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A Serious Game Exploring Diversity of Perspectives in Citizenship Education

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A Serious Game Exploring Diversity of Perspectives in Citizenship Education

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Abstract

Within citizenship education, a new focus is being laid upon what is expected of citizens within a diverse society. More emphasis is placed on teaching students how to understand and respect other people's opinions, regardless of how they may contrast with one's own. However, learning to be tolerant with others' viewpoints comes with hurdles, as it is quite easy to become stuck within one's own worldview. We designed and developed *Diermocratie*, an in-classroom game aimed at encouraging a more open conversation, which breaks through these hurdles and addresses key competencies such as empathy and argumentation. By a role-playing allegory that parallels real-world events, students explore their own predispositions, are made aware of the perspectives of others, and are enabled to discuss issues objectively. From a preliminary evaluation, most students could identify the parallelism between the in-game allegory and real-world situations. They also indicated that the game motivated them to further talk to each other,

approaching sensitive topics among them.

Keywords: Multiple perspectives, Citizenship Education, Diversity, Serious games

1. Introduction

Traditionally, citizenship education has laid the focus on teaching students to become ‘well-behaved’ citizens. However, over the last decade or so, this paradigm has been shifting. In addition to highlighting which morals are expected from citizens, a new focus is being placed on shaping citizens who think critically and participate actively in society. This change in paradigm can be attributed, in part, to the fact that society has become more fast-paced than ever. It has never been easier to acquire information or connect with like-minded individuals that share common thoughts and opinions. While such advancements have brought our standard of living to a new high, there are some significant downsides to these developments as well. Polarization, the phenomenon where opposing attitudes become increasingly divergent, making it difficult for different groups of people to communicate effectively, has increased significantly over the last decades [33]. Through emphasizing the importance of critical thinking skills and opinion acceptance within citizenship education, new education efforts attempt to address issues such as polarization early on. With such an approach, students of varying levels can realize the value of different opinions, as well as learn where and how each of them is grounded. It is expected that this approach should lead to more open and respectful participating citizens.

However, actually applying this strategy in the classroom has proven to be quite challenging [24,23]. Topics that are both relevant to the students and useful in this context are often sensitive to discuss in class. In the Dutch vocational system, for example, where classrooms are most diverse in terms of demographic background, vastly different opinions limit an open discussion. In such settings, teachers may not have the necessary skills and comfort to lead such complex discussion. Moreover, leading complex discussions becomes even more challenging as teachers recognize that their own point of view could also influence the debate.

In this article we explore how some of these hurdles can be overcome through the use of serious gaming. By encouraging a fictional discussion in an anonymized multiplayer online setting, we investigate whether vocational college students are more open to discussion and self-reflection when faced with an allegoric parallel of a real-life debate. The research question we try to answer with this article is:

How could a serious game utilize an allegory of a real-life scenario, to promote open conversations about complex and sensitive topics among students in vocational education?

Through this research, we contribute insights to the debate around polarization, and we demonstrate how the effects of clashing worldviews may be mitigated through the use of allegoric gameplay. In acknowledging related work, we build upon existing research in the domain of education and critical discussion, and we explore the role of serious gaming in

facilitating open discussion in an education context. We then introduce our game design, describe its prototype implementation, and present its evaluation in serving as a tool for educators to encourage a multi-perspective approach to conversation in the classroom. Finally, we conclude with a summary of our findings and point out a number of promising directions for further pursuing this research. A preliminary version of this article was presented at ICIDS 2021 [8]).

2. Related Work

There is extensive research regarding the discussion of sensitive topics in the classroom. A good example is a 2016 paper by Kello [19], which notes that multiple factors ranging from fear of a backlash from their students to feeling re-strained by their own belief, prevent teachers from leading classroom discussion about these sensitive topics. A disconnect between instructor and student culture can also lead to instructors feeling as if they do not possess the cultural literacy to approach sensitive social issues which affect students very differently. Because of this, instructors can often feel uncomfortable facilitating and leading conversation about sensitive topics. If classroom instructors lack the experience, skills, and confidence to facilitate open conversation about socially sensitive topics with students, then it is likely very difficult not only to ensure any deep conversation at all, but also to facilitate critical self-reflection and exploration of multiple perspectives.

The second barrier is groupthink, or the phenomenon of a group of people shifting towards a complacent decision that often disregards individual perspectives [17]. This is something that strongly applies to classroom dynamics. As indicated by Johnson and Weaver [18], “students rarely enter into lengthy conversations regarding course material with other students or teachers outside the classroom context. When such conversations do take place, it seems more common to hear a recitation of things heard in class rather than a disparaging or challenging of class statements or positions.” In order to avoid social exclusion or in an attempt not to offend others, groups of students might not accurately represent their range of opinions due to group think.

A person’s worldview is the way in which a person gives meaning to their surroundings through their own values and expectations. However, when different worldviews clash, this may form a barrier in the classroom. In a recent article by Brandt and Crawford [9], a clear overview is given on how through the protection of their own worldview, people are likely to reject conflicting worldviews. This study found that prejudice through worldview conflict is present in almost all worldviews, regardless of, for example, openness or cognitive ability. Since there are many different worldviews colliding within the multicultural classrooms of vocational college education, it may very well be that certain prejudices are ex-pressed, or even formed, within this setting. This would greatly impact open conversation and truly understanding other people’s opinions.

2.1 Barriers to Classroom Conversation

There is extensive research regarding the discussion of sensitive topics in the classroom. A good example is a 2016 paper by Kello [19], which notes that multiple factors ranging from fear of a backlash from their students to feeling restrained by their own belief, prevent teachers from leading classroom discussion about these sensitive topics. A disconnect between instructor and student culture can also lead to instructors feeling as if they do not possess the cultural literacy to approach sensitive social issues which affect students very differently. Because of this, instructors can often feel uncomfortable facilitating and leading conversation about sensitive topics. If classroom instructors lack the experience, skills, and confidence to facilitate open conversation about socially sensitive topics with students, then it is likely very difficult not only to ensure any deep conversation at all, but also to facilitate critical self-reflection and exploration of multiple perspectives.

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2.2 Dutch Citizenship Education

In the Netherlands, a citizenship curriculum has been developed to cope with some of the challenges that students may encounter in current society [27]. This curriculum is broken down into three main themes: democracy, diversity, and globalization. Particularly, the theme of diversity is relevant to this research. The curricular theme of diversity is focused on a set of competencies that are to be developed by the students. Competencies like self-awareness, context, empathy, argumentation, and complexity of relations are critical for diversity education. These competencies give a good indication of what is expected of students in diversity education curricula. In this subsection we will dive into how we can best achieve these goals through gameplay.

Self-Awareness *Self-awareness*, or critically evaluating one’s own actions and thoughts,

is key to an open discussion. Benbassat and Baumal [7] discuss six teaching methods for enhancing self-awareness in medical students. Of these, two techniques appear to be applicable to our scenario: *classroom discussions* of emotionally challenging situations, and *small-group discussions* in which personal experiences are shared. In particular, the latter has been used to address prejudices in medicine, by asking questions to determine whether individual students have themselves felt prejudice against particular patients.

Social Context Understanding the *social context* of a certain discussion and its stakeholders, is also crucial for it to be open. Through peer-to-peer communication, people are able to develop implicit social inferences which serve as context [35]. This context encourages conversation, thus promoting social interaction [1]. Thus, in developing context through peer-to-peer interaction, students can learn to engage in conversation with one another, no matter the diversity and differences in their backgrounds.

Empathy *Empathy*, or the capacity to recognize the feelings of other people, needs to be developed as well. Through group learning experiences, such as cooperative learning, vocational college students can develop empathy [4]. They can then use their developed empathy to inform knowledge and skills obtained in the classroom for conscious action [15].

Argumentation *Argumentation*, the process of arguing in an organized way (cf. https://www.collinsdictionary.com/dictionary/english/argumentation), is a key competency in citizenship as well. Structuring arguments leads to a better understanding of your own rationale. A common argumentation framework is the Toulmin method, presenting a model in which arguments are broken down into six parts: claim, grounds, warrant, qualifier, rebuttal, and backing [20]. This method has been used in classroom exercises to build argumentation skills [12], and may be applicable to a serious game, should that game want to confront students with arguments that they need to analyze.

Diversity Finally, it must be understood by students that relations within a debate are inherently *complex*, especially those within a diverse educational setting. Disproportionate representation within a classroom, in combination with cultural misunderstandings, can strain relationships in multicultural educational settings. Dynamic and engaging cooperative learning can encourage vocational college students to interact with one another and forge meaningful relations with each other, regardless of the complexity associated with diversity [16].

2.3 Serious Gaming in Social and Educational Contexts

Serious games have long been successfully designed and deployed to change, or at least influence, the mindset of players regarding very disparate and complex topics, from dealing with prejudices around home retrofitting [13] to raising understanding for the complexity of maintaining large infrastructure systems [3]. In educational contexts, there has also been increasing research into designing serious games that help students overcome known personal and social hurdles in their student life, including overcoming obstacles to their personal productivity [29], providing early ice-breaking within newly-

formed teams [32], and stimulating psychological safety among project colleagues [2].

Starks [34] provides a comprehensive overview of important elements of serious game design. One finding that stands out from her research is that students learn best when the information is presented in a real-world setting and when the information incorporated is of the students' interest. According to Starks, selfawareness seems to be promoted when the player experiences empathy during gameplay.

Darfur is Dying [30], a game world situated in Darfur, western Sudan, is an example of an empathy-provoking serious game. In this game, the player plays a refugee who has to find water for their village while not being captured by soldiers. The game attempts to let the player experience life as a Darfuri refugee and, as a result, to bring attention to the war situation by increasing empathy in the player.

Such empathy-provoking methods for game immersion can also ensure player engagement. As James Paul Gee puts it: "Games can show us how to get people to invest in new identities or roles, which can, in turn, become powerful motivators for new and deep learning in classrooms and workplaces" (p. 3) [14]. In addition, Starks [34] also describes two additional ways to create immersion: realistic graphics, and a first-person perspective where players can identify with the character they are playing. Aging simulations may also increase empathy with people who are older than the player [10].

Some studies suggest that video games designed to increase empathy do have positive effects on adolescent players [22]. While there was no evidence of group difference in behavioral change, participants who engaged more with the emotional aspects of gameplay in the empathy training game *Crystals of Kaydor* showed an increase in empathic accuracy. The authors note that this research is still in its early stages. However, they do mention that their results provide evidence that empathy-related brain functions can be improved in adolescents by using game mechanics that rely on empathy, such as perspective taking and emotional regulation. Additional research is needed to determine whether this kind of empathy training could lead to improvements in empathic behavior.

Belman and Flanagan [6] formulated four design principles for designing games to foster empathy. The first principle describes how players usually only empathize when they make an effort to do so at the beginning of the game – otherwise, people play "unempathically". The second principle proposes giving players recommendations about how their actions affect the issues in the game. The third principle describes how short bursts of emotional empathy work well if the desired outcome of playing the game does not require major shifts in the player's beliefs. Lastly, the fourth principle states that it is beneficial to put emphasis on points of similarity between the player and the people who the player is supposed to empathise with.

Serious games have also been used within a citizenship curriculum. The serious game *TimeMesh* [5], for example, is a collaborative multiplayer game designed to teach students about significant events in Portuguese history. The game has a non-linear storyline, where players time travel to different periods in history to influence historic

events and change the 'present reality'. Lorenzini et al. created *LawVille* [25], a serious game designed to teach citizenship topics, primarily the Italian constitution and lawmaking process, to secondary school students. Like *TimeMesh*, *LawVille* contains collaborative aspects in which players may communicate with each other while playing the game, although there is no interaction within the game world itself.

3. Game Design

The goal of promoting open conversations around sensitive topics guided the design of our game. In order to achieve this goal, many design choices taken aimed at avoiding group think and mitigating the influence of players' predispositions.

3.2 Game Synopsis

In an authoritarian farm regime, students play as different kinds of livestock that are presented with a dilemma imposed by the ruling farmers. Each player gets a small briefing about the dilemma and their species' role in that dilemma. These briefings are written based on character profiles created for each of the different species (An interactive display of these profiles can be found at http://erikblok.land/ charSelector).

Subsequently, they may get to know the other species' perspectives, by communicating with other players. This is done in-game, animal-to-animal, through anonymous chat using the user interface shown in Figure 5 Eventually, they will have to democratically decide on a solution to resolve the issue. In these scenarios, players have to role-play with an assigned opinion, that of their species, which may not match their own. Through player-to-player communication, a player's opinion may be influenced, or even changed. After the final democratic vote, a debriefing session revisits the process and relates the events during the game to a real-world scenario. The game was properly named *Diermocratie*, a novel Dutch word resulting from the contraction of *dier* (animal)
and *democratie* (democracy).

This synopsis fits into the SPP framework for interactive digital narratives defined by Koenitz [21], which divides digital narratives into three parts: System, Process and Product. The *system* contains a collection of potential narratives, also known as proto-stories. In our case, one of such narratives is chosen by the teacher to match the topic of the current lecture. While the available narratives may differ between classes (and CodeMBO (https://codembo.nl/) has added several since the conclusion of the authors' involvement in *Diermocratie*), all narratives will revolve around incidents on a farm, and students will not be informed of the "real" scenario until after the conclusion of the role-playing portion of the game.

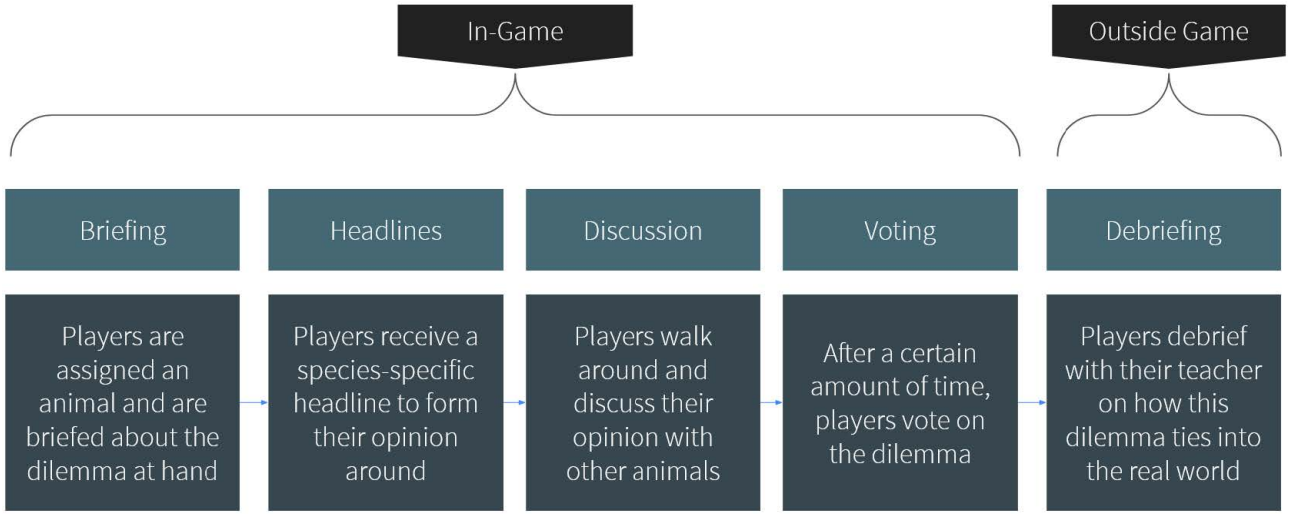


Fig 1. Illustration of the main game loop

The *process* involves the players interacting with the system, in this case, the students participating in the anonymous debate on the dilemma that affects the farm and its population. During the process, the player will need to consider which strategies to use while interacting with the other animals on the farm, as their ability to persuade others will help determine the outcome of the story. According to Koenitz, this players' need to consider their actions and the level of control they have on the narrative is a crucial component to an interactive digital narrative. In our design, we consider the teacher to be a passive observer – while they can view the conversations between players and thus observe how the narrative develops, they do not actively contribute to it. However, it is possible for instructors to join in as an animal themselves, in which case they would have a much larger influence on the development of the narrative, and could be considered as a second type of interactor. In contrast to the students, the teacher has significantly greater knowledge over the background of the narrative, and may want to influence it depending on the desired discussion topics. Finally, the *product* is the instantiated narrative: which solution to the dilemma will the students pick? After the final decision has been made, the debriefing session aims to explore the process and product further, analyzing why the narrative has played out the way it did, giving the students a means to reflect on the actions of themselves and their peers.

3.2 Game Mechanics

The above synopsis, together with the game loop of Figure 1, reveal the more tangible ways in which the game is perceived by the players. However, below the surface there are some overarching mechanics that help this game reach its intended goals. In this section, we go into the allegoric, motivational, and concluding aspects of our game. As a visual aid, we also provide a trailer of *Diermocratie* sample gameplay below.

The Allegory The key element in *Diermocratie* is the allegory, understood as a narrative or visual representation "in which the characters and events are symbols of something else" (cf. https://www.collinsdictionary.com/dictionary/english/allegory). Often, an allegory's hidden meaning has a moral, social or political significance. Through the use of an allegory, players are able to look at, and discuss, a given situation without any predispositions holding them back. This is further facilitated, in our allegory, by the choice for the fable literary genre. The allegory must still be relatable, though, as this will help the players get into character. In the game, the allegory manifests itself in multiple different ways: the *setting*, the *character assignment*, the *briefing*, and the *headlines*.

The game takes place in a farm setting inspired by George Orwell's fable *Animal Farm* [28], with the playable characters being farm animals. This environment was chosen because it is easy to relate to for almost anyone, as it creates an amenable role-playing atmosphere. This role-playing is necessary to stimulate empathy among the students. Empathy forms one of the citizenship competencies, as defined in Section 2.2. A farm setting is also easier to translate dilemmas into, as most people are already familiar with anthropomorphizing animals, due to a long tradition of fables in most cultures. Furthermore, in assigning players to different animal groups, a 'tribe mentality' is induced, as players connect to their animal and its specific group, thus fueling the notion that multiple and diverse perspectives exist within a society.

The briefing is the most prominent expression of the allegory, as it sets the scene with game rules and potential game outcomes. In essence, the briefing translates an existing societal dilemma or debate into a farm and animal context. In addition, it also provides players with a short description of their assigned animal and its viewpoints. With such a briefing, player immersion can be more easily and quickly achieved. It also enables the player to understand the true context of the dilemma, which links to the key competencies

of citizenship as well. Through the briefing, the translated societal concern should be unrecognizable as the specific dilemma on its own, however it should still be recognizable during the classroom debriefing session through guided discussion. An example briefing can be seen in Figure 2. The briefing wording itself is not recognizable as the Dutch nitrogen emission debate, however the link to farmers being the chickens and environmentalists being the sheep can easily be made.

An important aspect of our use of the allegory is the anonymity afforded by a digital game. While many of the gameplay elements described could translate to a physical tabletop game, role-playing would become more difficult as there would be a clear relation between actual players and roles. Since *Diermocratie* is intended to be played online among classmates, anonymizing players by giving them a virtual avatar both minimizes the effect of pre-existing player relationships and enhances players' immersion into the game, improving the role-playing quality. As students will play the game online regardless of real-world setting, we consider fully-online and in-class settings equal, as players will experience the core gameplay loop in the same way. However, there are likely to be some differences, particularly regarding the debriefing, as this component is not part of the interactive experience.

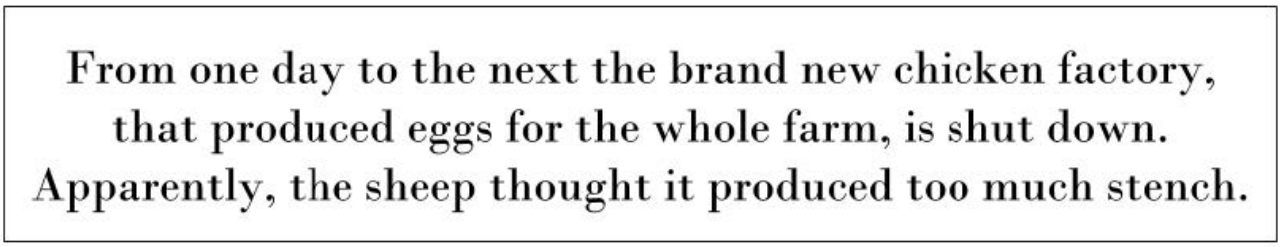


Fig 2. Example briefing based upon the Dutch nitrogen emission debate.

Motivational Mechanics Next to creating an environment in which roleplaying is encouraged, the players must also be motivated to actually play the game as intended. To do this, several motivational mechanics have been implemented, including: *headlines*, *communication*, *time*, and *voting*.

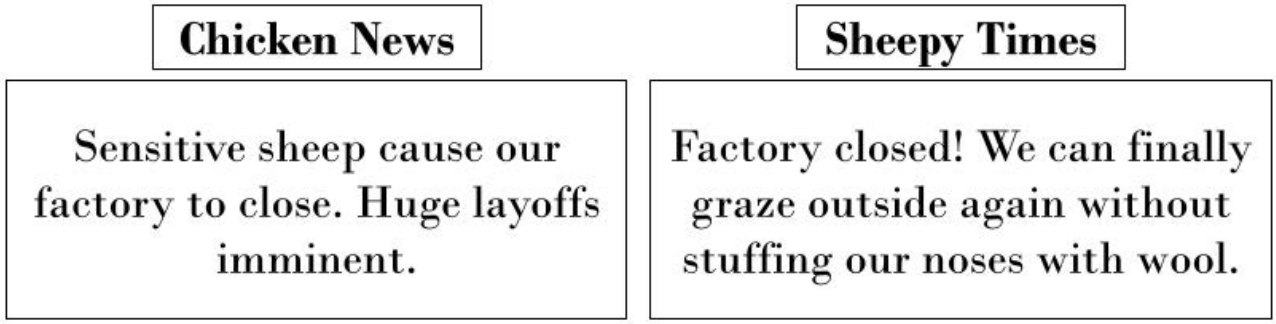


Fig 3. Example species exclusive headlines that are paired with the briefing from Figure 2.

Each animal group receives a potentially biased headline from their local news source with

species-exclusive coverage about the posed dilemma. Examples of these headlines are shown in Figure 3, and an example of how these headlines are presented is shown in Figure 4. The headlines motivate the players to form a specific opinion based on their assigned species and on the news they have been provided. The headlines will often imply consequences for said species, and they encourage the players to move around the game world, and to communicate with players of other species, using a chat function, in order to spread their viewpoints and influence the final vote. The user interface seen by the students, including the chat bubbles seen over animals' heads when a player sends a message, is shown in Figure 5. The headlines and the consequent communication around them, facilitate multiple diverse perspectives and conversation surrounding a polarizing topic. It also connects to the *argumentation* competency of citizenship, as defined in Section 2.2. After a set time for gameplay, the final vote is held, requiring the players to act immediately as time is a limited resource. With the final vote and the subsequent outcome announcement, the players are informed of the results of their discussion. The actual tally is not that important, as the game revolves mostly about getting an understanding of the democratic process as a whole. The results can, however, be used as input to the final debriefing between teacher and students.

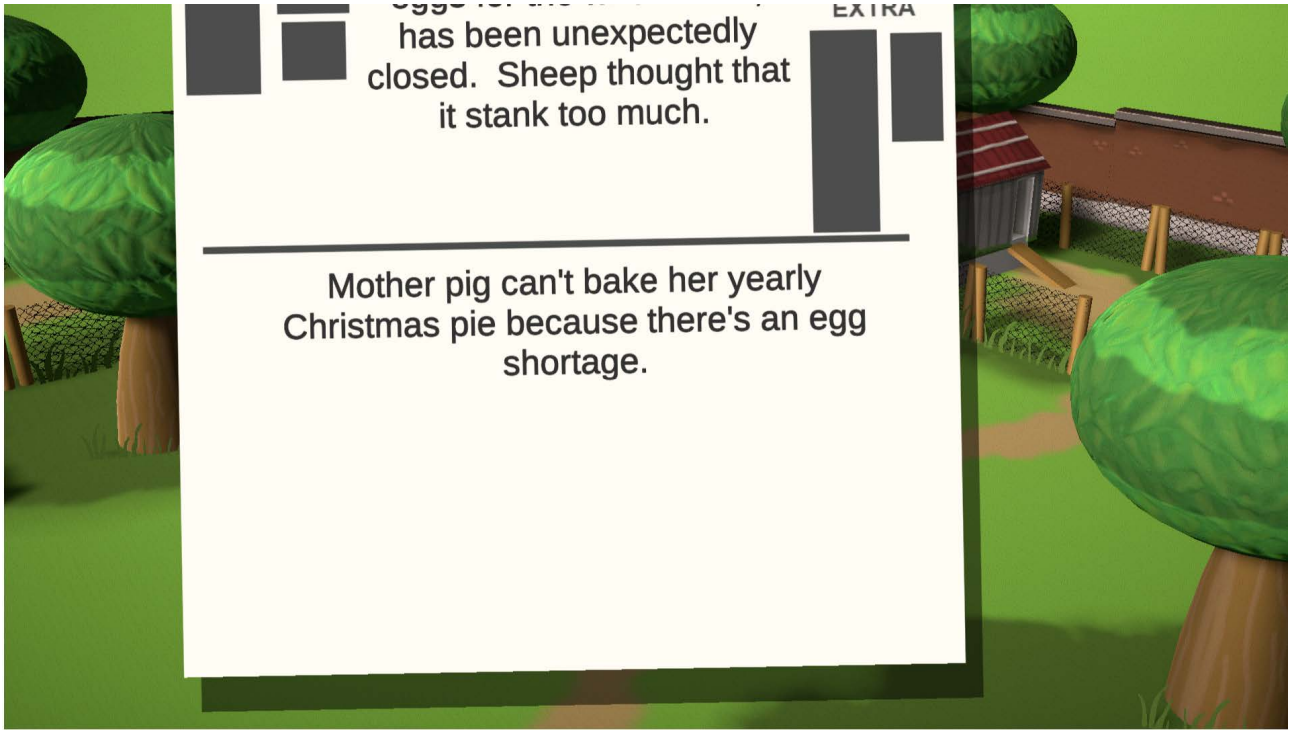


Fig 4. Screenshot of the cow-specific briefing to be paired with the briefing from figure 3.

Debriefing the Students Following gameplay, students engage in an instructorlead debriefing session where they have the opportunity to exchange their thoughts and experiences about the game session. Through this debriefing, students are particularly encouraged to translate game scenarios into real-world situations. In exploring the parallels between the allegoric game scenarios and real life, discussion is encouraged about the students' experiences with polarizing topics and the diverse opinions of others.

In this debriefing, self-awareness amongst students should be fostered, and the complexity of relations should be explored.

3.2 Implementation Aspects

In implementing this game, a communicative multi-player approach has been chosen. It deploys a server for handling all players in a session, and transparently manages all chat functionality for player-to-player communication, easily ensuring that players' diverse perspectives can be exchanged and explored. As more players participate in the game, more conversation can emerge. Additionally, because all chat content is made visible to everybody in the game world, every player is able to see the opinions, questions and objections stated by all others. As a result, pursuing further conversation is strongly stimulated.

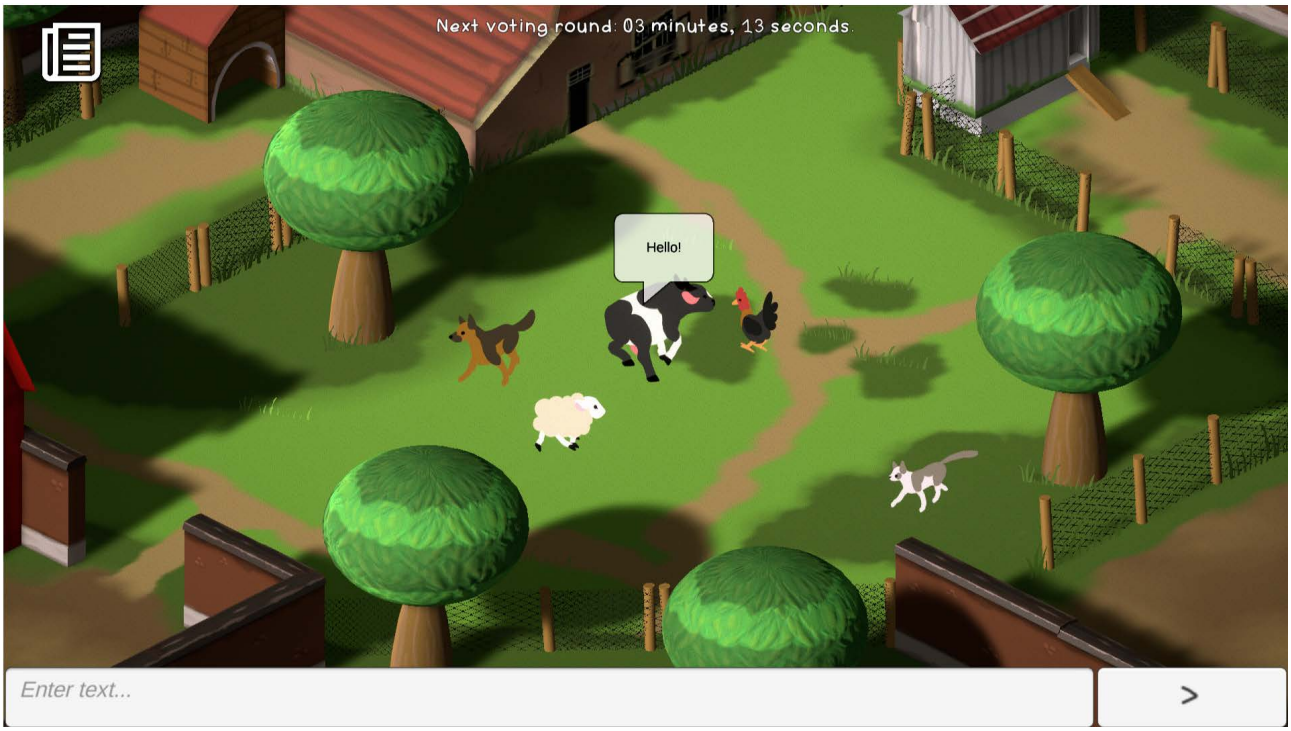


Fig 5. User interface During Gameplay

Diermocratie was implemented using the Unity game engine (https://unity.com/), as it supports the WebGL platform. This allows players to run the game directly in their browser, without the need to install a separate program. Along with this article, a full version of our game is made available (http://diermocratie.erikblok.land). This is the same version that was played by students during the evaluation described in the next section. For instructions on how to set up and play the game, please refer to Appendix A.

4. Game Evaluation

4.1 Method

In order to evaluate the extent to which the game was effective in its purpose to promote an open conversation about difficult topics, we organized play sessions with vocational college classes of approximately 20 students each. Due to known international societal constraints, only four play sessions could be held, varying between taking place fully online, entirely on location, and in a half-and-half setting. During each session, students were given a short presentation to get familiar with the functionality of the game. After this brief introduction, the students were asked to play the game.

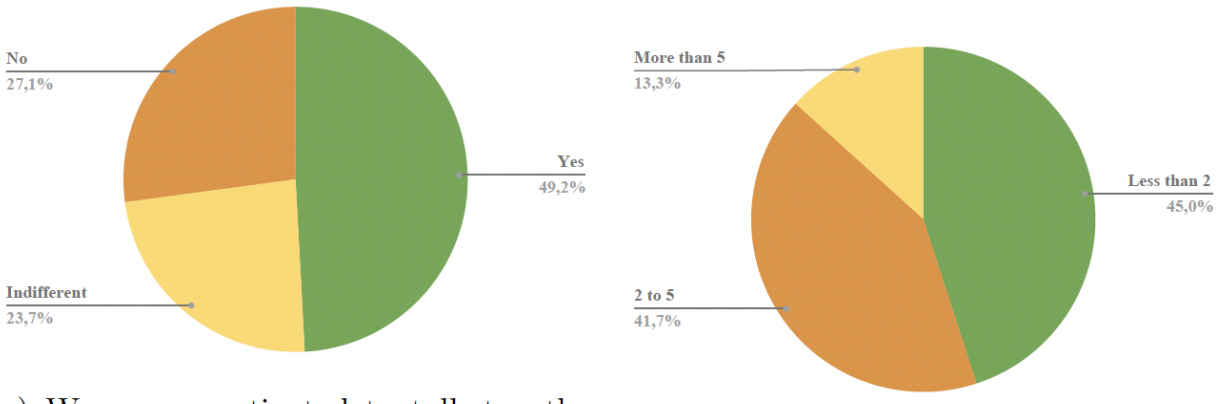
In order to give students an opportunity to debrief and voice their experiences and concerns, after each playing round they were divided into smaller focus groups of approximately five students, in which their views could be further discussed with their instructor. Because of the subjective nature of the topic, conversation was initially centered around evaluative topics of game concept, engagement, goal achievement and how comfortable they felt in expressing their opinions. Eventually, debriefing conversation was directed towards exploring parallel real-world dilemmas, as students were encouraged to

discuss how elements of the game dilemma transpire in society. In exploring parallels between the game world and the real world, students were led by instructors in discussion about other sensitive and societal relevant topics.

Finally, to assess the impact of this prototype game and subsequent debriefing on the perceptions of the students, they were asked to fill out a survey.

4.2 Results and Discussion

It was noticeable that students were more involved in the in-person sessions than when they played online. Debriefing sessions were also more actively attended, allowing for better discussion on societal issues to match the game purpose. The survey was filled in by a total of 60 students.



(a) Were you motivated to talk to other players?

(b) How many players have you talked to?

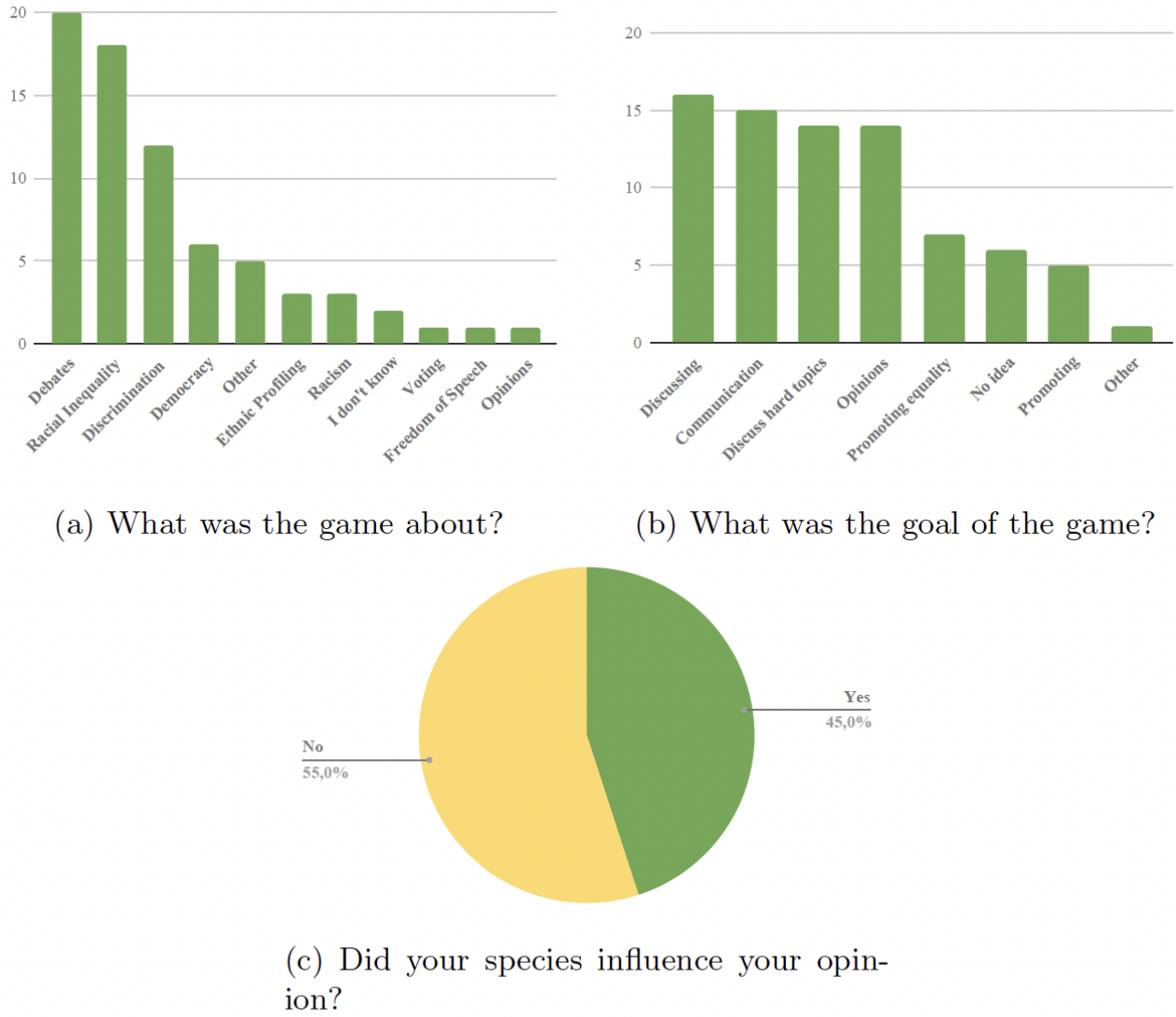
Fig 6. Survey results regarding player communication (N=60)

Regarding the communication among players (see Figure 6), about half of the players report they were motivated to talk to other players, as can be seen in Figure 6a. That said, Figure 6b indicates that 45% of the players talked to less than 2 people, which is a clear concern. During the debriefing sessions it came forward that excessive spamming was one of the major reasons players were less motivated to talk to each other. Measures should be taken to prevent spamming and improve the UI so the chat is more organized, for example by displaying the chat in a sidebar. With these improvements in mind, we believe it is perfectly achievable to have each player talk to at least two people.

Although we realized through survey responses and by observing chat logs that not all students took the game equally seriously, the topic and purpose of the game seem to have been clear for the large majority (see Figure 7). Open-ended survey questions like ”What was the game about?”, were mostly answered with mentions to debates (20), racial inequality (18), and discrimination (12); see Figure 7a. Likewise, students’ perception of the goal of the game was to practice discussions (16), improving communication between

people (15), facilitate talking about harder topics (14), and talking about and listening to others' opinions (14) (see Figure 7b). These are quite promising results, since they show that the purpose of the game is clearly conveyed, even when gameplay was not optimally experienced.

Finally, 45% of the participants reported that their own species had an effect on their opinion. Considering the non-optimal circumstances mentioned above, in which the play sessions took place, this indicates that a considerable amount of players were influenced by the role-playing aspect of the game, as shown in Figure 7c.



(a) What was the game about?

(b) What was the goal of the game?

(c) Did your species influence your opinion?

Fig 7. Survey results regarding game mechanics, topic and purpose (N=60)

4.2 Limitations

Here we identify some limitations present in conducting the evaluation of this research. Firstly, limited play-testing sessions and student interaction during game development

inevitably impacted the preliminary evaluation of this game. Moreover, during game development, interaction was limited to only a few educational facilities, and only a small range of course materials could be considered in the scope of this project. The current scope of this research is therefore very focused, and a long term evaluative effort is much recommended, in order to extend the range of topics in the game and improve its impact and effectiveness.

Secondly, due to the circumstances of the time when *Diermocratie* was play tested, it was not always possible to choose whether an evaluation was performed in-person, online, or in a hybrid setting. Part of the core of our narrative design relies on the anonymity afforded by role-playing, and we do not expect that the way players experience this will be dramatically affected by their surroundings. Nevertheless, our results are likely to be influenced by the educational setting, as for example, students may be more focused when in a physical classroom. We did not specifically develop *Diermocratie* with hybrid education in mind – this was a necessity of the time. Therefore, we consider investigation of these effects out of scope for this article, and a good topic for future work.

On another dimension, and as a result of the large cultural and ethnic diversity present, we realized that the farm allegory used in the game, including the various animal roles, can hold very different connotations to situations or activities for diverse groups of people. As a result, in the present game scenario, different players may interpret differently the game setting and its characters' stances. While this challenge was currently experienced as a limitation, future development scenarios for this game could use these differences in perspective as an advantage for fueling diversity of perspectives about sensitive topics.

5. Ongoing Work

Diermocratie was developed in cooperation with a Dutch non-profit, Critical Mass [11], which continued developing the game for further deployment (in collaboration with studio September [31]). Since our previous publication [8], a number of new game elements were added to increase student understanding of the gameplay and narrative, thus improving their effectiveness.

The first set of extensions consists of character information provided to players when they are assigned a character. Each player is displayed a unique screen, with their character sprite, a short description of its personality, and an assignment specific to each character. On the one hand, providing players with extra information about their assigned character may constrain the breadth of characterizations invented during the game, by way of assigning a specific type of personality to each animal. On the other hand, those who are less familiar with role-playing games may find the extra help invaluable in coming up and following their own unique characterization. The specific assignment provided to players gives them a clear goal, allowing them to begin the game with a concrete purpose. Moreover, after reading their character information and their 'species newspaper', players are now provided with three 'discussion hints', consisting of their character's 'thoughts' about the issue at hand. This gives players additional insight into the issues at hand, and provides entry points with which they can start a discussion with other players.

In addition to these extensions, a non-playable-character has been added to stimulate discussion between players and potentially guide the created narrative to explore different perspectives. This character takes the form of a raven, who appears on-screen at set times during the game, and conveys a message to all players. This message can take many forms, with some acting as a call to action for a particular species, and others providing additional information over the scenario, that was not present in the initial briefing. In the SPP context [21], this non-playable-character is part of the system, and influences the process by providing additional information at set times during game-play.

6. Conclusions

Citizenship education is increasingly regarded as an important pillar in vocational education. However, many educational institutions face important challenges to adapt to modern demands in this domain.

We designed and developed *Diermocratie*, an in-classroom game aimed at promoting open conversations within diverse classes among vocational college students. The game empowers students to grow in diversity-related competences, including self-awareness, empathy and argumentation. By means of allegoric role-playing, players explore their predispositions, and increase their awareness of each other's perspectives. This progress is further supported by a debriefing session, led by an instructor. As a result of a preliminary evaluation, we conclude that the game motivated students to discuss with their colleagues different perspectives on a complex scenario.

Compared to other serious games around citizenship topics, as e.g. *TimeMesh* [5] and *LawVille* [25], *Diermocratie* stands out in both the flexibility for approaching other potential discussion topics and the crucial role of player interaction in achieving the game goals. *Diermocratie* was not designed to teach a fact-based curriculum, but rather to promote open conversations around sensitive topics. Conversations between players take thus a much more central role, and shape the outcome of the story rather than being simply a tool for players to progress through a story. We can, therefore, conclude that *Diermocratie* provides a valuable and effective assistance to vocational college instructors in challenging citizenship education topics.

The current design extensions to *Diermocratie* (Section 5) have the potential to stimulate conversation, increase the players' motivation to talk to one another, enhance the role-playing experience of the game, and promote shaping the narrative generated by players in many different ways. An important next step should include an in-depth and extensive evaluation of the present game, in order to assess how effective those extensions are in improving the evaluation results of the original game (Section 4) and, therefore, its educational impact.

Additionally, future work could address automation of the raven NPC, allowing it to choose from a list of messages depending on the current state of the narrative and even of each concrete player. Such a dynamic character could react to player discussion by injecting 'missing' perspectives into the narrative, ensuring that no single perspective is given too

much attention by players. This character could be controlled by a drama manager, possibly implementing a natural language interface (e.g. similar to the drama manager used by Fac¸ade [26]), in order to determine the current state of the narrative, and then display either an individual or a globally visible statement which would guide players into an under-explored area of the topic at hand. Personalized drama managers have been shown to be effective at guiding players towards particular options in interactive narratives [36], and may be applicable to our multiplayer scenario, where gently influencing player dialogue could benefit the educational value of the game as a whole.

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Appendix. A Procedure to startup and play Diermocratie

For our user study, we used a WebGL version of the game, compiled with a predefined IP and hosted on a dedicated server. To facilitate experimentation from others, we have additionally compiled a standalone Windows x64 executable client with a configurable server IP address, which can be downloaded here. The download also includes the game server.

Windows Download
Mac Download
Linux Download
Windows .bat Download
Windows Server Download

Please follow the following steps:

1. Have every player download a copy of the game client on their own PC from the download link above. Choose one player that will host the game server.
2. Have every player unzip their copy of the game using ”Extract All” (or any other software such as 7-Zip or WinRAR).
3. Determine the amount of players that will play the game in this session.
4. On the PC of the player who will host the game server, run the bat file. This might prompt a permission popup from Windows. Allow running the file.
5. You will be prompted how many participants will be in a game lobby. We recommend using the exact number of players here, so a single lobby can contain

all players. Note that the game will not start until that number of (unique) players has joined the game lobby.

6. There will be a second popup asking for Windows Firewall access. Allow access.
7. On the 4th line of the game server output log is an IPv4 address. Share this address to every player, assuming they are all on the same local area network. If there are players who are not on the same network as the game server, port forwarding is required.
8. Start the bat on the computer of every player. The players will be asked for the server's IP address. Fill in the IP address found on the previous step.
9. Every player will be able to select a lobby. For a single experiment, they should all join the same lobby. Different lobbies have different game scenarios.
10. To modify or translate a scenario, open and edit one of the scenario{0,1,2}.json files in the /Server/Scenarios/ folder. They correspond to lobbies 1, 2, and 3, respectively.

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