DaLi

Data Literacy
for Citizenship

FACILITATORS GUIDE

Games are ancient. Like making music, telling stories, and creating images, playing games is part of what it means to be human.

Zimmerman & Chaplin (2013)
Manifesto for a Ludic Century

DALI: Data Literacy for Citizenship
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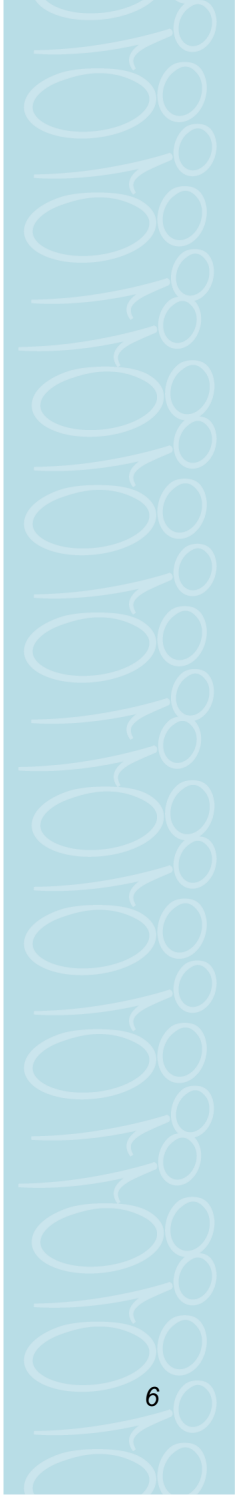
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Introduction

This document is aimed at helping facilitators to use DALI Game-Based Networked Learning Strategies (GBNLS), which have been designed according to the epistemic, social and set design to implement the set of the ten DALI games. In order to do that, this document introduces the following sections: the DALI framework, learning aims and the games' contents as well as some basic characteristics like target audiences, time, and groups. Suggestions to activate learning before playing, during playtime and for closing the session after playing are also introduced.

DALI Framework and GBNLS

Data literacy is the ability to draw significant information from data: it implies finding ways to make informed decisions in one's everyday life and in various contexts according to personal or collective goals. To ask and answer questions from data sets through an inquiry process, considering ethical use of data.

It includes understanding about data, awareness/attitudes towards non-neutrality / biased data (collection, etc.). It implies knowledge about collecting, selecting, storing, preserving and managing data; analysing, evaluating, interpreting, critiquing, applying, and working with data; and representing, visualising, and communicating stories from data. Data literacy includes skills to make critical judgments and interrogate the claims accompanying data systems, including ethical and legal aspects that affect themselves and other people's rights. It also comprises abilities to use data as part of a design process and solve problems to make decisions (different purposes). The following tables present the A level of skills per elements and subelements.

Understanding Data

Element	Subelement	Skills- Level A	Game
Understanding Data	Knowledge	What is data, how it is created?	Data iceberg
	Awareness	Being aware / Knowing about the existence of data.	Wifi and Data! DaliLife
	Critical Thinking	Knowing that data have a value- Knowing data can be used for multiple purposes.	Data Takeover

Acting on Data

Element	Subelement	Skills- Level A	Game
Acting on Data	Collecting data	Use external devices/ apps to collect data.	Protearn your Data
	Managing data	Creating, editing and storing simple file formats like .txt or .xls to manually insert the data.	DALIcious Week
	Sharing data artifacts	Share and communicate data sets that already exist under ethical considerations.	Game of Phones

Engaging Through Data

Element	Subelement	Skills- Level A	Game
Engaging Through Data	Policy and regulation	Understanding how society shapes data use/ influences policy making.	Daliopoly
	Taking decision	Understanding civil action / individual potential to use data.	Where is Data in your Story?
	Data activism	Participating - Understanding data activism movements and how these can change the use of that data that stakeholders do.	Data Chain
	Data advocacy	Understanding your influence on peers or stakeholders to help them understand the potential and applications of data.	Databi

Ethics & Privacy. A fourth transversal element (4), 'Ethics & Privacy', can be found in each of the three main elements. An ethical perspective must underlie all the knowledge, skills and levels in the framework.

For further information about DALI framework, visit: https://dalicitizens.eu/index.php/dali-data-literacy-framework-2/

You can also scan the QR-code

Games and the Pedagogical Strategy

Against the DALI framework as a backdrop, the project develops a holistic strategy that relates the games that have been designed to promote data literacy skills with a pedagogical strategy to put them into practice with adults of all ages, from a networked and playful approach. To outline the learning experience, the pedagogical design establishes the following elements to consider:

- Epistemic design: objective of the game, game mechanics and rules, estimated playing time, ethics and privacy issues.
- Social design: social aspects, number of players, roles and adaptations according to the different adult groups.
- Set design: game materials.

The following tables present a short summary of each Game Based Networked Learning Strategy (GBNLS) and some of its key elements according to the original design of the game for one target group.

		Epistemic D.	Social Design		Set Design
GBNLS'S Name	Game's Name	Estimated Duration	Number of Players	Roles	Materials
Taking Decisions with the Help of Data	Where is Data in your Story?	20-30 minutes	Multiplayer game At least 5	Player Random player for time control and note taking	• 20 cards about Individual • 20 cards about Location • 20 cards about Activity • 4 cards about Data
Understanding Data Generation Happens Everywhere	Wifi and Data!	30-60 minutes	2-4 players	Player	• 1 dice • A figure of different colour per each player • A few pieces of paper and a pencil/pen for drawing • Cards • Board

GBNLS'S Name	Game's Name	Epistemic D. Estimated Duration	Social Design Number of Players	Roles	Set Design Materials
Generate Discussion Around Data Literacy	Dali Life	30-60 min.	2-5 players	Player	• Board game • 62 event cards • 62 action cards • Counters or tokens • A dice
Save and Manage Data and Time	DALIcious Week	40 min.	Multiplayer game At least 2	Player	• 5 different types of boards (optional) • 36 normal cards • 10 collective cards • 20 harmful cards
Citizenship Through Data Activism	Data Chain	30-45 min.	4 players (2 teams of 2 players)	Data activist Data broker	• 20 artefact cards (10 data activists and 10 data brokers cards) • 32 action cards

| | Game's Name | Epistemic D. | Social Design | | Set Design |
GBNLS'S Name		Estimated Duration	Number of Players	Roles	Materials
Substantiating the Value of Data	Data Takeover	15-45 min.	3 (min.)-5 (max.) players	Player	3 Hacker powerful actor cards 3 Influencer powerful actor cards 3 Journalist powerful actor cards 3 Lawyer powerful actor cards 3 PR Consultant powerful actor cards 50 Real Coins tokens 50 DataNugget tokens - Summary card for each player - Token Tracker for each player
Data Flux and Collaboration	Databi	1 hour	Multiplayer game: at least 2	Player	45 Cards - A life and clue board - Memory helper

		Epistemic D.	Social Design		Set design
GBNLS'S Name	Game's Name	Estimated Duration	Number of Players	Roles	Materials
Relating digital activity with data creation	Data Iceberg	1 hour	Multiplayer game At least 2	Player	• Game board for each player/team • 40 cards • white joker • black joker
Relating digital activity with opportunities to learn about ourselves	Protearn your Data	1 hour	Multiplayer game At least 2	Player	• Game board • 72 data cards • 24 bilb cards • 24 lock cards • 24 forbidden cards • 3 thief cards (Dali logo) • A dice • 1 token per player • 1 solution sheet

GBNLS'S Name	Game's Name	Epistemic D.	Social Design		Set Design
		Estimated Duration	Number of Players	Roles	Materials
Discovering the Language of Data Literacy	Daliopoly	1 hour	Multiplayer game At least 2	Card dealer Player	• 39 Artefact cards • 20 Data cards • 47 Action cards
Data and Citizenship	Games of Phones	Less than an hour	Multiplayer game At least 2	Referee Player	• 120 standard cards • 6 quick Start Rules cards

		Epistemic D.	Social Design		Set Design
GBNLS'S Name	Game's Name	Estimated Duration	Number of Players	Roles	Materials
Using Simple Escape Rooms for Education	Dali Escape Room	1 hour	2-6 players	Player as codobroker Facilitator	• A crossword • Words printed onto strips of paper • A grid of letters • A vigenere code • Images and small coloured squares • Odd word out • A gridd of squares with letters • A sheet of paper with a code

Target Groups and Playing Contexts for Game Design and Adaptations

The diverse games have been designed in coherence with the prior definition of personas. Therefore, each game is firstly designed according to one specific target group, identified with two personas profiles and, afterwards adapted to the other adult groups. DALI also contemplates intergenerational groups, whose learning has two main lines of conceptualisation (Leek & Rojek, 2021):

- Intergenerational learning between related generations (family members)

- Intergenerational learning between unrelated generations (non-family members)

The following tables summarize the description of games design for the original target group and the different adaptations to the other adult:

Players	Age	Original Games for Target Group	Game Original Design	Adapted Games for Target Groups	Game Adaptation for Target Group
Young Adults	18-29	• Wifi & Data • Where is Data in your Story?	Original games for this target include card materials and design layouts in small sizes.	• Data Takeover • Data Chain • Dalicious Week • Databi • Data Iceberg • Protearn your Data • Daliopoly • Game of Phones	Adaptations for young adults include new rules for a quicker and more exciting gameplay, like adding challenging rules for extra-requirements.

Players	Age	Original Games for Target Group	Game Original Design	Adapted Games for Target Groups	Game Adaptation for Target Group
Senior Adults	65+	• Data Iceberg • Protearn Your Data	Original games for this target are focused on knowledge and are aimed at enhancing participants' discussion.	• Wifi & Data! • Where is Data in your Story? • Data Takeover • Data Chain • Dalicious Week • Databi • Daliopoly • Game of Phones	Adaptations for seniors are created in diverse ways: • Adapting materials, making them bigger, with higher sizes of font • Adapting contexts, including examples and situations that are close to seniors' interest. • Adding glossaries, that support understanding • Giving more time for answers. • Reducing the number of requirements for correct answers.

Players	Age	Original Games for Target Group	Game Original Design	Adapted Games for Target Groups	Game Adaptation for Target Group
General Adults	30-64	- Data Takeover - Data Chain - Dali Life - Dalicious Week - Databi	One of the games in this group offers collaborative gameplay deeply tied with the winning condition. Games originally designed for this target group are developed from a critical perspective, focusing both on the double-edge sword of a datafied society and the skills needed to manage data.	- Wifi & Data! - Where is Data in Your Story? - Data Iceberg - Protearn Your Data - Daliopoly - Game of Phones	Adaptations for general adults include sociocultural diversity. Moreover, these adaptations are recommended for intergenerational groups, since they also introduce children's friendly elements.

Players	Age	Original Games for Target Group	Adapted Games for Target Groups	Game Original Design & Adaptation for Target Group
Workers	18+	• Daliopoly • Game of Phones	• Wifi & Data! • Where is Data in your Story? • Data Takeover • Data Chain • Dalicious Week • Databi • Data Iceberg • Protearn your Data • Daliopoly • Game of Phones	Games and adaptations for workers highlight the relevant data literacy content contextualised in professional settings. For example, some games increase workers' awareness on the different lobby roles played by the diverse agents in the tech cluster. Other games promote skills in data management for safe, ethical and productive usages, as well as teamwork and team building.

Players	Age	Original Games for Target Group	Game Original Design	Game Adaptation for Target Group
All adult groups	18+	• Escape Room	Team-based game 9 interlocking puzzle	Adaptations are only possible through facilitators role: extending timeframe or providing feedback to help teams decode clues

How to Implement the Games

The recommended strategy includes three steps: before playing the games (Let's play!), the playing time (Time to play!) and after having played (Time to finish!). There is also a slide presentation that you can use to support the introduction of each step.

Let's Play (Activitation)

You can start the DALI game session by introducing the following elements:

- Start welcoming participants in the session held in your institution

- Optionally, introduce the DALI project aims and partnership

- Shortly describe the concept of data literacy, the common core element of each game

- Start a discussion with participants about their current knowledge and skills related to data management.

- Make sure players understand most frequent vocabulary of the games they are going to play: provide examples if participants need them to understand key works for the game.

- Introduce the games they are going to play. It should be decided whether detailed or general aspects of the games should be introduced to all participants or specific teams.

Before playing, you should plan the following aspects:

- Group organisation: deciding how the participants will be split into different groups (according to common or different skills, guaranteeing at least one participant with advanced skills in each group, allowing participants to group themselves or to team up with people they don't know).

- Participants can be encouraged to distribute roles among themselves (reading instructions, asking for help, delivering materials, etc.)

- Planning the games, their sequence, deciding if participants will be playing a single game or more than one.

- When playing DALI games for the first time, it is recommended that participants focus on a single game to allow them to play more than one round, as the experience might be more enjoyable during the following rounds, once all players are used to the rules. It is also recommended to grant players some time to discuss and exchange opinions and thoughts emerging from their gaming session.

- A session can be organised by focusing on specific aspects or promoting diversity. Games have various materials, collaborative components and players' group dynamic. If the session planning includes more than one game, they can be combined regarding the social, epistemic and material elements along with the the persona characerics of the players' group:

  o In general, it is recommended that participants first play games with more predefined game dynamics, like Wifi & Data!, which is based on questions and answers. And, afterwards, play the ones with more free and creative game dynamics like Where is Data in your Story? Also, the selection of games can be done regarding the collaborative component, for example: those which are cooperative like Databi, or that can be easily organised for pair work like DaliLife, or those with a greater individual or competitive approach like Databi or Data Chain.

  o Games that should be played can be chosen depending on participants' profile and their prior experience with games in general. Experienced players could enjoy more tactical games like Data Chain or Data Takeover, while casual players might engage more with games that are more mainstream, like Daliopoly or Data Iceberg.

  o Games have various materials' types: the ones that are card-based like Game of Phones could pair well with the ones with boards like DaliLife, Data Iceberg or Protearn your Data.

  o Games are highlighting different approaches to data literacy: Data Action or Data Takeover to provide a critical
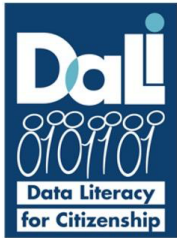
perspective, Wifi and Data! or Data Iceberg to enhance knowledge, Databi to introduce data management, and DALIcious Week to introduce data related skills.

Before starting the lesson, you need to make sure that you have the availability of the following materials:

- Flexible furniture
- Laptop and projector
- Results counter
- Other: dice, pencils, paper

The facilitator can use and adapt slides 1 to 21.

	Slide
1	
	This slide can be presented to welcome participants, and only use your own university/institution logo to give some key role to local partnership.
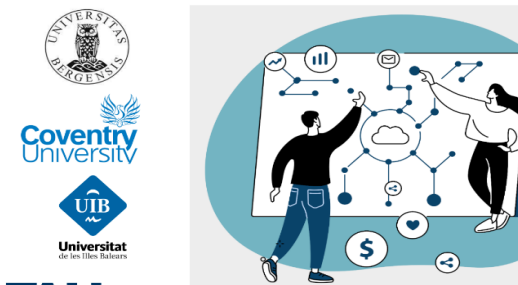
	Slide
2	DALI is a strategic partnership of the E+ program by the European Comission developed by 5 universities between 2021 and 2023.
3	DALI stands for Data Literacy for Citizenship. DALI aims to empower individuals (young adults, general adults, seniors) for responsible citizenship / civic engagement in terms of data, by acquiring and developing key competences related to data literacy. Adults (as teachers, parents, families, workers, and so on) are in charge of the social uses and regulation of data, both at home and in the education of young people, and moreover, in most of our countries adults are legally responsible for their children's data. Furthermore, seniors encounter data in their daily lives, such as grandparents interacting with their families, and as citizens interacting with public services such as tax or health systems.

4 Facilitators can introduce the data definition and the skills related to the management of data:
Data literacy is the ability to draw significant information from data: it implies finding ways to make informed decisions – in one's everyday life and in various contexts according to personal or collective goals.

Data can be defined as "measurements or observations that are collected as a source of information." (Australian Bureau of Statistics, 2022). We do not have just a passive relationship with data as something that is extracted from us as we live our postdigital lives. Therefore, knowing how to effectively and ethically deal with data – and, more generally, how to navigate our increasingly datafied day-to-day realities – has become an essential capability for work, education and citizenry in contemporary cultures and societies (Castañeda et al., 2024).

5	**What do you know about your data?** Start by asking participants about their current data knowledge and practices. If there is participation, this could take a long time. So it is important to summarise contributions and take some notes about the current awareness of players on data literacy skills and knowledge. To close the session, these notes can be useful to extend new knowledge after the playing time.
6	**Let's play** ▶ Announce the games that are going to be played

7	**What games?** In the following slides, there are some highlights for each game. Slides about the games that are not introduced can be deleted. The first bullet point is for the learning aims. The second is for some relevant characteristic that can help in understanding the game The third is for the winning conditions.
8	**Wifi and Data** It is aimed at understanding and being aware of the existence of data It is an adaption of the popular board game Snakes and Ladders The first player whose figure reaches the finish line (position 36) wins the game Aims Based on a popular game (Snakes & Ladders) Winning conditions

9	## Where is Data in your Story? Understanding civil action on data / Individual potential to use data / Engaging through Data / Taking decisions on data Imagine how data is created through digital devices by the people doing the activities in the contexts suggested by your cards The narrative that gets the most votes wins the round. After three rounds the winner of the game is announced: the one who won the most rounds, wins. Aims Storytelling Winning conditions
10	## Daliopoli COMPUTER PASSWORD SYSTEM SECURITY DalioPoly Understanding how society shapes data use/influences policymaking Adaptation of the popular Monopoly Winning the game? Aims Based on a popular game (Monopoly) Winning conditions
11	## Game of phones GAME OF PHONES Learning aim? Quick searches The player with the best result Aims Quick searches Winning conditions

12	## Data iceberg Understanding Data - Knowledge Based on the memory game After the check, the one with the most pairs of matching cards on the right part of the personal game board wins. Aims Based on a popular game (Memory) Winning conditions
13	## Protearn your data Learning about Acting on data / Collecting data / Using externaldevices/apps to collect data. By going through the board the player will be collecting data (cards with data icon) on which 3 actions can be carried out The first player that arrives at the final box (with a flag) STOPS the game.The winner is the one with the most data protected (data cards covered with lock cards) and with the most data cards covered with learning card (the bulb icon card). Aims Based on a popular game (The goose game) Winning conditions
14	## Data Takeover Laarning game? Role game A player wins when opponents have lost all their Powerful Actors to help them gain data and financial wealth. Aims Role game Winning conditions

15	## Data chain Participating - Understanding data activism movements and how these can change the use of that data that stakeholders do Data activism The game ends when one of the team has placed 6 artefact cards on the table. Aims Data activism Winning conditions
16	## Databi Learning game?... Databi is a cooperative game, which means all players are on the same team. You all have completed all the categories... Winners! Aims Cooperative game Winning conditions
17	## Dalicious week Creating, editing and storaging simple file formats like .txt or .xsl to manually insert the data. As the week has to be complete, there will be 7 rounds, it means, each round represents a day of the week. For each day there will be as many turns as players. The person who reaches his/her ideal week is the winner (or the one who is the nearest after 7 rounds) Aims Everyday life is data Winning conditions

| 18 |

DaLi Life

Learning aim?

The gameplay can be very tactical

The winner of the game is the first person to reach the circle marked 'FINISH'.

Aims
Tactical game
Winning conditions |

| 19 | ## Dali Escape Room

Knowing that data has value

A team-based game with 9 interlocking puzzles

The players must complete the game within an allotted time frame.

Aims
Team-based game with 9 interlocking puzzles
Winning conditions |

| 20 | # 5 online minigames

Delete if they are not played |

| 21 | |
| | Time to ask players to split in groups |

Time to Play (Application)

Once the games have been introduced, invite the participants to start playing. To support playtime you can consider how to carry out your role as facilitator, and decide on the following aspects:

- Give feedback about game dynamics or data literacy only when help is requested or offer advice to all teams while they are playing the games.

- Halfway through the session, you can consider doing a follow-up activity to promote self-reflection on data literacy skills or to enhance the gaming experience.

- During intergenerational sessions, pay attention to the relationship and verbal exchanges between younger and older participants: in case of a generation gap, differences in data practices and skills are more likely to be noticed. When playing with children, adults can be asked to support children's self-reflection for data practices.

The facilitator can use and adapt the slide 22:

	Slide
22	
	The slide can be projected during the playing time. Alternatively, a time counter can be projected.

Time to Finish (Closing)

After playing, the facilitator can close the session by promoting participants' self-reflection in diverse ways:

- Ask about participants' gameplay experience: their fun, engagement and feelings.

- Ask about the data literacy concept, and how they have understood the concepts and the related skills

- Ask about participants' data literacy skills: how do they normally manage data, and how they can improve their data routines based on their learning.

- Show the DALI summary of the DALI framework with the four areas and three levels, and show the skills they have practiced.

- Ask about their self-assessment of their knowledge and current learning and their next steps for future learning.

- Show the DALI Toolkit website (https://toolkit.dalicitizens.eu) from which participants can download the "print and play" versions

The facilitator can use and adapt slides 23 to 26:

	Slide
23	
	Show the screen to announce that the time for playing is over. You could use an alarm clock sound to announce the end of playtime.

24	
	Final reflection and assessment time. Players can be asked to participate by answering about what they have learned. It is recommended to ask about prior knowledge to compare and reflect and extend knowledge and skills.
25	
	The skills mentioned by adults can be contextualized in our framework. The framework is available in the DALI website
26	
	Say thank you for their participation and be as emotional as possible.

Conclusions

The Facilitator Guide is part of the materials included in the DALI Toolkit that you can find online (https://toolkit.dalicitizens.eu). This document presents an overview of the DALI games to promote the elements and subelements of the related data literacy framework in the beginners' level (level A). These games are the key element of a whole strategy to promote data skills among adult citizens based on a networked and playful approach. For a deeper knowledge of the pedagogical approach conceive for each game, see the Game Based Network Learning System Handbook.

Some general recommendations about how to play the DALI games and how to introduce gaming sessions are suggested. However, games are highly influenced by players and their environment, so as well as following this guiding advice, enjoy playing and get inspired to find your own creative solutions. Please, also share pics and thoughts of your gaming experience on social media using our hashtag #g4dataliteracy or giving us a shout on the microblogging site formerly called Twitter (@DaLi_Citizens).

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