GEMMA

SERIOUS GAME FACTORY

Co-funded by the European Union

GEMMA

Activity A4.9 (Game implementation)

Trials results

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1. About the project

The **GEMMA** Project (**G**ame-based learning for **E**nhancement of new skills using **M**icro-**M**OOCs for **A**cademic staff) is a project funded by the Erasmus+ programme of the European Union, under Key Action 2, specifically focused on innovation in Higher Education (KA220-HED). The target population includes academic staff, ranging from doctoral candidates in training to tenured university professors, as well as all professionals working in the field of scientific research. GEMMA aims to develop innovative educational tools specifically designed for this target group, namely mini-MOOCs and a Serious Game (SG).

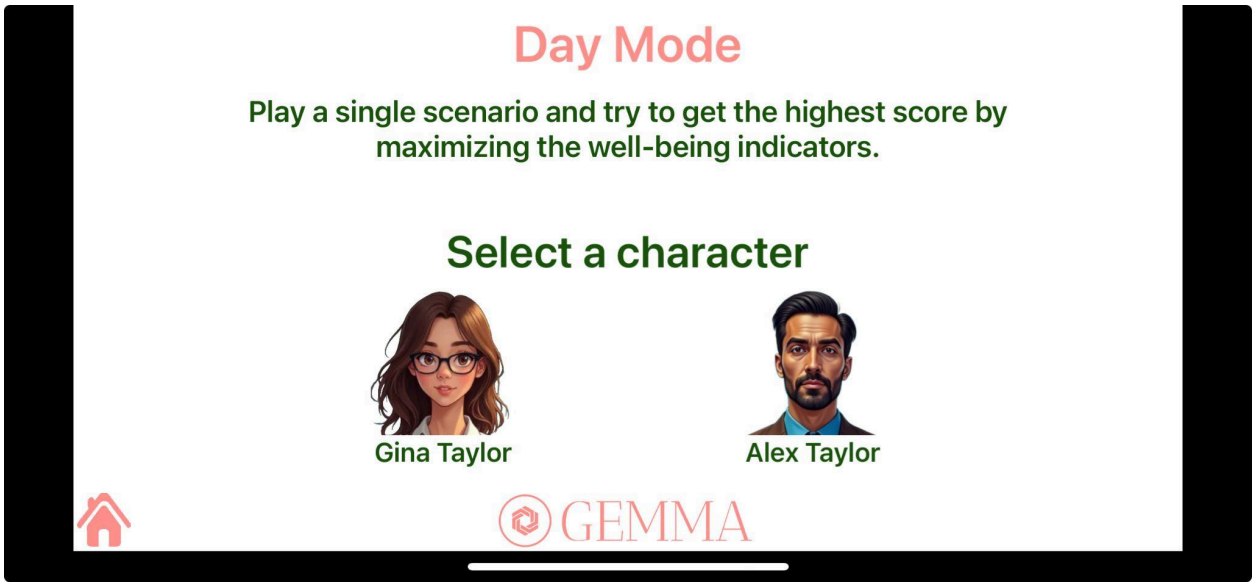
The learning objectives are cross-cutting and focus on **digital, entrepreneurial, and life skills**. In practice, GEMMA seeks to provide academics and research staff with tools and good practices that promote a better work–life balance, by implementing strategies and emerging technologies suited to the post-pandemic era, which began five years ago.

The degree of **originality and innovation** brought by the GEMMA project is developed along four main lines: 1. Integration of content within the three skill areas identified by the European Union: digital, entrepreneurial, and life skills; 2. Didactic innovation through the game-based learning (GBL) approach; 3. Creation of an online course open to the academic community (MOOC, which stands for Massive Open Online Course); 4. Co-creation approach in the development of project outputs, primarily the GEMMA Serious Game, which will be integrated into the MOOC and co-created by the project partners.

GEMMA is a **user-centered project**: the researcher is not only the target audience but also a co-designer of the project outcomes. Specifically, in relation to this document, academic staff have been actively involved in every phase of the implementation of Work Package 4 (WP4), which focuses on the **development of the GEMMA Serious Game**: from its initial design and conceptualization, to the co-creation of scenarios, and finally the trial phase that enabled the game's final implementation. The SG, delivered as an application for smartphones and tablets, is one of the project's main outputs, alongside the didactic framework and the MOOC course aimed at transferring knowledge and skills related to work-life well-being management in academic contexts. The final output consists of operational guidelines for GEMMA's end users/learners.

This report refers to **project activity A4.9**, assigned to the partner Serious Game Factory SRL (Italy), concerning the implementation of the GEMMA video game. In particular, this report presents the data and considerations emerging from the trials carried out on various versions of the video game during its development, with a focus on usability, content quality, and perceived effectiveness.

The **trials were conducted in the partner countries** with a large number of participants, involving students from specialized courses, PhD students, postdoctoral researchers, university teaching staff, academic staff, and researchers. The game content features real-life and simulated cases, allowing players to reflect on common challenges and recurring issues in the academic workplace. Through its interactive design, the game enables learners to make choices in different scenarios by embodying a playable character, selected from two different avatars.



The **trials showed that** the SG had a mostly positive impact on users during the testing phase of the beta version of the application. Most users did not report any necessary changes regarding the visual design, playability, or storytelling, describing the game as engaging and aligned with the MOOC content. The trials were aimed at providing valuable feedback to the developer in order to improve the product throughout its design process. Overall, given the positive user/learner feedback, it can be stated that the SG successfully fulfills its intended purpose — serving as a tool for knowledge acquisition and practical application of the GEMMA content. Through its simulation-based and role-playing approach, the SG allows participants to experience in

practice the theoretical concepts conveyed in the MOOC. The data presented in this report offer a valuable foundation for deeper reflection on the SG as a product and pave the way for future developments, particularly in terms of adaptability, accessibility, and transferability. The tool also shows potential for alternative applications beyond those originally identified in the initial project proposal.

2. Overview of Trials for Serious Game Implementation: outlining, execution, feedback

The aim of the SG trials was to gather an **overview of the following parameters**:

a) feasibility of the game;

b) recommendability of the game;

c) user engagement with the game;

d) perceived usefulness of the game.

These parameters collectively contribute to forming a final overall rating provided by the users/players, which serves as a quantitative indicator of the product's quality.

The trials were conducted in two phases:

- A **first phase (T_0)**, during which data were collected from users who evaluated only the non-digital version of the game scenarios;
- A **second phase (T_1)**, in which users downloaded and played the Serious Game app on their own devices and then completed an evaluation.

Data were collected from participants including postgraduate and PhD students, academic staff, and researchers. Participants were recruited across the five partner countries: Finland, Greece, Italy, Poland, and Spain. The overall data collection activity was coordinated by SGF, while each partner contributed to ensuring the successful implementation of the process in their respective country.

2.1. SG Trials

2.1.1. Aim

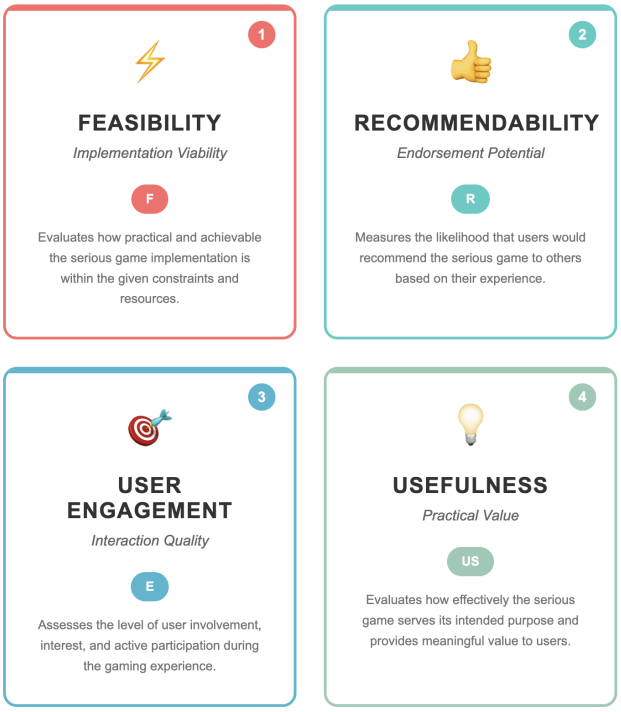
The main objective of the SG trials was to collect **qualitative and quantitative data** at two distinct stages: prior to the implementation of the game, based solely on the co-created scenarios (T_0); after the release of the beta version of the game on major online platforms (App Store and Google Play) (T_1).

The parameters observed during the trials (Tab. 1) primarily focused on:

1. Feasibility (F),
2. Recommendability (R),
3. User Engagement (E), and
4. Usefulness (US) of the SG.

SG Trial Measured Parameters		
#	**Dimension**	
1	Feasibility	How easy was the Serious Game to use?
2	Recommendability	Would you recommend the Serious Game to your colleagues?
3	User Engagement	To what extent would you be willing to play the entire Serious Game?
4	Usefulness	Overall, how useful was the Serious Game?

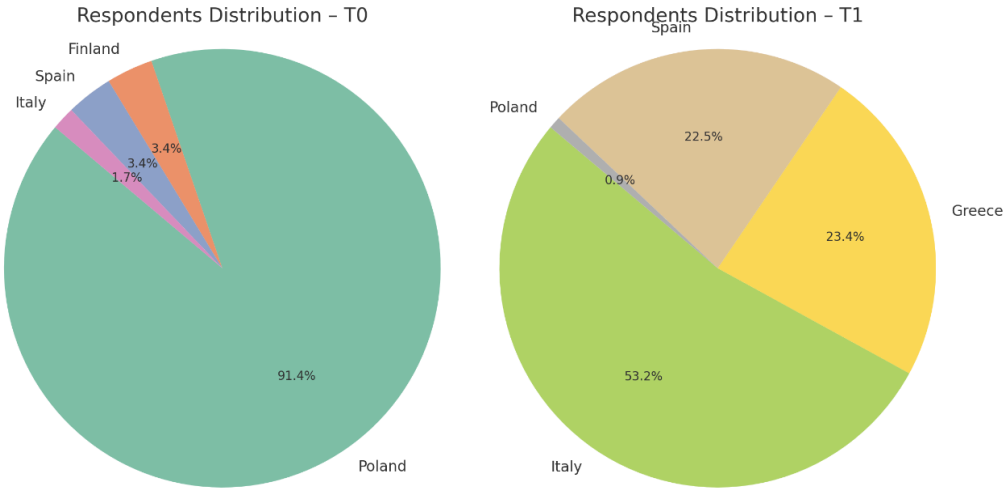
Table 1 - Objectives of data collection



2.1.2. Participants

The **trials involved participants** recruited by the staff engaged in the GEMMA project within each partner country, specifically within their respective university contexts, forming a non-probability sample. At T_0, there were **66** participants; at T_1, there were **222** participants, for a total of **288** respondents.

At T_0, the respondents were distributed as follows: **53** from Poland; **10** from Finland; **2** from Spain; **1** from Italy. At T_1, the respondents were distributed as follows: **118** from Italy; **52** from Greece; **50** from Spain; **2** from Poland.



2.1.3. Procedure

Participants were **recruited through convenience sampling** within the academic contexts relevant to each partner. Recruitment focused on advanced training courses, the departments affiliated with GEMMA project staff, and stakeholders belonging to the partners' academic networks. Data collection was carried out through two main strategies: sending a formal online invitation to academic staff and students potentially interested in participating; embedding the trials within structured training activities organized at the university premises.

At $\mathbf{T_0}$, participants were presented only with printed versions of the game scenarios, distributed in hard copy. At $\mathbf{T_1}$, participants received instructions for downloading and installing the GEMMA app on their Android or iOS devices.

All participants completed a **self-report questionnaire** consisting of 5 items, each rated on a 6-point Likert scale (Appendix 1). The items were designed to assess the four core dimensions evaluated in the trials (see Table 1), as well as to gather an overall evaluation of the SG. For the quantitative data analysis, means and standard deviations were calculated for each individual parameter.

The questionnaire concluded with an **open-ended question** to collect qualitative feedback: "What modifications would you suggest to improve the Serious Game?". Qualitative responses were analyzed using thematic analysis through the Voyant tools software. The data collected at T_0, especially the open-ended feedback, allowed the SGF team to further improve the app before its official release on digital stores. The data collected at T_1 are now being used for the preparation of final project documentation, as well as for future enhancements and developments of the GEMMA protocol.

The trials were conducted at each of the **partner institutions** participating in the GEMMA project, at different points in time. The tables below (Tab. 2; Tab. 3) provide a timeline overview of the two-phase data collection process:

Venue	**Date**	**Participants**
Universitat de Valencia (Spain)	16/05/2025	2 academic staff members
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	16/05/2025	1 academic staff member
Università degli Studi di Bari "Aldo Moro" (Italy)	16/05/2025	1 academic staff member
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	17/05/2025	1 academic staff member
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	23/05/2025	29 academic staff members
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	26/05/2025	1 academic staff member
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	28/05/2025	20 academic staff members
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	31/05/2025	1 academic staff member
Turun yliopisto (Finland)	03/06/2025	2 academic staff members

Table 2 - Phases of data collection at T_0

Venue	Date	Participants
Università degli Studi di Foggia (Italy)	24/05/2025	64 students from specialization courses
Uniwersytet im. Adama Mickiewicza w Poznaniu (Poland)	26/05/2025	2 academic staff members
Universitat de Valencia (Spain)	27/05/2025	1 academic staff member
Università degli Studi di Bari "Aldo Moro" (Italy)	27/05/2025	1 academic staff member
Università degli Studi di Bari "Aldo Moro" (Italy)	31/05/2025	9 academic staff members
IASIS NGO (Greece)	05/06/2025	9 academic staff members
Universitat de Valencia (Spain)	06/06/2025	5 academic staff members
IASIS NGO (Greece)	06/06/2025	4 academic staff members
Universitat de Valencia (Spain)	08/06/2025	1 academic staff member
Università degli Studi di Bari "Aldo Moro" (Italy)	11/06/2025	44 academic staff members
Universitat de Valencia (Spain)	11/06/2025	9 academic staff members
Universitat de Valencia (Spain)	12/06/2025	7 academic staff members
Universitat de Valencia (Spain)	13/06/2025	7 academic staff members
IASIS NGO (Greece)	13/06/2025	3 academic staff members
Universitat de Valencia (Spain)	14/06/2025	1 academic staff member
IASIS NGO (Greece)	16/06/2025	1 academic staff member
Universitat de Valencia (Spain)	16/06/2025	4 academic staff members
IASIS NGO (Greece)	17/06/2025	1 academic staff member
Universitat de Valencia (Spain)	17/06/2025	3 academic staff members
Universitat de Valencia (Spain)	18/06/2025	8 academic staff members
Universitat de Valencia (Spain)	19/06/2025	1 academic staff member

IASIS NGO (Greece)	20/06/2025	1 academic staff member
IASIS NGO (Greece)	21/06/2025	4 academic staff members
IASIS NGO (Greece)	22/06/2025	1 academic staff member
Universitat de Valencia (Spain)	23/06/2025	3 academic staff members
IASIS NGO (Greece)	23/06/2025	20 academic staff members
IASIS NGO (Greece)	24/06/2025	7 academic staff members
IASIS NGO (Greece)	02/07/2025	1 academic staff member

Table 2 - Phases of data collection at T_1

Below the **structure of the trial process** is described:

- At time T_0, the scenarios were presented to groups of individuals who had previously familiarized themselves with the GEMMA project, including its main contents, objectives, and expected outcomes.
- The qualitative and quantitative feedback gathered during the initial data collection phase—conducted via a questionnaire over approximately two and a half weeks (from May 16, 2025, to June 3, 2025)—proved useful for the developer in improving the scenarios for the beta release of the app.
- The beta version of the app was released on May 23, 2024.
- At time T_1, the questionnaire was administered to groups of participants who had the opportunity to test the beta version of the app by playing the character of Gina Taylor (one of the two available avatars), in Day Mode (Appendix 2).
- The data collected at T_1, from May 24, 2025, to July 2, 2025, allowed SGF to obtain both quantitative and qualitative feedback on the final product, useful for the future development of the application.

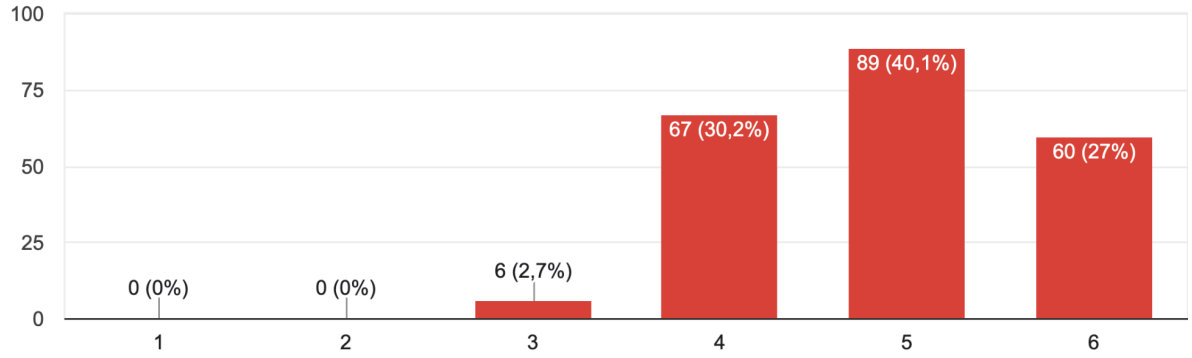
2.2. Data analysis

2.2.1. Results from the questionnaire: quantitative parameters on SG

The **post-trial questionnaire** on the beta version of the app was completed by 222 participants in total, from Italy, Greece, Poland and Spain.

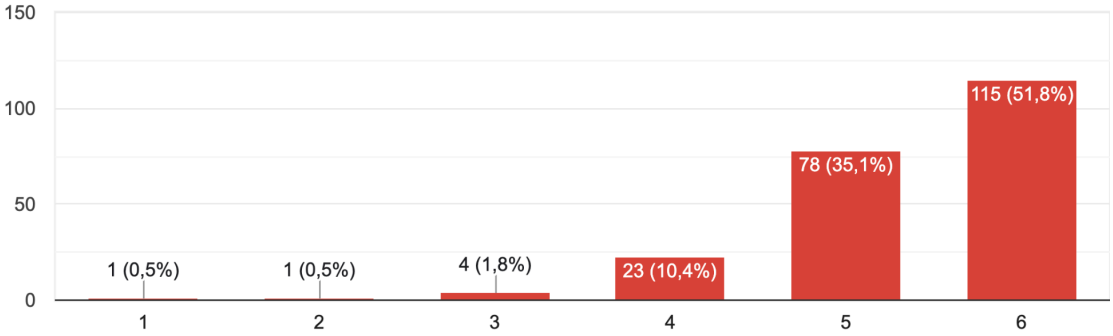
1. Overall Impression

The majority of participants rated the serious game as mostly positive (40.1%), with a mean score of 4.91 (SD = 0.82) out of a maximum of 6 on a Likert scale. The percentage of participants who evaluated the product negatively is zero. Overall, the serious game received positive evaluations (216 respondents).



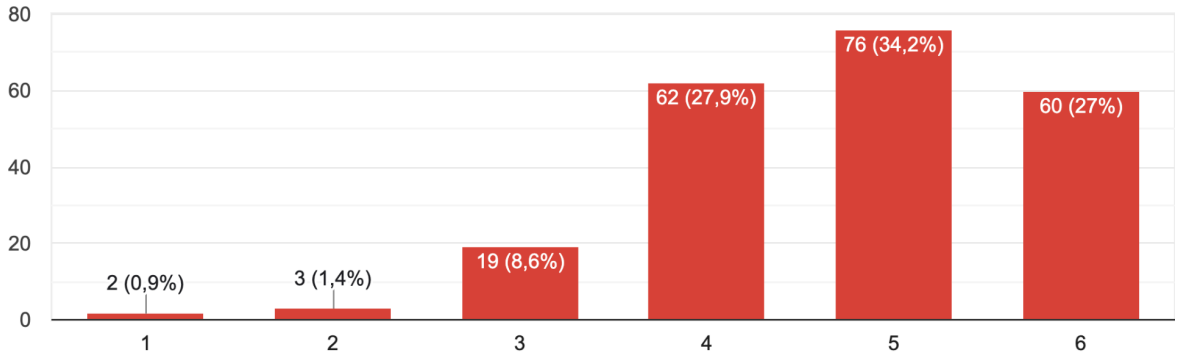
2. Feasibility

The majority of participants rated the serious game as easy to use (51.8%), assigning the highest score on the Likert scale, with a mean of 5.34 (SD = 0.83). Only two participants (1%) found the serious game “not at all” or slightly easy to use.



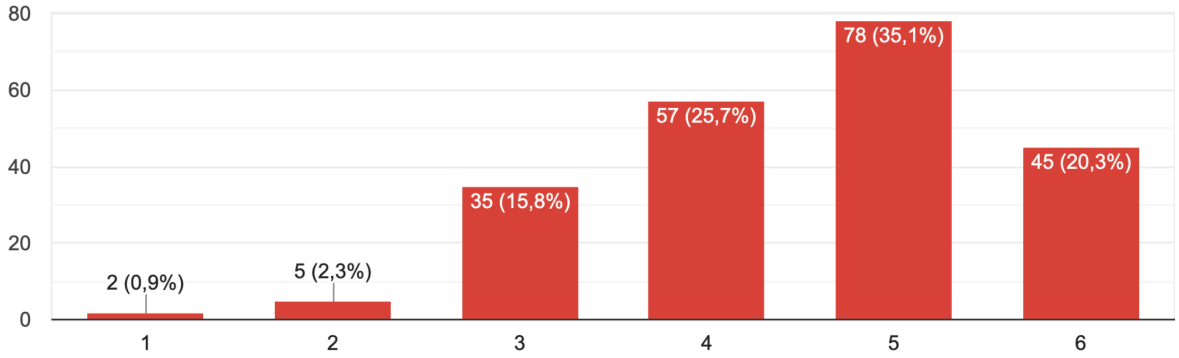
3. Recommendability

A total of 136 participants responded “yes” or “definitely yes” to the question regarding the recommendability of the product. Negative response rates remained low. The mean score is 4.74 (SD = 1.04).



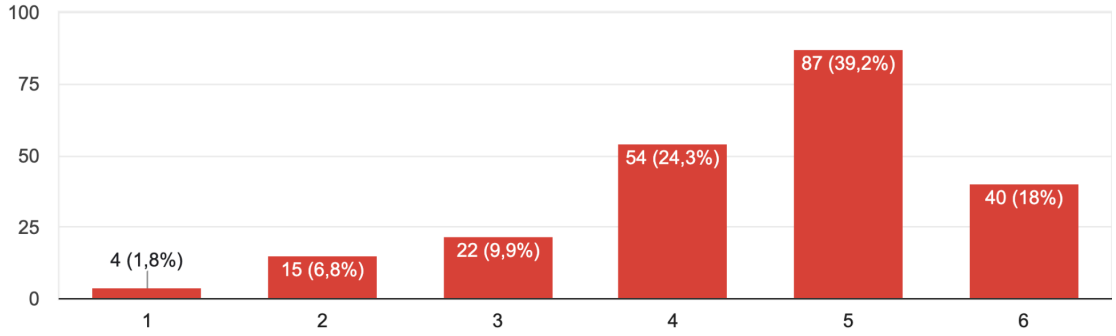
4. User Engagement

The majority of users reported being positively engaged by the game: approximately 80% of players indicated that they would like to play the entire game, selecting responses ranging from “probably” to “yes” and “definitely yes.” The mean score was 4.52 (SD = 1.10).



5. Usefulness

The final dimension investigated—perceived usefulness—shows the lowest scores, with a mean of 4.46 (SD = 1.19) on a 6-point Likert scale. Specifically, 41 participants rated the GEMMA app as not at all useful (1.8%), slightly useful (6.8%), or somewhat useful (9.9%).



2.2.2. Results from the questionnaire: qualitative feedbacks

The questionnaire administered to the players of the demo version ended with an **open-ended question**: "What modifications would you suggest to improve the Serious Game?". The question was included to collect qualitative data on the user experience. The responses were received in English, Italian, and Spanish. They were

therefore translated and subjected to thematic analysis using the Voyant software.

1. General Assessment

- Many responses (56) did not provide any suggestions (nothing = 18 occurrences; none = 14 occurrences; no suggestions/no changes/no modifications = 24);
- 26 participants chose not to answer the question;
- There were explicitly positive feedbacks ("it gives good answers that make you rethink the situation in a different way and learn"; "it's simple and interesting"; "it is easy to use");
- Negative comments were also present, some expressed as suggestions for future versions of the game ("More possible answers, including some with a more colloquial language to make interactions more spontaneous"; "I would add other situations to manage (e.g., pleasant activities like sports, reading, going out with friends...)"; "It is really easy for people to spoil the game by picking the answer they know will get the best score, even if it is not what they would do in a real setting or even believe is the correct response").
- No significant difficulties or complexities were reported.

2. Level of Engagement

- Some participants suggest modifications to make the game more engaging — it is perceived by some as "boring" (2 occurrences), "predictable" (3 occurrences), and

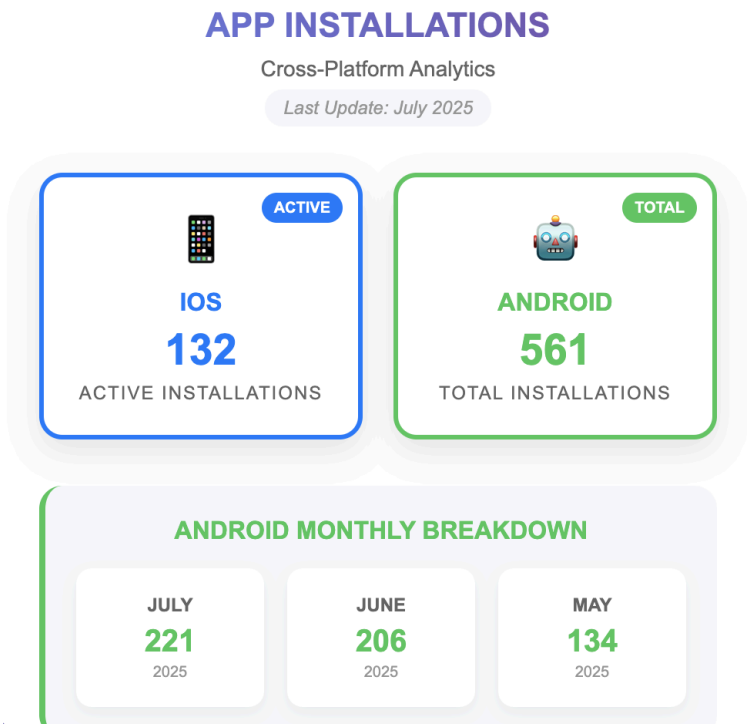
the game dynamics are described as "obvious" (6 occurrences), which makes the game less challenging;
- Some respondents propose to improve the graphics ("More appealing graphics");
- Other respondents (4) write that the user experience and game dynamics should be more "dynamic";
- Some users propose greater interactivity or authenticity ("I would like a little more interaction"; "Maybe to incorporate voice will be more real"), in one case suggesting that this could be achieved by enriching the scenarios ("More possible answers, including some with a more colloquial language to make interactions more spontaneous").

3. Technical issues

- Some users reported errors or technical issues, mainly concerning the linguistic aspect of the game and the interface, while there were no comments regarding gameplay mechanics or accessibility;
- Comments on language-related aspects, such as the amount of text or the quality of the translation: "The dialogues are perhaps too long and scattered. The Italian translation has some errors"; "there are errors in the Spanish translation";
- Comments on the interface or technical bugs: "Errors in the app-data not saved"; "In Day 1 there was an error, and the last scenario info was not presented. The text was the feedback about the previous scenario instead of the new scenario, but the different options of response were presented"; "It misses a back button to the previous slide";

2.2.3. App download: numerical indicators to evaluate app usage

As of July 2025, there are **132 active installations** on iOS devices. On Android devices, a total of **561 installations** have been recorded, including 221 in July 2025, 206 in June, and 134 in May. Notably, installation events on Android also include users from countries outside the official partnership, particularly Brazil (2.71% in July) and Turkey (7.24% in July).



3. Suggested revisions for the SG

The trials provided data to support both the **ongoing implementation of the app and the future development** of the GEMMA protocol. The suggestions collected from participants during the data collection phase related to the demo version of the app are summarized in the table below (Table 3).

Category	Suggestion
1. Graphics / Interface	1.1. Making the graphics more appealing
	1.2. Making the interface more pleasant
	1.3. Inserting audio or visual for involvement
	1.4. Distributing the space better
2. Game experience	2.1. Making the answers less obvious
	2.2. Entering more instructions in the game
	2.3. Improving the interactivity of the game and creating more authentic scenarios

3. Bug fixes and translations	3.1. Resolving errors reported by users and improving translations in various languages

Table 3 - Suggestions from participants

4. Conclusions

One of the main outputs of the GEMMA project is the Serious Game, designed to be integrated into the MOOC as both a **learning resource** and a **tool** to support the acquisition of the GEMMA contents. The trials conducted on the scenarios prior to the app release (T_0) and on the demo version of the app afterward (T_1) allowed us to evaluate the product and identify potential areas for improvement.

The data analyzed in this report are not without **limitations**: 1) they were collected from convenience samples; 2) not all trial participants completed the MOOC, although they did receive training on the project content; 3) the trials were conducted at different times due to logistical constraints. Despite these limitations, the collected data offer a valuable foundation for scientifically analyzing the "GEMMA Serious Game" phenomenon and assessing its impact, usability, and effectiveness among cohorts of academic staff or students in advanced degree programs.

The **main strengths** of the SG are: a) its ease of use, which increases the degree of technology acceptance and does not require specific digital skills; b) its relevance to the academic environment, making it highly recommendable among peers in the same field.

The **usefulness** of the app may not be immediately apparent; however, when embedded within a structured training program—including the MOOC and proper guidance on how to use the game—the tool gains greater significance and value. Moreover, as clearly evidenced by the qualitative data, the game could benefit from improvements in terms of interactivity and level of challenge, in order to make the experience less predictable and more engaging.

Overall, **the product is positively evaluated**, effectively meeting the project's objectives and aligning with the expected outcomes set during the proposal phase.

APPENDICES

APPENDIX I *Online questionnaire for SG trials*

1. Introduction

GEMMA Assessment Form SG - ENG

*After reviewing the demo of GEMMA **Serious Game**.*

Dear Participant,

As part of the GEMMA project, in which our university is a partner, we are collecting your opinions and feedback on its main results.

We kindly ask you to complete a short, anonymous questionnaire after reviewing one of the two key outputs of the project: GEMMA Serious Game. You can access the game by following the instructions provided by your instructor.

Thank you for your valuable contribution.

The GEMMA Team

2. Questions

After reviewing the demo of GEMMA Serious Game…

1. What is your overall impression of the Serious Game?

1 = Very negative
2 = Mostly negative
3 = Somewhat negative
4 = Somewhat positive

5 = Mostly positive
6 = Very positive

2. Overall, how easy was the Serious Game to use?

1 = Not at all
2 = A little
3 = Somewhat
4 = Fairly easy
5 = Very easy
6 = Extremely easy

3. Would you recommend the Serious Game to your colleagues?

1= not at all
2 = no
3 = probably not
4 = probably yes
5 = yes
6 = definitely yes

4. To what extent would you be willing to play the entire Serious Game?

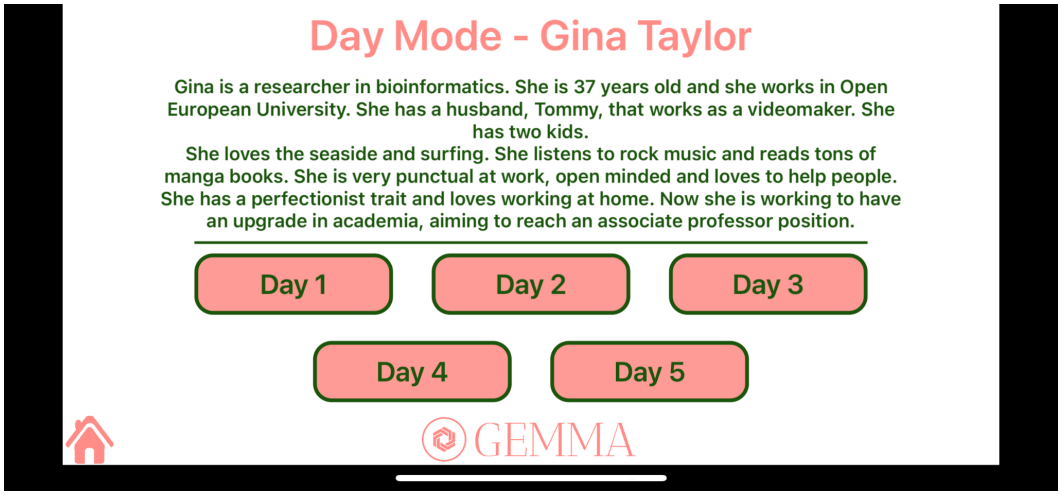
1= not at all
2 = no
3 = probably not
4 = probably yes

5 = yes
6 = definitely yes

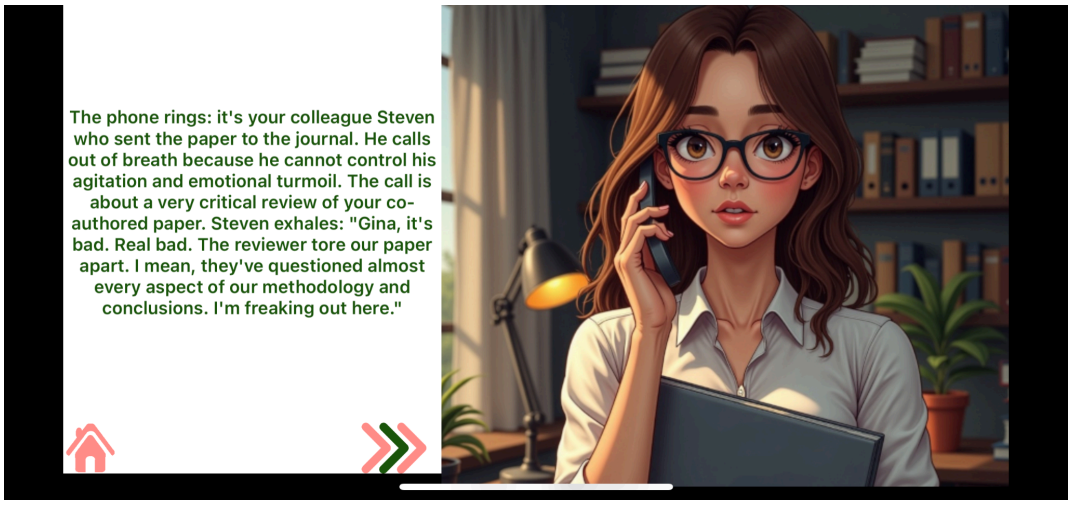
6. Overall, how useful was the Serious Game?

[open-ended question]

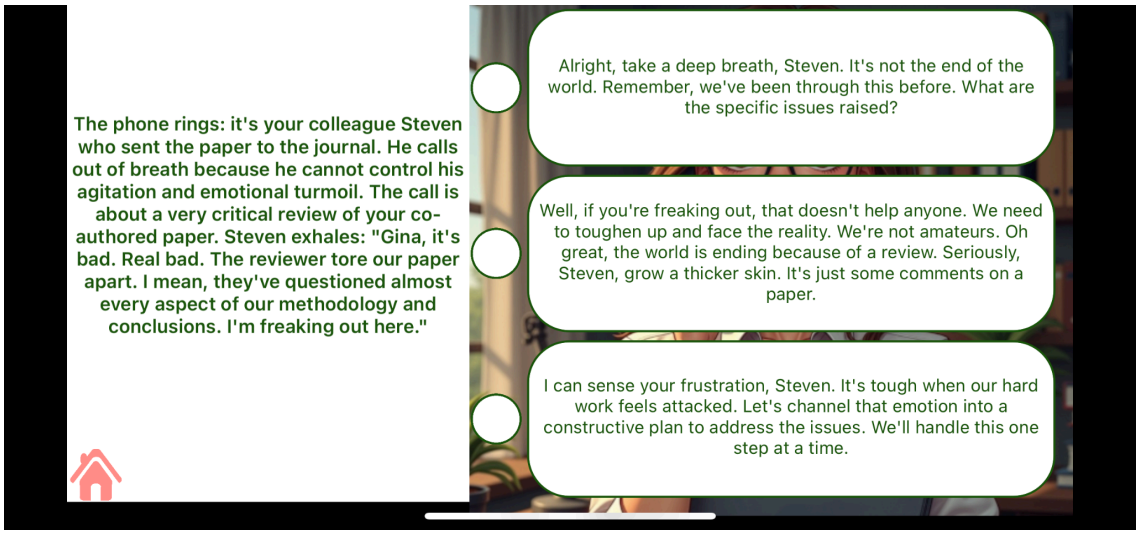
APPENDIX II *Frames from the GEMMA Serious Game Demo*



The player is introduced to a brief bio describing the character of Gina Taylor, a young researcher in bioinformatics. The SG is developed in 2D, based on a role-playing dynamic, and the gameplay is built around a click-and-play mechanic.



The scenarios co-created by the GEMMA partners represent the game levels that the user must complete by embodying the avatar and making decisions on her behalf. The player is invited to select a possible reaction for the avatar when faced with a critical situation, choosing from three different alternatives.



The choices provide the player with bonuses or penalties in the form of numerical scores, distributed across the four dimensions addressed by GEMMA's educational content: a) **Hedonic well-being**, meaning emotional well-being, focused on the individual's perception of positive feelings; b) **Eudaimonic well-being**, or psychological well-being, which is based on environmental factors, positive relationships with others, self-acceptance, and perceived self-efficacy; c) **Social well-being**, which depends on the quality of one's network as well as the role played within the community, in terms of belonging, integration, acceptance, and contribution; d) **Work-related outcome**, meaning the quality of the work performed in terms of the effectiveness of one's choices. In Day Mode, the goal is to complete the five levels of the scenario while aiming to achieve the highest possible score (a maximum of 20 points) in each of the four dimensions of the game.

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