





# Cards and Roles: Co-designing Privacy Serious Games with an Online Role-Playing Boardgame

Patrick Jost<sup>1</sup>  and Andreas Künz<sup>2</sup> 

<sup>1</sup> Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway

patrick.jost@ntnu.no

<sup>2</sup> Research Centre for User-Centred Technologies, Vorarlberg University of Applied Sciences, Dornbirn, Austria

**Abstract.** The increasing digitalisation of daily routines confronts people with frequent privacy decisions. However, obscure data processing often leads to tedious decision-making and results in unreflective choices that unduly compromise privacy. Serious Games could be applied to encourage teenagers and young adults to make more thoughtful privacy decisions. Creating a Serious Game (SG) that promotes privacy awareness while maintaining an engaging gameplay requires, however, a carefully balanced game concept. This study explores the benefits of an online role-playing boardgame as a co-designing activity for creating SGs about privacy. In a between-subjects trial, student groups and educator/researcher groups were taking the roles of player, teacher, researcher and designer to co-design a balanced privacy SG concept. Using predefined design proposal cards or creating their own, students and educators played the online boardgame during a video conference session to generate game ideas, resolve potential conflicts and balance the different SG aspects. The comparative results of the present study indicate that students and educators alike perceive support from role-playing when ideating and balancing SG concepts and are happy with their playfully co-designed game concepts. Implications for supporting SG design with role-playing in remote collaboration scenarios are conclusively synthesised.

**Keywords:** Role play · Digital boardgame · Serious game design · Online co-design · Remote co-creation · Design card set · Privacy

## 1 Introduction

By increasing data services integration in our daily routine, we are faced with ubiquitous data sharing decisions. However, specifically, teenagers/young adults are susceptible to making less reflected privacy judgments [1]. Serious Games represent a promising strategy to reach this target audience and encourage better privacy choices. Yet, creating a Serious Game (SG) that keeps an entertaining game flow and at the same time succeeds to raise awareness about real-world privacy choices requires a sensibly balanced game concept. As Dörner et al. [2] emphasised, SGs have the intention to entertain and to achieve at least one or more additional goals. Concerning privacy decision-making,

factors such as risk behaviour or social group influences may be assessed in the SG. Thereby the entertainment goal is complemented not only by the educational goal to encourage better privacy choices but also by the researching goal to learn about privacy choice influences for improving the SG efficacy.

Balancing these different perspectives in an early ideation phase is essential to avoid both interrupting the players' engaging game flow [3] and extraneous cognitive impact from game interaction on pedagogical and scientific assessments. Considering the perspectives of different stakeholders in a role-playing co-design activity may help to create such balanced SG concepts.

### **1.1 Related Work – Role-Play as Support in Design Activities**

In 1956, Mann [4] defined role-play as situations where an individual takes a new role or his usual role in a “setting not normal for the enactment of the role”. In a more recent definition by Mäkelä et al. [5], role-playing is seen as “any act in which an imaginary reality is concurrently created, added to and observed”. While role-playing is often used for learning and training [6, 7], it can also enhance design processes [8]. A literature review by Seland [9] found the rationales for using role-play in design are understanding/involving users and exploring and communicating ideas. Burns et al. [10] showed in the early 1990s how designers role-playing as users can improve idea finding by fostering conversations between stakeholders. Various research works from the last 30 years further proved the potential of role-playing for design processes, especially for the ideation phase [11–13], including online applications using virtual 3D worlds [14].

Role-play elements can further be combined with games for idea finding and design creation to enhance the communication by defining the roles of participants and specific rules and pushing a creative, exploratory and visionary mindset [15]. Vaajakallio and Mattelmäki [16] promote the so-called design games as playful co-creation tools – in accordance with Brandt [17] non-competitive scenarios with specific rules – that can bring designers, researchers and users/non-experts together (e.g. for idea finding) and foster reflection upon experiences and knowledge.

The potential of games for the early design phase depends on a balance between restrictive structure and creative aspects [18]. Brandt and Messeter [19] and Finke et al. [20] also point out the importance of restrictions in the ideation phase and the great capability of design games to improve idea finding outcomes. The outlined suggestions are considered by the design game described in this paper that investigates the purported benefits of role-playing in the currently underexplored online/remote co-design context.

### **1.2 Research Objectives**

This study introduces a digital role-playing boardgame that aims to support students, teachers, and researchers in co-creating an engaging SG about privacy. The game is evaluated in collaborative video conference sessions with student groups and international educators/researcher groups playing the different roles and co-designing privacy SGs with a playboard and a selection of cards. The research questions that guided the investigation were:

1. How does role-playing with an online boardgame support students and educators in collaboratively ideating and balancing SG concepts?
2. How do students and educators perceive the applicability of boardgame role-playing for online co-designing SG concepts?

## 2 Research Approach

The research follows the cyclic design science approach [21]. The presented evaluation cycle examines the qualities of the designed digital boardgame artefacts (Sect. 2.1) for supporting online co-creation of SG concepts. The role-playing boardgame design was oriented on the card-based SG design toolset developed by Jost and Divitini [22]. The toolset features design cards for the roles of *player*, *teacher*, *researcher* and *designer*, a playboard to lay out privacy game challenges and stepwise instructions to balance each role-oriented part of a SG to a complete game concept. For example, such a privacy game could aim to raise awareness about third-party data sharing or tracking behaviours by integrating engaging game qualities (e.g. storytelling) and pedagogical/research strategies (e.g. reflection, evaluation of privacy decisions) into a balanced SG.

In online user trials, student and educator groups played the boardgame via video conferencing to co-create SG concepts. Perceived support from playing the roles and using the design cards/board was investigated (Sect. 2.2). Therefore, the online game sessions were evaluated by in-game ratings of the individual role-players' satisfaction with the game concept and a post-game questionnaire where the participants rated their perceived support for ideating, balancing, and the perceived applicability of the role-playing boardgame. According to the *two research objectives*, the null hypotheses established for the empirical study were:

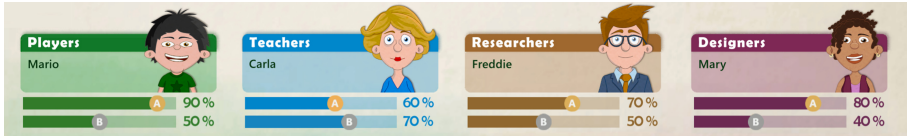
$H_{OA}$ : 'There are no significant differences in perceived ideation and balancing support between students and educators when using the online role-playing boardgame for co-designing SG concepts.'

$H_{OB}$ : 'There are no significant differences in perceived applicability between students and educators when using the online role-playing boardgame for co-designing SG concepts.'

### 2.1 Artefacts and Features of the Online Role-Playing Boardgame

The digital boardgame is based on the affordance-oriented SG design toolset – the Challenge Game Frame (CGF) [22]. The toolset features cards with SG design suggestions for the roles of player, teacher, researcher and designer – 12 decks with 150 cards in total. In addition, it includes four role-independent card decks to define the context of who will play the game when and where, and a dedicated card deck with privacy challenges to define the domain/educational goal. For creating balanced SG concepts in a multi-perspective dialogue, a playboard and time-restricted, stepwise instructions are provided to lay out each of the parts and discuss conflicts between the roles. The game is intended to be used by remote groups of two to six players that are connected in a videoconference and play the game in a web browser.

**Roles and Cards.** Each of the four different roles was implemented with a cartoon illustration and two rating sliders ranging from 0 to 100% (Fig. 1). These sliders allow players to rate their satisfaction with the currently laid out game concepts at any time.



**Fig. 1.** The four roles and two rating sliders for rating satisfaction with concept A or alternative B

There are two alternate game challenge streams that can be rated. The main game challenge A and an optional concept stream B that can be used to place alternative design suggestions (Sect. 2.2, Fig. 2). Based on the ratings, the group can decide to change their focus from main to alternative. Being able to try out alternate design representations can support creativity, as pointed out by Fischer [23]. At the same time, the two streams provide a guiding structure that may help narrow down choices from the comprehensive card decks and focus on ideas [19, 20]. Rating the current satisfaction with the concepts provides a quality success criterion for the role-players [24], complemented by supporting the remotely collaborating players to give emotional feedback. Therefore, the pictured avatars change their facial expression according to the ratings.

The role-independent context cards and the privacy challenge (i.e. the domain goal) are selected in the beginning stages and can be placed by all players. The role-oriented cards, on the other hand, are chosen and placed goal-driven by each role separately and discussed for conflicts in a stepwise process. Thereby the player role chooses how the game affords *achieving* (e.g. maximising score), *acting* (e.g. collaborating teams), *progressing* (e.g. narrative, story), *engaging* (e.g. awards, curiosity) and *adapting* (e.g. extending game world). The teacher role includes design suggestions for *reflecting* (e.g. in-game questions, journal) and *examining* (e.g. answer time, patterns). The researcher is deciding how the game is *researching* privacy decision influences (e.g. risk behaviour), *reporting* (e.g. by questionnaire) and *monitoring* (e.g. logging team decisions). Finally, the designer is responsible for the *interacting* and *presenting* qualities of the game and chooses if the game world is, for example, represented in a 2D or 3D visualisation and can be operated by touch, mouse pointer, voice or any other modality.

**Board and Rules.** The goal of the game is to reach a balanced SG concept about the domain challenge, in this case, better privacy decisions. The group has six timed co-designing steps (Sect. 2.2) to reach that goal which are explained/read-out-loud by a character before each segment. This follows the suggestions of other research to provide clearly defined goals, a step-by-step process and guiding restrictions in co-design activities [19, 20, 24]. Players play the boardgame in their own browser with all interactions (e.g. movement of cards, markers) synchronised over the web while discussing the game concept connected in a video conference.

## 2.2 Online Co-design Sessions with Educators and Students

The created digital game was subsequently applied in online game sessions with students, researchers and educators (Fig. 2).

**Participants.** A class of Computer Science students ( $n = 32$ ) at the first authors' university was selected to play the boardgame in groups.



**Fig. 2.** Online role-playing sessions with student or educator groups – here in step 5, marking and discussing conflicts (red bands)

Twenty-six researchers/educators ( $n = 26$ ) participated in randomly assigned groups after responding to an e-mail invitation sent out to universities in Norway, Austria, and Ireland. The participants from various scientific fields had experience in both research ( $M = 6.5$  years) and teaching ( $M = 7.3$  years). However, for better readability, we will refer to the group hereafter as educators. Students and educators reported a comparable skill average in game design (students  $M = 2.7$ , educators  $M = 2.3$ ; Likert scale: 1, none; 7, professional).

**Procedure and Data Collection.** In the two-hour sessions, players were first introduced to SG design theory by the researcher/facilitator. After the interface and rules of the boardgame were explained, the game session took one hour. The step-by-step instructions were displayed and read aloud by a voiceover before the designated group manager clicked the start button that started each step synchronised. The steps were:

1. Agree on who plays the role of either player, teacher, researcher or designer
2. Define the context of the game: domain, target group, location/time of play
3. Individually read through role-assigned cards and pick favourites
4. Co-create/balance a game challenge: starting from left to right, discuss ideas from the role-oriented cards or create custom cards and fill all slots of at least one challenge stream (A or B). Each role places/argues its proposals while rating the whole concept

5. Identify conflicting pairs of cards in the game concept and balance out the potential flow breaks by discussing alternative picks or another group agreement
6. Agree on the final picks, define a working title and write a game plot summary

The players kept their role for the entire game and had the decisional authority over their card decks. In step three, all role-players were studying their cards in detail so they could explain them to the others. Role-players were also instructed to advocate their chosen design proposals and explain their reasoning to the other roles when sorting out conflicts in stage five. When a placed card pair was marked as conflicting, it was resolved in group discussion. The role-players had to either agree to keep the current cards or one or both respective roles switched to other design suggestions to balance the game concept. During the game, the role-players rated their satisfaction with the concept using the rating sliders.

After the game session, all participants individually filled out the post-game questionnaire. A 7-point Likert scale (1, strongly disagree; 7, strongly agree) was used to appraise the players' impressions. The players rated perceived ideation/balancing support and perceived applicability of the role-playing game, cards, roles and playboard. Ideation and application dimensions consisted of 4 items each, and balancing support was assessed with 8 items. Exemplary statements included: *'I had ideas I would not have had without the cards.'* (ideation); *'The roles helped identifying conflicts between the game parts.'* (balancing); *'I can imagine using the boardgame to co-design games for research (e.g. investigate decisions, risk-taking).'* (application).

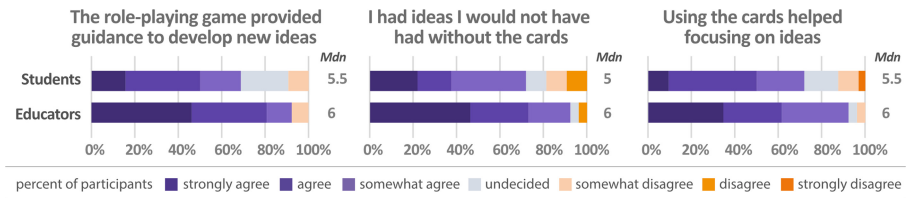
### 3 Results

Data analysis showed non-normal but similar distributions (Kolmogorov-Smirnov-Z test  $p > .05$ ) and homogeneity of variance (Levene's test  $p > .05$ ) for the groups. Thus, following Field [25] and Hart [26], non-parametric Mann-Whitney  $U$  analysis ( $\alpha = 0.05$ ) was performed to compare the distribution medians.

#### 3.1 Ideating and Balancing

As regards *ideation*, students and educators reported support from playing the boardgame with a median rating of at least 5 (somewhat agree) on the Likert scale for all four items. Educators thereby perceived more guidance to develop new ideas from playing the game with 92% agreeing at least partly compared to 69% of the students,  $U = 589.5$ ,  $z = 2.82$ ,  $p = .005$ ,  $r = .37$  (Fig. 3).

Similarly, educators felt more ideation support from the role-oriented design cards, with 92% largely agreeing that they had ideas they would not have had without cards, whereas 72% of students reported that,  $U = 581$ ,  $z = 2.67$ ,  $p = .008$ ,  $r = .35$ . To the same significant difference and percentages except the students' median rating being 5.5, educators felt more that the cards helped them focusing on ideas,  $U = 541$ ,  $z = 2.03$ ,  $p = .043$ ,  $r = .27$ . Most students (75%) and educators (65%) agreed that the cards helped them fine-tune already existing ideas,  $U = 406.5$ ,  $z = -.15$ ,  $p = .878$  with an equal median rating of 5.



**Fig. 3.** Perceived *ideating* support by the role-playing game – significantly different ratings between students and educators

Concerning the *balancing* support, students and educators experienced support largely similar (Table 1) with median ratings of at least 5 for all eight items. However, educators statistically felt more supported structuring and visualising the game concept balance using the playboard than the students (effect size  $r = .29$ ).

**Table 1.** Perceived *balancing* support by the role-playing game

	Agreeing % S/E	<i>Mdn</i> S/E	<i>Mode</i> S/E	<i>U</i>	<i>z</i>	<i>p</i>
Using the boardgame helped balancing game to domain goal	70/96	5/6	7/6	501.0	1.38	.169
Using the boardgame helped balancing the SG concept parts	78/77	5/6	6/6	468.0	0.84	.399
Using the cards helped balancing the SG concept parts	75/85	5.5/6	6/6	467.0	0.84	.410
Playing the roles helped identifying conflicts	75/88	5/6	6/6	493.0	1.26	.208
Playing the roles helped balancing game to domain goal	66/92	5/6	5/5	504.5	1.43	.154
Playing the roles helped balancing the SG concept parts	69/81	5/6	7/6	418.0	0.03	.974
Using playboard helped balancing game to domain goal	66/77	5/5	6/5	432.5	0.27	.790
Using playboard helped structuring and visualising SG balance	84/88	6/6	6/7	551.5	2.23	.026

*Note.* S = Students, E = Educators; agreeing percentage includes strongly agreeing, agreeing, and somewhat agreeing

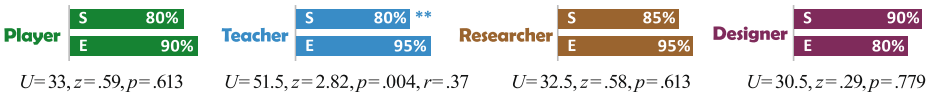
While the median for both groups was equal and the percentage of overall agreement was similar, the rating difference is represented in detail by the mode (i.e. the most frequent rating). Educators considerably more often (42% of educators vs 15% of students) rated structuring and visualising support with the maximum rating of 7. As educators and students perceived ideating and balancing support differently, analysis suggests rejecting  $H_{0A}$ .

### 3.2 Applicability

Regarding the *applicability*, most educators (77%, *Mdn* = 6) and students (66%, *Mdn* = 5) expressed to have fun playing the role-playing game. While educator ratings showed a higher tendency for enjoyment, the result was not statistically different,  $U = 537.5, z = 1.95, p = .051$ . With a similar result, most educators (85%, *Mdn* = 6) and students (66%, *Mdn* = 5) stated that they can imagine using the game by themselves for co-designing SG concepts,  $U = 538, z = 1.96, p = .051$ .

Expectedly, the educators were significantly more confident (81%, *Mdn* = 6) than the students (59%, *Mdn* = 5) when agreeing that they can imagine using the role-playing boardgame to create research-oriented games,  $U = 553.5, z = 2.21, p = .027, r = .29$ . Most educators (88%, *Mdn* = 6) and students (75%, *Mdn* = 5) also expressed to be well satisfied with the co-designed game concept in the questionnaire,  $U = 526, z = 1.79, p = .074$ .

This is confirmed by analysis of the in-game role slider ratings. Both students and educator role-players showed a high level of satisfaction with their final SG concept, with a median rating of 80% or higher for every role (Fig. 4).



**Fig. 4.** Role-oriented satisfaction (*Mdn*) with the final co-designed SG concept; S = Students, E = Educators

Educators playing the role of the teacher were thereby significantly more comfortable (*Mdn* = 95%) with the co-created SG concept than their student peers with an already high-level 80% median. Since the groups differ in perceived applicability, the analysis suggests rejection of  $H_{0B}$ .

## 4 Discussion

Regarding the *first research question*, the trials showed that both students and educators were well supported in ideating and balancing SG concepts by the online boardgame. Our results confirm previously found positive influences of role-playing with a structured, time guided [19, 20] and stepwise process [17] for remote/online co-design scenarios. The role-oriented card decks helped students and educators finding and focusing on ideas. For both groups playing the game provided guidance to develop new ideas as the playboard helped structuring and visualising the SG balance. The results suggest that integrating quality feedback criteria such as instant ratings of design alternatives and emotional feedback cues can support role-oriented co-creation of design solutions in remote/online scenarios and thus align with recommendations of Maaravi et al. [24].

Comparative analysis showed that educators felt even more supported than students, with 88% agreeing in general and 42% strongly agreeing that the playboard helped SG balancing, and more than 90% perceiving support for ideating SG concepts. It is



conceivable that the pedagogical and scientific background of the educators facilitated role-playing, linking design proposals and resolving conflicts regarding the teacher and researcher roles. The synthesised results on role-playing support for ideation/balancing of SG parts Fig. 3/Table 1 and role-oriented satisfaction shown in Fig. 4 support this conception. The findings imply that educators joining student groups for playing the teacher/researcher role in the co-design game could help ideation and improve the balance of a SG concept. However, further trials are required with such integrated scenarios to investigate the influences of the teacher-student relationship.

When looking at the *second research question*, the perceived ideation and balancing support is also backed by applicability. Most students and educators enjoyed playing the role-playing game and were satisfied with the final SG concept to a high degree. The role-oriented analysis confirmed this contentment with all median ratings at or above 80%. This indicates that the role-playing game is applicable for co-designing SGs with non-experts feeling comfortable playing expert roles when supported with design cards and structured gameplay. Additionally, educators reported strong confidence to use the game for co-creating SG concepts in a privacy education and research context. The results suggest the role-playing design game approach is applicable by educator/research groups to playfully co-design privacy SG concepts in initial development phases to integrate and balance privacy research objectives with engaging game ideas. As students also showed confidence playing the roles and satisfaction with the outcome, their sense of enjoyable experiences can be fostered in joint gaming sessions. Thereby they can complement research groups/educators by taking the roles of players or designers. The ability to participate remotely adds to this utility in research scenarios where international cooperation is obligatory even in the absence of a pandemic.

## 5 Conclusion

This study investigated supporting collaboratively ideating and balancing SG concepts in online/remote scenarios using a role-playing browser game and video conferencing. The results provide valuable insight on co-design strategies and benefits of a multiperspective approach, especially relevant in times of pandemics that previous research rarely covered. All in all, the introduced online role-playing game proved as a supportive co-design tool. It represents a playful activity that enables co-designing balanced SG concepts with physically distanced participants.

The study shows that non-experts can confidently engage in role-playing with digital expert design suggestion cards, an associated playboard and guided gameplay to successfully ideate and balance SG concepts in a dialogical approach. Students and educators were having fun playing the design game while also being satisfied with the final game concepts. Mixed co-design groups are suggested as future research trail for online role-playing investigations to learn more about SG multiperspectivity and foster the outlined potential for balancing SG designs.

**Acknowledgements.** This research was funded by the NFR IKTPLUSS project ALerT, #270969. We thank the participating students and educators, Tobias Werner for being the voice of the game and Monica Divitini for helping to organise the game sessions.

## References

1. Jost, P.: The Quest Game-Frame: Balancing Serious Games for Investigating Privacy Decisions. In: Ahlin, K., Mozelius, P., Sundberg, L. (eds.) Proceedings of the 11th Scandinavian Conference on Information Systems (SCIS2020), pp. 1–17. AIS, Atlanta (2020)
2. Dörner, R., Göbel, S., Effelsberg, W., Wiemeyer, J. (eds.): Serious Games. Springer, Cham (2016). <https://doi.org/10.1007/978-3-319-40612-1>
3. Nakamura, J., Csikszentmihalyi, M.: Flow theory and research. In: Snyder, C.R., Lopez, S.J. (eds.) Handbook of Positive Psychology, pp. 195–206. Oxford University Press, Oxford (2009)
4. Mann, J.H.: Experimental evaluations of role playing. *Psychol. Bull.* **53**, 227–234 (1956)
5. Mäkelä, E., Koistinen, S., Siukola, M., Turunen, S.: The process model of role-playing. In: Bøckman, P., Hutchison, R. (eds.) Dissecting LARP: Collected papers for Knutepunkt the 9<sup>th</sup> annual Nordic Conference on LARP, pp. 205–236. Grimshei Trykkeri, Oslo (2005)
6. van Ments, M.: The Effective Use of Role-play: Practical Techniques for Improving Learning, 2nd edn., vol. 4, pp. 400–402. International Career Development (1999)
7. Zowghi, D., Paryani, S.: Teaching requirements engineering through role playing: lessons learnt. In: Proceedings. 11th IEEE International Requirements Engineering Conference, pp. 233–241. IEEE, Washington (2003)
8. Boess, S.: Rationales for Role playing in design. Presented at the 3rd International Conference UNIDCOM/IADE, Lisbon, Portugal, 1 November 2006
9. Seland, G.: System designer assessments of role play as a design method: a qualitative study. In: Proceedings of the 4th Nordic Conference on Human-Computer Interaction: Changing Roles, pp. 222–231. ACM, New York (2006)
10. Burns, C., Dishman, E., Verplank, W., Lassiter, B.: Actors, hairdos and videotape—informant design. In: Conference Companion on Human Factors in Computing Systems, pp. 119–120. ACM, New York (1994)
11. Buchenau, M., Suri, J.F.: Experience prototyping. In: Proceedings of the 3rd Conference on Designing Interactive Systems, pp. 424–433. ACM, New York (2000)
12. Karwowski, M., Soszynski, M.: How to develop creative imagination?: assumptions, aims and effectiveness of role play training in creativity. *Think. Ski. Creat.* **3**, 163–171 (2008)
13. Strömberg, H., Pirttilä, V., Ikonen, V.: Interactive scenarios-building ubiquitous computing concepts in the spirit of participatory design. *Pers. Ubiquitous Comput.* **8**, 200–207 (2004)
14. Rudra, A., Jæger, B., Aitken, A., Chang, V., Helgheim, B.: Virtual team role play using second life for teaching business process concepts. In: Sprague, R.H. Jr. (ed.) Proceedings of the 44th Annual Hawaii International Conference on System Sciences, pp. 1–8. IEEE, Washington (2011)
15. Vaajakallio, K.: Design games as a tool, a mindset and a structure. Ph.D. thesis, Aalto University School of Arts, Design and Architecture, Aalto (2012)
16. Vaajakallio, K., Mattelmäki, T.: Design games in codesign: as a tool, a mindset and a structure. *CoDesign* **10**, 63–77 (2014)
17. Brandt, E.: Designing exploratory design games: a framework for participation in participatory design? In: Proceedings of the ninth Conference on Participatory Design, pp. 57–66. ACM, New York (2006)
18. Hannula, O., Irrmann, O.: Played into collaborating: design games as scaffolding for service co-design project planning. *Simul. Gaming.* **47**, 599–627 (2016)

19. Brandt, E., Messeter, J.: Facilitating collaboration through design games. In: Proceedings of the Eighth Conference on Participatory Design: Artful Integration: Interweaving Media, Materials and Practices - Volume 1, pp. 121–131. ACM, New York (2004)
20. Finke, R.A., Ward, T.B., Smith, S.M.: Creative Cognition: Theory, Research, and Applications. The MIT Press, Cambridge (1992)
21. Hevner, A.R.: A three cycle view of design science research. *Scand. J. Inf. Syst.* **19**, 4 (2007)
22. Jost, P., Divitini, M.: The challenge game frame: affordance oriented co-creation of privacy decision games. In: Fotaris, P. (ed.) Proceedings of the 14th International Conference on Game Based Learning (ECGBL 2020), pp. 277–286. ACI, Reading (2020)
23. Fischer, G.: Social creativity: turning barriers into opportunities for collaborative design. In: Proceedings of the Eighth Conference on Participatory Design: Artful Integration: Interweaving Media, Materials and Practices-Volume 1, pp. 152–161. ACM, New York (2004)
24. Maaravi, Y., Heller, B., Shoham, Y., Mohar, S., Deutsch, B.: Ideation in the digital age: literature review and integrative model for electronic brainstorming. *Rev. Manag. Sci.* **15**, 1431–1464 (2021)
25. Field, A.: *Discovering Statistics Using IBM SPSS Statistics*. SAGE Publications, Thousand Oaks (2017)
26. Hart, A.: Mann-Whitney test is not just a test of medians: differences in spread can be important. *BMJ* **323**, 391–393 (2001)

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

