Guidelines for Development and Implementation

DIGI BLEND

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Altum

From the authors:

"With the creation of a guideline, we want to enable the transferability, of the methods developed and tested in the project, to other areas of adult education. The implicit advantages of game-based learning – especially for the target group of older adults – are explained and illustrated by examples."

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INTRODUCTION ABOUT THE PROJECT AND GUIDELINES

"We applied for this project with the confidence that our partnership would contribute to improving digital literacy within the EU. We want to develop a new and innovative approach to teaching and training basic digital skills for a target group that, for different reasons, is reluctant to enter the digital world. The continuous use of familiar game-based elements in combination with an interactive blended learning approach is innovative and promising. Older adults are particularly negatively affected by the rapidly developing digital world. The digital gap is growing, and digital exclusion is a real danger for a sizeable part of the population in Europe. Digital competences are becoming more and more a necessity for everyday activities."

From the Project Summary section of the Application Form

From these lines, we can deduce the primary objectives of the DIGIBLEND Project. The project application has been created based on the clear conviction of all participating strategic partners about the need to improve **digital literacy** in the European Union. To this end, some teaching-learning proposals have been developed regarding basic digital skills aimed at a group that, for different reasons, is reluctant to do anything related to the digital world. The continuous use of already-known game elements, in conjunction with an **interactive** blended learning approach, is innovative and promising. The development and exponential growth of the digital world have negatively impacted **older adults in particular**. The digital gap continues to grow, and digital exclusion is a real fear for many of the European population. Digital skills are becoming more than just a necessity for everyday activities.

In this project, we have sought to analyse the current situation in reference to the previously contextualised digital divide, propose different learning models based on game-based learning and, finally, create a guide for the future application of said learning models. We have developed and designed game models focused on specific digital skills that we previously chose. However, these models are also highly versatile and can be easily adjusted to teach other types of content.

The project's main objective has been to improve digital literacy among adults in the European Union through an innovative teaching and learning approach that combines game elements with interactive learning.

The project team conducted a comprehensive analysis of the digital divide in older adults, identifying key challenges and areas for improvement in their digital literacy and basic digital skills. After this analysis, the team developed and tested two gamified learning models: *Infinity.net* and *DigiUp*. These models aim to make learning more attractive and effective through the use of playful elements that promote active participation and continuous commitment of users.

We have created a detailed implementation guide to ensure the effectiveness and adoption of these models. This guide provides clear and practical instructions for integrating the models in different educational and community contexts, allowing facilitators and educators to follow a structured and evidence-based approach.

Additionally, the impact of these models was monitored to evaluate their effectiveness in improving the digital literacy and basic digital skills of older adults. This monitoring has included collecting qualitative and quantitative data and participant feedback, allowing continuous adjustments and improvements of the games.

Finally, we are committed to disseminating the results obtained through reports, case studies, workshops, and seminars. Best practices and learnings are being shared to facilitate the adoption and long-term sustainability of these models across the European Union. This dissemination will contribute to reducing the digital divide among older adults, promote greater digital inclusion, and improve their quality of life.

Recognising the Needs

There is a growing demand for digital skills in everyday life, as well as for employability in most industries. It is challenging to keep up, especially for senior citizens and older adults. The "digital divide" continues to grow for these groups. Parliament has found that "around half of the least educated and elderly population do not use it [the Internet] regularly, and around 58 million EU citizens have never used it." ("Bridging the digital divide in the EU", 12/2015)

At the same time, at least basic digital skills are increasingly becoming a prerequisite for participating in everyday life. However, a significant proportion of the European population still has no or insufficient digital skills: "The Digital Economy and Society Index (DESI) shows that four in ten adults and one in three working people in Europe lack basic digital skills."

Our project has been oriented around the digital skills framework for EU citizens. We have worked on the skills of the three competency areas of the DigComp 2.2 framework that we have considered relevant and valuable for our evaluation:

1. Information and data literacy
2. Safety
3. Problem-solving

We have prepared content from these areas that served as the basis for the designed games.

Results of the Project

And how did it all happen? We can divide the period into three different phases:

In the first phase (**PR 1: A game-based digital skills assessment tool**), we developed a game-based assessment tool to measure the digital skills of our target group. This step was crucial for creating training content in the second part of the project (PR2).

The research highlighted the importance of incorporating various elements and stages within a game. While common elements such as using points, badges and increasing challenge levels improve the user experience, assessments and assessment plans have also been identified as essential. These not only evaluate the efficiency of the process, but also optimise resources and measure competences.

In this phase, it has been concluded that a substantial benefit is the familiarisation of learners with the game-based approach, which facilitates their adaptation and maximises the impact of gamified learning.

From this point, we have been able to develop a board game called *Infinity.net*. This game includes a board, a set of rules, and a series of questions organised into three difficulty levels. In addition, we have translated the game into all partner languages (English, German, Italian, Spanish, Serbian, Latvian, Turkish, and Slovenian).

Our *Infinity.net* game, developed in the project's first phase, has been designed to evaluate the existing digital skills within our target group of older adults. The evaluation of the qualities of this board game focuses on several key aspects:

1. Interactivity and Engagement: *Infinity.net* keeps players active and engaged through its interactive format. Including a game board and questions at varying difficulty levels promotes continued players' engagement and interest.

2. Adaptability: The game has been translated into the different languages of the project partners, ensuring its accessibility and relevance for a multicultural audience.

3. Progressive Challenge: The questions, divided into three difficulty levels, allow a gradual evaluation of digital skills, adapting to each player's pace and prior knowledge.

4. Formative Assessment: Through game mechanics, participants receive continuous feedback on their performance, which helps them identify areas of improvement and strengths in their digital skills.

5. Resource Optimisation: The game design evaluates the efficiency of the learning process and helps optimise the resources used in training, as it facilitates the identification of specific training needs.

6. Familiarisation with Technology: One of the substantial benefits is the familiarisation of older adults with the game-based approach, which can reduce technological anxiety and improve their willingness to learn new digital skills.

In short, *Infinity.net* has been designed not only as an assessment tool but also as a means to engage and educate older adults in a playful and accessible environment.

In the second phase **(PR2: Gamified Blended Learning)**, we developed the *DigiUp* game.

To utilise the challenge-reward mechanism, which is essential to motivate players, we have designed increasing difficulty levels with different help mechanisms to keep players interested if a specific challenge is too difficult. We start the game completely analogue and integrate the online content incrementally (blended learning) by incorporating QR codes. The game is designed for small groups (4-6 players), so that there is competition, but also the possibility of cooperation.

When developing the *DigiUp* game, we explored various free options and finally chose Genially for its ability to bring interactivity and engagement to our content. The platform's wide range of interactive elements, from clickable areas to animations and quizzes, allowed us to create a dynamic learning environment. We have used Genially's user-friendly interface to design visually appealing games without needing advanced technical skills. Integrating multimedia elements such as videos, audio clips, and images enhanced the learning experience, ensuring a comprehensive educational approach.

Additionally, Genially's collaborative features allowed our team to collaborate and create content for each digital challenge within the game. The platform's gamification tools promote active participation and engagement, while the integrated analytics help us track user interaction and refine our game for maximum effectiveness. With Genially's web-based accessibility and integration with other educational tools, we provided an immersive and flexible learning experience that fitted with the goals that we have set for this game.

DigiUp game has been designed to combine competition and learning. The idea of having a game master to guide the experience is very positive; It surely helps to keep the focus on learning while enjoying the game.

We had to plan how our learners can progress through our game and gradually gain knowledge along the way. Throughout the game, we work on acquiring knowledge in identified skills and abilities that we want learners to enhance when they complete our training. This is the foundation on which everything is built!

The versatility of *DigiUp* in adapting to different gaming approaches is enormous. From a more competitive experience to one focused on individual learning, the game seems to offer something for everyone. The fact that it can be adapted to different learning content makes it even more valuable; flexibility is always a big advantage when it comes to education and development. It would be wonderful to see this idea expand and adapt to different areas of study.

The third outcome of this project (**PR 3: Guidelines for development and implementation**) reflects the results and experiences of PR 1 and PR2. These guidelines aim to provide a comprehensive framework for developing and implementing game-based learning methods to enhance digital skills among adults. By detailing the steps taken in creating and testing the games, offering insights, and sharing lessons learned, these guidelines will support educators and trainers in effectively using game-based assessments and blended learning approaches. The document includes an introduction to the project, an exploration of game-based learning methods, a study report on the efficacy of games in skill assessment and training, and specific chapters dedicated to the developed board games for both skills assessment and education. The main objective is to foster better digital inclusion and acceptance of game-based learning within the educational community and among adult learners.

European Added Value

Closing the digital divide is one of the main objectives of the European Union. For this reason, the Commission has created the European Agenda for Skills and Digital Education "to ensure that 70% of adults have basic digital skills by 2025."

The project's European value has been in finding the most appropriate way to achieve "digital literacy" in each country because there are different starting points and agendas within Europe. By combining these different approaches, we can select the best ways to achieve our common goal based on experiential evidence. All partners will promote the strategy suggestions (PR3) within their national context.

Expected Impact

The DIGIBLEND project is expected to have a significant impact on reducing the digital divide among older adults in the European Union, improving their integration and participation in digital society. Furthermore, the creation of a standardised application guide will allow the project's success to be replicated in various regions, thus contributing to greater cohesion and digital equity throughout Europe.

The project lasted 30 months and produced the final results in June 2024. Various meetings were held in different countries to achieve these results, find common points, exchange ideas, and consolidate the obtained content. In addition, the team plans to organise diverse dissemination activities to make the project and its results known to society.

Institutions, companies, associations and educational centres from different European countries have participated in this strategic partnership:

RegioVision - Germany - www.regiovisionschwerin.de
ilmiolavorosrl - Italy - www.ilmiofuturo.it
Biedriba "ALTUM" - Latvia - www.altum1.lv
Belgrade City Library - Serbia - www.bgb.rs
Laois and Offaly Education and Training Board - Ireland - www.loetb.ie
Institut Jozef Stefan - Slovenia - www.ijs.si
Konya Il Milli Egitim - Turkey - http://konya.meb.gov.tr
Decroly - Cantabria - www.decroly.com
CIAPE - Italy - www.ciape.it
Jugendkunst eV - Germany - www.jugendkunst.de

When we look at the 2030 Agenda and the proposed SDGs, the DIGIBLEND project undoubtedly addresses Goal 4: Quality Education. We firmly believe that education is essential for accessing a job, breaking prejudices, and promoting equal opportunities. If we want to improve the world, we must start with education. DIGIBLEND contributed to creating a framework for pursuing the proposed new learning models through gamification.

Real equal opportunities for ALL people are the key to achieving a fairer world. We show that everyone can excel in something with the necessary support and resources. Society, the business sector, and public administration must commit to achieving this. The team behind the DIGIBLEND project strongly believes that accomplished project results are a small contribution to achieving SDG Goal 10: Reduced Inequalities.

GAME-BASED LEARNING METHOD

Definition

Game-based learning (GBL) is an educational method that incorporates games and simulations as a strategic tool, into the learning environment, to enhance comprehension and memory, and engage learners. Instead of only relying on reading or listening, this approach incorporates educational content into enjoyable games. It transforms the learning process into an exciting adventure, allowing individuals to enjoy themselves while acquiring new skills and knowledge.

This method develops critical 21st-century skills like problem-solving, teamwork, and decision-making. Furthermore, GBL allows for personalised learning paths, as games can adapt to the skill level of each learner, providing individual feedback and adjusting difficulties accordingly. As a result, GBL is recognized as an innovative and effective educational method that aligns well with the needs and preferences of modern learners.

Theoretical Framework

Game-based learning is backed by educational theories emphasising active, contextual, and student-driven learning. Constructivism highlights that learners construct knowledge through experiences, making GBL effective by allowing exploration and discovery in structured environments. Experiential learning aligns well by offering realistic scenarios that bridge theoretical knowledge with practical application. Situated learning further deepens understanding by embedding learning in real-world contexts.

From a cognitive perspective, GBL engages multiple cognitive skills essential for success. It nurtures critical thinking and problem-solving by requiring players to solve complex problems and make quick decisions. Many games also enhance spatial awareness and reasoning through complex maps and scenarios. These interactive aspects make learning more engaging and boost crucial cognitive skills, leading to improved educational outcomes.

History and Evolution of Game-Based Learning

Game-based learning has roots that stretch back to the 1950s and 1960s, when educational theorists Jean Piaget and Lev Vygotsky began promoting the concept of learning through play. Piaget's theory of cognitive development emphasised the importance of active learning, which later became a foundational principle of GBL. In the 1960s, the U.S. military developed simulation-based training programs that prepared soldiers for real-life scenarios, an early form of GBL.

This foundation paved the way for the first educational games in schools during the 1980s, such as The Oregon Trail, which combined learning with interactive play to teach American history and decision-making skills. As technology evolved, so did GBL. The 1990s introduced multimedia-rich games that made learning more immersive. In comparison, the early 2000s saw the integration of the Internet and digital technologies allowing for more sophisticated educational games across various subjects. Today, GBL has integrated advanced technologies like virtual reality (VR), augmented reality (AR), and artificial intelligence (AI). These tools offer immersive experiences and personalised learning paths, transforming GBL from simple skill-based games to comprehensive educational environments that enhance learning across all educational levels.

Types of Games Used in Game-Based Learning

Games used in the field of education and training come in a variety of forms. Each type offers different educational benefits and is suited for various learning environments. Here are the main types:

- **Educational Video Games** are specifically designed with educational outcomes in mind. They often include features that align with curricular goals and are used in formal education settings to enhance understanding in subjects like math, science, or language arts. Examples: *DragonBox, Zoombinis*

- **Simulations** replicate real-life processes or systems, allowing learners to explore scenarios that are too dangerous, expensive, or impractical to experience firsthand. They're common in fields such as aviation (*Flight Simulator*), medicine (*Pulse!!*), and business.

- **Serious Games** have purposes beyond pure entertainment. They are often used for training, problem-solving, and creating awareness. They can be employed in various sectors. Examples include *Foldit*, which is used in scientific research, and *Re-Mission* which is aimed at helping young cancer patients manage their treatment.

- **Gamified Learning Systems (LMS)** are not games per se, but involve the use of game-like elements such as points, badges, and leaderboards in educational contexts. Such systems are designed to motivate learners and enhance engagement with the learning material. Many LMS incorporate gamification to encourage participation and completion of courses.

- **Role-playing games (RPGs):** Players assume the roles of characters in fictional settings, making decisions that affect the game's outcome. This type of game is valuable for teaching history, ethics, and social studies. Examples include video games like *Civilization* and board games like *Dungeons & Dragons*.

- **Puzzle and Strategy Games** require problem-solving and strategic planning, helping to develop cognitive skills like logic and strategic thinking. Portal and Tetris are video game examples, while board games like *Settlers of Catan* and *Ticket to Ride* teach strategic thinking and resource management.

- **Educational Board Games** are designed with learning outcomes in mind. They reinforce knowledge and skills in areas such as math, language arts, and science. Examples: *Prime Climb, Pandemic*

Current Trends and Innovations in Game-Based Learning

The GBL continues to evolve, driven by advancements in technology and a deeper understanding of educational psychology. Current trends include the integration of **virtual and augmented reality** to provide immersive learning experiences that allow learners to explore environments and scenarios that would otherwise be inaccessible or impractical. **Adaptive learning technologies** within GBL use algorithms to customize game experiences to the individual needs of learners, offering personalized challenges and support. Such personalization helps keep learners engaged and allows them to progress at their own pace, making learning more effective.

Applications in Education and Professional Development

In primary and secondary education, interactive games like *DragonBox* and *Prodigy* transform mathematical challenges into fun puzzles, helping students grasp complex concepts through play. Science education benefits from games such as Kerbal Space Program, where students design and launch spacecraft, deepening their understanding of physics and engineering. At the same time Eco teaches ecology by having students create sustainable ecosystems. Furthermore, history and social studies are enriched by games like *Civilization* and *Assassin's Creed: Discovery Tour* which immerse students in different historical periods and provide a contextual understanding of historical events and cultures.

Game-based learning **in higher education** is utilized in fields such as medical training and business management to provide practical and risk-free learning experiences. Medical students benefit from simulations and serious games like *Pulse!!*, which present realistic scenarios for practicing clinical decision-making and procedures. In the realm of business and management, games like *SimCity* and *The Sims* explore economic principles, urban planning, and management strategies, offering students valuable insights.

In professional development, GBL is invaluable in enhancing key workplace skills. Corporate training programs increasingly utilize games like *Keep Talking and Nobody Explodes* and *Pandemic* to improve leadership, team building, communication, and problem-solving abilities among employees. This approach makes learning more engaging and aligns with the dynamic needs of modern workplaces, ensuring that employees are well-equipped to tackle professional challenges.

Game-based learning exceeds traditional educational boundaries, extending into **lifelong learning** to foster ongoing personal and professional development. In a world where skills and knowledge continually evolve, GBL offers a compelling method for individuals to stay abreast of new competencies and information. For adult education, language learning apps like *Duolingo* and *Babbel* incorporate game mechanics such as streaks, points, and levels to make acquiring new languages both fun and effective. Moreover, digital literacy programs for seniors often leverage GBL to demystify new technologies, making them more approachable and easier to learn. This holistic approach demonstrates GBL's versatility and effectiveness in supporting lifelong educational journeys across various age groups.
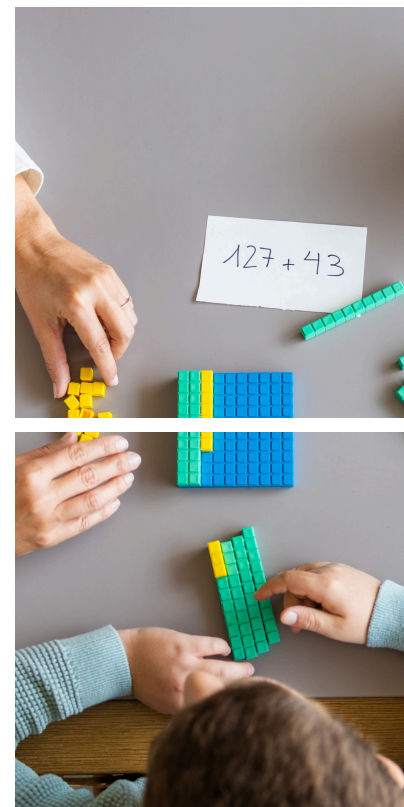
Benefits of Game-Based Learning

Enhanced Engagement and Motivation: GBL captivates learners' attention more effectively than traditional learning methods. Incorporating elements of play, increases motivation and encourages learners to engage deeply with the content. This heightened engagement is particularly beneficial in maintaining interest in subjects learners might find challenging or uninteresting.

Improved Retention of Information: The interactive nature of GBL promotes active learning, which is linked to improved retention of information. When learners are active participants in their learning process, they are more likely to remember and understand the material, thanks in part to the contextual and experiential elements provided by games.

Development of Critical Thinking and Problem-Solving Skills: Many educational games are designed to challenge learners with problems that require critical thinking and strategic planning. This makes the learning process more stimulating and helps develop important cognitive skills that are transferable to real-world situations.

Personalised Learning Experiences: Adaptive learning technologies within GBL can tailor challenges and feedback to each learners' individual needs, allowing for a personalised learning experience. This adaptive approach helps meet learners at their level, catering to their unique learning styles and paces, which is often not feasible in conventional educational settings.

Encouragement of Collaboration and Social Interaction: GBL often involves multi-player scenarios requiring peer cooperation and communication. This can foster important social skills such as teamwork, leadership, and communication skills, preparing students for collaborative work environments.

Safe Learning Environment: Games provide a virtual environment where students can experiment and explore without the fear of real-world consequences. This safety net encourages risk-taking and experimentation, crucial components of the learning process.

Challenges and Solutions

Resource Limitations: A significant barrier to GBL adoption is the availability of necessary technology and financial constraints. Schools and educational institutions often struggle with limited budgets that may not allow the purchase of advanced gaming equipment or software. A solution is seeking partnerships with technology companies and applying for grants dedicated to educational technology, or utilizing open-source or low-cost educational games and platforms that require minimal technology.

Resistance to Change: Resistance from educators and institutions can also impede the adoption of GBL. This resistance often stems from a lack of familiarity with GBL methodologies or scepticism about their educational efficacy. To overcome this, providing comprehensive training and professional development for educators can be crucial. Demonstrating the evidence-based benefits of GBL through case studies and pilot programs can also help in gaining buy-in from stakeholders.

Balancing Fun and Learning: One of the core challenges in designing educational games is ensuring that educational content is effectively integrated and not overshadowed by the entertainment aspect of the games. This requires a careful balance where the fun elements are used to enhance engagement without compromising educational integrity. To address this, game designers and educational experts collaborate closely to align the game's learning objectives with its mechanics.

Game-Based Learning vs. Gamification

Game-Based Learning (GBL) and gamification are often mentioned together in the context of educational strategies, but they represent distinctly different approaches. GBL involves using actual games to facilitate learning, where the game is the central teaching tool. Gamification, on the other hand, refers to the application of game-like elements to non-game contexts, such as education or business processes, to increase engagement and motivation. This does not involve playing games per se but rather incorporates elements from games—such as point scoring, competition with others, rules of play, and badges—into educational activities. For instance, a teacher might gamify a classroom by assigning points for homework submissions, awarding badges for achievements, and displaying a leaderboard. The primary aim of gamification is to leverage the motivational techniques of games to enhance the learning experience, rather than using the games themselves as the primary means of learning.

STUDY REPORT ON USING GAMES IN ASSESSMENT AND TRAINING

Introduction

During our project, we have done extensive research into the use of games for assessment and training. Our project team developed two games to study the advantages of a game-based approach toward these tasks in a practical way with members of our target group (older adults).

Therefore, we can describe the use of games in these areas based on our own observations with a sizeable number of participants (more than 100).

In this chapter, we will compile some basic principles and considerations for the use of games both in training and assessment. This should help training providers and other users to create an approach that is tailored toward their needs.

General Observations

Games have a couple of advantages when used for assessment and training:

- they are inherently motivating
- they lower the threshold for participation and reduce anxiety
- they provide instant feedback

All topics are significant when working with target groups like adults in a voluntary setting, which means outside of work or schools, where there is no external motivation for the participants to proceed. Keeping them in the process is the key to a successful assessment or training.

However, especially among the older generation, gaming is connotated as "not serious". For this age group, games have been an integral part of their lives, beginning early in childhood. But this kind of activity is reserved for spare time and is understood as inherently funny.

When we want to use a game for "serious" learning, we first need to overcome this common bias. That does not necessarily require an explicit introduction but can also be achieved by creating a proper environment and explaining the game's goals.

A well-prepared setting, professionally designed gaming board, and clear and straightforward rules also help raise acceptance. The path chosen in our project – starting with a familiar board game and expanding that with online elements – has clearly been effective.

There is a widespread desire to avoid activities that can bring someone out of their comfort zone. Embarrassing situations have to be avoided to keep older adults engaged and open.

In general, creating a set of rules for a game that is both simple and clear and also fostering smooth gameplay and motivation among the players has proven to be the most difficult task for us. It was very common to add new rules and sub-rules to cover any possible situations within the game. But with this kind of mindset, the complexity of the gaming rules grows rapidly and reaches a point where players become annoyed and demotivated quickly.
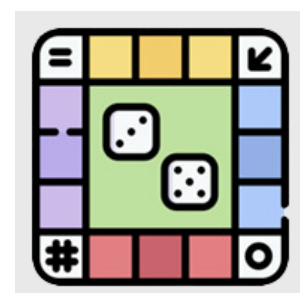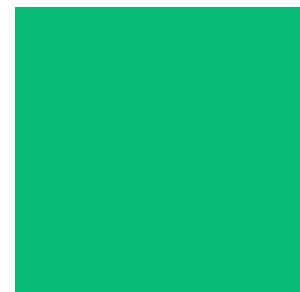
Games in Assessment

Assessment can be defined as the process of evaluating or measuring someone's knowledge, skills, or progress in a particular area. It involves gathering evidence of learning through various methods and making judgments based on that evidence.

Games can be an effective tool for assessment in several ways:

- **Knowledge assessment:** Educational games can be designed to assess a learner's knowledge and understanding of specific concepts or subjects. For example, quiz games or interactive simulations can present questions or scenarios that require players to apply their knowledge to progress or score points.

- **Skill assessment:** Games can evaluate a player's skills, such as problem-solving, critical thinking, decision-making, or spatial reasoning. Puzzle games, for example, can assess logical thinking and strategy skills. In contrast, simulation games can assess decision-making abilities in various scenarios.

- **Behavioural assessment:** Certain games are ideal for evaluating a player's behaviour, attitudes, and social skills. For instance, role-playing games or multiplayer games are excellent for assessing how players interact, communicate, and collaborate with others.

- **Performance assessment:** Games that involve completing tasks or achieving objectives can assess a player's performance, efficiency, and ability to apply learned concepts or skills in a practical setting.

In our project, we evaluated our players' skills and knowledge.

The main difficulty in using a game in the assessment process is to design it in such a way that it evaluates the level of existing skills and knowledge correctly. If the assessment aims to get a more differentiated result than simply "skills exist/skill does not exist", a fine-tuned challenge system needs to be designed and implemented. You can find more detailed information about how we developed our game-based assessment in Chapter 5 of these Guidelines.

While we have split our approach and created a game-based assessment and then a gamified blended learning, it has to be noted that the borderline between assessment and learning is somewhat blurred. Each assessment is also a learning experience, and vice versa.

With the proper set of challenges, games can be used to assess almost any kind of knowledge and skills. However, if the competency framework for the area that is to be assessed doesn't exist, it takes a considerable amount of time and effort to create a consistent competency profile. This is especially true when different levels of competence/skill are to be evaluated.

The game's tasks and challenges need to be directly related to the knowledge or skills being tested to ensure a valid measure of the skills/competencies it intends to assess. They also need to be formulated in a way that is related to the experience and living/working circumstances of the prospective players.

Effective feedback mechanisms are crucial in game-based assessments. The game should provide timely and constructive feedback to players, helping them understand their performance and areas for improvement and keeping them motivated at the same time.

Games in Training

First, each assessment also has a training effect, at least if the results of the challenges are given to the person who did the assessment. However, this only points out which challenge was answered right and what was wrong and maybe even shows the correct answer. More information is necessary for proper training, and it cannot usually be distributed during an assessment.

Training games can target very different skills or knowledge. Every simulator experience is a game in a certain way, and it could be used to train specific skills up to the most complex skill sets and even mindsets, like pilot training.

Combining a traditional board game with online learning content, as we did in our *DigiUp* game, offers the chance to engage immediately older adults because of the familiar setting. Playing this kind of game recalls favourable memories within the participants and has the positive side effect of fostering social interaction and communication.

Finding a perfect balance when creating the gaming rules proved to be a lot of work for this kind of game. However, using some ideas and principles from well-known games as a starting point for your creation could save some time and significantly improve the set of rules.

The placement of the learning content needs to be considered very carefully. For certain simpler topics, one option is to place the material you want to train the players on the board or some game elements like playing cards. However, a presentation outside of the learning game might be more suitable for more complex stuff.

We decided, for instance, to put them into an online learning platform and linked specific learning modules to challenges on the game board via something we called "bridging cards". This way, the gameplay stays uninterrupted because the playing and learning process are separated. At the same time, this concept keeps the training connected to the gameplay and the performance of each player.

When designing the game board and additional elements, avoiding visual overload and confusion is crucial. Instead, clear and simple symbols should be used that are consistent throughout the game. Standard rules of user-friendly design apply.

Conclusion

Games can be serious tools for assessment and training. They offer certain inherent advantages over more traditional approaches.

Andragogic principles emphasize the importance of self-directed learning and its relevance to the learner's experience. Both can easily be met with a game-based approach.

Games have proven to be accepted by older adults and keep them engaged and motivated.

Designing a game-based assessment and a gamified blended learning environment for older adults requires thoughtful integration of andragogical strategies, technological accessibility, motivational aspects, and support mechanisms tailored to their unique needs. By addressing these considerations, educators can create an engaging, effective, and supportive learning experience that enhances digital competencies among older adults.

OUR APPROACH AND GENERAL OBSERVATIONS

The project is about tackling digital change in a playful way by developing digital readiness, resilience and capacity. The concept of gamified blended learning was implemented in a combination of an analogue board game and digital challenges.

Our project targets people 55 and older who have low digital skills. We focus particularly on competence areas 1 (information and data literacy), 4 (security), and 5 (problem solving) of the _EU DigComp framework_.

Our aim was to develop methods and tools that are easy to use and attractive for trainers in adult education. At the same time, our project shows how serious games can bridge the gap between the needs and attitudes of our target group. The first result is the game-based assessment of existing digital skills using the game model _Infinity.net_. The second result is the working model of gamified blended training/learning _DigiUp_. Both models can be adapted and translated to national or cultural contexts. As we have distributed the work and responsibilities among all partners during development, we have already found common denominators in the content. The project is innovative for all partners for different reasons. It brings the gamified approach to a new use case, not just using games but creating new games. In this sense, the games developed are also an invitation to create games yourself.

Project meetings in Giulianova and Stralsund

The attractiveness of a game and the ease of accessibility when playing reduce barriers to learning. The interactivity is motivating. The plan not to separate joyful play from the learning exercise/experience has worked. We learnt that the game models encourage people to take part. One of the spontaneous feedbacks during the test games was: "I know more than I thought at the beginning." As it was a new, innovative approach for all partners to combine the analogue and digital worlds, we started with the LTTA game development/design. For one week, we learned intensively about game mechanics, game principles, and game design, and we chose concrete competences within our three selected areas of expertise. We looked for story-telling forms for competences that are attractive for use in the game. It was a very fruitful week, resulting in 3 set-ups of an assessment game. Then, we crystallised the attractive elements of the three models from the abundant material and summarised them in the *Infinity.net* game model.

The next step was to test the game with its mechanics and game elements and fine-tune the assessment questions. The evaluation model of the possible answers was a particular challenge. The most important realisation was the complexity of the abundant material. So the motto was: Keep it simple! Simple rules/logic, not so many details! Working on the design of the game was not only educational for us, but we also enjoyed it ourselves. How to realise the digital challenges, how to design the "fun", how to create the "reward" for the tasks (cards, points), and how to control the interaction of the players to involve every player equally. And, of course, how to finalise the playing field and the elements themselves.

After testing the games with the target group, we analysed the results and feedback. The concept of taking the form of traditional board games as a starting point was confirmed by our test players. We reflected on the results and experiences from the assessment game *Infinity.net* from two points of view, one regarding a game mechanic for an educational game and the other regarding the possible presentation of the learning content to be conveyed within the game.

This resulted in the working models for the *DigiUp* learning game, which combines the idea of the competition (being the first to reach the finish line) with learning questions in several difficulty levels, digital tasks via QR codes and bridging cards to the learning content. The claim of the game *DigiUp* as an educational game led us to the decision to have the game played with a game master (trainer).

Test-playing and fine-tuning the game with the target group confirmed our original approach. The game was a joy to play, and at the same time, playing physically together enabled a direct exchange between the players on the topics of digital skills, which surprised all parties, although it was, of course, hoped for.

The game *DigiUp* can be played as a more comparative game, emphasising rewards and support between players. However, it can also be played more as a purely educational game with an emphasis on the individual learning content (via the bridging cards). It is attractive even with just two players.

We have sought out and created game models that are specifically geared towards the digital skills we have selected. However, the models can be wonderfully tailored to other learning content. This means they can be flexibly adapted to your content. The availability of tailor-made learning opportunities is even more important for the target group of our project than for the rest of the population.
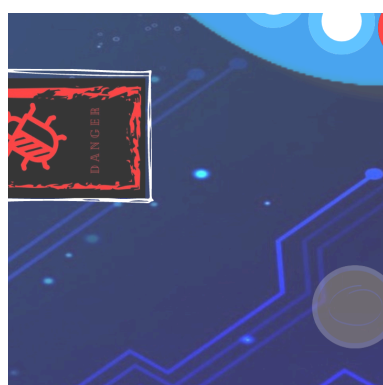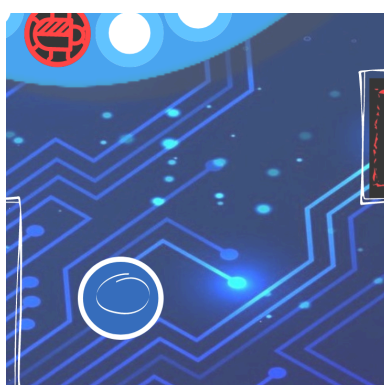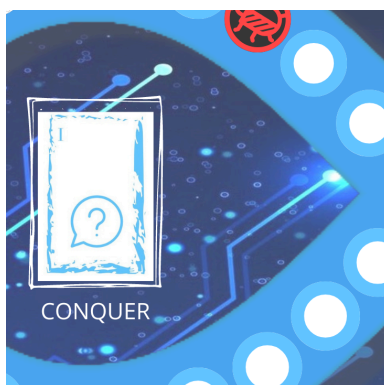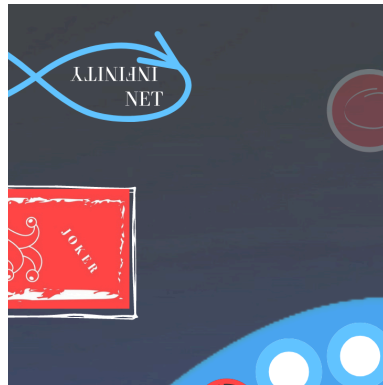

Testing sessions in Germany, Turkey and Serbia

BOARD GAME FOR SKILLS ASSESSMENT – DESCRIPTION, GAME INSTRUCTIONS, TESTING RESULTS AND LESSON LEARNED

Infinity.net
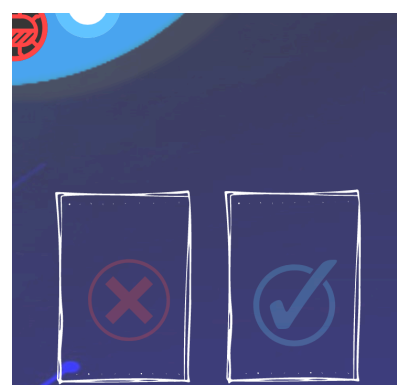
Short Description of the Game

The game is designed to make the assessment of the digital skills for the audience over-55s with low digital propensity. The focus was particularly on 3 of the 5 areas of the DigComp framework:

- Information and data literacy
- Security
- Problem solving

Considering our target group, in setting the learning goals, it was decided to focus on the first three proficiency levels of DigComp.
The basic idea is to assess the level of the players' digital knowledge through a game-based pathway. With the help of this game, the digital skills of 2 or 4 players can be determined in an entertaining way. Existing knowledge is tested by means of playing cards in three difficulty levels and a separate icon board. By adding more cards, other competence areas or difficulty levels can easily be modified and added accordingly.

Description of the Game *Infinity.net*

The *Infinity.net* game has Monopoly-like scenarios and cards with questions that must be answered correctly for the player to advance in the game. The *Infinity.net* gameboard is in the shape of the mathematical symbol for infinity "∞" in the ratio 75 × 60 cm. The gameboard consists of the following fields (see Figure 1.)

Game Instructions

32 conquer/attack fields (white circle fields)
2 wi-fi fields,
4 debug-zone fields
1 tele-transport field
1 hacker field
1 joker field
1 start centre field

On the gameboard, there are 4 spots to place 4 decks of cards (see Fig. 2.):
1 deck of conquer cards (set of 45 easy questions cards)
1 deck of attack cards (set of 45 intermediate questions cards)
1 deck of debug zone cards (set of 30 advanced questions cards)
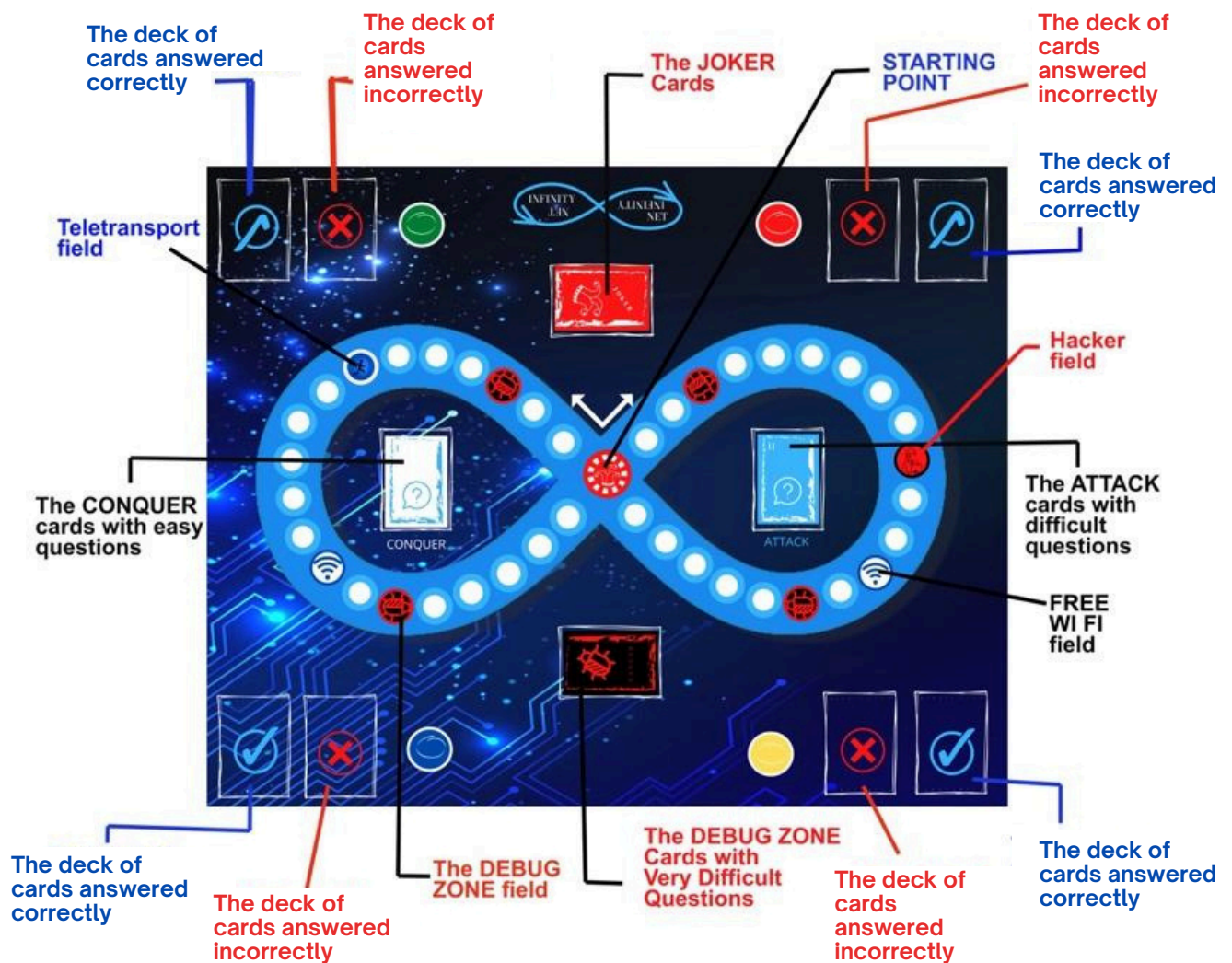1 deck of joker cards (set of 8 free of questions cards)

Figure 1: The *Infinity.net* gameboard design

Each player places the game totem identified by a selected colour, which can be red, blue, green or yellow, on the centre of the gameboard with the joker hat symbol (See Figure 1.). The players then start to roll a classic dice (with numbers from 1 to 6) to move through the fields on the path. The goal of the game is to conquer 8 fields on the gameboard. The player who first conquers 8 fields, finishes the game. To complete the challenge of conquering the 8 fields the following scenarios must happen:

TO CONQUER: When a player lands on an empty white field, the player can decide to conquer the free white field (this is a field that has not been conquered by any other player yet). To conquer the free white field, a player must pick a card from the CONQUER CARD DECK and answer the question that is written on the back of the conquer card. If the player answers it correctly, the field is now conquered, and a player has to mark it with his/her own game colour. If a player's answer is incorrect, then a player cannot conquer the free white field and must play in order to reach the next field to conquer. The questions written on the card address some knowledge of digital competences.

Testing session in Italy and Spain

TO ATTACK: When a player lands on the conquered field, i.e., it has been already conquered by another player, then the player can decide to "attack" the conquered field. In this situation a player has to pick a card from the ATTACK CARD DECK, and answer the question that is written on the back of the attack card. If the player answers the question correctly, he/she can re-take the "conquered" field and mark it with his/her own colour (red, blue, green or purple). The attack card deck consists of more difficult and advanced questions than the conquer card deck. The cards with correct or incorrect answers are placed on each player's corner of the gameboard (See Figure 1.) but they are open when the player reaches the next field.

DEBUG ZONE: These fields are penalty fields and they cannot be conquered by a player. On the contrary, if the player lands on the "debug zone" field, a player must answer a question chosen from the DEBUG ZONE DECK. The Debug Zone are the cards with the most difficult questions. They are the penalty questions. If the questions are answered correctly, a player can continue the round, if answered incorrectly, the player must wait for another round and try to answer the next less-advanced question. The cards with correct or incorrect answers are placed on each player's corner on the gameboard.

WI-FI FREE ZONE: If a player lands on the Wi-Fi FREE ZONE field, he/she can conquer the field without answering any questions. If the field has already been conquered, the player attacks it without a question, so the player removes the other player's colour and put his/her own colour in its place.

TELETRANSPORT FIELD: From this field the player can switch to any field to conquer or attack except WIFI FREE fields.

JOKER FIELD: Once a player sets in this field, he gets one Joker Card. This card has two possible options shown with different icons: Security card - keep it in order to use when you set in a Debug Zone field in order to avoid questions, Fire card - you can keep this card and use it to remove the tokens of other players around your figure position and one a player sets in this field can choose the direction of the next figure position between the two possible options shown in the arrows (right and left).

Summary

During the game each player has to answer the questions from the conquer or the attack card deck. If the player's answer is correct, the player places the card on the "right field", if the answer is incorrect, the player places the card on the "wrong field". The "correct" and "incorrect" fields are shown in the corners of the gameboard with a "right" and "wrong" symbol. When one player has conquered 8 fields, the game is finished. At the end of the game, each player reviews his/her collection of cards. All the questions from the decks of cards address some topics from the digital skills that were tested. The number of the cards that is answered correctly provides information of the players' digital skills and their level of knowledge. The advantage of the *Infinity.net* game is that allows the difficulties of the questions to be changed and the level to accommodate the levels of different players.
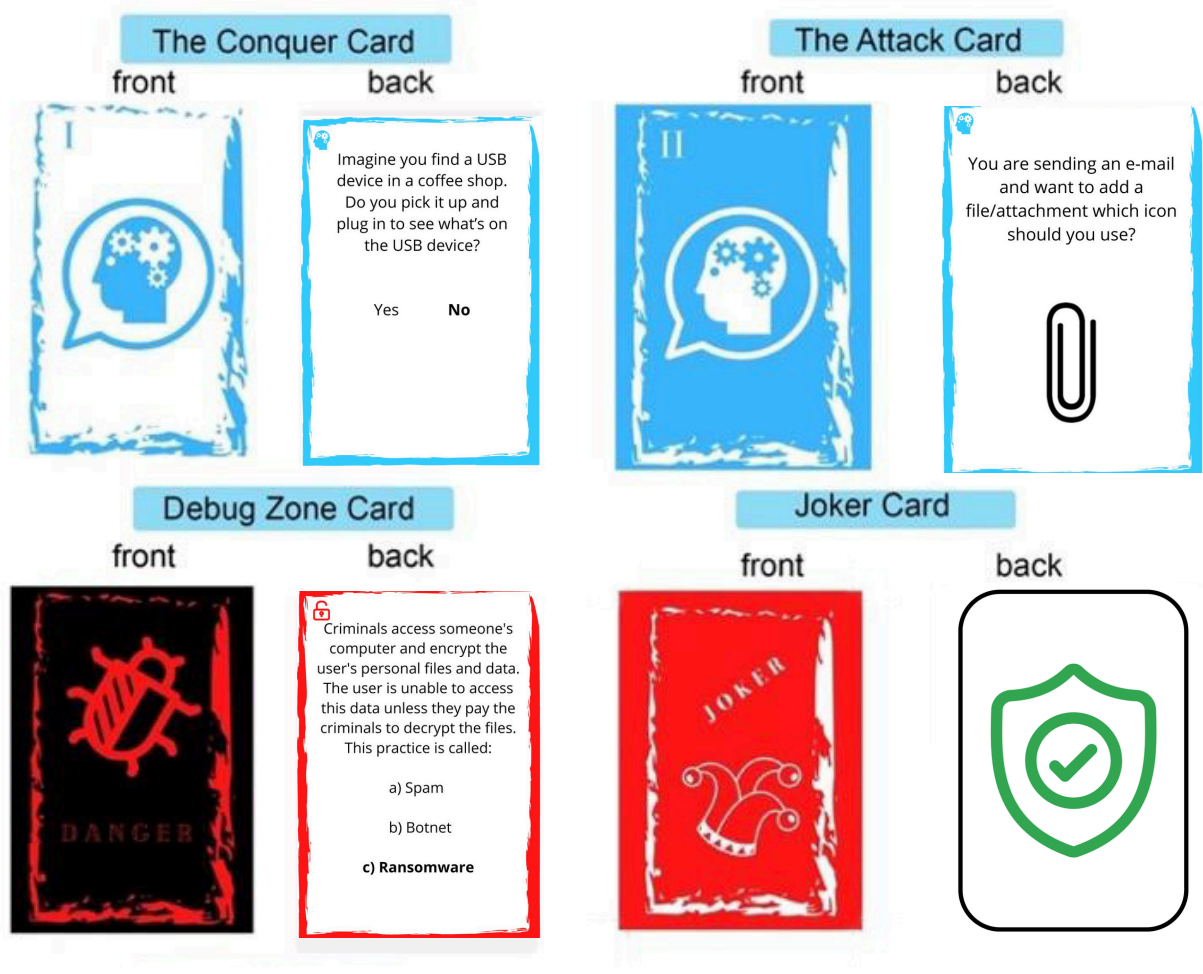
Figure 2: The samples of the Questions Card Decks of *Infinity.net* game

The Results of the Game Testing

Infinity.net game was tested by 72 adults. Namely:
- 8 adults in Germany (2 trainers involved)
- 9 adults in Italy (1 trainer involved)
- 4 adults in Spain (1 trainer involved)
- 12 adults in Slovenia (3 trainers involved)
- 11 adults in Serbia (1 trainer involved)
- 8 adults in Ireland (1 trainer involved)
- 16 adults in Latvia (2 trainer involved)
- 4 adults in Turkey (1 trainer involved)

Results and Insights from Participants

The study took place at a facility as designated by each partner which had a clear secluded area which only contained the people involved in the experiment: the players, a gamemaster/moderator, a person that explains the game, interacts with the participants and guides them during gameplay, and an observer, a person that does not interact with the players but makes observations and takes notes as to how the game is progressing.

Feedbacks from Trainers

The trainers have difficulty with the participant with low background digital knowledge, because, they have difficulty to adapt to the rules of the game and the questions of the game as well. While the focusing on explaining the game rules to the participants with low digital skills, other participants lost their motivation in continuing the game.

Testing session in Turkey

LESSON LEARNED

Technical Issues

Loop direction - Playing the game on a loop board was distracting. These distractions occurred always at the beginning of the game and sometimes during the game as a participant would ask where to go now while approaching the center field. It was noted that they expected to play in linear directions as all board games that they ever played had this feature. A notable story example was when a grandad explained playing Snakes and Ladders with his grandson which is a game that moves pieces all over the board, but the direction is always implied.

Positive/negative placeholders - There were two issues noted with the placeholders for positive/negative cards on the board.
- The first observed issue was that after one positive and negative card would be placed in their spot, it was not easy to figure out where to place the next card as the signifiers were now covered.
- The second issue was the sequence of the positive/negative placeholders as they are different on the left side of the board vs the right side of the board. Instead of having one on the left and one on the right we have the positive on the outside and the negative on the inside of the board.

Attack/conquer cards labels - When the cards are placed in their positions, players on one side of the board cannot understand what cards are Attack and what cards are Conquer as the label is obscured by the cards. They were also looking for a label on the card itself, just like there is a label on the other two card types.

Board size - As the printed size of the board is 75 x 60 cm, during gameplay with 3 and 4 users it was discovered that smaller board sizes are inconvenient as they influence comfortability during gameplay.

Teleport field - The original "no purpose" idea as a feature for the Teleport field turned out to be purposeless as participants were expecting some sort of action to be initiated on each field.

Debug zone - This field was disliked by most users as they found it difficult to count the rounds of absence.

Gameplay Issues

Complexity - In general the game rules were seen as complex. Most gameplay issues were related to the game rules which were either not remembered or misunderstood. The complexity issues are further supported by the significance of the game master role. While initially planned only as an experiment-only role, the results showed that the game would not be playable without the presence of such a person.

Score keeping - There was some confusion in keeping score. While the number of pieces on the board is an indicator of who is winning, the participants were wondering how that relates to the positive/negative card slots on the board.

Question length - Participants identified questions to be overly long as most had to reread multiple times before they could be answered. This does not include the questions with icons which were found to be most effective.

Question ratio - The ratio of questions across difficulties was not well suited to actual gameplay as it was distributed at a ratio of 70:20:10 between levels 1, 2 and 3.

Knowledge vs skill - In this game the knowledge player will always dominate and win. While winning/losing is not the important aspect for us as observers, the losing player would easily lose motivation to play the game as it would be almost immediately obvious who is going to win. The element of chance should be more present, thus allowing the concept of luck to have a more significant influence on gameplay.

Icon board - Having a separate board with icons was awkward for participants. They were wondering why there were no icons on the cards.

Testing session in Slovenia

Game Play Questionnaire

The mixed results of the Gameplay Questionnaire (GPQ) reflect the findings in the observation and post-game interview results. The GPQ is a subjective gameplay experience measure based on the theoretical framework of self-regulated learning which identifies four factors that might influence players' enjoyment in video games: enjoyment, autonomy, competence, and intuitive controls.

The score was lowest for competence (3.17), as players did not feel overly confident and capable of solving problems within the game, thus indicating that the game was not only challenging, but also overwhelming. Regarding autonomy, the score of 3.94 indicates that the players' perceived degrees of freedom or number of choices in the game was somewhat restricted. The players also had issues with the ease of which they can learn to play the game intuitively, as the score for Intuitive control was 3.63. All of these scores affect game enjoyment which is a strong indicator of how likely are the users to engage into future play of the game.

Conclusion

In its current form, the *Infinity.net* board game presents a solid base for further iterations. The significant amount of user tests discovered a myriad of issues, which, when addressed, could provide an improved version that is easier to play, more enjoyable and addresses assessment more closely.

Testing session in Germany

BOARD GAME FOR EDUCATION – DESCRIPTION, GAME INSTRUCTIONS, TESTING RESULTS AND LESSON LEARNED

DigiUp
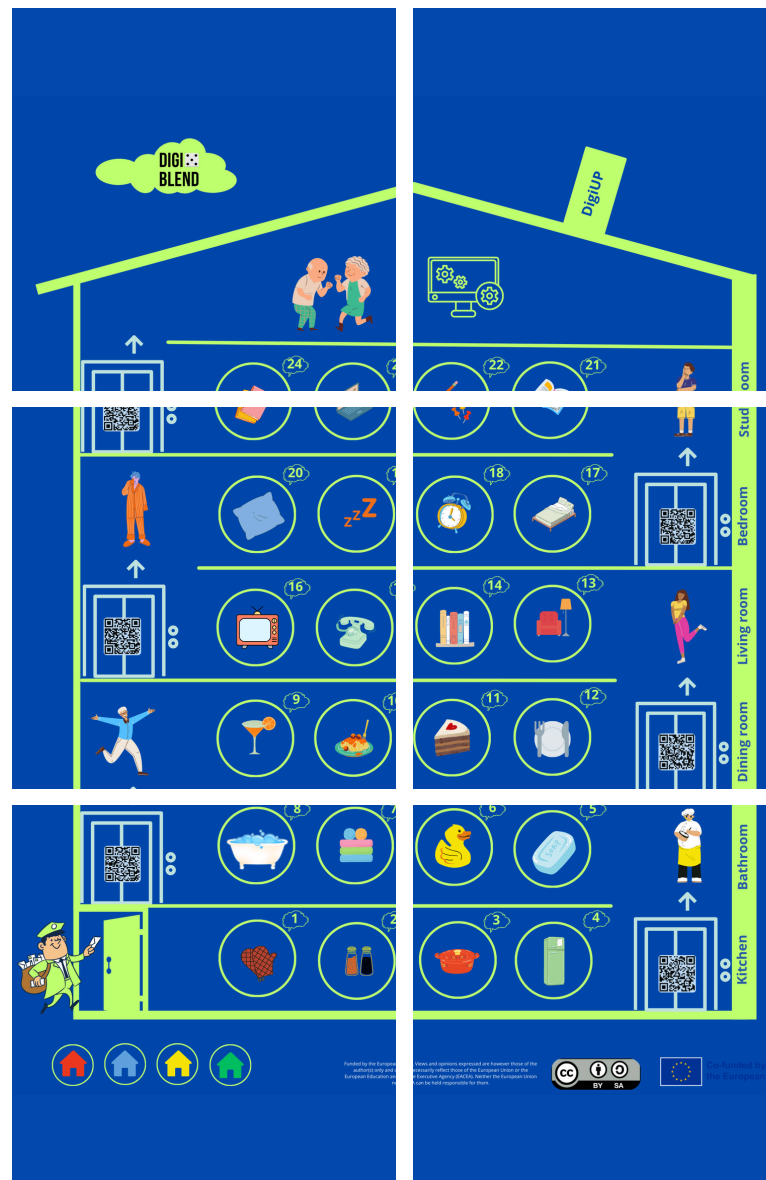
Short Description of the Game

The game *DigiUp* is designed to develop the digital skills of individuals over 55 with low digital knowledge. The focus is particularly on three of the five areas of the DigComp framework:

- Information and data literacy
- Safety
- Problem-solving

When defining the learning goals, we considered our target group and adhered to DigComp's first three proficiency levels.

The basic idea is to develop these skills through a game-based pathway. By interacting with each other and addressing the proposed challenges, the participants can gain a meaningful learning experience on topics linked to these three areas.

The Narrative Structure of the Game

The narrative frame of the game is designed to introduce the target group to the experience they will be going through. It starts with a simple sentence:

"ARE YOU DIGITAL ENOUGH TO TAKE CARE OF YOUR GRANDCHILDREN?!!"

Your son told you he would like you to take care of his babies (your grandson and your granddaughter) for one month since he has to leave for work reasons. But he is sceptical because the babies use many digital devices (at school, for homework, in their spare time at home), so they need to be controlled a bit. And your son thinks you don't have enough digital knowledge and competences to control them. He says, "It's better to call a babysitter". But you want to prove you are good enough for this "digital task". So, he proposed a test about digital literacy, safety and problem-solving topics to test your digital competences.
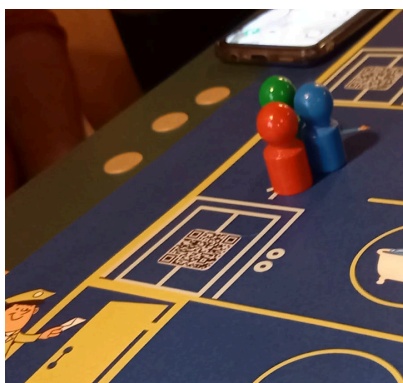
During the game, players will participate in a competition where they have to overcome several challenges related to digital topics. They must be able to go through six rooms in the house. Each room contains four "traditional steps" and a final "digital step".

- In the kitchen and the living room, they find challenges related to the *Information and data literacy* competence area of the DigComp framework;

- In the bathroom and the bedroom, they find challenges related to the *Safety* competence area of the DigComp;

- In the dining room and study room, they find challenges related to the *Problem-solving* competence area of the DigComp.
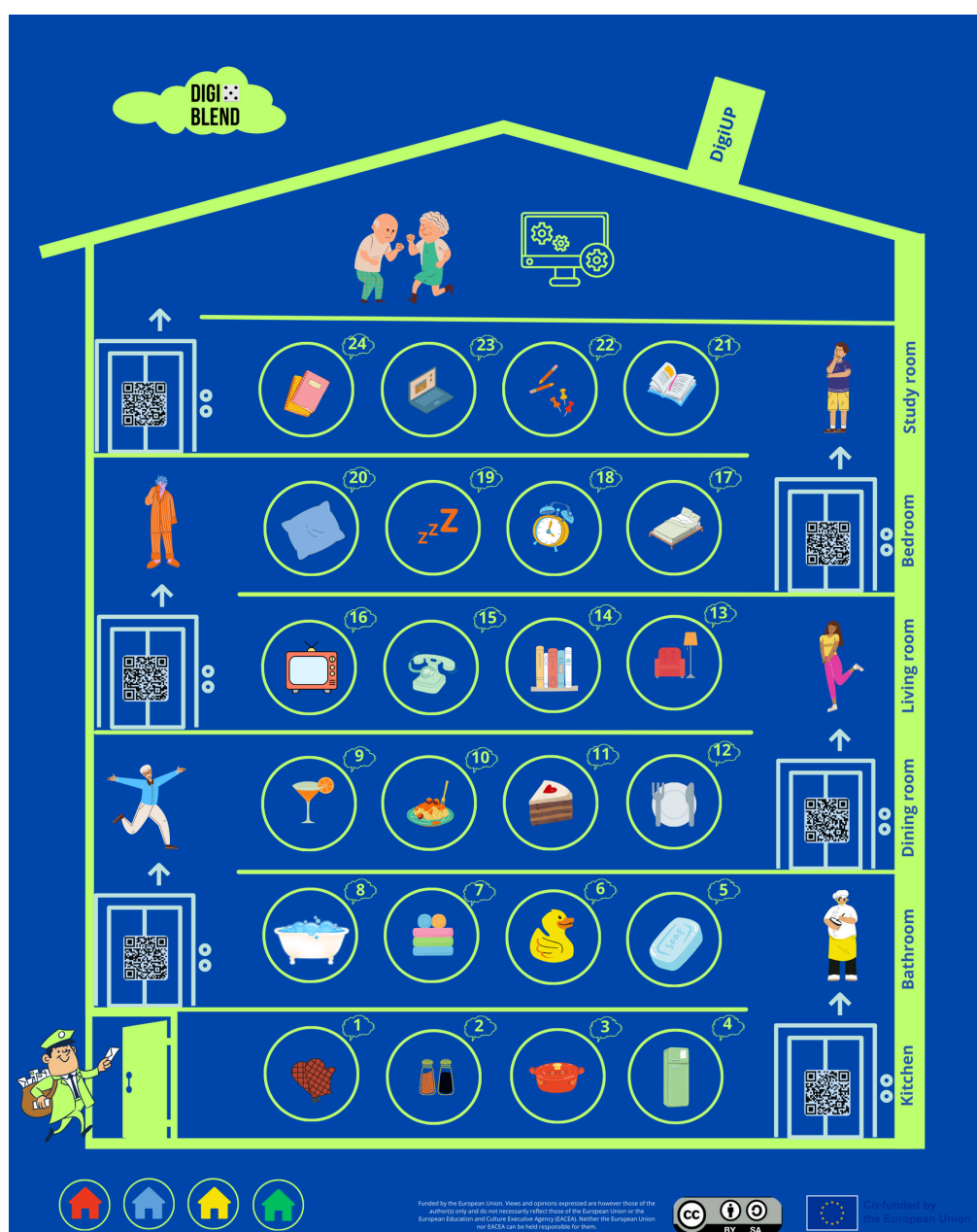

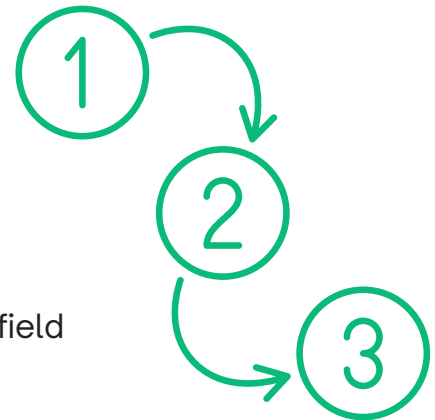Figure 3: The *DigiUp* gameboard design

Game Instructions

Game content:
- 4 x figures (blue, yellow, green, red)
- 1 x game board

Structure:
- 6 levels with four question fields and a QR code field

Question book:
The game comes with a booklet for the trainer who facilitates it. It contains questions for the players, which have three different difficulty levels.

Depending on the difficulty, the player may move his figure a certain number of spaces.
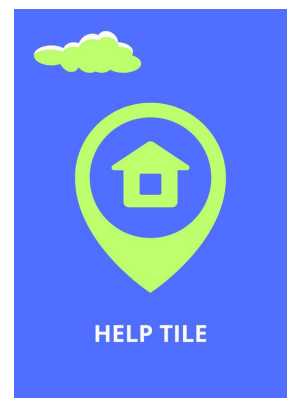Level 1 -> 1 step
Level 2 -> 2 steps
Level 3 -> 3 steps

12 x help tiles:
Each player may only have a maximum of three help tiles.

The help tiles can be used in the following situations:
- Ask a fellow player for help solving a field task.
- Pass over the QR field with another player
  if the player cannot independently solve the QR field task.

Used help tiles must be returned to the game host.
If a player has used all three tiles, the trainer gives the player an additional help tile whenever he/she wants it, but the player must go one field back whenever he/she requests a new help tile.

After passing each QR field (i.e. getting to a new floor), the player can replenish the help tiles.

Game preparation:
Each player chooses a figure of her/his choice and receives three help tiles.
Each player places her/his figure on the starting square.
Roll the dice to determine who will start playing first, and then it is each player's turn clockwise.

Gameplay

Placing the figure:
The player whose turn it is and who is standing in front of a question field chooses the difficulty level of the question.
After hearing the question, the player can choose whether to:
- answer it alone, or
- use a help tile.

- Answering the question without a help tile:

If the player answers the question correctly, she/he may advance the number of spaces the question is worth.
If the player answers the question incorrectly, she/he stops and chooses a new question in the next round.

- Answering the question with help tiles:

If the player needs help answering the question, she/he asks a fellow player of her/his choice for help. The selected player has to respond.

Attention: Players whose figure is on a QR field (i.e. "in the elevator") cannot be asked for help.
If the answer is correct, both players may move forward by the number of squares the question is worth.
If the answer is wrong, both players remain standing.

QR fields
The QR fields are mandatory fields at the end of each level.
If a player's number of possible steps exceeds the distance from the playing figure to the QR field, the figure is placed on the QR field, and all steps beyond it are forfeited.

If it is a player's turn to stand on a QR field, she/he must solve a digital task.
Once she/he has done this, she/he may place her/his figure in front of the first question field on the next level. From there, she/he continues as usual in the next round.

The figure remains on the QR field if the player cannot solve the task.
The player now has two possibilities to move on:

- If the player has at least two help tiles, she/he uses two of them to ask for the help of the next player who solves her/his digital task and moves up to the next level with her/him.
- If the player has less than two help tiles, she/he may only place her/his figure in front of the first question field of the next level when all the other players have passed the QR field on which her/his figure is standing.
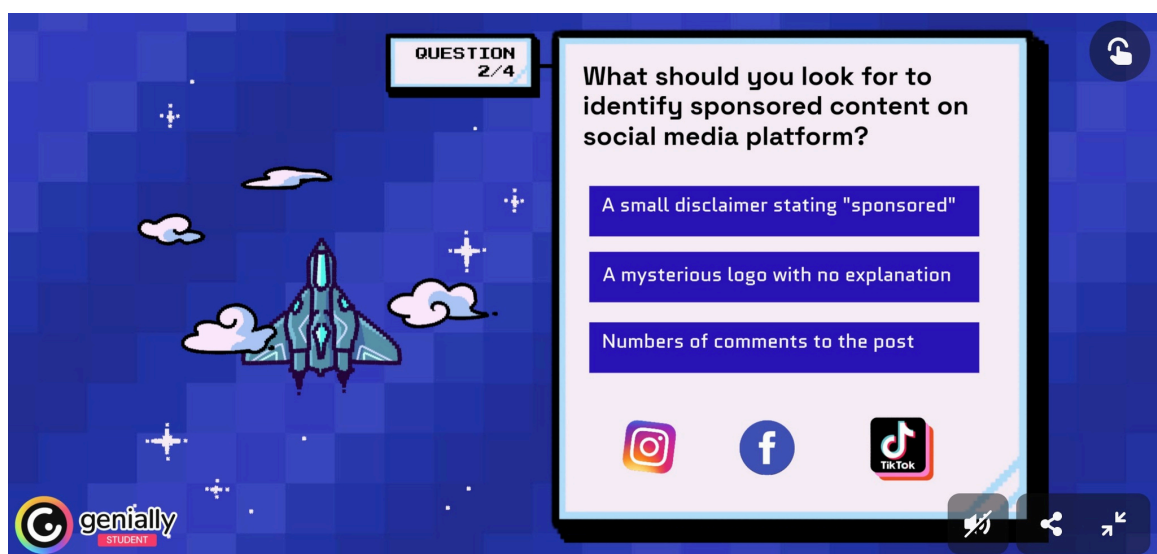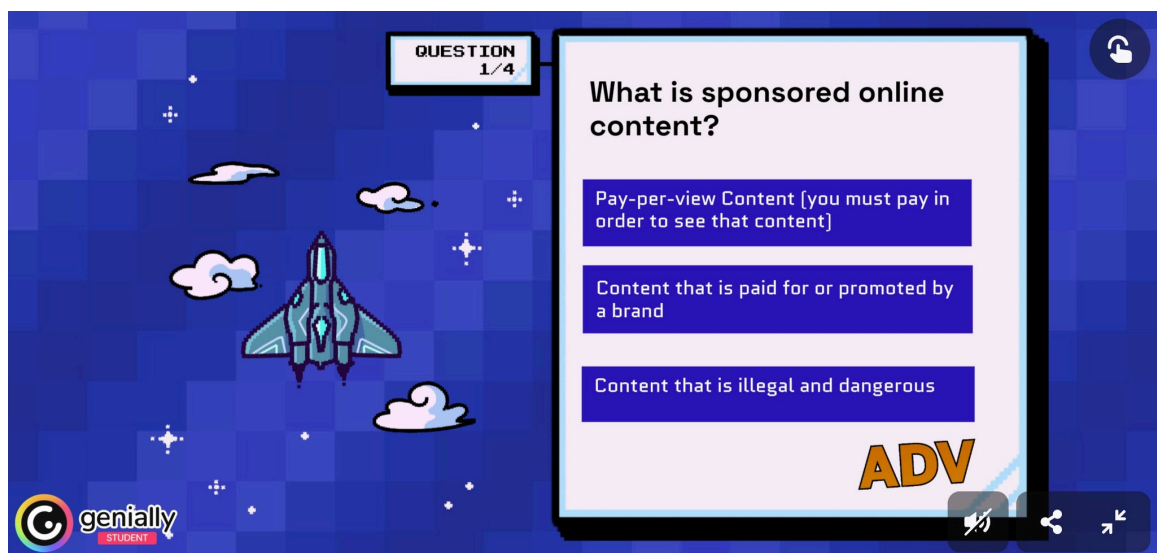
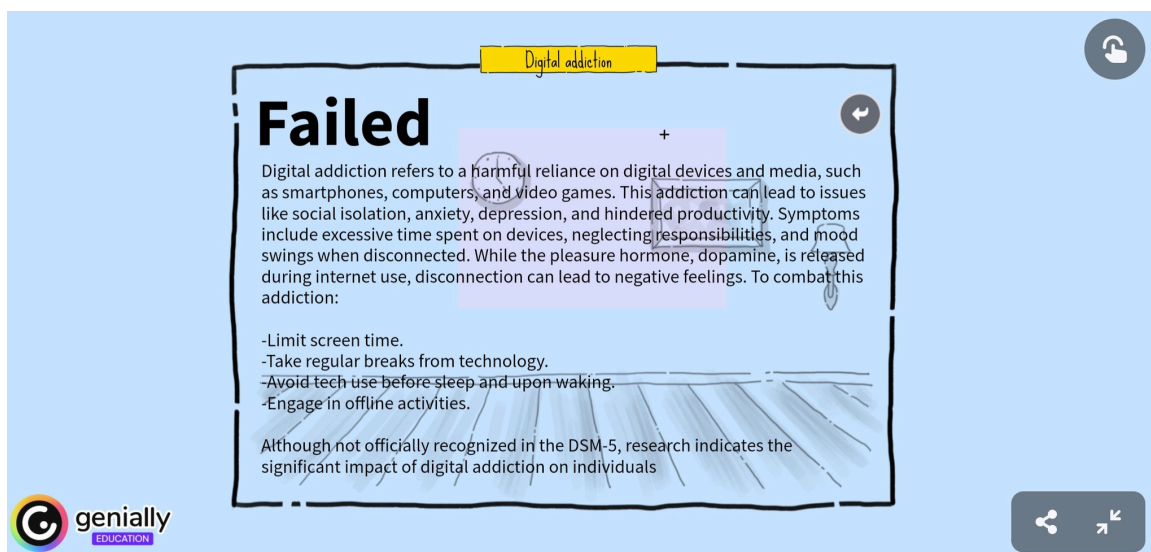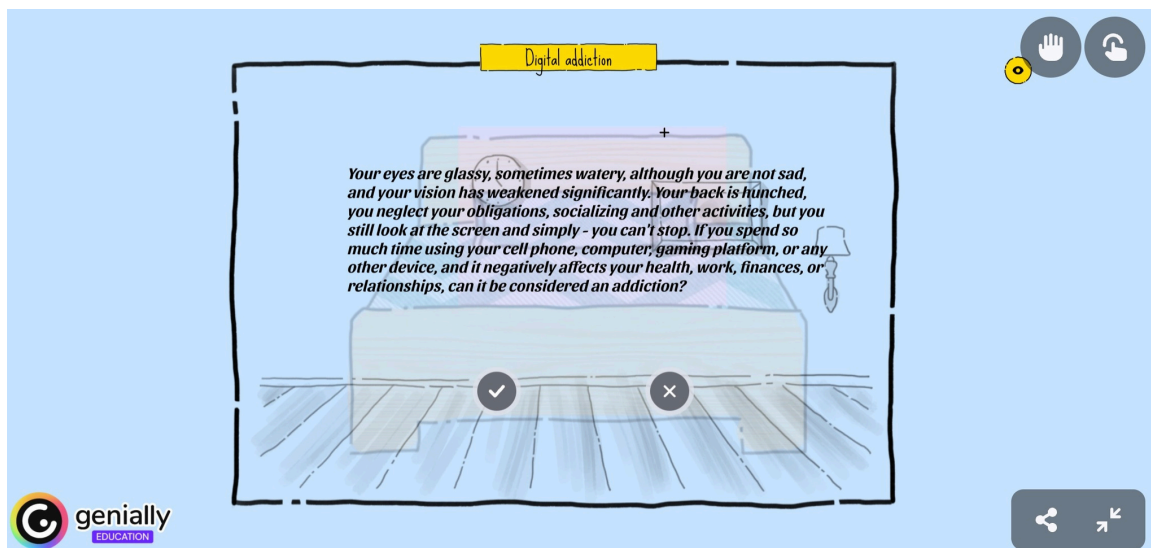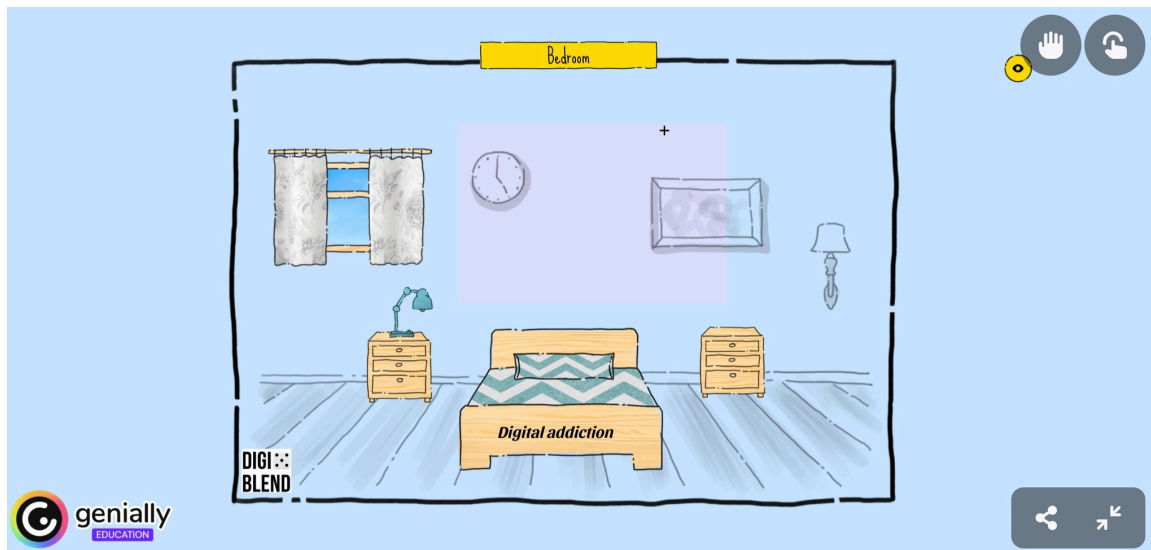Figure 4: Screenshots of a digital task, room - Kitchen

Figure 5: Screenshots of a digital task, room - Bedroom

The *Infinity.net* game includes 24 bridging cards that direct players to additional learning materials on digital topics. Each card features an introductory picture or statement on the front and a QR code on the back that links to the learning material. While reviewing these materials during the game session is not mandatory, players are encouraged to read them at home. This approach emphasizes that the game is part of a comprehensive process to enhance digital knowledge and skills, engaging players in a blended training pathway.

LOST IN TRANSLATION

Do you speak...?

Learn more about translation tools with our learning material #23.

https://digiblend.eu/en/learning-module-23/

23   **23**

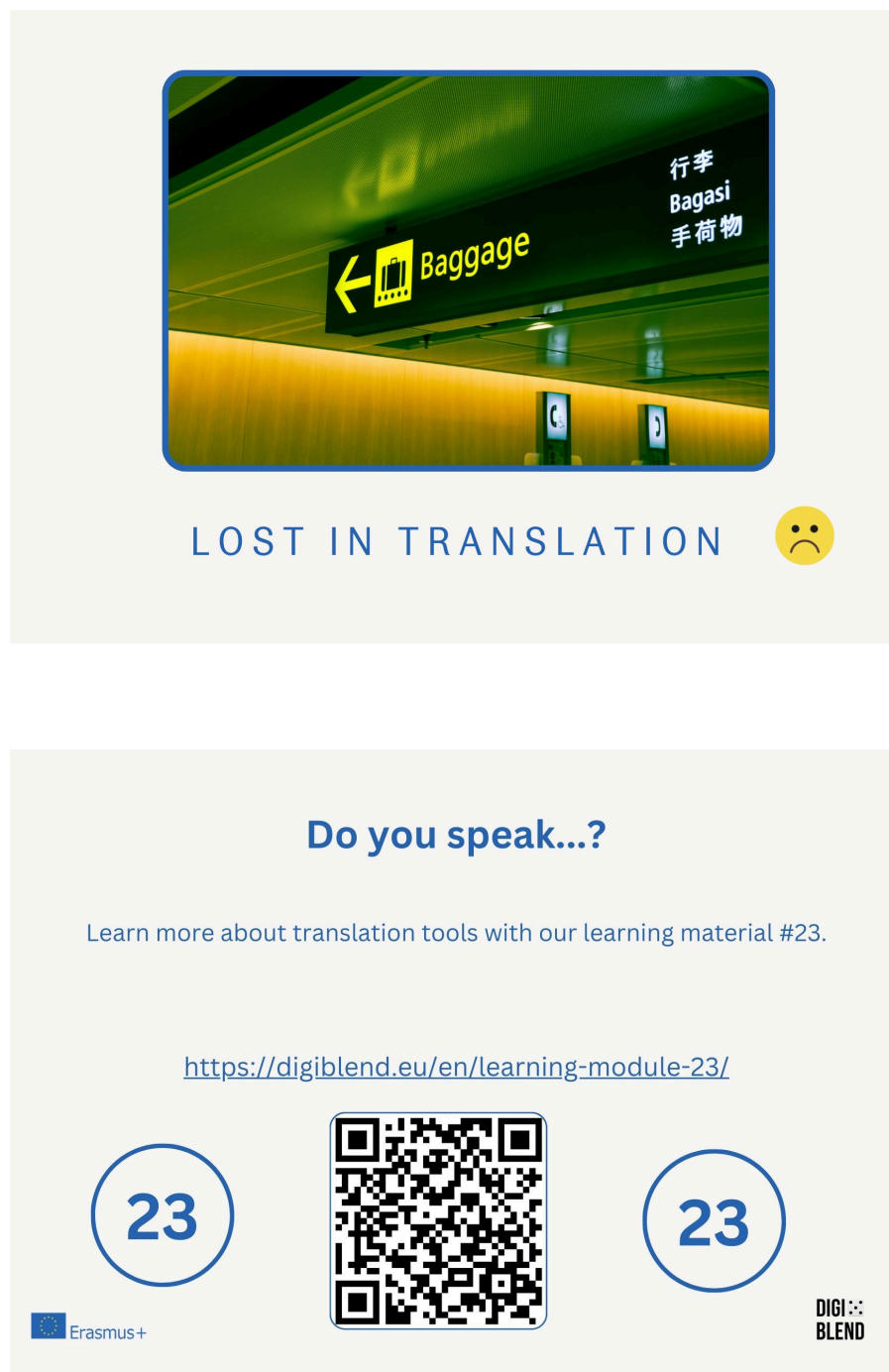Erasmus+   DIGI BLEND

Figure 6: The *DigiUp* bridging card

End of the game

The first player to solve the last digital task wins.
If two or more players reach the top of the building within the same round, the player with the lowest number of bridging cards wins. If two or more players arrive there within the same round and have the same number of bridging cards, the dice is thrown, and the player with the highest number wins.

The Results of the Game Testing

DigiUp was tested by 60 adults. Namely:
- 16 adults in Germany (3 trainers involved)
- 8 adults in Italy (2 trainers involved)
- 4 adults in Spain (2 trainers involved)
- 5 adults in Slovenia (1 trainer involved)
- 6 adults in Serbia (1 trainer involved)
- 5 adults in Ireland (2 trainers involved)
- 12 adults in Latvia (2 trainers involved)
- 4 adults in Turkey (2 trainers involved)

Results and Insights from Participants

The multiple-choice questions (provided to participants before and after the test) show a slight improvement in the participants' answers. In most cases, they gave the same answer (correct or incorrect) both before and after the test. But in some cases, the *DigiUP* experience helped them answer correctly the second time after they had answered incorrectly the first time.

The self-assessment questionnaires (provided to participants before and after the test) show that they feel more comfortable about their knowledge and competences in general after the experience with *DigiUp*. The most significant improvement is in problem-solving, while the improvement is almost undetectable in information and data literacy.

Feedbacks from Trainers

Trainers found the game very stimulating and generally had no problems leading it. They found the game very stimulating for the participants' attention and curiosity. They especially appreciated the game's dynamics, which stimulated interaction among participants and led to valuable co-reflecting and peer-learning experiences.

Lessons Learned

- The game is a bit too long. It takes time to complete the game, especially in a match with four players. In this case, the concentration of players tends to decrease. Participants don't like to play a game that takes too much time.

- The game is quite complex, with many components to consider. In some cases, this factor tends to demotivate participants who have greater difficulty understanding all the dynamics of the game

- Interaction among the participants turns out to be one of the most valued components of the game. The possibility of asking other players for help stimulates a very positive interaction and improves the atmosphere of the match. Furthermore, the shared reflections at the end of each challenge lead to continuous interaction and exchange of ideas among the participants, facilitating the dimensions of peer learning and mutual learning.

- The game's structure divided into two sessions has two different impacts: on one hand, it creates some logistics problems. On the other hand, it allows participants to reflect on the first session and come back prepared for the second session, which generates a trigger effect in some participants.

- The learning content is an additional part of the game and is generally appreciated. Although it was too long for participants to read during the game sessions, they appreciated some of the explanations and insights they could find there.

- Digital challenges with QR codes are generally appreciated, but they have occasionally created minor discomfort and lapses in concentration for some participants.

- Traditional challenges with open questions have sometimes led to disagreements among participants, a slowing down of the game, and lapses in concentration. Usually, participants prefer multiple-choice questions.

CONCLUSIONS & RECOMMENDATIONS

The DIGIBLEND project aimed to enhance digital literacy among older adults through innovative gamified blended learning methods. Over the project's duration, we developed and tested two game-based learning models, *Infinity.net* and *DigiUp* — designed to assess and improve digital skills in a playful and engaging manner. This final chapter of the Guidelines summarizes the key findings, insights, and recommendations derived from the project.

All project results, including reports, outcomes, and developed games, will be accessible on the project's and Erasmus+ project results websites.

Summary of Key Findings

1. **Engagement and Motivation:**
   - Both *Infinity.net* and *DigiUp* games successfully engaged older adults, motivating them to participate actively and enjoy the learning process.
   - Using familiar board game elements combined with digital challenges effectively reduced anxiety and increased participants' willingness to learn.

2. **Skill Improvement:**
   - The games facilitated noticeable improvements in digital skills, particularly in problem-solving.
   - Participants reported feeling more confident in their digital abilities after playing the games.

3. **Interactivity and Peer Learning:**
   - The games encouraged significant interaction among participants, fostering a collaborative learning environment.
   - Peer assistance and shared reflections during gameplay enhanced the overall learning experience and promoted mutual learning.

4. **Challenges and Adaptations:**
   - The complexity and duration of the games posed challenges, with some participants finding them too lengthy or difficult to follow.
   - Simplifying game rules and reducing the length of sessions can improve accessibility and maintain participants' concentration.

5. **Feedback from Trainers:**
   - Trainers found the games to be valuable tools for engaging participants and maintaining their attention.
   - The role of the trainer as a game master was crucial in guiding the sessions and ensuring a smooth learning experience.

Recommendations

1. **Simplify Game Mechanics:**
   - Simplify the rules and structure of the games to make them more accessible to all participants, particularly those with lower initial digital skills.
   - Consider breaking down the game into shorter, more manageable sessions to maintain engagement and concentration.

2. **Enhance Learning Content:**
   - Incorporate more interactive and multimedia content to cater to diverse learning preferences and keep participants engaged.
   - Provide concise, easy-to-understand instructions and materials to avoid overwhelming participants with information.

3. **Promote Peer Learning:**
   - Encourage more peer-to-peer interaction and collaboration during gameplay to leverage the benefits of mutual learning.
   - Include activities that require teamwork and communication to solve digital challenges.

4. **Provide Ongoing Support:**
   - Ensure continuous support and guidance from trainers to help participants navigate the games and understand the learning content.
   - Offer follow-up sessions or additional resources for participants to practice and reinforce their newly acquired digital skills.

5. **Adapt for Diverse Contexts:**
   - Customize the games to suit different cultural and national contexts, ensuring relevance and inclusivity.
   - Translate game materials into multiple languages to reach a broader audience.

Conclusion

The DIGIBLEND project has demonstrated the effectiveness of gamified blended learning in improving digital literacy among older adults. By addressing the challenges and building on the successes identified, future projects can further enhance the impact and reach of such innovative educational approaches. The journey towards closing the digital divide continues, and with the right tools and strategies, we can empower older adults to thrive in the digital age.

Through our research and testing of both the *Infinity.net* and *DigiUp* board games Erasmus partners have made some interesting observations about the many applications of the DIGIBLEND project. While our content centres around digital literacy the concept of our games can be adapted to many other contexts such as financial literacy, health literacy and language learning. The questions that make up the gameplay can be changed from those focusing on digital literacy to take in many areas of learning. The benefits of increased motivation, creativity, teamwork, and memory building that gaming facilitates can be translated beyond the remit of digital literacy once the gameplay remains the same, but questions and content are adapted for whatever subject matter is being taught.

All partners involved in the DIGIBLEND project recognize the potential to scale the *Infinity.net* and *DigiUp* board games. These innovative games are seen as powerful tools for achieving various learning objectives related to digital literacy, guided by the DigComp competences.

For instance, LOETB plans to develop a certified program with Quality and Qualifications Ireland (QQI) based on these games for their learners. The goal is to integrate these games into their curriculum to create a comprehensive educational experience that enhances digital literacy. This initiative reflects a broader commitment among all partners to leverage gamified blended learning methods to improve adult digital literacy.

It is also essential to highlight the diverse nature of the organizations participating in our DIGIBLEND project, which has contributed greatly to its overall success. Our partners encompass a wide array of sectors, from those specializing in project management and labor market integration to those offering state-funded education programmes. Additionally, our collaborators include institutions focused on cultural and youth engagement, as well as those dedicated to academic research. This broad spectrum of expertise and focus enriches the project and fosters a comprehensive approach to implementing gamified blended learning. This diversity of input into the project shows how transferable it is to multiple audiences.

The advantages of gamified blended learning, as exemplified in DIGIBLEND, are numerous and impactful for learners. We have witnessed these benefits firsthand through our testing and feedback from learners. We have seen how gamified blended learning is a powerful tool that not only makes education more engaging but also equips individuals with essential skills for navigating daily life and enhancing their employability. By integrating game elements with traditional learning, it fosters a comprehensive skill set that meets the demands of modern life and the evolving job market.

The DIGIBLEND project has demonstrated the effectiveness of gamified blended learning in improving digital literacy among older adults. By addressing the challenges and building on the successes identified, future projects can further enhance the impact and reach of such innovative educational approaches. The journey towards closing the digital divide continues, and with the right tools and strategies, we can empower older adults to thrive in the digital age.

The following tables and illustrations provide a visual summary of the recommendations for creating both analog and digital games using game mechanics.

Mechanic	Description	Example
Point System	Award points for tasks	Points for correct answers
Levels of Difficulty	Multiple challenge levels	Easy, medium, hard questions
Help Tiles	Assistance tiles	3 tiles per player
Progression Path	Clear board path	Move pieces based on answers
Randomization	Elements of chance	Dice rolls for movement

Table 1: Analog Game Mechanics

Mechanic	Description	Example
Adaptive Learning	Tailored challenges	Adjust difficulty by performance
Immediate Feedback	Instant performance feedback	Explanations for answers
Multimedia Integration	Use of videos and animations	Illustrate concepts with media
Leaderboards	Display rankings	Show top performers
Achievement Badges	Milestone rewards	Earn badges for tasks

Table 2: Digital Game Mechanics

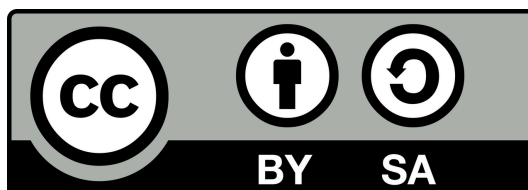## Recommendations for Creating Analog and Digital Games

Step-by-Step Instructions:

Step	Analog Games	Digital Games
1. Define Objectives	Identify the educational or entertainment goals. What skills or knowledge should players gain?	Identify the educational or entertainment goals. What skills or knowledge should players gain?
2. Select Game Mechanics	Choose suitable game mechanics (e.g., point systems, levels of difficulty, help s).	Choose suitable game mechanics (e.g., adaptive learning, immediate feedback, multimedia integration).
3. Design Game Content	Develop game content, including questions, tasks, and scenarios aligned with the objectives.	Develop game content, including interactive modules, challenges, and multimedia elements aligned with the objectives.
4. Create Game Components	Design physical components such as boards, cards, tokens, and figures. Ensure clarity and accessibility.	Develop digital assets such as user interface, animations, and interactive elements. Ensure user-friendly navigation.
5. Develop Rules and Instructions	Write clear and simple rules. Include instructions on how to play and how to use help tokens.	Write clear and simple rules. Include instructions on how to navigate the game, use tools, and access help.

Step	Analog Games	Digital Games
6. Test the Game	Conduct initial testing with a small group to identify issues and gather feedback.	Conduct initial testing with a small group to identify issues and gather feedback.
7. Refine and Improve	Make necessary adjustments based on feedback. Simplify rules if needed and ensure components are user-friendly.	Make necessary adjustments based on feedback. Simplify user interface if needed and ensure digital elements function smoothly.
8. Implement in Real Settings	Introduce the game to the target audience in educational or community settings. Provide guidance and support.	Launch the digital game on suitable platforms. Provide tutorials and support for users.
9. Gather Feedback and Evaluate	Collect feedback from players and trainers. Evaluate the game's effectiveness and make further improvements.	Collect feedback from players and trainers. Evaluate the game's effectiveness and make further improvements.

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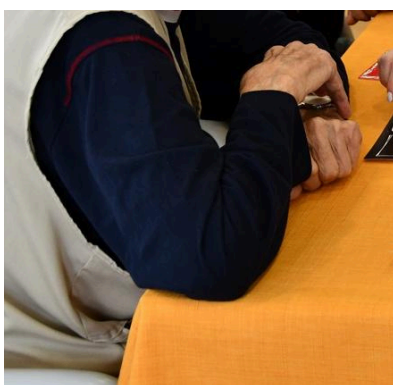
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