

# Game Jams as a Space to Tackle Social Issues: an Approach Based on the Critical Pedagogy

Christina Myers  
The Open University  
Milton Keynes, UK  
christina.myers@open.ac.uk

Lara S. G. Piccolo  
The Open University  
Milton Keynes, UK  
lara.piccolo@open.ac.uk

Trevor Collins  
The Open University  
Milton Keynes, UK  
trevor.collins@open.ac.uk

## ABSTRACT

This paper introduces a framework to guide the design of educational games during game jams based on Critical Pedagogy, an educational theory grounded on the democratisation of knowledge, critical reflection and collaboration for empowering people to tackle social issues. The process and resources that compose the framework are discussed based on a case study exploring everyday sexism. The framework design has been supported by participatory activities and a trial, suggesting the adequacy of the methods and resources in engaging diverse participants with both the educational game design and the social issue. It is expected that the design process introduced here will boost the potential of game jams as a space for learning, collaboration and critical thinking.

## CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in HCI*.

## KEYWORDS

Game Design, Education, Critical Pedagogy, Gender studies

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## 1 INTRODUCTION

Democratising knowledge on educational game design means making educational game design open and accessible to everyone. It has the potential to create meaningful and effective educational games by diversifying teams of designers and by portraying them as equal design partners [5, 6]. However, supporting diverse groups to participate in the activities needed to design educational games poses significant challenges.

The main challenge is that educational game design is multidisciplinary. For creating such games, designers need to have knowledge of education, the topic of the game (e.g. algebra), educational game design and game development. Moreover, creating games that are both fun and educational requires the designers to

synchronise and couple educational and game design literature [30] as well as present relevant educational content.

Most of the frameworks that support educational game design intend to cover as many educational theories as possible. However, they have been mainly focusing on how game design could contribute to learning without paying sufficient attention to how educational theories could be used to optimise learning in games (e.g. [1, 12, 35]). Gee [12] proposes a different approach by providing learning principles that target how learning could be facilitated by aligning the potential of education with game design.

In contexts where the democratisation of knowledge is intended, coupling educational and game design literature and exploring their synergies require narrowing down the scope of educational theories, as there are evidences that certain educational theories are better suited to support learning on certain topics [21]. Critical Pedagogy [10] is an educational theory that has been used to raise awareness on social issues and has some possible synergies with game design [9, 12, 31]. For instance, Critical Pedagogy is based on the idea that learners should have more control over their educational pathways which is aligned with the interactive and customisable potential of games.

A range of approaches for involving non-experts in game design have been proposed in the literature. Naming a few, Carvalho [3] presented a framework for educational game design that could also be used by non-experts to conceptualise educational games; Vasalou et al. [34] created a process where children could develop educational game design ideas; De Jans et al. [4] and Marne et al. [22] have created a process where people with different areas of expertise could design educational games. Additional to that, game engines aiming at lowering technological barriers to design games are emerging [15, 24]. To the best of our knowledge, an approach based on the democratisation of knowledge to design educational games from the ideation phase to the development has not yet been proposed.

Yet, game jams bring a new perspective to game design as an opportunity to democratise knowledge. They have been described as spaces where participants could learn about game design [8, 29], have conversations about social topics [7], design educational game [25] and as an opportunity to improve the diversity of people involved with game design [5, 19].

By supporting the learning and engagement of a diverse audience to design educational games on a social topic, this paper proposes a framework for democratising knowledge on educational game design to be used during game jams. Grounded in the theory of Critical Pedagogy [10], the framework builds on the literature of educational game design to propose a process and set of resources to build awareness collectively and to support group activities in

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educational game design. Although instantiated here in tackling everyday sexism, it is expected that the proposed framework can be applied to similar studies in which the democratisation of knowledge as a means to deal with social issues is considered a central aspect of a game design. Some methods and resources proposed for the framework have been piloted, confirming the potential of this on-going work.

The paper starts by discussing related literature in Section 2. Section 3 describes the framework design rationale, including two sets of resources: cards on everyday sexism and cards on educational game design. Section 4 presents and discusses the results of a trial in which 47 people used the cards to create branching stories with educational outcomes on everyday sexism. Section 5 discusses the democratisation of knowledge for educational game design and game jams. The paper is then concluded in Section 6.

## 2 BACKGROUND

Democratisation of knowledge is a central concept in this research. Therefore, this section explores the related literature on Critical Pedagogy, educational game design and game jams and their synergies with this concept.

### 2.1 Critical Pedagogy

Democratising knowledge means making knowledge open and accessible and to enable anyone to learn [27]. In the context of education, this concept is often associated with Paulo Freire and his Critical Pedagogy theory [10]. This theory aims at raising awareness on social issues through constant reflection, group discussions and empowering learners to be agents of change; it has been developed from Freire's experiences in addressing poverty in rural Brazil but has also been used to tackle sexism [17], beyond other social issues or inequalities. This theory presents learning as a process made up of a number of stages known as 'the process of conscientisation' [10, 11]. The process starts with an *Investigation* stage where learners observe reality and start reflecting on the social inequalities they face in their everyday life. The *Thematization* stage involves taking distance from these everyday life scenarios by drawing themes from the problems and social contradictions identified. Learners are also invited to elaborate on new meanings from these experiences and understand how they could be creators of knowledge by interpreting them. In the *Problematisation* phase, all the material and discussions elaborated are used to trigger conversations about social and political aspects of the learners' lives. This phase is also marked by understanding how these aspects could be transformed and position learners as catalysts of social change [10]. The last stage is called *Systematisation* and learners communicate their learnings with the objective to inspire people in other realities [32].

### 2.2 Educational game design

Designing educational games requires knowledge of educational theories, game design, the topic of the game and game development. Hence, different approaches have been developed to support groups of designers creating such games. The simplest approach is to describe educational game design as a process in which experts in education, game design, the topic of the game and game

development are requested to contribute to a given objective at a specific moment of the process [4, 22]. It is important to note that this approach relies on the synchronised availability of these experts.

Another approach is based on listing educational game elements, which are the components that constitute such games, and inviting designers to choose the ones they want to integrate into their educational games [33, 35]. While these lists are relevant from a practical perspective, they do not address the designer's conceptual understanding of educational game design, which is covered by more complex approaches.

Arnab et al. [1] presented a model to connect educational theories and game mechanics. Building on this, Carvalho [3] developed a conceptual model that represents how game elements could be associated with different learning outcomes. Finally, Lameris et al. [21] created a taxonomy linking learning and game mechanics to guide university teachers to use educational games. These studies present a variety of educational theories and game elements allowing designers to explore potential combinations for their game. However, these models can also pose risks, especially for designers with little or no expertise in educational game design. Firstly, they disregard how some educational theories are better suited to certain educational topics and, secondly, they do not elaborate why certain combinations of educational theories and game design could be more appropriate than others.

As certain educational topics require specific educational theories, it is important to understand how games could be designed based on these theories [21]. Grounded on that, Vasalou et al. [34] state that a lack of knowledge on the educational topic is a barrier to designing impactful educational game. As a solution, other approaches narrow down the scope of educational game design focusing on a precise topic guiding then the choice of the most adequate educational theory. For example, Schrier [28] developed 46 design principles with game elements to create moral learning games. Regarding matching game design and education, the work of Gee [12] presented 13 principles of learning in games that illustrate why and how gaming could be used to activate learning and vice versa.

Gee's essay on the empirical relevance of Critical Pedagogy [13] suggests a connection between this theory and his principles of learning in games. Potential synergies between games and Critical Pedagogy have also been explored in the works of Frasca and Torres. Frasca [9] used Critical Pedagogy to adapt the game 'the Sims' to stimulate players to think critically about social issues; while Torres [31] created a game which presents inequalities by following the life of a young poor black woman in Colombia. None of these studies have detailed how Critical Pedagogy was integrated into the educational game design process.

Perhaps the most complete work on the democratisation of educational game design is the previously introduced study of Carvalho [3]. The author developed a model and a process describing when and how different resources could be used to conceptualise an educational game, including by non-experts. However, the results reported suggest that more explanations about game design should be accommodated to fulfil non-experts needs. Also involving non-experts, Vasalou et al. [34] involved children as co-designers of ideas for educational games, arguing that they developed more

consistent ideas when they had access to training with experts on the educational topic. Storytelling using branching stories have been recommended to develop educational digital games [18], and branching stories are described as having the potential to represent a game structure [18]. Last but not least, it is impossible to ignore that democratisation of game design faces technological barriers. As a result, game engines used to build digital games without deep programming skills have been emerging, such as Twine, GameSalad and GameMaker [24].

### 2.3 Game jams

Game jams are considered a promising approach for designing games in a short period of time, usually during a weekend [20]. More often than not, game jams are informal events where participants meet and have freedom to choose how they design their games. Goddard et al. [14] presented guidelines on game jams' organisation. They defined the main elements of game jams arguing that for each of them a playful or gameful perspective could be taken. A playful perspective is described as unstructured and open-ended, while a gameful perspective is represented by structures and rules. Based on their analysis, game jams taking a playful perspective facilitate more innovation in game designs, but also expose participants to the risk of finishing the event without a complete and viable game [14, 26]. Adding on that, Ramzan and Reid [26] argue that formalising too much the structure of a game jam risks ending up with a traditional development environment.

Tools and game engines are the main resources in a game jam. Ho [16] found that cards are the most used tool in game jams to evoke inspiration among participants. Zook and Riedl [36] reported that paper prototyping was considered a positive practice by the participants in their study.

The literature on game jams to design educational games is very limited, both in terms of the material resources and processes. Preston [25] presented a framework to design educational games on public health during game jams using lightning talks and posters to present information on public health. Similarly, Ramzan and Reid [26] recommended inviting topic experts to support game jam participants.

Looking at diversity and inclusion in game design, Deen et al. [5] compared games designed during game jams by teams with greater or lesser diversity in terms of gender, race, religion, ethnicity, class and sexual orientation. They found that diverse teams focused more on creating an ethical and inclusive representation of society in their final games. An obstacle to creating this diversity is that the participants tend to be males, reflecting the gender difference in the game design and programming fields [2, 19]. Battling that, feminist interventions have promoted all-female game jams to increase women's participation [19]. Lastly, game jams were also illustrated as spaces with the potential to discuss social issues while designing games. The study of Ederhardt [7] presented the 'Equal Pay Jam' where participants discussed issues related to discrimination and inequalities in salaries. The author concluded that *game jams are an interesting space to have conversations about difficult topics, but also that the design of a particular game jam space would highly influence what these conversations might be* [7, p. 2].

The literature reviewed suggests a pertinent role for democratising knowledge on educational game design during game jams. However, there remain several aspects of game jams for educational game design which relatively little is known, specifically on how to make them accessible to everyone and how to support multidisciplinary learning.

## 3 DESIGN RATIONAL

Embedding educational game design approaches in a game jam setting requires consistently aligning educational theories, topic knowledge and game design. To this end, an educational game design framework constituted of a process and resources has been developed.

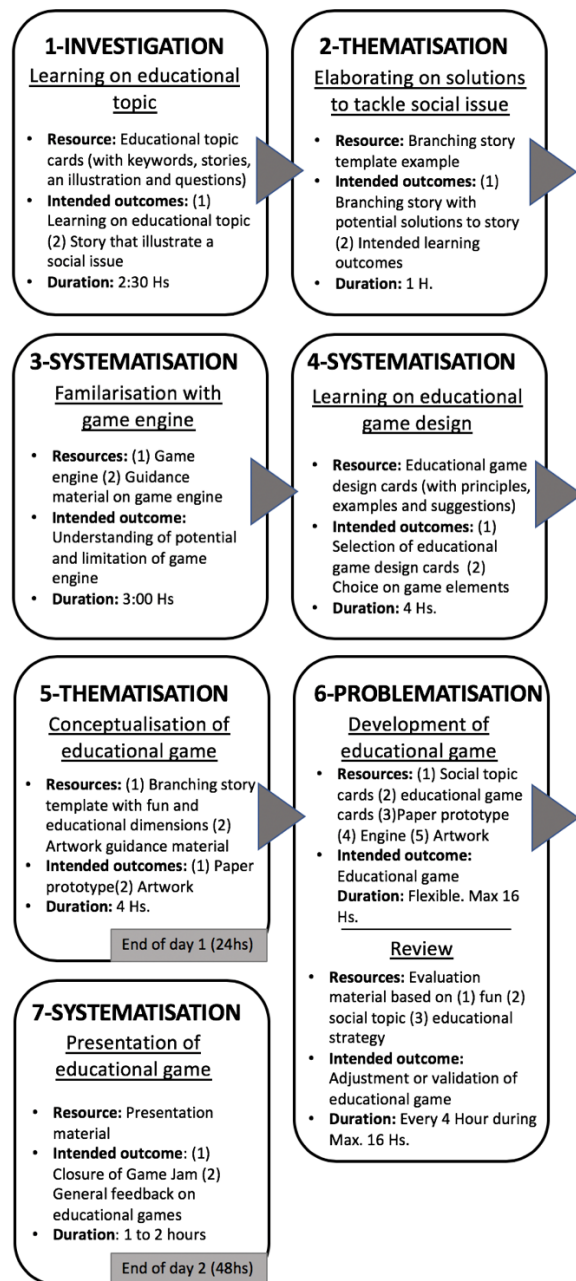
For including experienced and non-experienced designers in creating educational games demands, both the design process and resources have to be considered [3]. Studies targeting the democratisation of knowledge on educational game design have covered only segments of it, such as the conceptualisation [3], developing educational game ideas [34], or the usage of game engines to develop such games [15]. Based on the Critical Pedagogy theory, the framework proposed aims at filling the literature gap on game jams, suggesting to explore the potential of these structured events to democratise knowledge on educational game design, supporting participants with different backgrounds to create educational games from a blank page to the development.

### 3.1 Proposed framework

Reflecting the process of conscientisation of Critical Pedagogy [10], the framework is anchored on the ideas of critical reflection and group discussions. It is developed for a two-days game jam, with participants working in groups of 3 to 4 people. The activities are divided into 7 stages referring the non-linear process of investigation, thematisation, problematisation and systematisation around the social issue been tackled and aspects of game design.

Game jams and the process of conscientisation [10] are both based on the ideas of freedom and empowerment of people to become co-creators. The process of conscientisation provides important insights on how to balance such ideas with imposed learning stages in order to facilitate the democratisation of knowledge [11]. Using such stages (investigation, thematisation, problematisation and systematisation) to inform a game jam process can potentially benefit time management and establishes a coherent order for the participants to explore crucial facets of knowledge democratisation on the educational game design process. Additionally, this process can also be used to align goals and intended outcomes with resources given to the participants on each stage. The process and resources proposed will be described having the topic everyday sexism as the social issue to be tackled.

As Figure1 illustrates, our framework starts with the investigation stage to facilitate learning of the topic by using resources and by inviting participants to create a story depicting the social issue being targeted. In the sequence, as a thematisation activity, the participants are guided to imagine solutions tackling the issue presented in their story, transforming it into a branching story with a learning outcome [18]. The resources on the educational topic will be further described in Section 3.2. The third stage, about



**Figure 1: Game jam framework for educational game design**

systematisation, aims at familiarising the participants with a game engine, its potential and limitations. Participants are organised in new groups according to their familiarity with the game engine during this stage. The fourth stage of the framework refers to learning about educational game design; it is targeted at elaborating on principles of learning in games of Gee [12] and Critical Pedagogy [10], and on how to implement them into a game using game elements [1, 3, 21, 28, 33, 35]. The resources developed for this stage are further described in Section 3.3.

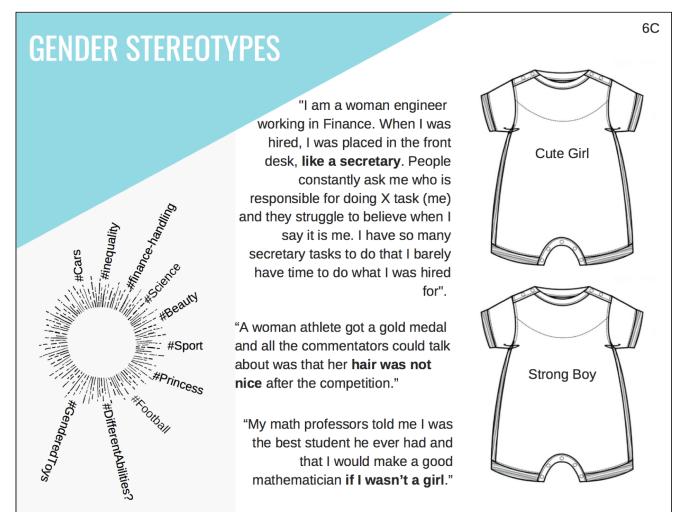
The fifth stage invites to create a paper prototype [36]. This prototype is developed by using the branching story created and by combining them with the chosen principle(s) of learning in games and game elements. When developing their prototype the participants are asked to explore the parts of their games that could contribute to making it fun and educational [30]. In the next stage, the participants are asked to develop and then review their game in a series of four-hours cycles considering the fun and educational dimensions of their game [3]. The educational dimensions are reviewed in terms of the topic of the game and their educational strategy according to the principles of learning in games [12]. Lastly, is the presentation and evaluation of the games aimed at gathering feedback and marking the conclusion of the game jam.

### 3.2 Educational topic resources

In this case study, the educational topic resources took the form of cards on everyday sexism [23], which aim to inspire participants' reflections and discussions towards creating stories that mirror social issues. The cards' design was also based on the Critical Pedagogy theory [10], and included keywords, real stories about the issues, four questions (each illustrates a stage of the process of conscientisation) and an illustration (See Figure 2).

The set of cards covers categories of everyday sexism, such as sexist language, benevolent sexism, feminism, etc. and are intended to engage with diverse audiences by exploring different facets of sexism in each category. To maximise the potential for the cards to impact group of people with different levels of understanding on the topic, the cards were co-created with diverse groups. More precisely, the cards were developed through a methodology consisting of an iterative process of two co-creation workshops, review and re-design iterations and a summative feedback survey [23].

This methodology enabled the creation of 13 cards based on 7 categories of everyday sexism. The cards are available online: <https://figshare.com/s/e9c84fd34fcb1264388e>.



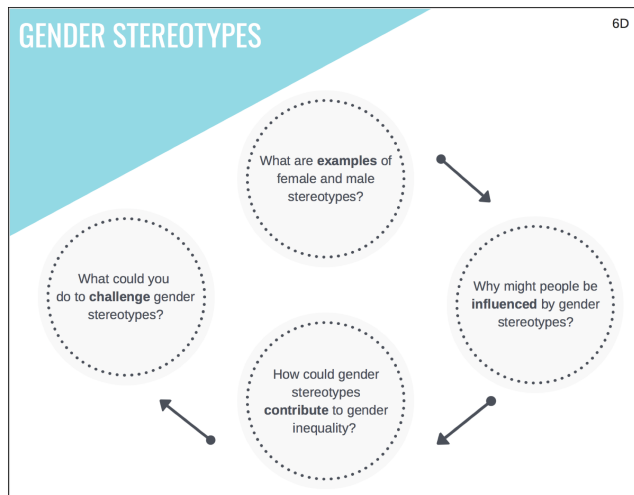


Figure 2: Example of a card on Gender Stereotypes

### 3.3 Educational game resources

The resources on educational game design, which also took the form of cards, as recommended by Ho [16], were designed for the fourth stage of our proposed framework and aimed at democratising knowledge and facilitating the implementation of the educational aspects in the game. To do so, the cards were designed by merging the principles of learning in games [12] with Critical Pedagogy [10] and were enhanced with examples and suggestions for the implementation.

The educational game cards intend to present these set of principles in an easy-to-understand manner, namely with short and clear sentences, keywords and examples. As illustrated in Figure 3, each card provides an example of a game that applied such a principle. The back of the card presents suggestions on how to implement the principle described in a game. It builds on the preliminary ideas on how to implement the principles presented by [12] and complemented with the studies of Wilson et al., Arnab et al., Carvalo, Lamas et al. and Schrier [1, 3, 21, 28, 33, 35] that identified game elements that could contribute to learning. As a result, more than 180 game elements found in the literature are provided as suggestions to implement certain principles. The cards are available online: <https://figshare.com/s/89eb20ab3830f6083e52>.

## 4 EVERYDAY SEXISM CARDS TRIAL

This section reports a trial on the first and third stages of the proposed framework for testing the effectiveness of selected elements in the proposed process and one of the two sets of resources. The cards on everyday sexism were used in a game design workshop with the objective of raising the participants' awareness of the topic. This study validated the potential of the cards for democratising knowledge on everyday sexism by investigating the extent to which participants with different levels of understanding of the topic felt the cards facilitated their learning and supported the process of educational game prototyping based on storytelling.

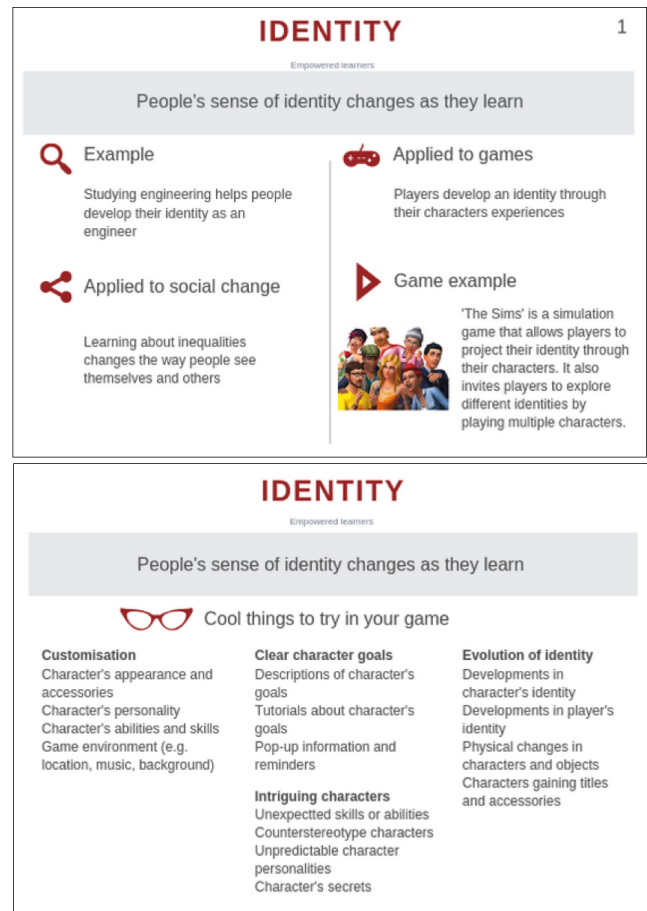


Figure 3: Example of a card on Identity principle

### 4.1 Method

The trial comprised a 45 minute workshop with three group activities and an evaluation questionnaire. Each group of 3 or 4 people worked with one topic card about everyday sexism. They first read the card and discussed the four questions on the back of the card (Figure 2), and then filled in a form with their answers. The second exercise invited participants to illustrate a sequential story on the issue presented in the card (i.e. gender stereotypes, as illustrated in Figure 2). The third exercise asked the participants to think about a possible intervention to resolve the issue. To do so, the participants edited their story into a branching story using additional post-it notes to represent the intervention. They were also asked to describe what they expected people to learn from their story.

A questionnaire was used to collect the participant's perceptions of the potential of the cards and activities to democratise knowledge on everyday sexism, and to create branching stories with an educational purpose. The first part of questionnaire gathered information at the beginning of the workshop on each participant's level of understanding and interest on everyday sexism. The second part of the questionnaire, completed at the end of the workshop, asked the participants to evaluate their learning acquired during

the workshop, how useful the cards were at triggering group discussion, how useful the card were at stimulating reflection and how useful the card were at supporting participation in group discussion. The questionnaire then explored how easy it was to create a story based on the previous group conversations and how easy it was to create a branching story with a learning outcome based on the previous group conversations. The responses were collected in a 5-point Likert scale (1 to 5). Questions 1, 2 and 3 used the scales: 'None, A little, Some, Quite a bit, A lot'. Questions 4, 5 and 6: 'Not at all useful, A little useful, Reasonably useful, Very useful, Extremely useful.' And questions 7 and 8: 'Very difficult, Difficult, OK, Easy, Very easy.'

The questionnaire also included a multiple choice question asking which parts of workshop the participants found the most informative(s). The participants were asked to select a maximum of two responses from the following list: 'Use of cards in Activity 1 (Card A1)'; 'Answering to the four questions in Activity 1 (Quest. A1)'; 'Creating a story in Activity 2 (Story A2)'; 'Creating a branching story in Activity 3 (B. Story A3)'; or 'Other'. The questionnaire finishes with an open question and a comment box for general comments and/or suggestions.

To perform the analysis, the responses were grouped according to the low or high level of understanding and interest. A *Welch t-test* was applied to explore statistically significant differences between these two levels (i.e. low and high) for the data groupings (i.e. understanding and interest). It was expected that people from the group with low interest in the topic would learn less than those with a high level of interest. In addition, the stories could also serve as a foundation to generate insights on the feasibility of creating branching stories with a learning outcome and to identify if they have the potential to be developed into an educational game.

## 4.2 Results

A total of 47 people (30 female and 17 male) participated in the workshop, which was held at a university and involved researchers, lecturers, students, and administration staff. The results of the questionnaire are presented in Table 1.

Two groups were created based on the participants' levels of understanding and two others based on their level of interest reported on the pre-workshop questions (1 and 2). Low levels of interest (LI) and understanding (LU) are participants who responded 1, 2 or 3, and high level of interest (HI) and high level of understanding (HU) are participants who responded 4 or 5 to the questions 1 and 2.

We could not process a four-way comparison since the group (LI) and (HU) was composed of only six participants. As a result, a *Welch t-test* was applied between LU (n=25) and HU (n=22), and between LI (n=21) and HI (n=26). When comparing the groups with different levels of understanding, no statistically significant differences were found for the post-workshop questions ( $p > 0.05$  for every post-workshop questions). Whereas, for Question 3 and 4, a higher significance was found ( $p$ -values of 0.0064 and 0.0109) when comparing the two groups with different levels of interests on everyday sexism.

Concerning the question enquiring which parts of the workshop were the most informative ones, the use of the cards comes first, followed by answering the questions at the back of the card, as

shown in Table 2. The branching story exercise was also reported to be more informative than the story creation exercise. Lastly, all participants that chose 'Other' identified group discussions and chatting to each other (Chat).

	Card A1	Quest. A1	Story A2	B. Story A3	Other- Chat
Card A1	11 5LU-6HU			2 2LU	
Quest. A1	11 6LU-5HU	5 2LU-3HU			
Story A2			4 3LU-1HU		
B. Story A3			3 2LU-1HU	4 3LU-1HU	1 1HU
Other- Chat					6 2LU-4HU

**Table 2: Responses on the parts of the workshop considered most informative on everyday sexism with low (LU) and high level of understanding (HU)**

Moving on to the qualitative results, all participants answered the four questions in the first activity. This is a transcript of the answers of a group on these questions:

1. Identifying an issue: "Existing stereotypes may stop people exploiting their abilities and reaching their full potential."
2. Analysing the issue: "Tradition. Society is gender bias. Dolls for girls!"
3. Explaining the issue: "They put expectation on those from each gender to behave a certain way from a young age. Personal development can be challenged."
4. Elaborating on solutions to tackle the issue: "Encourage all young people to reach for their goals no matter their gender."

Figure 4 shows an example of a branching story created. The story illustrates a girl who loves playing football and hears people saying that "Girls don't play", "Where's your doll and "You suck". In the last part of the story, the girl looks sad and it says that she does not want to play. The intervention in the branching story shows the girl/woman who says "How about you go in goal, I'll show you". At the end of the branching story, she scored and someone says "Turns out she is OK". The intended learning outcome was described as "Raising awareness on the fact that discriminatory comments about women playing sports contribute to women not playing sports. People should understand together that anyone can play any sport".

The participants' feedback in the concluding open question included: "I had no idea that sexism could even be in games, now I realise that it is everywhere.", another said "I wondered many times how to have conversations about sexism with men. Today I could for the first time and it was constructive". It is also important to mention that 10 participants from 8 different groups reported that they would have liked to have more time for the workshop.

## 4.3 Discussion

As seen in the literature review, inviting topic experts to give talks or trainings was described as an effective approach to help participants to understand more about an educational topic of a game



	Overall average (sta. dev)	Average (sta.dev) LU	Average (sta.dev) HU	Average (sta.dev) LI	Average (sta.dev) HI
Number of responses	47	25	22	21	26
1- Understanding	3.30 (0.93)	2.56 (0.58)**	4.14 (0.35)**	3.10(1.04)	3.46 (0.81)
2- Interest	3.45 (0.93)	3.24(0.78)	3.68(1.04)	2.57 (0.60)**	4.15 (0.37)**
3- Learning	3.06(1.24)	3.04 (1.12)	3.09 (1.30)	2.57(1.20)*	3.46 (1.12)*
4- Card group discussions	2.98 (1.15)	3.12 (1.09)	2.82 (1.01)	2.62 (0.93)*	3.27 (0.93)*
5- Card stimulate reflection	3.26 (1.07)	3.28 (0.83)	3.23 (1.02)	3.10 (1.12)	3.38 (0.89)
6- Card support discussion	3.34 (1.29)	3.40 (1.16)	3.27 (1.37)	3.23 (1.36)	3.43 (0.87)
7- Story	3.32 (1.07)	3.28 (0.96)	3.36 (1.05)	3.24 (1.18)	3.39 (0.92)
8- Branching story	3.53 (1.08)	3.32 (0.96)	3.77 (1.04)	3.57 (1.20)	3.50 (1.01)

**Table 1: Average and standard deviation of all questions. \*When a statistically significant difference was found ( $p < 0.05$ ) and \*\*when the statistical difference was extremely significant ( $p < 0.00005$ ).**



**Figure 4: Branching story created during workshop**

(e.g. [25, 26, 34]). In line with the ideas of democratising knowledge and Critical Pedagogy [10] this study is interested in supporting learning about everyday sexism by people with different levels of understanding, through stimulating reflection and group discussion. Overall, the results were considered satisfactory to validate the cards and the process. However, since our analysis was conducted using questionnaire responses based on the participants' perceptions, the results can only be used as indicative measures and not as an objective evaluation.

There was no statistically significant difference between people with different levels of understanding and their learning during the workshop. Similarly, in the multiple choices question, both groups with different levels of understanding on everyday sexism had similar responses, which means that their level of understanding seemed not to influence the parts of the workshop they found most informative on everyday sexism compared to the other group. The fact that the cards were intended to cover distinct facets of everyday sexism and were co-designed by different groups could have contributed to that. Together, these results indicate that the resource materials and group activities can facilitate learning in groups by people with different levels of understanding of the topic.

As anticipated, participants who reported having low levels of interest on everyday sexism felt they learnt less than the ones who reported higher levels of interest. In addition, while the responses to the questions targeted at evaluating the usefulness of the cards (4, 5 and 6) show no difference between groups with different level of understanding, that level of interest did have an impact. Indeed, the perceived usefulness of the cards to trigger group conversations is significantly more pronounced with groups with higher levels of interest. These results seem to confirm that variances on level of interest influenced learning and perceptions of the usefulness of such cards to trigger discussion. For future work, we recommend exploring the relevance of having opening sessions or exercises to raise the level of interest in the social topic.

The results also point out that the difficulties reported when creating a story and a branching story are not correlated with the level of understanding and interest on everyday sexism. It is also important to repeat at this point that question 8 presents the highest average rating among the questions and that the branching stories, as exemplified in Figure 4, have meaningful educational outcomes and the potential to be transformed into educational games.

## 5 DISCUSSION

Aimed at empowering diverse groups to become creators of meaningful and impactful educational games, this research builds on multidisciplinary domains of the educational game literature to propose a game jam framework. The framework describes the democratisation of knowledge as a process that integrates learning opportunities on the topic of educational games, allowing groups to explore the multidisciplinary dimension of educational game design, inviting game jam participants to review the educational potential of a game, which the literature has identified as a challenge to be addressed.

The proposed framework has been initially conceived for game jams lasting at least two days, in which groups of three or more people are invited to work in collaboration. The groups can be diverse, which means that people with a range of experience in educational game design and related domains could join the game jam and contribute to the activities. The framework is intended to be used for topics related to social issues, where reflections on the designers' lived experiences can be used to induce learning.

Although the topic resources have been evaluated in the context of this study, it is expected that other material also co-designed by a diverse group, equally facilitating group discussions and critical reflection, could be applied to replace the set of cards.

As on-going work, the limitations of this study include the partial validation of the resources, so far restricted to the educational topic. The execution of two game jams have been planned as future work, where the first jam will be used to test the framework and the second jam to validate it. Beforehand, this research will pilot each of the stages and resources in the framework. More precisely: the cards on educational game design will be used in a workshop, then validated by experts in Critical Pedagogy and educational game design, and a workshop will be organised to confirm the suitability of the chosen games engine.

## 6 CONCLUSION

While the benefits of creating diverse groups of game designers has been acknowledged in the literature [5, 6, 19], supporting these groups in creating meaningful and effective educational games during game jams has not yet been thoroughly investigated. By embracing the ideas of critical reflection and group discussions to facilitate learning, this research introduces a novel approach aimed at enabling anyone to contribute to the design of educational games in game jams. To this end, a framework describing the process and a set of supporting resources for the democratisation of knowledge has been proposed, building on the synergy between the principles of the Critical Pedagogy [10], educational game design and game jams.

The study presented in this paper focuses on addressing everyday sexism as a social issue. The reported trial supports the potential of the process and some of resources from the framework to democratise knowledge, and to lead participants to think critically and become agents of social change. The evaluation of the framework is formative, but by presenting this framework, this research hopes to inspire and contribute toward further findings on the potential of game jams as spaces for democratising knowledge and facilitating educational game design.

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