Digital Games For Conflict Mediation: a Study on The Developers' Responsibility Practices and The Way Forward

Georgina Guillen
Gamification Group - Faculty of Information Technology and Communication Sciences.
Tampere University
Tampere, Finland
georgina.guillen@tuni.fi

Nevena Sicevic
Gamification Group
Faculty of Information Technology and Communication Sciences, Tampere University
Tampere, Finland
nevena.sicevic@tuni.fi

Ana Carolina Tomé Klock
Gamification Group
aculty of Information Technology and Communication Sciences, Tampere University
Tampere, Finland
actklock@gmail.com

Juho Hamari
Gamification Group
aculty of Information Technology and Communication Sciences, Tampere University
Tampere, Finland
juho.hamari@tuni.fi

Abstract

Conflicts represent unwanted tensions between individuals, groups, and societies, being a pervasively defining dimension of global world politics. Existing approaches to mediate and resolve conflicts require all-encompassing, innovative practices appropriate to today's world state and the ambition of becoming more sustainable. Traditional conflict mediation approaches (e.g., simulations) can gain potential from digital games, as information technologies are ubiquitous and games inherently afford conflict, strategy, collaboration, shared sense-making, and goal-setting. However, digital games can lead to misinformation, biases, data management, and online safety risks, calling for transparent responsibility practices, which are often unclear. To identify and understand responsibility principles and practices inherent to digital games for conflict mediation, we developed a systematic evidence synthesis in this initial study, collecting and analyzing the development processes of 26 conflict-mediation digital games. Our results comprise five practical recommendations, and a future research agenda to assist digital game developers in making sustainable HCI happen.

CCS Concepts

• **Human-centered computing → HCI design and evaluation methods**.

Keywords

Games and play, sustainability, HCI for development, conflict mediation, meta-analysis, qualitative methods

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1 Introduction

Conflicts have existed for as long as humans have expressed their different, often unparalleled goals, views, ideas, values, motivations, perceptions, and beliefs. Avoiding their escalation depends on how the parties involved can find common ground built on respect, communication, and cooperation [17, 33, 44]. The criticism of traditional peace-building strategies highlights top-down, state-centric approaches [47], often inadequate to address wider cultural, economic, and social needs and rights of people [8] and to integrate local perspectives and practices crucial for sustainable peace [69]. Conflict mediation generally involves efforts of a third party (e.g., individual, group, state, or organization) and their non-violent interventions tend to include civil society, capacity building, training, advisory services, and even the involvement of private actors and platforms to shift attitudes from violence to peace [34]. Against this background, human-technology solutions – among them digital games for conflict mediation (DGCM) – have been gaining relevance as a form of Sustainable Human-Computer Interaction (SHCI), because they apply technology to facilitate dialogue, enable social interactions, and engage individuals to reflect on societal issues [10, 21, 53]. Despite the increasing interest and a rising body of evidence showcasing DGCM as powerful tools with societal impact on wellbeing [46] and peace-building [28, 40], existing SHCI literature focuses mainly on the functionality of the design and the expected environmental impacts of the solution (e.g., reduced greenhouse emissions) [11, 51, 54], leaving room to explore digital gameful approaches as technological innovations themselves [2, 19], given they can reveal problems, stimulate novel behaviors, and engage individuals in transformation processes [1, 24]. Therefore, the

goal of this study is **to identify and understand responsibility principles and practices inherent to games for conflict mediation**. By analyzing the practices imbued with developing and implementing 26 DGCM, we derived five recommendations for the development of conflict mediation games to support and address ethical, inclusive and transparent trust-building initiatives. The findings create opportunities for future research and practice on how DGCM developers can benefit from integrating responsible research and innovation practices into their creative endeavors.

2 Related Work

This study departs from the notion that designing for SHCI entails adopting criteria for choice making based on what the developer considers the best to do. This means that, consciously or not, developers must make ethical, strategic choices [39]. Exercising responsibility by design, in addition to being proactive, involves accountability for potentially unwanted outcomes; it is focused on shaping practices where social goals and societal engagement lie at the core of the overall development journey, combining desirable outcomes with responsible processes [57, 59, 64]. Moreover, the responsibility practices behind digital tools call for acknowledging that stakeholders' roles are ever-evolving, as they need to have some understanding of how the digital solutions work and make choices about the extent they will interact with them, considering issues like privacy, security, representation, and accessibility [66].

2.1 Digital Games for Conflict Mediation (DGCM)

Traditional conflict mediation approaches require a presential location-based approach in which a neutral party attempts to tackle the reasons behind the conflict and assist in its resolution [31]. These approaches are often criticized for their high costs, limited accessibility, rigid procedures, and even risky situations for disputants and mediators, including "emotional undertows" that can escalate tensions [4, 31]. On the other hand, DGCM offer highly customizable settings employing gameful activities (e.g., role-playing) to provide an emotionally supportive personalized environment towards conflict mediation [6]. DGCMs are considered serious games as, besides entertaining, they aim to strengthen players' empathy and decision-making skills to understand the root causes of conflicts and the dynamics within [9], further teaching communication, negotiation, problem solving, compromise making, and facilitating dialogue [14]. Thus, DGCM provide environments for experiential learning to understand how peace could be achieved and maintained, allowing the exploration of different scenarios and their consequences without the irreversibility of real-life happenings [6, 20], being increasingly present in fields such as education [15], diplomacy [12, 35], healthcare [50], and military [13]. Overall, DGCM address certain limitations of traditional mediation methods by enabling broader participation from multiple locations, facilitating computer-supported cooperative work for communication, deploying calming technologies, and supporting multi-lifespan research initiatives toward conflict mediation – ultimately contributing to reconciliation and peace [6, 23]. However, DGCM developers must carefully consider how their games can responsibly address complex societal issues [37], especially their role as a tool to facilitate dialogue in controlled, safe spaces with collaborative player interaction setups [53]. For example, games to develop mediation skills should look at many individual and contextual aspects (e.g., trust of each party in the mediator, emotional responses to the conflict, and validity of available information) to create meaningful decision-making opportunities within different timelines that properly illustrate their consequences and allow reflection, experimentation, learning, while engaging players [21, 29, 37]. Therefore, several cautionary considerations must be acknowledge, including the risk of oversimplification [3], distraction of players that potentially incite more conflict [21, 67], and emergence of deadlocks that address misunderstandings rather than conflicts [29]. These challenges underscore the responsibility of DGCM developers to critically consider their current efforts, identify opportunities to improve them, or even develop a whole new responsibility strategy.

2.2 Anticipate, Reflect, Engage, and Act (AREA) framework

In pursuit of identifying and understanding the principles and practices of responsibility inherent in DGCM, this study builds on the notion of Responsible Research and Innovation (RRI) of the European Union, a comprehensive approach to governance, ethical, economic, legal, and political issues affecting all involved stakeholders [36, 41, 52, 68]. Given the strong need for collaboration and transparency throughout conflict mediation processes [16, 57, 66], RRI is an ideal approach to explore mutual responsiveness among stakeholders [64] and to enable the communication necessary in such mediation [18]. RRI also facilitates the recognition of uncertainties and unintended consequences, allowing the preparation of appropriate responses [7]. Compared to other responsible technological innovation frameworks, such as Technology Assessment (TA) and Socio-Technical Integration Research (STIR), RRI focuses primarily on societal needs in innovation and research, emphasizing social values and the responsibility to build trust in science toward societal acceptance of new technologies [43]. Among the several frameworks within the RRI approach [7, 56], the AREA framework [43, 58] represents an opportunity to address some of the conflicts posed by innovation in the ever-evolving innovations of information communication technologies, such as the ethics behind HCI [26]. AREA stands for four principles: "**Anticipation** of the potential future impact of new knowledge and technologies; **Reflection** on the conceptual, social, ethical, and regulatory implications of [...] research and emerging [...] technologies; **Engagement** and dialogue with diverse stakeholders on issues of immediate relevance to the [...] innovation; and **Action** based on insights gained through anticipation, reflection, and engagement" [62]. Given its flowing nature towards "closes the loop" [62], AREA intertwines research and practices with the social study of science and technology at its core [42, 62], presenting a flexible framework that integrates non-linear processes to ensure stakeholder engagement, fosters creativity, anticipates impacts, enables interdisciplinarity, and encourages self-criticism [26, 62]. Although some of the overlaps between the activities in principles may create confusion and even lead to tensions [41], practice and observation allow those involved in RRI practices to align innovation, research and social needs [58].

3 Methods

We conducted a systematic evidence synthesis, which is a rigorous methodology that facilitates the comprehensive and unbiased exploration of existing literature from diverse sources (e.g., academic studies, gray literature) [5]. Data collection and analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyzes (PRISMA) protocol [45] to identify ongoing RRI practices reported as part of the development and implementation of DGCM. Using the AREA framework for the analytical aspects of our study, the results of the qualitative analysis are described narratively, allowing the identification of categories and practices within and the formulation of recommendations [55].

3.1 Data Collection

The systematic evidence synthesis involved parallel processes of search in academic and gray literature to compile a comprehensive database. A systematic review of the academic peer-reviewed literature was conducted on June 11th, 2024, searching for the following string in the SCOPUS database: *conflict AND (manag* OR mediat* OR mitigat* OR resol* OR transform*) AND (gameful OR game* OR gami* OR boardgame OR game-based OR role-play OR videogame) AND (player* OR participant* OR designer* OR maker* OR developer* OR stakeholder*) AND (peace OR sustainab*) AND NOT "game theor*" AND NOT evolution**. In summary, we introduced diverse concepts related to conflict mediation and games to ensure a complete search, while literature on game theory and evolutionary games was excluded. This search yielded 87 publications, which were screened using the following inclusion criteria: peer-reviewed articles in English or German (common languages of the two first authors of this study), freely accessible through Tampere University library, and related to both digital games and conflict mediation. After this screening, 40 publications were included in this study. The gray literature search first consisted of a broad Google search of the keywords (on private mode to reduce technological bias), stopping when most of the results were unrelated to the research (e.g., job postings, university programs, conferences), which happened around the 14th search results page. These searches provided a total of 98 entries. Beyond applying the same inclusion criteria used for screening academic papers, the titles, abstracts, or executive summaries of this gray literature were analyzed to confirm that the content was created or verified by specialized multilateral agencies (e.g., the United Nations), research institutions, well-known printing houses, and well-established newspapers. Information behind paywalls or not scientifically backed was excluded. This process yielded 86 entries, including 19 peer-reviewed publications that were not found in SCOPUS. The combined database, comprising academic and gray literature, was analyzed to identify publications discussing digital games for conflict mediation and detailing their development processes.

3.2 Data Analysis

After developing an assessment criterion comprising several characteristics of project development (see Appendix A), the two first authors carried out a descriptive overview of the games found in the reviewed literature. Following this, the first authors individually identified responsibility practices reported by these games and preliminarily allocated them within the principles from AREA framework. Then, these authors reconvened to compare results, consolidate the list of practices, and agree on the AREA principle to which each game belonged. The discussions to allocate the reported activities within the included games according to the AREA framework helped to highlight specific actions that contribute to all principles, hence, "closing the loop." In other words, the next step was connecting the reported practices to feed back the anticipation, reflection, and engagement actions into the game creation and implementation processes. For example, the action "draw from personal experience" entails a reflective process that leads to anticipating situations the game developers already know about. This same action also helps to explore engagement actions, which, in turn, will create new experiences to reflect upon, and so the loops go. Once the list of "loop closing" activities was curated, it was possible to have a clear picture of the most common responsibility principles and practices and identify opportunities for further development. Understanding what was behind these opportunities led to a first draft of recommendations that DGCM developers could use as a guideline. This document was shared with two highly experienced researchers in the field of SHCI and gameful approaches for their feedback. The methodological process is illustrated in Fig. 1.

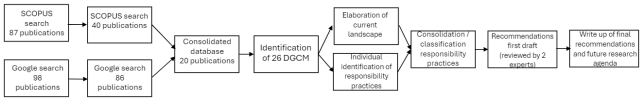

Figure 1: Methodological process followed in this study.

4 Results

By analyzing published scholarly and gray literature, we identified the most common responsibility practices adopted by DGCM developers. Before examining these practices, it was essential to also understand the existing DGCM landscape. Therefore, the results of our study are twofold: first, we identified the number and general characteristics of DGCM according to the systematic evidence synthesis (Section 4.1); and second, we recognized the developers' considerations behind 26 DGCM, structured within the AREA framework (Section 4.2). Ultimately, these detailed results hereby presented serve as a foundation for more in-depth research that can build upon the groundwork.

4.1 The Landscape: A Descriptive Overview of DGCM According to Systematic Evidence Synthesis

The oldest game, *African Farmer Game*, was released in 1990, immersing players in the difficult choices that poverty and conflict can cause. In constrast, the most recent included game, *(In) the Hate Booth*, was released in 2023, addressubg a relatively new form of conflict – online hate. Additionally, 18.5% of the games in this study were released in 2017, while another 14.8% date back to a decade earlier. Although the selection criteria focused on digital games, two also have a physical version. Moreover, six games have a hybrid format, incorporating offline or off-game components such

as reflection rounds with facilitators and interactive multimedia installations. Most of the information available relates to the games' implementation (24), followed by descriptions of the design process (20), potential impacts (18), and, to a lesser extent, observations about testing phases (12) or the structuring of sessions in which the games were played (4). While most games are set in real-world countries or regions, they often depict fictional scenarios inspired by actual conflicts, particularly those in the Middle East (Israel-Palestine, Yemen, Iran), Rwanda, and Colombia. Many of these games are grounded in extensive research and incorporate footage and even testimonials from the happenings, as seen in *1979 Revolution: Black Friday* and *This War of Mine*. Although many games could be played individually, studies showed that most games were mainly played in educational institutions (13) or as part of community programs (13), further emphasizing the need of after-play reflective processes for a holistic experience. From the 26 games included in this study, 17 of them were launched before 2016 – year in which the United Nations Sustainable Development Goals (SDGs) were released [63]. Still, only three publications mention the SDGs, with only one of them directly referencing to SDG 16 "Peace, justice and strong institutions". Notwithstanding, eight of the games were designed for purposes beyond conflict resolution – such as climate change and water management, where conflict may arise – whereas 16 of the remaining 18 games implicitly contribute to SDG 16, and 10 of them also directly support SDG 17 "Partnerships for the Goals". Other SDGs addressed by these games are: 1 "No poverty", 2 "Zero hunger", 6 "Clear water and sanitation", and more predominantly, 12 "Climate change", 14 "Life below water", and 15 "Life on land". This landscape helps to gain a more thorough understanding of how DGCM are designed and, in many cases, implemented, shedding light on their purpose, the stakeholders involved, and participants' reflections. A comprehensive overview of the DGCM landscape can be found in Appendix A. These insights also facilitated their identification within the AREA principles below.

4.2 Responsibility Practices for DGCM Developers According to the AREA Framework

Human-centered design approaches may suggest that digital game developers inherently adopt practices aligned with RRI during their design processes, as they prioritize end-user values and needs [22]. However, RRI encompasses a broader perspective, aiming to involve diverse stakeholders throughout the innovation process while considering its socio-environmental and ethical impacts [26, 65]. Overall, the collected data indicates that DGCM developers engage with RRI practices to varying degrees. While some primarily incorporate them as part of their development strategies (e.g., feedback collection), only a few explicitly acknowledge potential risks for users or consider unintended consequences. The reviewed literature tends to provide a first-hand account of how local stakeholders, subject matter experts, or both were involved in the game design. Some studies elaborate on user feedback gathered during testing phases, while others reflect on insights gained after game implementation. The following understanding of AREA principles in DGCM highlights several opportunities to advance more comprehensive SHCI solutions:

- **Anticipation** focuses on foreseeing the potential impact of games, including their implementation methods, and assessing their effects on players beyond the original intent. Anticipation helps DGCM developers to understand the contexts in which games take place, ensuring less unbiased narratives and addressing potential access barriers (e.g., the requirement of VR headsets). Other considerations include misrepresentation, potential misuse, bias, and other unintended consequences. To address these concerns, the anticipation principle includes historical data collection and collaboration with multidisciplinary, international teams to foster a shared understanding while observing local idiosyncrasies and respecting cultural, environmental, and social values.
- **Reflection** involves the iterative examination of existing narratives and situations, often through the creation of system maps to visualize causal relationships and influencing factors. Regular meetings with the creative teams, local partners, and other involved stakeholders (e.g., intended users, funding entities) throughout the development process (e.g., consulting, prototyping, testing) contribute to building the basis for more anticipatory and engagement actions.
- **Engagement** seeks to unite all relevant stakeholders, fostering communication and collaboration while building trust. This principle involves ensuring that all voices are heard, promoting cross-sector collaboration, and cultivating a shared group identity.
- **Action** drives stakeholders toward recognizing and fulfilling their responsibilities by integrating anticipation, reflection, and engagement principles. Responsible action encompasses accountability and transparency measures, including legal and ethical compliance (e.g., reporting mechanisms and publicly accessible codes of conduct).

The responsibility principles and practices identified within the AREA framework are further detailed in Appendix B.

5 Discussion and Future Work

In this study, we set out to identify and understand the responsibility principles and practices DGCM developers consider or apply when creating their games, contributing to advancements in the broader field of SHCI.

5.1 DGCM as a promising new avenue

Recognizing that digital games are socio-technical systems shaping human interactions, the study highlighted the need for developers to anticipate and reflect on social and ethical consequences, engage stakeholders in the development process, and act towards sustainable practices responsibly. [18] presents a series of effective mediation strategies, which we classified according to AREA as a way to understand the responsibility practices identified in our study. The strategies are the following:

- Investing in good conflict analysis, setting realistic goals, and recognizing changing contexts can be understood as strategies within the **anticipation principle**.
- Distinguishing between working on conflict versus working in conflict, i.e., considering whether to mitigate tensions or address root causes, directly relates to **reflection**.

- Establishing space for collaboration and networks to exchange ideas is a means to **engage** all involved parties.
- These strategies together inform the fair share of resources towards sustainable operations, thus enabling the **action principle**.

5.2 Recommendations

By identifying and understanding the responsibility principles and practices inherent to games for conflict mediation, our findings revealed several opportunities to support DGCM developers in addressing ethical, inclusive and transparent trust-building undertakings. While none of the reviewed games applied all the identified practices (Appendix B), experienced developers (whether DGCM or other types) may be familiar with them as this study only summarizes existing practices while integrating them into innovation and sustainability-related fields. The present recommendations incorporate three perspectives: responsible development practices, game components enabling AREA, and effective conflict mediation strategies that complement traditional methods.

Recommendation 1: Be proactive, not reactive - Interestingly, responsiveness practices are predominant both in the development (e.g., reaching out to the users for testing rather than involving them as a part of the development process) and even the game dynamics (e.g., predominance of data provision and quiz-like option-choosing). [58] emphasizes that RRI is about proactivity rather than responsiveness. The findings showed that the most mentioned DGCM are these with engaging narratives that tap into emotions like fear, excitement, strategic thinking, and a sense of accomplishment [38, 49]. These games have an inherent proactive character due to their enabling multiplayer components such as alliance formation that enable competitive, yet collaborative dynamics, where players can experience power and responsibility [30, 60]. Although working on conflicts is a challenging and complex endeavor, there is a need to be ambitious, take risks, and find a balance between immediate fixes and resolution [18].

Recommendation 2: Go beyond collaboration, embrace co-creation - Since collaborative networks are also crucial from the conflict mediation perspective [18], current responsibility practices reflect interactions between game developers and topic experts in the initial development stages, including the voices of the communities and users during the prototyping and testing phase. However, co-creation, as the active engagement and collaboration of stakeholders to achieve innovation and research that is more socially relevant, widely adopted, and closely connected to end users [61], is an opportunity to harness the knowledge, engagement, and potential that involved stakeholders bring with them beyond providing feedback. Engaging different voices throughout the game development, implementation, and reflection stages helps prevent risks such as sharing misinformation, stereotype reinforcement, or conflict trivialization. Besides enabling collaborative environments, each stakeholder's after-development and implementation experiences are important and are often missing. A step forward in practicing responsibility could include planning for a retrospective report at a determined time after the implementation (e.g., three to five years) to track and learn from the experience's impact on all participating stakeholders.

Recommendation 3: Plan for accessibility, longevity, and the unexpected - Understand your stakeholders' needs and plan for each of them, mainly the facilitators and the players, and if and how their roles will evolve. Also, setting expectations right from the beginning is crucial, as some games, particularly those developed with funding agencies' support, have shorter life spans due to project lengths and maintenance costs afterward. Although most of these games were created for free use and could be accessible by anyone with at least a computer, there may be a missed opportunity in their being unavailable after some time, particularly if they became popular among their target users. On the other hand, games behind a paywall (including licenses) tended to be active and among the most implemented regardless of their release year. For example, when an institution (e.g., school, government) pays for the license for everyone to access the game. This situation is an invitation to pay attention to the success indicators beyond those established for the projects' success (e.g., number of users in a determined number of sessions) as there might be other (non-measured) implementations of the game. Some approaches to harness this opportunity include considering long-lasting partnerships, exploring different funding mechanisms (e.g., crowdfunding), or even long-term licensing programs.

Recommendation 4: Make Information Contextual, Relatable, and Purpose-driven - Those living in areas where conflict is present perceive differently from those who lack first-hand experience and knowledge about the root causes [32]. While this apparent ignorance may strengthen unbiased input from this particular stakeholder group, it also emphasizes the developers' responsibility to provide neutral narratives promoting empathy and understanding of all the situations related to conflict mediation, a daunting task since most of these games are applied in educational contexts, and their efficiency in motivating learning peace-building skills remains debatable [27]. To create relatedness with the challenge at hand, the players must understand the context and what the information presented is illustrating. As another example, most DGCM where natural resources are at play, mainly those focusing on environmental issues, deal with plenty of data and often rely on information that can look ominous but may lead to underrepresenting the actual situation. Sometimes, comparisons are more illustrative than numbers, e.g., "40 alkaline batteries could contaminate 6,5 million liters of water" [48]. Someone unfamiliar with the metric system may find this challenging to understand, or vice-versa; 1.7 million gallons of water may seem relatively less, though it is the same amount. In contrast, the notion "the equivalent of the size of an Olympic swimming pool" [48] already shows it is a large body of water regardless of the measurement system. Providing too much data may be overwhelming for the player if not put at play; make sure that the information is straight to the point and relevant for the overall purpose of the game.

Recommendation 5: Report real-world impact, regardless of game's Focus - DGCM like *PeaceMaker*, *Global Conflicts*, or *The Peace Game* are built around real-world political situations,

where players mediate between opposing groups. These narratives are designed to reflect the challenges of finding peaceful solutions where compromise is difficult, forcing players to engage in nuanced decision-making that mirrors the reality of international diplomacy. Rooting the narrative context in real-life situations and systems, players can better relate to the game world by utilizing their existing mental models. Furthermore, the game world might seem universal (and thus relatable) through abstraction or minimalism, as it better represents diverse personal experiences [25]. When it comes to choice and consequence, by giving players agency over outcomes, DGCM allow for experimentation with various mediation strategies, such as negotiation, compromise, or diplomacy. The player's decisions directly impact the game world in a way that simulates real-world consequences. This ensures that every interaction feels significant and that players can see how their successful and unsuccessful choices affect the larger conflict. The call for transparency about impacts also extends outside the game itself and calls for practices such as Environmental, Social, and Governance Accounting (ESG) or Corporate Social Responsibility (CSR) reporting to own other impacts resulting from the developers' activities. After all, digital technologies come with a hefty environmental tag, from the access.

5.3 Future Research Agenda

Our findings open the door to discuss responsible DGCM development, linking SHCI with RRI practices, and illustrating how some are already in place. Although the AREA framework is a well-established approach to exploring responsibility practices, to our knowledge, it has never been applied to serious game development. Empirical studies on the topic of responsible gamification [19] show how responsibility frameworks similar to AREA provide a solid basis for all relevant stakeholders to get involved in the creative process and support the developers' responsibility efforts, and this study enables the debate for future game development; for example, the recommendations can serve to reflect on existing responsibility practices and consider the introduction of new ones, giving AREA a prospective character.

As a review of published data, this study possesses various shortcomings, such as the sample size and lack of input from any of the actors involved in these practices. While reflecting and reporting part of the creative processes is already one responsibility step, there is a bias in the publications, as none of them addressed unexpected outcomes or even situations of failure. Also, while some reviewed documents included reflections about the conflict mediation skills acquired and how the participants noted changes in their attitudes, more thorough research is needed to measure DGCM's impacts. Another challenge is to apply the recommendations; some of them could be costly to carry out. Not only financially but also in terms of time (particularly sub-contracted projects), skills, and outreach. Future work in this area can also focus on identifying opportunities to help implement all recommendations, perhaps by developing a more in-depth exploration of successful business models and other strategies that enable DGCM to survive and meet their goals. Our next steps consist of empirical activities to validate our findings via an online psychometric survey among DGCM players, as well as interviews with developers and conflict management experts. We will also develop a DGCM-tailored RRI analytical framework, which will be used to analyze and harmonize the results from these interactions. The consolidated results will be turned into an improved version of the recommendations that, besides being presented to the HCI research community, will also be offered as a series of practical guidelines - playbooks - for practitioners to enable the broader applicability of our results. The current paper, and the subsequent studies represent an initial step for researchers and practitioners from various fields, from conflict mediation to game development, to connect their experiences, learn together, and take responsible SHCI forward.

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References

[1] Carmen Abril, Elena M. Gimenez-Fernandez, and María del Mar Camacho-Miñano. 2024. Using gamification to overcome innovation process challenges: A literature review and future agenda. *Technovation* 133 (2024), 103020. https://doi.org/10.1016/j.technovation.2024.103020

[2] Fatemah M. AlSaad and Christopher M. Durugbo. 2021. Gamification-as-Innovation: A Review. *International Journal of Innovation and Technology Management* 18, 05 (2021), 2130002. https://doi.org/10.1142/S0219877021300020

[3] Elizabeth Bartels, Margaret McCown, and Timothy Wilkie. 2013. Designing Peace and Conflict Exercises: Level of Analysis, Scenario, and Role Specification. *Simulation & Gaming* 44, 1 (2013), 36–50. https://doi.org/10.1177/1046878112455486

[4] Jacob Bercovitch and Scott Sigmund Gartner. 2008. *International Conflict Mediation: New Approaches and Findings* (1 ed.). Taylor and Francis Group, London. https://doi.org/10.4324/9780203885130

[5] Annette Boaz, Deborah Ashby, David Denyer, Matt Egan, Angela Harden, David R. Jones, Ray Pawson, and David Tranfield. 2006. A multitude of syntheses: a comparison of five approaches from diverse policy fields. *Evidence & Policy* 2, 4 (2006), 479 – 502. https://doi.org/10.1332/174426406778881755

[6] Rex Brynen and Gary Milante. 2013. Peacebuilding with games and simulations. *Simulation & Gaming* 44, 1 (2013), 27–35. https://doi.org/10.1177/1046878112455485

[7] Mirjam Burget, Emanuele Bardone, and Margus Pedaste. 2017. Definitions and conceptual dimensions of responsible research and innovation: A literature review. *Science and engineering ethics* 23 (2017), 1–19. https://doi.org/10.1007/s11948-016-9782-1

[8] Amanda Cahill-Ripley. 2016. Reclaiming the Peacebuilding Agenda: Economic and Social Rights as a Legal Framework for Building Positive Peace - A Human Security Plus Approach to Peacebuilding. *Human Rights Law Review* 16, 2 (2016), 223–246. https://doi.org/10.1093/hrlr/ngw007

[9] Yun-Gyung Cheong, Rilla Khaled, Christoffer Holmgard, and Georgios N. Yannakakis. 2015. Serious Games for Teaching Conflict Resolution: Modeling Conflict Dynamics. In *Conflict and Multimodal Communication*. Springer International Publishing, Cham, 449–475. https://doi.org/10.1007/978-3-319-14081-0_21

[10] Dimitrios Paris Darzentas and Lachlan Urquhart. 2015. Interdisciplinary Reflections on Games and Human Values. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play*. Association for Computing Machinery, New York, 805–810. https://doi.org/10.1145/2793107.2810259

[11] Vânia Paula De Almeida Neris, Kamila Rios Da Hora Rodrigues, and Renata Firmino Lima. 2014. A systematic review of sustainability and aspects of human-computer interaction. In *Proceedings of the 16th International Conference on Human-Computer Interaction*. Springer International Publishing, Cham, 742–753. https://doi.org/10.1007/978-3-319-07227-2_71

[12] Iain Donald, Nick Webber, and Esther Wright. 2023. Video games, historical representation and soft power. *Journal of Gaming and Virtual Worlds* 15, China and the World: Navigating Video Game Localization and Copyright Challenges (2023), 105–127. https://doi.org/10.1386/jgvw_00075_1

[13] A. Walter Dorn and Peter F. Dawson. 2021. Simulating Peace Operations: New Digital Possibilities for Training and Public Education. *Simulation & Gaming* 52, 2 (2021), 226–242. https://doi.org/10.1177/1046878120968605

[14] Levent Durdu. 2020. Digital Games for Peace Education. In *Empowering Multiculturalism and Peacebuilding in Schools*. IGI Global, Hershey, 238–269.

https://doi.org/10.4018/978-1-7998-2827-3.ch011

[15] Dena A. Evans and Anthony R. Curtis. 2011. Animosity, Antagonism, and Avatars: Teaching Conflict Management in Second Life. *Journal of Nursing Education* 50, 11 (2011), 653–655. https://doi.org/10.3928/01484834-20110729-03

[16] Tim Flink and David Kaldewey. 2018. The new production of legitimacy: STI policy discourses beyond the contract metaphor. *Research Policy* 47, 1 (2018), 14–22. https://doi.org/10.1016/j.respol.2017.09.008

[17] Johan Galtung. 1969. Violence, peace, and peace research. *Journal of Peace Research* 6, 3 (1969), 167–191.

[18] Roger Mac Ginty. 2024. *What works? Effectiveness in Mediation and Peacemaking. A policy brief.* Technical Report. Durham University, Durham. 1–3 pages.

[19] Georgina Guillen Mandujano, Nevena Sicevic, and Juho Hamari. 2024. Gamifying responsibly: Sustainable HCI for the future. In *Proceedings of the 8th International GamiFIN Conference*. CEUR Workshop Proceedings, Ruka, 170–182. https://ceur-ws.org/Vol-3669/paper16.pdf

[20] David Gundry and Sebastian Deterding. 2019. Validity Threats in Quantitative Data Collection With Games: A Narrative Survey. *Simulation & Gaming* 50, 3 (2019), 302–328. https://doi.org/10.1177/1046878118805515

[21] Andreas T Hirblinger, Ville Brummer, and Felix Kufus. 2024. Leveraging digital methods in the quest for peaceful futures: the interplay of sincere and subjunctive technology affordances in peace mediation. *Information, Communication & Society* 27, 11 (2024), 2039–2058. https://doi.org/10.1080/1369118X.2023.2247070

[22] Veronica Margit Hoth, Anne Elisabeth Krueger, and Stefan Brandenburg. 2024. A Hands-On Method for introducing Ethical Experience Design into Daily Creative Processes based on Psychological Needs and Values. In *Adjunct Proceedings of the 2024 Nordic Conference on Human-Computer Interaction*. Association for Computing Machinery, New York, 4 pages. https://doi.org/10.1145/3677045.3685463

[23] Juan Pablo Hourcade, Natasha Bullock-Rest, Janet Davis, Lahiru Jayatilaka, Neema Moraveji, Lisa Nathan, and Panayiotis Zaphiris. 2012. HCI for peace: preventing, de-escalating and recovering from conflict. In *CHI '12 Extended Abstracts on Human Factors in Computing Systems*. Association for Computing Machinery, New York, 2703–2706. https://doi.org/10.1145/2212776.2212700

[24] Mirva Hyypiä and Satu Parjanen. 2015. Gamification as an Intervention Method in Practice-Based Innovation. *International Journal of Innovation and Technology Management* 12, 04 (2015), 1550018. https://doi.org/10.1142/S0219877015500182

[25] Adam Jerrett, Peter Howell, and Neil Dansey. 2020. Creating meaningful games through values-driven design principles. In *Proceedings of DiGRA 2020 Conference: Play Everywhere*. DiGRA, Tampere, 1–17. https://dl.digra.org/index.php/dl/article/view/1158

[26] Marina Jirotka, Barbara Grimpe, Bernd Stahl, Grace Eden, and Mark Hartswood. 2017. Responsible research and innovation in the digital age. *Commun. ACM* 60, 5 (2017), 62–68. https://doi.org/10.1145/3064940

[27] Ronit Kampf and Esra Cuhadar. 2015. Do computer games enhance learning about conflicts? A cross-national inquiry into proximate and distant scenarios in Global Conflicts. *Computers in Human Behavior* 52 (2015), 541–549. https://doi.org/10.1016/j.chb.2014.08.008

[28] Ronit Kampf and Iolie Nicolaidou. 2024. Using social impact games to overcome intractable conflicts: the case of Fact Finders and PeaceMaker. *Information, Communication & Society* 0, 0 (2024), 1–16. https://doi.org/10.1080/1369118X.2024.2331770

[29] Nikolaos Kiriazis and Thanasis Hadzilacos. 2022. *Designing a Peer-Mediation Serious Game*. Technical Report. International Association for Development of the Information Society. 154–158 pages. https://files.eric.ed.gov/fulltext/ED639843.pdf

[30] Rachel Kowert and Thorsten Quandt. 2015. *The Video Game Debate: Unravelling the Physical, Social, and Psychological Effects of Digital Games* (1 ed.). Taylor & Francis, New York. https://doi.org/10.4324/9781315736495

[31] Kenneth Kressel. 2007. The strategic style in mediation. *Conflict Resolution Quarterly* 24, 3 (2007), 251–283. https://doi.org/10.1002/crq.174

[32] Kori L. Krueger, Matthew A. Diabes, and Laurie R. Weingart. 2022. Reprint of: The psychological experience of intragroup conflict. *Research in Organizational Behavior* 42 (2022), 100186. https://doi.org/10.1016/j.riob.2023.100186

[33] John Paul Lederach and Michelle Maiese. 2009. Conflict transformation: A circular journey with a purpose. *New Routes: A Journal of Peace Research and Action* 14, 2 (2009), 7–10.

[34] Marko Lehti. 2022. Private Peacemaking and Dialogic Approach to Mediation. In *The Palgrave Encyclopedia of Peace and Conflict Studies*. Springer International Publishing, Cham, 1212–1224. https://doi.org/10.1007/978-3-030-77954-2_53

[35] Rhett Loban. 2017. Digitising Diplomacy: Grand Strategy Video Games as an Introductory Tool for Learning Diplomacy and International Relations. In *Proceedings of DiGRA 2017 Conference*. DiGRA, Tampere, 1–18. https://dl.digra.org/index.php/dl/article/view/915

[36] Miklós Lukovics, Steven M Flipse, Beáta Udvari, and Erik Fisher. 2017. Responsible research and innovation in contrasting innovation environments: Socio-Technical Integration Research in Hungary and the Netherlands. *Technology in Society* 51 (2017), 172–182. https://doi.org/10.1016/j.techsoc.2017.09.003

[37] Joelle-Denise Lux, André Czauderna, Emmanuel Guardiola, and Alexandra Budke. 2021. Guidelines for the design of (educational) digital games on complex societal issues. (2021). https://doi.org/10.31235/osf.io/9fq4u Accessed: 2025-01-23.

[38] Steven Malliet. 2007. Adapting the Principles of Ludology to the Method of Video Game Content Analysis. *Game Studies. The International Journal of Computer Game Research* 7, 1 (2007), 1–18.

[39] Ezio Manzini. 2006. Design, ethics and sustainability: Guidelines for a transition phase. In *Cumulus Working Papers: Nantes*. University of Art and Design Helsinki, Helsinki, 9–15. https://designmattersatartcenter.org/wp-content/uploads/2010/09/NantesWorkingPaper.pdf

[40] Robin Isfold Munkvold, Line Kolås, and Adam Palmquist. 2023. A Conflict Management Game in Project-Based Learning. In *European Conference on Games Based Learning*. Academic Conferences International Limited, Reading, 443–451. https://doi.org/10.34190/ecgbl.17.1.1375

[41] Lukasz Nazarko. 2019. Responsible research and innovation: A conceptual contribution to theory and practice of technology management. *Business: Theory and Practice* 20 (2019), 342–351. https://doi.org/10.3846/btp.2019.32

[42] Richard Owen and Mario Pansera. 2019. *Responsible innovation and responsible research and innovation*. Edward Elgar Publishing, Cheltenham, 26–48. https://doi.org/10.4337/9781784715946.00010

[43] R Owen, R von Schomberg, and P Macnaghten. 2021. An unfinished journey? Reflections on a decade of responsible research and innovation. *Journal of Responsible Innovation* 8, 11 (2021), 217–233. https://doi.org/10.1080/23299460.2021.1948789

[44] Thania Paffenholz. 2009. Understanding peacebuilding theory: Management, resolution and transformation. *New Routes: A Journal of Peace Research and Action* 14, 2 (2009), 3–6.

[45] Matthew J Page, David Moher, Patrick M Bossuyt, Isabelle Boutron, Tammy C Hoffmann, Cynthia D Mulrow, Larissa Shamseer, Jennifer M Tetzlaff, Elie A Akl, Sue E Brennan, et al. 2021. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *bmj* 372 (2021), n160. https://doi.org/10.1136/bmj.n160

[46] Federica Pallavicini, Ambra Ferrari, and Fabrizia Mantovani. 2018. Video games for well-being: A systematic review on the application of computer games for cognitive and emotional training in the adult population. *Frontiers in Psychology* 9, 7 (2018), 1–26. https://doi.org/10.3389/fpsyg.2018.02127

[47] María Martín de Almagro Pol Bargués and Katrin Travouillon. 2023. New Visions, Critiques, and Hope in the Post-Liberal Age? A Call for Rethinking Intervention and Statebuilding. *Journal of Intervention and Statebuilding* 17, 1 (2023), 1–15. https://doi.org/10.1080/17502977.2023.2184941

[48] Germán Portillo. 2024. How much batteries pollute and how to avoid it: everything you need to know. https://en.renovablesverdes.com/how-much-do-batteries-pollute/ Accessed: 2025-01-23.

[49] Andrew Przybylski, C. Rigby, and Richard Ryan. 2010. A Motivational Model of Video Game Engagement. *Review of General Psychology* 14 (2010), 154–166. https://doi.org/10.1037/a0019440

[50] Sarah Kureshi Ranit Mishori and Hope Ferdowsian. 2017. War games: using an online game to teach medical students about survival during conflict 'When my survival instincts kick in, what am I truly capable of in times of conflict?'. *Medicine, Conflict and Survival* 33, 4 (2017), 250–262. https://doi.org/10.1080/13623699.2017.1406439

[51] Christian Remy, Oliver Bates, Alan Dix, Vanessa Thomas, Mike Hazas, Adrian Friday, and Elaine M Huang. 2018. Evaluation beyond usability: Validating sustainable HCI research. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, 1–14. https://doi.org/10.1145/3173574.3173790

[52] Gianni Robert, Pearson John, and Reber Bernard. 2018. *Responsible Research and Innovation: From Concepts to Practices* (1 ed.). Routledge, Abingdon. https://doi.org/10.4324/9781315457291

[53] Philip Sabin. 2011. The benefits and limits of computerization in conflict simulation. *Literary and linguistic computing* 26, 3 (2011), 323–328. https://doi.org/10.1093/llc/fqr024

[54] Sabrina Scuri, Marta Ferreira, Nuno Jardim Nunes, Valentina Nisi, and Cathy Mulligan. 2022. Hitting the triple bottom line: Widening the HCI approach to sustainability. In *Proceedings of the 2022 CHI conference on human factors in computing systems*. Association for Computing Machinery, New York, 1–19. https://doi.org/10.1145/3491102.3517518

[55] Melissa K Sharp, Dayang Anis Binti Awang Baki, Joan Quigley, Barrie Tyner, Declan Devane, Kamal R Mahtani, Susan M Smith, Michelle O'Neill, Mairin Ryan, and Barbara Clyne. 2022. The effectiveness and acceptability of evidence synthesis summary formats for clinical guideline development groups: a mixed-methods systematic review. *Implementation Science* 17, 1 (2022), 74. https://doi.org/10.1186/s13012-022-01243-2

[56] Bernd Stahl, Grace Eden, and Marina Jirotka. 2013. *Responsible Research and Innovation in Information and Communication Technology: Identifying and Engaging with the Ethical Implications of ICTs*. John Wiley & Sons, Chichester, 199–218. https://doi.org/10.1002/9781118551424.ch11

[57] Bernd Carsten Stahl, Simisola Akintoye, Lise Bitsch, Berit Bringedal, Damian Eke, Michele Farisco, Karin Grasenick, Manuel Guerrero, William Knight, Tonii Leach, et al. 2021. From Responsible Research and Innovation to responsibility by design. *Journal of Responsible Innovation* 8, 2 (2021), 175–198. https://doi.org/10.1080/23299460.2021.1955613

[58] Bernd Carsten Stahl, Simisola Akintoye, Lise Bitsch, Berit Bringedal, Damian Eke, Michele Farisco, Karin Grasenick, Manuel Guerrero, William Knight, Tonii Leach, Sven Nyholm, George Ogoh, Achim Rosemann, Arleen Salles, Julia Trattnig, and Inga Ulnicane. 2021. From Responsible Research and Innovation to responsibility by design. *Journal of Responsible Innovation* 8, 2 (2021), 175–198. https://doi.org/10.1080/23299460.2021.1955613

[59] Jack Stilgoe, Richard Owen, and Phil Macnaghten. 2017. Developing a framework for responsible innovation. In *The Ethics of Nanotechnology, Geoengineering, and Clean Energy* (1 ed.). Routledge, London, 347–359. https://doi.org/10.4324/9781003075028-2

[60] T. L. Taylor. 2012. *Raising the Stakes: E-sports and the Professionalization of Computer Gaming* (1 ed.). MIT Press, United States. https://doi.org/10.7551/mitpress/8624.001.0001

[61] Tamsin Treasure-Jones, Sebastian Dennerlein, Panagiotis Antoniou, and István Koren. 2019. Co-Creation in the Design, Development and Implementation of Technology-Enhanced Learning. *Interaction Design and Architecture(s)* 42 (2019), 5–10. https://doi.org/10.55612/S-5002-042-001PSI

[62] Inga Ulnicane, Tara Mahfoud, and Arleen Salles. 2023. ‹. *Journal of Responsible Innovation* 10, 1 (2023), 2094071. https://doi.org/10.1080/23299460.2022.2094071

[63] Department of Economic United Nations and Social Affairs Sustainable Development. 2015. Transforming our world: The 2030 Agenda for Sustainable Development. , 16301 pages. https://www.un.org/sustainabledevelopment/development-agenda/

[64] Rene Von Schomberg. 2013. *A vision of responsible research and innovation.* John Wiley & Sons, Chichester, 51–74. https://doi.org/10.1002/9781118551424.ch3

[65] René Von Schomberg. 2014. The Quest for the 'Right' Impacts of Science and Technology: A Framework for Responsible Research and Innovation. In *Responsible Innovation 1: Innovative solutions for global issues.* Springer, Dordrecht, 33–50. https://doi.org/10.1007/978-94-017-8956-1_3

[66] Claudia Werker. 2020. *Assessing Responsible Research and Innovation (RRI) systems in the digital age.* Routledge, London, 275–292. https://doi.org/10.4324/9780429298998-19

[67] Yu Xia, Shulong Yan, and Marcela Borge. 2023. Emotion Expressions as Negotiations of Critical Technology Tool Use in Small Group Collaborative Design. In *Proceedings of the 16th International Conference on Computer-Supported Collaborative Learning.* International Society of the Learning Sciences, Bloomington, 281–284. https://doi.org/10.22318/cscl2023.513971

[68] Emad Yaghmaei, Zenlin Kwee, Martijn Wiarda, and Steven Flipse. 2024. *Exploring synergies: comparative analysis of technology assessment and RRI in European industrial contexts.* Edward Elgar Publishing, Cheltenham, 430–439. https://doi.org/10.4337/9781035310685.00059

[69] Joakim Öjendal and Sivhouch Ou. 2015. The 'local turn' saving liberal peacebuilding? Unpacking virtual peace in Cambodia. *Third World Quarterly* 36, 5 (2015), 929–949. https://doi.org/10.1080/01436597.2015.1030387

A Descriptive Overview of DGCM from the Systematic Evidence Synthesis According to Our Analytical Criteria

The categories selected for the descriptive overview comprise a series of characteristics related to the games as products, the process behind their creation, and the type of conflict narrative they depict (management, resolution or transformation, as defined by [44]). The categories are: type of gameful solution (fully digital, digital with fully non-digital version, or hybrid - digital with offline components); the lifecycle phase in the game development process (design, testing, implementation, impact measurement); the type of design approach (co-design among different stakeholder groups, crowdsourced, as a contracted project, self-inspired, and no information available); the type of funding behind the game (development cooperation agencies, project partnership - e.g., local research institutions and national ministries, self-funded, no information available); their approach to conflict (management, resolution, transformation, other wording); type of conflict portrayed (fictional, real, both); implementation context (workplace, community, country, region, not specified/everywhere); purpose of the DGCM (raise awareness, invite to action, enable participation and/or behavior change, educate, incentivize empathy to war victims, intercultural understanding); and, lastly, which and how are the Sustainable Development Goals (SDGs) presented.

A.1 Landscape per Category

A.1.1 Category 1. Type of Game.

- 18 Purely Digital - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Hush, 1979 Revolution: Black Friday, Project Honduras, African Farmer Game, Global Conflicts: Palestine, Help: the Game, Global Conflicts, En tus Zapatos, Cards against calamity, Irrigania, Help: the Game, Atollgame,
- 2 Digital with non-digital version - This war of mine, Atollgame
- 6 Hybrid (digital and offline components) - Bana Dukine, MineSet, Flood Resilience Challenge, Com Mod, MesMis, In the Hate Booth

A.1.2 Category 2. Development stage.

- 21 Design - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Hush, 1979 Revolution: Black Friday, Bana Dukine, African Farmer Game, Help: the Game, MineSet, Atollgame, En tus Zapatos, Cards against calamity, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, In the Hate Booth, The Peace Game, Enact
- 13 Testing - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Bana Dukine, MineSet, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, In the Hate Booth, The Peace Game, Enact
- 24 Implementation - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Hush, This war of mine, 1979 Revolution: Black Friday, Bana Dukine, Project Honduras, African Farmer Game, Global Conflicts: Palestine, MineSet, Atollgame, Global Conflicts, Cards against calamity, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, In the Hate Booth, The Peace Game, Enact
- 18 Impact - The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Hush, This war of mine, 1979 Revolution: Black Friday, Bana Dukine, African Farmer Game, Global Conflicts: Palestine, MineSet, Atollgame, Global Conflicts, Cards against calamity, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, IntheHate Booth

A.1.3 Category 3. Design Process.

- 14 Co-designed - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Bana Dukine, African Farmer Game MineSet, Atollgame, Cards against calamity, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción
- 1 Crowdsourced - Help: the Game
- 14 Participatory - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Bana Dukine, Help: the Game, MineSet, Atollgame, Cards against calamity,

Flood Resilience Challenge, Com Mod, MesMis, In the Hate Booth, Enact
- 7 Sub-contracted - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Bana Dukine, Project Honduras, Enact
- 5 Self-inspired - PeaceMaker, Hush, This war of mine, 1979 Revolution: Black Friday, In the Hate Booth
- 4 N.A. - Global Conflicts: Palestine, Global Conflicts, En tus Zapatos, The Peace Game

A.1.4 Category 4. Funding.

- 9 Development agency - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Bana Dukine, Project Honduras, African Farmer Game, Atollgame, Reconstrucción
- 3 Self-funded - This war of mine, 1979 Revolution: Black Friday, The Peace Game
- 3 Cooperation project - Atollgame, Flood Resilience Challenge, Enact
- 6 Partnerships - Bana Dukine, Cards against calamity, Flood Resilience Challenge, Com Mod, MesMis, In the Hate Booth
- 9 N.A. - PeaceMaker, Hush, This war of mine, Global Conflicts: Palestine, Help: the Game, MineSet, Global Conflicts, En tus Zapatos, Irrigania

A.1.5 Category 5. Approach to Conflict.

- 13 Management - PeaceMaker, Project Honduras, MineSet, Atollgame, Global Conflicts, Cards against calamity, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, The Peace Game, Enact
- 12 Resolution - Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, 1979 Revolution: Black Friday, Bana Dukine, Global Conflicts, Cards against calamity, Flood Resilience Challenge, Enact
- 9 Transformation - PeaceMaker, This war of mine, Bana Dukine, Global Conflicts: Palestine, Global Conflicts, En tus Zapatos, MesMis, Reconstrucción, In the Hate Booth
- 10 Other wording - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Hush, This war of mine, Bana Dukine, Global Conflicts: Palestine, Help: the Game, The Peace Game

A.1.6 Category 6. Type of Conflict.

- 6 Fictional - This war of mine, Project Honduras, African Farmer Game, Help: the Game, Irrigania, Enact
- 14 Real - Eduo Run, Eduo Quest, The Secrets Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Hush, 1979 Revolution:Black Friday, Global Conflicts: Palestine, Atollgame, Global Conflicts, En tus Zapatos, Cardsagainst calamity, ComMod, MesMis
- 6 Both - Bana Dukine, MineSet, Flood Resilience Challenge, Reconstrucción, In the Hate Booth, The Peace Game

A.1.7 Category 7. Implementation Context.

- 13 School / university - PeaceMaker, This war of mine, Bana Dukine, Project Honduras, Global Conflicts: Palestine, MineSet, Global Conflicts, Cards against calamity, Irrigania, Flood Resilience Challenge, MesMis, MineSet, Global Conflicts
- 2 Workplace - Flood Resilience Challenge, The Peace Game
- 12 Community - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, This war of mine, African Farmer Game, Atollgame, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción
- 11 Country - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Bana Dukine, African Farmer Game, Atollgame, Flood Resilience Challenge, MesMis, Reconstrucción
- 7 Region - PeaceMaker, African Farmer Game, Atollgame, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción
- 5 Everywhere - Hush, This war of mine, 1979 Revolution: Black Friday, Help: the Game, Enact

A.1.8 Category 8. Purpose of the Game.

- 17 Raise awareness - Eduo Run, Eduo Quest, PeaceMaker, Hush, This war of mine, Global Conflicts: Palestine, Help: the Game, MineSet, Atollgame, Global Conflicts, Cards against calamity, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, In the Hate Booth, The Peace Game
- 15 Invite participation/behavior - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, This war of mine, Bana Dukine, Help: the Game, Atollgame, En tus Zapatos, Flood Resilience Challenge, Com Mod, Reconstrucción, In the Hate Booth, Enact
- 26 Educate - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, PeaceMaker, Hush, This war of mine, 1979 Revolution: Black Friday, Bana Dukine, Project Honduras African Farmer Game, Global Conflicts: Palestine, Help: the Game, MineSet, Atollgame, Global Conflicts, En tus Zapatos, Cards against calamity, Irrigania, Flood Resilience Challenge, Com Mod, MesMis, Reconstrucción, In the Hate Booth, The Peace Game, Enact
- 6 Incentivize empathy to war victims - Eduo Run, Hush, This war of mine, Help: the Game, Cards against calamity, Reconstrucción
- 6 Intercultural understanding - PeaceMaker, 1979 Revolution: Black Friday, Bana Dukine, Global Conflicts: Palestine, Global Conflicts, Enact

A.1.9 Category 9. Positioning of the SDGs.

- 3 Source mentions the SDGs - Project Honduras, MineSet, In the Hate Booth
- 15 Tackle SDG 16 - Eduo Run, Eduo Quest, The Secrets of Arabia Felix II, PeaceMaker, Hush, This war of mine, 1979 Revolution: Black Friday, Bana Dukine, Global Conflicts: Palestine, Global Conflicts, En tus Zapatos, Cards against calamity, Reconstrucción, In the Hate Booth, Enact
- 10 Tackle SDG 17 - Eduo Run, Eduo Quest, The Secrets of Arabia Felix I, The Secrets of Arabia Felix II, Project Honduras, Help: the Game, Atollgame, Cards against calamity, Com Mod, In the Hate Booth
- 8 Tackle other SDGs - Project Honduras, African Farmer Game, MineSet, Atollgame, Irrigania, Flood Resilience Challenge, Com Mod, MesMis

A.2 Games mentioned in the study and their developers

- Eduo Run. Consortium of developers.
- Eduo Quest. Consortium of developers.
- The Secrets of Arabia Felix I. Consortium of developers.
- The Secrets of Arabia Felix II. Consortium of developers.
- PeaceMaker. Impact Games.
- Hush. Jamie Antonisse and Devon Johnson.
- This war of mine.
- 1979 Revolution: Black Friday. iNK Stories, N-Fusion Interactive.
- Bana Dukine. Samantha Brotman.
- Project Honduras. Trocaire.ie.
- African Farmer Game. James Jackson.
- Global Conflicts: Palestine. Serious Games Interactive.
- Help: The Game. Several studios.
- MineSet. ETH Zürich.
- Atollgame. (N.A)
- Global Conflicts. Serious Games Interactive.
- EnTusZapatos. (N.A)
- Cards against Calamity. 1st Playable Solutions.
- Irrigania. J. Seibert, M. J. P. Vis.
- Flood Resilience Challenge. University of York.
- ComMod (CoCom Forest, Nam Haem). (N.A.)
- MesMis Interactive (N.A.)
- Reconstrucción. Pathos Audiovisual.
- (In) The Hate Booth (N.A.)
- The Peace Game (N.A.)
- Enact. Smarted IT.

B Responsibility Practices According to the AREA Framework

B.1 Anticipation

- Review of historical data about past and existing conflicts.
- Create multidisciplinary, international (if applicable) teams to develop a common understanding of the problem to be portrayed.
- Consider the interests and limitations of all involved parties.
- Raise awareness about different aspects related to conflict.
- Evoke conflict prevention through understanding the causes behind it.
- Develop the games for specific target groups according to the contexts to be used, particularly if portraying real-life situations and locations.

B.2 Reflection

- Draw from personal experience.
- Feedback from all involved stakeholders.
- Regular meetings with the creative team. Several prototyping and testing rounds.
- Involving topic experts in all aspects of the development process.
- Follow-up existing situations that may reflect those the game portrays; they are likely to include unexpected issues that may improve the games' content.
- Consider the tone of the narratives and the type of imagery to use.
- Be mindful of stereotypes and situations that the game may perpetuate, potentially leading to unintended conflicts among stakeholders Create systems maps to visualize how actors are related, including non-human ones.
- Prototype and test as much as possible.

B.3 Engagement

- When addressing real-life conflicts (e.g., Middle East), bring in voices from all sides involved.
- Collaborate with the local partners of the funding agencies.
- Team up with local research institutions with better access to the communities and the problems addressed.
- Enable all necessary communication channels and mechanisms to keep everyone informed, deal with misinformation, and build trust among everyone involved.
- Establish clear objectives and stances according to all the stakeholders' interests and viewpoints.
- Create a group identity—invest in solutions to generate an open group dynamic where opposing views can be discussed to reach agreements.
- Clear feedback channels and prompt responses to involved stakeholders.
- Invite all stakeholders to stay connected throughout the process, allowing them to opt-out if they choose to.
- Present opportunities for implementing the games with other interest groups—a strategy that can help maintain the games.
- Develop empathetic relationships among all stakeholders to handle different opinions sensibly.
- Enable notions of shared responsibility among the co-creators, acknowledging their limitations and strengths.
- Establish feedback loops and approaches to collect insights about the effect of non-human actors on those involved.

B.4 Action

- Train the trainers - organize demonstrations and train the people who will be implementing the game, building capacity and deeper understanding of the issues discussed, as well as how to maximize the game.
- Establish open information flows that allow for learning and sharing knowledge.
- Emphasize accountability practices, making information easily available (e.g., reports, videos, blog entries).
- Present all the feedback collected to all stakeholders, and show the reasoning behind heeding it or not.
- Invest in structures that convey no or minimum access barriers for all intended stakeholders if possible.
- Enable accessibility to the games and the opportunity to improve them.
- Set up channels accessible to all involved stakeholders and maintain them.
- Enable post-play experience-sharing opportunities.
- Create clear onboarding strategies to involve stakeholders at all stages of the co-creative process if needed.

- Offer demonstrations of the game in action (videos, testimonials) for other stakeholders to relate to and engage.
- Keep the game updated and use neutral, unbiased narratives.