notes. Each tool was assigned two code clusters, reflecting RQ1 resp. RQ2. For research question 1, 26 initial codes were generated, e.g., professional language, solution-oriented, management styles, teamwork. For research question 2, 73 initial codes were generated, e.g., simulation, exploration, learning by doing, research-based, discussion, etc. While identifying themes, we continued to separate the work into two parts, reflecting the two research questions. Examples of early themes were exploration, articulation, research, and cognitive processes. Two researchers spent a full day performing the 2 first stages of the collective quality analysis (Eggebø, 2020). From stage 3, a third researcher was included in the analysis. The researchers are all teachers/associate professors within HE, from the same university as the students. All researchers are associated with Excited, and are experienced researchers within computing education research, game development and educational technology / technology-enhanced learning. The researchers are

from two nationalities (Sweden and Norway), with one female and two male researchers.

The findings may be influenced by the students' study programme, including specific courses, topics, and teaching strategies.

# 4 Findings and discussion

This chapter will present findings and discuss implications from the project. The first part introduces RQ1, looking into what educational challenges are addressed as part of the educational tools developed by students within the program, looking at what course types are addressed, what skills are focused on, the complexity implemented, and the cognitive level addressed. The second part addresses RQ2, presenting and discussing learning approaches which the students implemented as part of their educational tools, like content creation, exploration, collaboration, competition, and articulation. We also discuss how some of the student-made educational tools are using research-based professional methods as a pedagogical approach and how the implementation of the tools is both designed for in-classroom activities.

## 4.1 Educational challenges

The specific educational challenges addressed through the tools (RQ1) are conflict management in project work (CoC), team management (MB), the reading and understanding of academic texts (BB), introductory Unity programming (CL), vocabulary / terms and concepts within 3D modelling (MM) and the secure process of a structured brainstorming process with anonymously sharing ideas within a group (BS). The analysis further ended up with three main themes regarding what educational challenges the students addressed: Skills for a future career, complexity of educational challenges, and cognitive process dimensions.

The students are addressing a variety of courses, from project-based courses (BS, CoC, MB) to programming (CL), art through 3D modelling courses (MM) and theoretical courses (BB). These course types also reflect the study program, which the students are part of. The backbone of the study program is the implementation of game lab courses (project-based courses) in each semester. All student-generated tools can be related to the game lab course in one way or the other, except one (BB). The sections below present the main findings addressing RQ1.

**Skills for a future career.**
The tools address both soft skills and hard skills. Among soft skills, the student-made tools are focusing on conflict management, team lead skills, presentation skills, collaboration, communication, and process management. We also observe soft skills as a factor within the BS tool, as the participants are to make use of their creativity during the brainstorming process. The students exemplify, through their focus on soft skills, a similar emphasis as De Paula (2024) argues for, a shift away from overemphasising technology and algorithmic methods in game design education. She further argues for an

approach that encourages students to think critically and independently about game creation tools and processes, and even though the student-made educational tools address several soft skills, critical thinking is not one of the skills we find in their games.

Regarding hard skills, some tools address e.g., Unity programming, Maya commands, reading and understanding academic texts, and professional vocabulary. This relates to previous research arguing for the necessity of integrating industry-relevant technologies into HE game courses, emphasising that this will better prepare students for the demands of the game industry (Bidarra et al., 2008; Mikami et al., 2010).

**Complexity of educational challenges.**
There is a wide variation in the complexity of the educational challenges that the students address when making learning tools. Looking into the content of the tools, them exemplify that student find both basic content and complex content challenging. In one of the tools, the focus is on learning basic vocabulary and simple commands in your own pace (MM), while another tool is implementing the complex process of team management (MB), where the player must juggle skills sets, task division, stress levels, etc. in a stressful work situation, with a constant changing environment and diverse issues with game development progression and team members' stress level. This can be related to Scanlon (2021), who acknowledges the broader influences on the development of educational technology and the complexity of the challenges facing the field and its practical applications.

**Cognitive process dimensions.**
Bloom's revised taxonomy (Anderson et al, 2001) defines categories of the cognitive process dimension and we found that different tools cover several categories. MM fits the Remember / Understand categories, as it challenges you to remember and grasp the vocabulary used within the field through an index connecting the vocabulary to videos instructing and explaining the different terms and how they are used. It also gives the player a possibility of testing their understanding with short assignments where they can test the topic at hand. BB fits into the Understand and Apply categories, as you must read and interpret academic texts to be able to summarise and explain the given topic to other participants. BS and MB can be categorised under the Apply category. With BS you are given an assignment where you must apply your skills and knowledge to produce game ideas. For MB you play as the team leader and need to apply your skills to assign suitable tasks to your group of employees and manage the employees' stress level to make sure they produce well. The CoC gamification tool fits to the Analyze and Evaluate categories, as the players, in teams, discuss different solutions for managing conflict scenarios and where they need to reason for their choices. One feature of the tool CL fits into the Create category, where the players can use a built-in tool to create their own levels.

### 4.2 Learning approaches

Concerning learning approaches (RQ2), the analysis shows that the students have implemented tools focusing on the following learning approaches: content creation, exploration, collaboration, competition, and articulation as well as research-based professional methods as pedagogical methods and classroom-based tools. The sections below present the main findings addressing RQ2.

**Content creation.**
Two of the student teams created content creation tools, where the teacher / player can add their own content: In CoC, the teacher can add their own scenarios with given solutions and then play the new scenarios with the students. This is also possible in the CL game, where the player can create new levels. Even though two of the student-made tools allow the user to create content, there is a difference if the content is teacher-made or student-made. In a constructivist learning environment, active learning is important (Prince, 2004) and allowing the learner to create their own content may be valuable in a learning setting.

**Exploration.**
Several of the tools presented learning activities taking on an explorative learning approach. The MB game simulates a work environment for project work where the player is a project lead and the choices the player makes affect the dynamics of the gameplay and final score. In CL, the game simulates a simplified Unity environment, where the players write programming commands and where actions are simulated and visualised, based on the given input. Both MM and CL give the player an opportunity for trial and error through their sandbox design. The player can repeat the actions as many times as necessary to master each level. This is similar to Kanyaru & Maina (2019), who emphasizes the importance of how computer simulations help learners conceptualize concepts within science subjects.

**Collaboration.**
The collaboration aspect is clearly an important design choice within the games BS, CoC and BB, and matches Alphonce et al. (2016), da Silva (2022), Munkvold (2017) and Timcenko et al. (2017), who emphasized that it is essential to familiarise students with collaborative practices in role-specific teams that closely mirror real-world game production environments. In BS, participants are urged to collaborate, producing game ideas with given design choices, in a safe environment, where all ideas are anonymous. In CoC, students are divided into teams where they need to collaborate within the team to find the right solutions to the scenarios presented by the game master. The BB game starts with an individual presentation by all participants and is continued with a collaborative element, where participants need to figure out who the imposter is.

**Competition.**
The competition aspect is seen in the games CoC and BB. In both games, students are competing and given a score, based on their answer (CoC) and on figuring out who is the imposter (BB). In CoC students compete in teams, while in BB students compete against each other individually. Burguillo (2010) describes how friendly competitions provide a strong motivation that helps to increase the student performance. The competition-based learning in the student-made games also use rewards as a motivational element.

**Articulation.**
Based on the theories of both Vygotsky and Bakhtin, Postholm (2008) emphasises the importance of using both the oral and written language as a mediating tool in the learning process, also in HE. This is also reflected in some of the student-generated learning tools. In CoC, the students need to discuss different solutions to team conflicts in groups and decide as a group which of the solutions to choose. In BB, each student needs to orally present a text they just read in their own words, in a convincing way to avoid being accused of being the imposter. The articulation of subject content is a valuable tool, according to modern learning theories. Seeing that students, with no prior formal pedagogical education, put this much emphasis on articulation of subject content, even related to digital tools, is interesting and suggests that the students find it important in a learning process.

**Research-based professional methods as pedagogical approaches.**
Three of the games have addressed research-based knowledge in the games, but in diverse ways. CoC implements the concept of conflict resolution strategies (Xia et al., 2020) and the Thomas & Kilmann (1974) conflict model's five modes of conflict management: Accommodating, Avoiding, Compromising, Competing, and Collaboration (Algert et al, 2021). The five modes of conflict management are a crucial part of the game. BS is also based on a research-based professional method, taken from a lecture and workshop with a researcher who presented an alternative view on brainstorming processes, making it anonymous and adding game design elements as part of the process and input. In the MB game, you can, as a player, enter the role as a team lead, reading up on theories about team leadership. These are not implemented into the gameplay but is accessible if you would like to learn more about how to succeed as a team lead, and you can, as the team lead character of the game, implement these leadership strategies if wanted.

With BS, the students were introduced to an alternative when it comes to working with brainstorming processes and BS is inspired from this lecture. As for the CoC and the MB games the students did their own research on the given topics. The students' implementation of these research-based professional methods in their tools is interesting, especially when implemented as pedagogical approaches. It reflects a need and desire for a professional environment in HE learning situations. This is often exemplified through students' demands to learn professional tools in HE (Guzdial, 2014) but in

these cases it shows that professional methods also are important, even as pedagogical approaches.

**Classroom-based tools.**
Even though all student teams developed digital educational tools, two tools are in-class tools. CoC is run by a game master (often the teacher) and students are divided into groups where they discuss possible strategies for solving the given conflict case, and then, based on the case and the strategies for conflict management, each group must choose what management style they would like to take. The game master then reveals the "right" strategy and teams are rewarded points based on their choices. The BB game is also a group-based tool, to be played in a classroom setting and as part of a physical learning environment, where students will be organised in groups. The students will then present assigned academic texts, where one of the participating students will have to present a false topic to the group. Each participant will then try to figure out who is the imposter. The social aspects of the classroom-based tools reflect important parts of socio-constructivist learning theories (Vygotsky, 1978), where one should facilitate social situations.

### 4.3 Learning approaches and learning theories

Even though the students do not have a formal pedagogical education, they contribute with educational tools where they implement learning approaches based on both cognitive constructivist theory of learning and socio-cultural learning theories. As IT technology started to emerge in education, many of the early tools were based on an instruction approach, based on behaviorist theory of learning (Koschmann, 1996). A "drill and practice" approach is often an easy solution when creating educational technology. This approach was not used by the students developing their educational tools. Koschmann (1996) further describes three other paradigms. The ITS paradigm emerging in the 1970s, was influenced by information processing theory and characterised by one-to-one tutorials, while the Logo-as-latin paradigm, emerging during the 80s, was distinguished by discovery-based learning and cognitive constructivist theory of learning. Our analysis shows that the students have adopted exploration as a learning approach. The computer-supported collaborative learning paradigm was based on socially oriented theories of learning, characterised by collaborative learning. Several of the student-made educational tools have implemented collaboration as a learning approach.

## 5 Conclusions

A common way of involving students in the quality work of HE is to involve students as information providers, actors, experts, and partners (Varvell, 2021). They provide information by completing surveys and providing feedback or collect and analyse feedback. As experts, students' competence is recognised as valuable in developing learning practices and as partners, students engage in authentic, constructive dialogue, contributing directly to improving educational processes (Varvell, 2021). In this study,

students had a developer role, to improve the quality of their study program through the development of educational tools for their study program. The aim of this study was twofold: 1) exploring what game development students address when allowed to improve HE courses, and 2) to analyse how they approach these challenges through the development of digital tools. For RQ1, the research found that the tools have addressed both soft skills and hard skills, relating to the industry expectations. There is also a complexity within the topics, addressing curricula basics (professional vocabulary and hard skills), soft skills, addressing typical need for project-based courses and team management and, at last, approaching the learning activities at several levels of Bloom's revised taxonomy (Anderson et al, 2001).

As for RQ2, students have designed their tools focusing on themes such as content creation, exploration, collaboration, competition, articulation, and research-based professional methods as pedagogical methods. They have also designed tools for both individual and in-class learning contexts. Generally, the tools are addressing typical competencies relevant for addressing skills needed (both soft and hard skills) to better be prepared for project-based courses in game design.

The study offers insights on student involvement, specifically focusing through students' creation of learning tools. This study suggests an extension of the SPARQS model of student involvement through a fifth step: students as creators of learning tools.

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# Appendix 1

This appendix gives an added overview of the student- made games mentioned in the paper. This includes figures (screen dumps) of the given games.

Table 1 gives a short overview of the games developed, including links to where more information can be found and where playable versions of the games can be downloaded.

Table 1

| Title & Year | Category | (Temporary) link |
|---|---|---|
| Cards of conflict (CoC) (2022) | Gamification tool | https://gamejolt.com/games/CardsofConflict/689375 |
| Bibliobluff (BB) (2023 and 2024) | Gamification tool | https://play.bibliobluff.com/credit/ |
| Component Lab (CL) (2023 and 2024) | Learning support | https://tusj.itch.io/component-lab |
| ModelMaster (MM) (2024) | Learning support | https://hengikken.itch.io/modelmaster (password:1234) |
| BlazeStorm (BS) (2024) | Brainstorming process tool | https://marzlars.itch.io/blazestorm |
| Monkey Business (MB) (2024) | Game | https://borari.itch.io/monkey-business (password: bananas) |

The **Cards of Conflict** gamification tool (CoC) was developed by a team of six students, where the funding for the summer job was used to start up their company, called North Camp Games. This is defined as a gamification tool, designed to equip students to handle and reflect upon conflict management, relevant to their team- and project-based learning courses. Cards of Conflict presents 12 realistic conflict scenarios, each with possible solutions focusing on Thomas & Kilmann's (1974) five modes and strategies for managing conflicts. The tool requires students to work in teams to discuss and agree on the best conflict resolution strategies, with the teacher as the game master in a classroom setting.

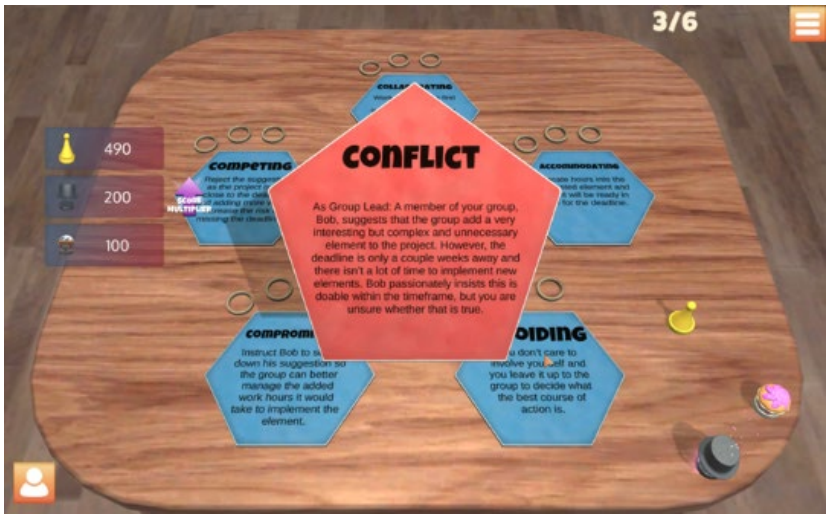


**Fig. 1.** Cards of Conflict

The **Bibliobluff** gamification tool (BB) was developed by a team of three students. The tool gamifies the reading of academic texts by making it an interactive experience where you compete with your peers in a social deduction game, trying to expose who is the imposter in the game through reading, presenting and voting activities.

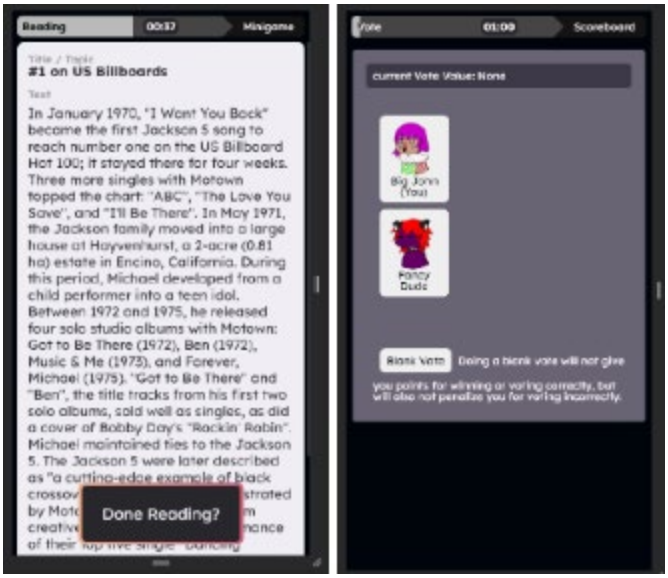


**Fig. 2.** Bibliobluff

The **Component lab** (CL) learning support tool was developed by two students. CL teaches newcomers how they can program in Unity, learn what different components the game engine offers and what they do. CL gives the player the possibility of testing different functions and learning via trial and error, as a puzzle game which is fun to play and teaches the basics of Unity, as well as giving the players the opportunity of developing their own levels.


**Fig. 3.** Component Lab

The **Model Master** (MM) learning support tool was developed by two students. MM is designed as a mobile app with structured chapters, simple explanations, and interactable visual examples where the user can easily access information about 3D modelling rules and terminologies that apply to most 3D software.


**Fig. 4.** ModelMaster

The **Blazestorm** (BS) tool was developed by four students. It gamifies and streamlines the process of brainstorming game ideas into 4 steps in a local multiplayer setting. BS's main goal is to encourage students to think creatively and not being too hesitant about sharing their ideas in a group setting.

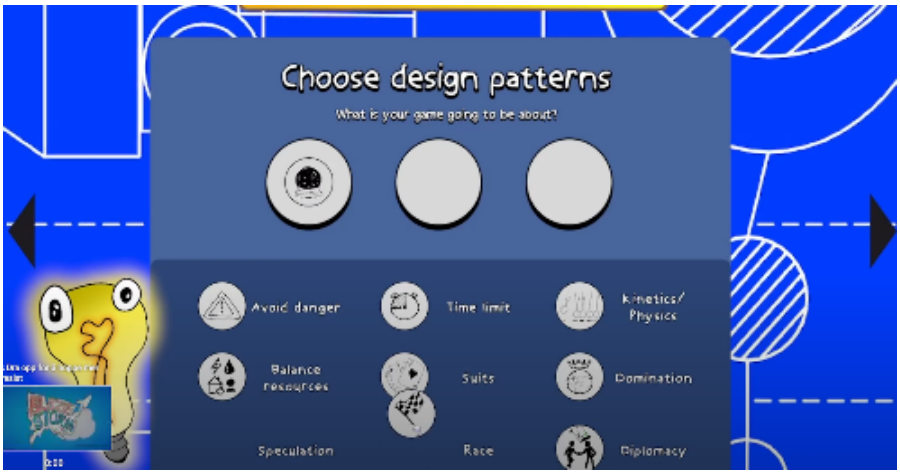


**Fig. 5.** Blazestorm

The **Monkey Business** (MB) game was developed by four students. MB is a single player top-down strategy and simulation game that teaches how to manage a game development team, in a stressful context, with a comedic twist.


**Fig. 6.** Monkey Business