
# IMPLEMENTATION FRAMEWORK:

# REPORT ON FIELDS TRIALS

Erasmus+

# *Intellectual Output 4*

# *The Implementation Framework: Report on Field Trials*

# Acknowledgements

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# Introduction

The Implementation Framework consists of the report from field trials conducted by each of the DALI partners, and analysis of the data collected about the quality of games, created by the DALI project, and their learning impact. Due to the large volume of collected data, this document presents a short overview of the entire process, as developed throughout the project.

- To begin, we present the construction of instruments for the collection of data.
- Secondly, a quantitative summary of fields trials, adult participants, and facilitators, is provided.
- We then examine quantitative and qualitative data, supplying a descriptive analysis of the quality assessment by participants and facilitators.
- Finally, we show an overview of the data collected on the design of the field trials, which was provided by facilitators after the trials had been implemented.

Conclusions offer an overview of the games, session analysis, and reflect on the diversity of the field trials, which ensure the adaptability of the DALI outputs for a playful approach for enhancing education around data literacy.

This implementation framework represents the huge effort to collect data during the diverse and iterative co-creation development process involved in making the DALI games. The data collected allowed each of the teams tasked with making specific games to achieve a final draft of all the materials, including the game components, instructions, and pedagogical strategy. For this reason, understanding of the obtained data was imperative as the provided feedback showed where limitations and challenges existed to be overcome in order to improve the games and create the final versions which can be found in the DALI Toolkit at https://toolkit.dalicitizens.eu/.

# Instrument and Field Trial Design

During the first half of development, while games were being co-created, meetings were held and tasks were carried out for the creation of instruments for data collection during field trials. These are shown in figure 1.

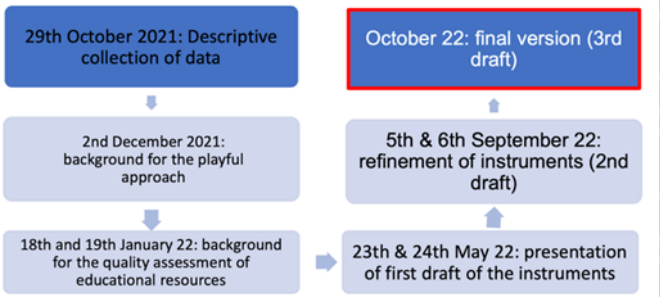



*Figure 1: Meeting timetable.*

Figure 2 shows a description of the structure of the three instruments built to assess the quality of games by those who are involved in field trials, adult players and facilitators.

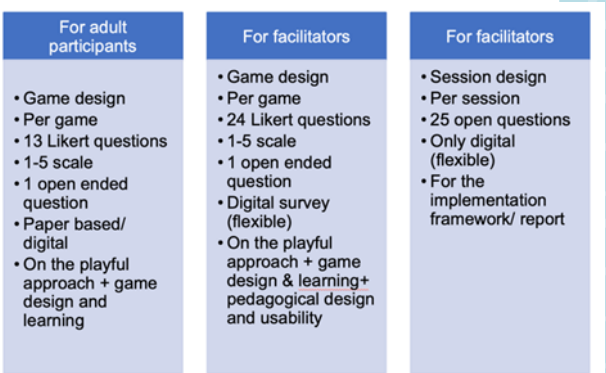



*Figure 2: Instrument Structure.*

A short description of the aspects explored by the instruments is presented in figure 3. The completed final drafts of both surveys can be viewed within Appendix 1.

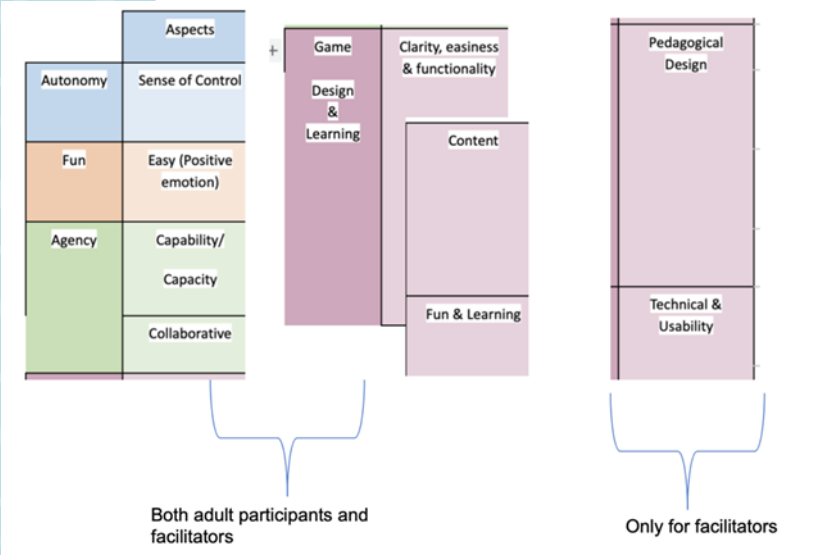



*Figure 3: Aspects of the Instruments.*

Whilst the instruments were being created, the structure of the field trials was discussed and determined. In September 2022, during a meeting in Bergen, general comments about the structure were discussed and, through online communications in October and November 2022, the following structure for the field trials was agreed:

- Initial brainstorm to explore adult participants prior knowledge of data literacy, and present the project.
- Play time, to test the games created by the DALI team members.
- Closing activity connecting new learning and request survey completion.
- A PowerPoint presentation was created for partners to edit and complete regarding their own context. This presentation was the initial draft of the version included within the Facilitators Guide.

Finally, ethical approval was obtained from the Balearic Islands (Exp.298CER22), allowing all partners to use the survey developed during field trials.

## Summary of Field Trials

Field trials took place between November 2022 and May 2023 in four partner countries; Norway (Bergen), Germany (Erlangen and Nuremberg), the United Kingdom (Coventry), and Spain (Murcia and the Balearic Islands). Over thirty facilitators were involved within the field trials which hosted more than one hundred groups consisting of over three hundred and eighty participants. Several of the field trials included participants of all ages, including children and teenagers, helping to increase knowledge of the games using intergenerational field trials.

Each of the project partners held field trials involving different participants, as shown in table 1.

| | | |
|---|---|---|
|  | Number of Sessions | 42 |
|  | Number of Field Trials | 104 |
|  | Number of Intergenerational Field Trials | 11 |
|  | Number of Adult Participants | 384 |
|  | Number of Survey Responses | 341 |
|  | Number of Facilitators | 34 |

*Table 1: Breakdown of Field Trial Participants.*

## Game Assessment by Adult Participants

All of the DALI games were tested, however no data was collected for the game 'Data Chain'. The following list provides a breakdown of which games were played the most: Data Iceberg (20.5%), Data Life (17.1%), *Protearn* Your Data (17.1%), Where is Data in Your Story? (12.8%), Dalicious Week (9.4%), Wifi and Data (8.5%), Databi (7.7%) Dali Takeover (5.1%), Game of Phones (0.9%), and Dalipoly (0.9%). These figures can also be viewed as a graph within table 2.

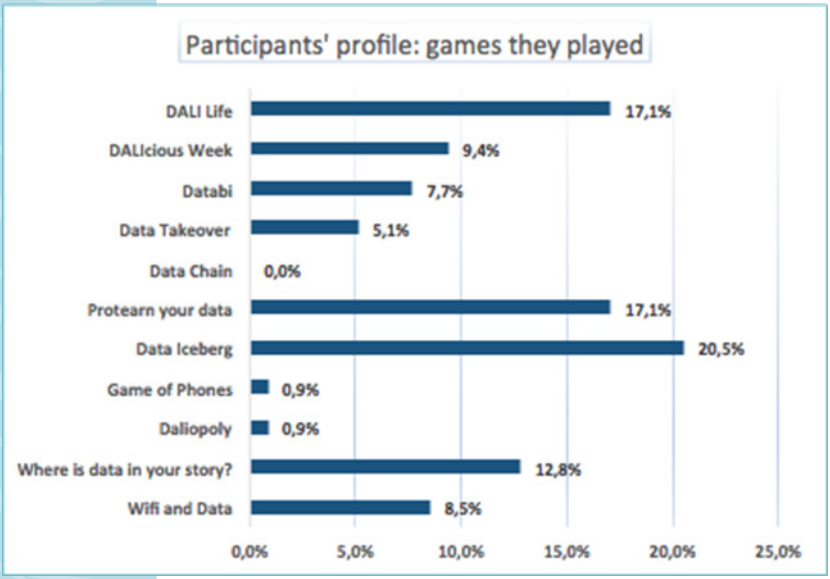



*Table 2: Percentages of Game Played by Participants.*

The majority of participants (59%) were aged between 18-29. This group was followed by those aged over 65 (24.5%), and finally those aged between 30-64 (16.5%).

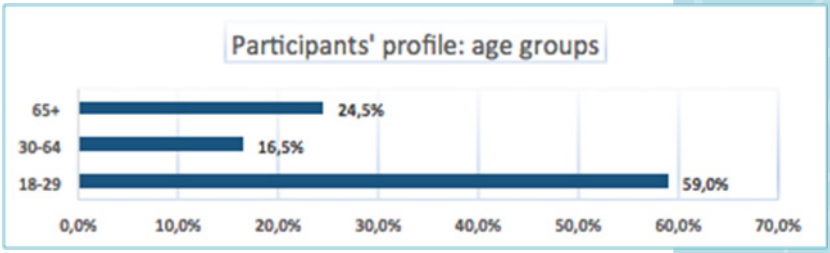



*Table 3:* *Participant Age Groupings.*

After the playing sessions, the vast majority of players confirmed they have intention to keep playing in the future, this is a good indicator of the players general satisfaction with those games which they played.

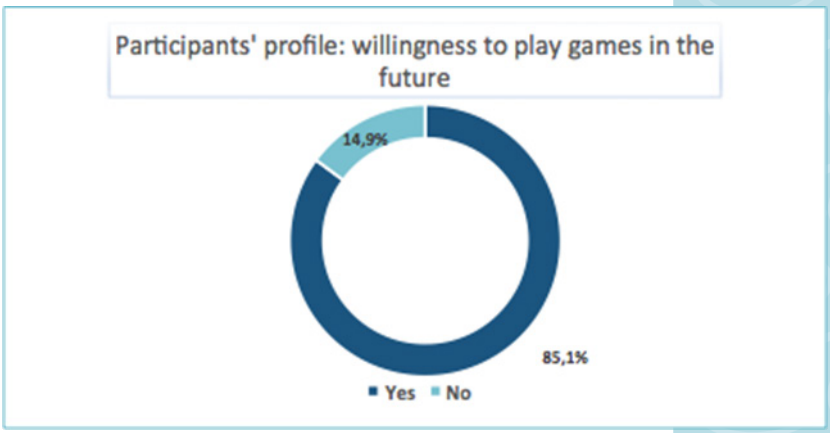



*Table 4:* *Participant Willingness to Play Games in the Future.*

Table 5 shows more examples of the summary of results obtained though the participant survey about game quality. The instruments explore agency enhancement, clarity, ease of use, functionality, content, fun, and learning. The example shows one item per section, highlighting the most interesting results about participants' perceptions.

Questions about the enactment of agency achieved, in all cases, more than 60% positive responses (either agreement or total agreement). Questions relating to game decisions; i.e. make, choose, or select, (item 1) received the highest number of positive responses from participants who agreed or strongly agreed that the games gave them agency within this area. Regarding clarity, ease of use, and functionality, 60% of participants were

either in agreement, or strongly agreed, points 4 and 5 on the Likert scale. Amongst all of the questions, those relating to the games visual styles (items 5) score the highest, having received the most positive answers, and the least negative responses. In relation to the content, more than 70% of participants agreed or totally agreed with the appropriateness of the games dynamics (item 9). The majority of participants also indicated that they felt the games were fun to play (item 10), providing 72% positive answers within the agree and totally agree ranges, whilst 50% of the participants stated that they had fun whilst learning and improving their data strategy. The fact that within all of the responses less that 20% are neutral suggests the hypothesis that a very reduced number of participants observed limitations in the different approaches to game quality.

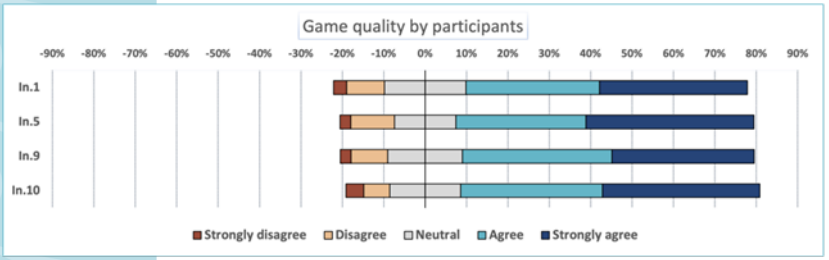



*Table 5: Game Quality.*

The survey instrument also included two open questions allowing participants opportunity to provide feedback. Firstly, participants were asked about their learning, and most of them stated that they had learnt about data, whether it was knowing, being aware, or developing critical thinking skills. The participants also highlighted general skills such as those related to knowledge acquisition, technical abilities, and other transversal skills. The following provides examples of quotes obtained from participants.

- Understanding Data: "*I've thought more of how data surrounds me in my daily life.*"; "*I have learned what happens to many of the permissions we accept in applications*".
- Engaging Through Data: "*I have learned that I have to understand what I am being asked and analyse it in order to be able to make decisions according to what I am being asked.*"

- Acting on Data: "*I have learned how to be more careful when sharing data via applications, devices and from the Web and I learned strategies how to do this via updating my software and two-step authentication and having unique passwords via the password manager app*".
- Other Skills: "*improving my storytelling skills*".

Finally, open comments about game design were fostered due to the co-design process in which games have been created. Sometimes, comments confirmed the game strategy whilst at other times, opinions informed further changes in the game design. The following are examples of these aspects:

- Positive Aspects: "*It's perfect. I wouldn't make changes because it allows adaptation depending on the level of players*".
- Negative Aspects: "*The game was rather long"; "It needs more information about the meaning of some icons*".

## Game Assessment by Facilitators

In total the project utilized 44 facilitators, each of whom answered a survey about the DALI games. Although monitoring of the project assured the piloting of all DALI games, responses were only collected regarding some of them.

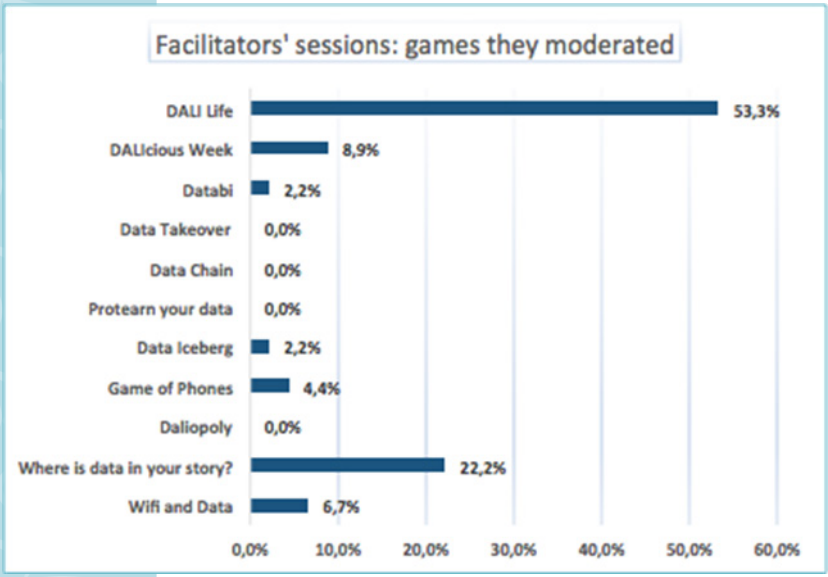



*Table 6: Games Moderated by Facilitators.*

Using the games tested, data was collected regarding the facilitators' perceptions. In this case, the games most assessed by facilitators were Dali Life (53%), Where is Your Data Story? (22.5%), followed by Dalicious Week (8.9%), Wifi and Data (6.7%), Games of Phones (4.4%), Data Iceberg (2.2%), and Databi (2.2%).

As stated previously, the survey instrument for facilitators included six sections, the first four sections mirrored the survey for participants, whilst additional sections were added covering pedagogical and technical elements. In table 7, we provide an example summarizing the narrative of the data obtained regarding quality assessment by facilitators. Of those surveyed, 48.9% strongly agreed that the games gave their players autonomy to chose and take decisions during gameplay (item 1). In the items that asked about clarity and functionality; item 6, which covers rules and winning conditions, achieved more than 80% positive responses; either agree or totally agree. Facilitators

also perceived the game content as appropriate, with 80% of responses being level 4 or 5 for item 11, and more than 80% of facilitators thought the game was fun; item 13.

In general it can be observed that in all cases, approximately 70% of facilitators agreed or totally agreed with the pedagogical alignment of the games design, especially the alignment of learning aims, activities, and content; item 19. When we evaluate the technical design and usability, all questions received positive responses, more than 70% of facilitators agreeing or totally agreeing. This shows that facilitators validate the DALI games designs in terms of quality and target usability, and, for example, in terms of accessibility; item 23, almost 80% of facilitators were in agreement, or totally agreed, whilst at the same time there are no facilitators in total disagreement, whilst only 10% of facilitators disagreed.

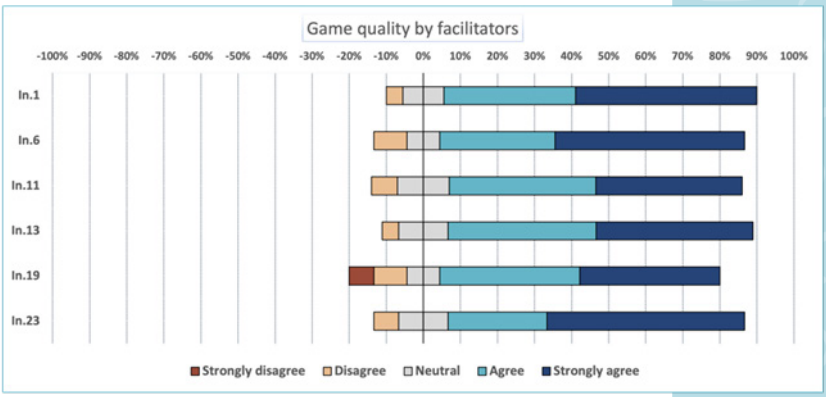



*Table 7: Game Quality by Facilitators.*

As for participants, comments have been organized against the following framework:

- Agency, Game Design (clarity, ease of use, functionality, content), Fun and Learning: "*It is perhaps not the most exciting game, but it is fun and one hour went quite fast.*"
- Game Design (Pedagogical Design, Technical Design & Usability): "*Design is great, game play is good and satisfaction from playing the game is increased especially when turn taking interaction are taking place*"
- Final Comments: "*It has been VERY fun to see siblings and parents playing together*".

## Session Assessment by Facilitators

Facilitators were asked to report on their organization of sessions, the results of this are presented in table 8.

| General Description | |
|---|---|
| Duration | Majority of sessions were one and a half hours to two hours long. |
| Target Adults | Sessions included all project defined adult groups and were mainly conducted as small field trials. |
| Setting and Infrastructure | Flexible furniture, laptop, and projector. |
| Number of Games | Mostly one to two games per session. |
| Session Introduction | Games were mostly introduced in short presentations by facilitators, framing the project work and data literacy terms. |
| Game Introduction | Facilitators mostly introduced the games with instructions for the whole group. |
| Playing Groups | Facilitators mostly allowed participants to group themselves. |
| Feeback | Whilst playing, most facilitators offered feedback only when they were asked, also, some visited each team offering feedback. |
| Follow-Up Activity | Follow-up activities were not required as participants were found to be engaged and motivated, or they could understand the games aims and dynamics without difficulty. |
| Closing Activity | Facilitators mostly focused on the game quality survey. |

*Table 8: Session Organization.*

Finally, in table 9 we provide some examples of responses received as open comments written by the facilitators as concluding remarks.

| Concluding Remarks | |
|---|---|
| What do you consider to have been the most positive aspects? | "Community building" |
| What difficulties have participants found for playing? | "Understand the rules in detail in an appropriate time of 10-15 minutes" |
| What are the negative aspects that you have observed? | "Too much time was needed to understand the rules" |
| What improvements would you introduce? | "Easier rules" |
| Do you have any advice for future facilitators? | "In general, I consider that everything is very well done. Maybe be able to dedicate a little more time to each game." |
| Do you think that future facilitators would need training? | "Good knowledge of the games"<br>"Data literacy awareness" |

*Table 9: Concluding Remarks.*

# Conclusions

This document reports on the survey instruments and the field trial implementation. Both were conceived as complementary tasks that would help to inform the co-creation process of game design within the consortium. Therefore, the results must be observed as data collected during an on-going and open process that was intended to be finalised with feedback provided within the instruments themselves. Positive aspects were used to confirm the design and strategy adopted by teams of co-creators, whilst negative aspects were carefully discussed and considered in order to improve the final game designs.

In short, yet to a great extent, regarding the data obtained from both participants and facilitators, we can highlight the following aspects.

- Games allow enacting agency and autonomous learning.
- Games are fun and allow playful learning.
- Games are data-literacy based and allow developing awareness, data management skills, and data activism.
- Games allow other transversal learning like language skills, or soft skills like discussion.
- Games are high quality in clarity and usability, pedagogical and technical design.
- A typical session requires an introductory presentation by facilitators and a closing activity to support reflection and data-literacy learning. Also, the length of a gaming session should typically be between one and a half hours to two hours in duration.
- Games include instructions and sometimes examples and supporting materials. However, based on field trial experience, it is highly recommended that facilitators use the DALI Handbook and Facilitators Guide for extended details and advice for a successful gaming experience.

The wide variety of cultural and organizational contexts along with the diversity of adults participating suggest the validity of the games constructed. Additionally, field trials have showed that games are highly flexible and can be adapted to players' needs. We look forward to receive future feedback of the DALI games impact for adult data-literacy and playful learning!

# Appendix

| Data Collection Survey Instrument for Adult Learners | | | | | |
|---|---|---|---|---|---|
| Title: | Dropdown menu of game titles. | | | | |
| Age Group: | 18-29 | 30-64 | 65+ | | |
| Game Experience: | Digital | Non-Digital | | | |
| Frequency: | I play games often. | I play games occasionally. | I used to play games. | I have never played games. | |
| When was the Last Time you Played Games? | Last Week. | Last Month. | Last Six Months. | Last Year. | More Than a Year. |
| I Intend to Play Games | Yes | No | | | |

| Please Rate the Following Statements From 1 to 5. | |
|---|---|
| 1 – Strongly disagreel 2 – Disagree I 3 – Neither agree or disagree I 4 – Agree I 5 – Strongly agree | Rating 1-5 |
| 1. The game enables me to make/choose/select decisions, and act on them. | |
| 2. The game evokes emotional reactions, such as wonder, delight, excitement, and/or surprise. | |
| 3. The game gives me the confidence to act. | |
| 4. The game encourages peer-support (e.g. , to ask questions, learn and collaborate with others). | |
| 5. The visual elements are clear. | |
| 6. The text elements/ instructions are clear. | |
| 7. The game is easy to understand and play (e.g. game aims, game rules, winning conditions etc.). | |
| 8. The game content is relevant for me. | |

| | |
|---|---|
| 9. The game dynamics takes the appropriate amount of time (e.g. it not too long nor too short). | |
| 10. The game is fun. | |
| 11. The game made me feel that I was learning while I was playing. | |
| 12. The game enables me to test my current knowledge and improve my data strategy for the future. | |
| 13. What do you feel you have learned with this game? | |
| 14. Other comments (if you answered 1-3, please give your insights). | |

Thank you for your participation!!

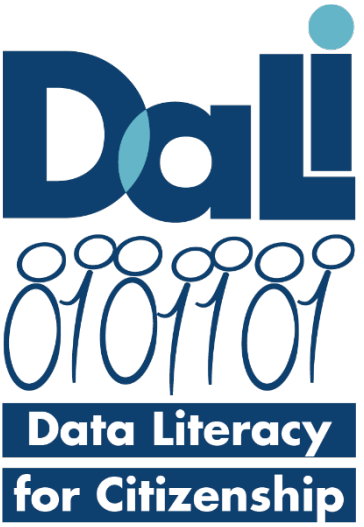
| **Data Collection Instrument for Facilitators** | | |
|---|---|---|
| Title: | Dropdown menu of game titles. | |
| Target Audience: | Dropdown menu '*Young Adults, General Adults, Workers, Senior Adults'*. | |
| Please Rate the Following Statements From 1 to 5. | | |
| 1 – Strongly disagreel 2 – Disagree I 3 – Neither agree or disagree I 4 – Agree I 5 – Strongly agree | | Rating 1-5 |

| | Aspects | Indicator Statements | Rating 1-5 |
|---|---|---|---|
| Autonomy | Sense of Control | 1. The game enables the participant to make / choose / select decisions, and act on them. | |
| Fun | Ease (Positive Emotion) | 2. The game evokes emotional reactions, such as wonder, delight, excitement, and/or surprise. | |
| Agency | Capability / Capacity | 3. The game gives participants the confidence to act. | |
| | Collaborative | 4. The game encourages peer-support and peer interaction. | |

| | | | |
|---|---|---|---|
| Game Design & Learning | Clarity, Easiness & Functionality | 5. The game aims are clear. | |
| | | 6. The game rules and winning conditions are clear. | |
| | | 7. The visual elements are clear. | |
| | | 8. The text elements / instructions are clear. | |
| | | 9. The game is easy to understand and play (e.g. game aims, game rules, winning conditions etc.). | |
| | Content | 10. The game content is relevant to develop data literacy. | |
| | | 11. The game content is appropriate for me. | |
| | | 12. The game dynamics takes the appropriate amount of time (e.g. it not too long nor too short). | |
| | Fun & Learning | 13. The game is fun. | |
| | | 14. The game allows participants learning while playing. | |
| | | 15. The game allows participants to test current knowledge and data strategy. | |
| Other comments (if you answered 1-3, please give your insights). | | | |
| Other comments. | | | |

| Aspects | Indicator Statements | Rating 1-5 |
|---|---|---|
| Pedagogical Design | 17. The game answers to the learning aims | |
| | 18. The number of questions/activities is adequate for the acquisition of the intended content/learning objectives. | |
| | 19. The type of activities is appropriate for the acquisition of the intended content/learning objectives. | |
| | 20. The content of the work is easy to understand for the target audience. | |
| Technical Design & Usability | 21. The quality of the visual elements is adequate and sufficient. | |
| | 22. The quality of the materials used is adequate. | |
| | 23. The game requirements are easily accessible. | |
| | 24. The format of the materials is appropriate . | |
| | 25. The content is updated. | |
| | 26. Game length is suitable (time). | |
| 27.Other comments (if you answered 1-3, please give your insights). | | |
| 28.Other comments. | | |

Thank you for your participation!













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