Training for Board Game-based Learning: Evaluation Model and Preliminary Results From a National Program in Italy

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Abstract: Board Game-Based Learning (bGBL) is a dynamic pedagogical approach that leverages the immersive power and distinctive features of board games to promote active and meaningful learning. However, the use of board games in formal learning environments (such as schools, universities, etc.) is limited, and its use in informal learning contexts (such as cultural associations, after-school, fairs, summer camps, etc.) is often reduced to solely entertainment or engagement functions. The reasons include lack of competencies by teachers and educators and of pedagogical and instructional frameworks in scientific literature. In Italy, a joint effort by the National Sport association (CSI) and the Game Science Research Center has given birth to the first bGBL training course at the national level, based on a two-step structure: the first level (L1) is a short training aimed at all individuals willing to learn how to conduct board game activities in different settings; the second level (L2) is a more intensive course aimed at L1 trainees willing to learn how to design, implement, and evaluate bGBL activities. Evaluating the impact of such training is paramount to improve its quality, promoting new training opportunities nationwide, and better understand the competencies required for effective bGBL implementation in different settings. The present study focuses on two main aspects: first, presenting the model for evaluating the course, using Kirkpatrick's Four levels of evaluation as a reference framework, and the related tools that have been developed, including an *ex ante-ex post* questionnaire based on four dimensions of self-assessment (performance, process, attitudes, and idea of self); second, presenting preliminary results. We aim to identify the professional, motivational and competence profiles of individuals entering L1 courses, information that is instrumental to design the training to fit participants' needs and expectations. Taken together, this study might provide valuable information on the implementation of bGBL in various educational contexts and inform the design of learning curricula to enhance bGBL competencies.

Keywords: Educator Training, Game-based Learning, Impact Evaluation, Learner Profile, Board Games

1. Introduction

1.1 Board Game-Based Learning

Board Game-Based Learning (bGBL) is a dynamic pedagogical approach that leverages the immersive power and distinctive features of board games and role-playing games to promote active and meaningful learning. However, in Italy the use of board games in formal learning environments (such as schools, universities, etc.) is limited, and its use in informal learning contexts (such as cultural associations, after-school, fairs, summer camps, etc.) is often reduced to pure entertainment or engagement functions (Allsop and Jessel, 2015; Loperfido, Dipace and Scarinci, 2019). bGBL, also known in Italy as "Didattica Ludica" (Ligabue, 2020), involves the use of games, particularly board and role-playing games, as a privileged tool for the development of both "hard skills" (mnemonic study, acquisition of information and knowledge) and "soft skills" (cognitive, metacognitive, strategic, relational, emotional skills). The bGBL should not be understood as a substitute for existing teaching approaches, but in support of others traditionally used in the school system. bGBL requires the teacher, or facilitator, to play different roles in the design, development, and implementation of the activity, according to its context and scope, as well as personal style and pedagogical approach (Andreoletti and Tinterri, 2023).

1.2 The Training Courses

In Italy, the Centro Sportivo Italiano (CSI - a nationwide, nonprofit, volunteer-based association that promotes sports as a means for education, growth, commitment and social gathering) and the Game Science Research Center (an inter-universities research organisation that aims to promote, support and disseminate research in Game Science) has organised the first national bGBL training course, based on a two-level structure: the first

level (L1) is a short training (24h) aimed at all individuals willing to learn how to conduct board game activities in different settings; it is designed to train operators who could act in different educational contexts: formal (schools of all levels), non-formal (summer schools, community centres, etc.), and informal (fairs, public events, etc.). The target audience is very broad: it is enough to be of age to access it. The second level (L2) is a more intensive course aimed at L1-level operators willing to learn how to design, implement, and evaluate bGBL activities. In this study we will focus primarily on the L1 courses.

The overall aims of the present study are:

1. Develop a model for evaluating the effectiveness of L1 training courses.
2. Identify the initial profile of training participants. This includes:
    a. Demographic characteristics
    b. Previous experience with games, both personal and professional
    c. Perceptions concerning the educational use of games
    d. Expectations concerning the training

2. Model for Training Evaluation

Evaluating the impact of any training is a key step to understand its effectiveness and provide information to ameliorate it in further interactions. It is even more important in this context as there is not much evidence yet concerning professional training for bGBL. Thus, we developed a model with the aim of understanding:

1. the professional, motivational and competence profiles of individuals entering the training program, in particular L1 courses;
2. the learning achievements of the trainees;
3. the impact of the training on the trainees activity, including professional choices.

To this goal, the reference framework was Kirkpatrick's four levels of evaluation (Smidt et al., 2009). This has been chosen as it a) is a well-established methodology, with empirical support (for a critical perspective, see Reio et al., 2017) b) can be adapted to different kinds of training programs, including formal and informal contexts c) combines four kinds of evidence to provide a well-rounded picture of the training impact, both short- and long-term:

- *Reaction*, concerning the trainees' satisfaction for the training activity.
- *Learning,* the extent to which participants change attitudes, improve knowledge, and/or increase skill as a result of attending the program.
- *Behaviour,* the extent to which attending the training program determined changes in the trainees behaviour.
- *Results,* the final results that occurred because the participants attended the program.

In addition to the original levels, we added a diagnostic evaluation step, as one of the goals of the study was to understand the entering profile of the trainees (Table 1). The *learning* level used a self-assessment paradigm, motivated by the fact that the L1 course did not include any kind of product from trainees. According to Castoldi (2016) self-assessment can refer to four dimensions: tasks (*prestazioni*), process (processi), attitudes (*atteggiamenti*), idea of self (*idea di sé*).

- *Tasks* refer to the level of competence and ability that an individual shows in specific activities, including reaching goals and facing challenges.
- *Processes* refer to the procedures and methods through which tasks are addressed. This dimension focuses on"how" something has been done rather than "what".
- *Attitudes* refer to the mental disposition or approaches that a person assumes toward a task or a situation. Attitudes include motivation, enthusiasm, openness to change, resilience, teamwork, and stress management.
- *Idea of self* concerns the perception and awareness about oneself and includes evaluation of one's competencies, personal and professional identity, self-reflection, and personal growth.

The self-evaluation questionnaire was developed by crossing each dimension with the expected goals of the L1 training and identifying a question for each of the six learning goals of the training: game knowledge, ability to learn other games, ability to explain the rules, ability to modify and personalise the game experience, ability to relate to

players and teamwork. Each question was self-assessed through a 1-4 points Likert scale (Joshi *et al.*, 2015).

Table 1. The model for evaluating the impact of the L1 training.

3. Methods

The *ex ante* survey was structured in five parts (only four of them will be discussed in this study):

1. A demographic section, including questions concerning age, provenience, gender, current job, and professional experience.
2. Questions concerning the participant's expectations and playing habits, including the frequency of playing with different game types (board games, video games, role-playing games), perceived expertise with different game types, and past or current professional experiences with games.
3. An evaluation of the participants' knowledge of game mechanics. This part has not been included in this contribution due to text length limitations.
4. Questions concerning the participants' beliefs about the skills that can be developed through games, both in general and related to the aforementioned games.
5. A self-assessment of the respondent's competencies as ludic operator, as previously described.

Table 1

Level	Indicators	Evidence collection
Diagnostic evaluation	Participants' demographic profile bGBL perceived skills Attitudes towards bGBL as a teaching and learning approach	*ex ante* survey
Reaction	Satisfaction for the training Perceived relevance of the activity Engagement	*ex post* survey on perceived self-efficacy and bGBL skills.
Learning	Learning achievements in terms of knowledge, skills, and attitudes	*ex ante* and *ex post* self-evaluation
Behaviour (intended)	Future perspectives	*ex post* survey on future perspectives (including participation to L2 courses)
Behaviour (observed)	Active engagement in the training Enrollment in L2 course Professional or vocational activity (e.g. participation to associations, ludic events, as a ludic operator)	Learning analytics *post-hoc* questionnaire at 12-month distance
Results	Participation in initiatives involving bGBL changes in professional activity	Follow-up *via* email at 24-moth distance

The survey was administered in CAWI format, using Google Modules. Training participants were asked to fill the survey before the start of the training. Data was collected via Google Modules and analysed using R (R Core Team, 2023), an open-source and flexible language commonly employed in statistical analysis.

4. Results

4.1 Description of the Sample. 69 Participants Were Recruited for the Study (F = 44%, M = 49%, other = 7%) with Mean age of 41±11. Professions of the Participants are Reported in Table 2.

Table 2: Professions of the participants to the study

Profession	*N of participants*
Educator	15
Teacher	9
Employee	9
Creative and visual professional	7
Student	6
ITC professional	6
Unoccupied	6
Gaming industry professional	4
Care profession (nursing, speech therapy, psychology, medicine, etc...)	3
Other	4

Table 3 shows the education level of the participants.

Table 3: Educational level of the participants

Education	*N of participants*
Middle school diploma	3
High school diploma	32
Bachelor degree	15
Master degree	12
Postgraduate degree	6
N/A	3

The majority of the sample (N = 32) reported that they are not currently employed in education but express a desire to work in the field. Only eight respondents indicated no intention to pursue a career in education. Twenty-six participants are currently involved in at least one educational context and wish to continue, while only two education employees express a desire to leave the field.

Participants were queried about their experience in working or volunteering within educational settings. Twenty-three of them reported no prior experience, while the distribution of other responses is illustrated in Figure 1. Informal contexts emerged as areas where participants reported greater work experience, even if there are participants involved across all levels of education, from kindergarten to university.

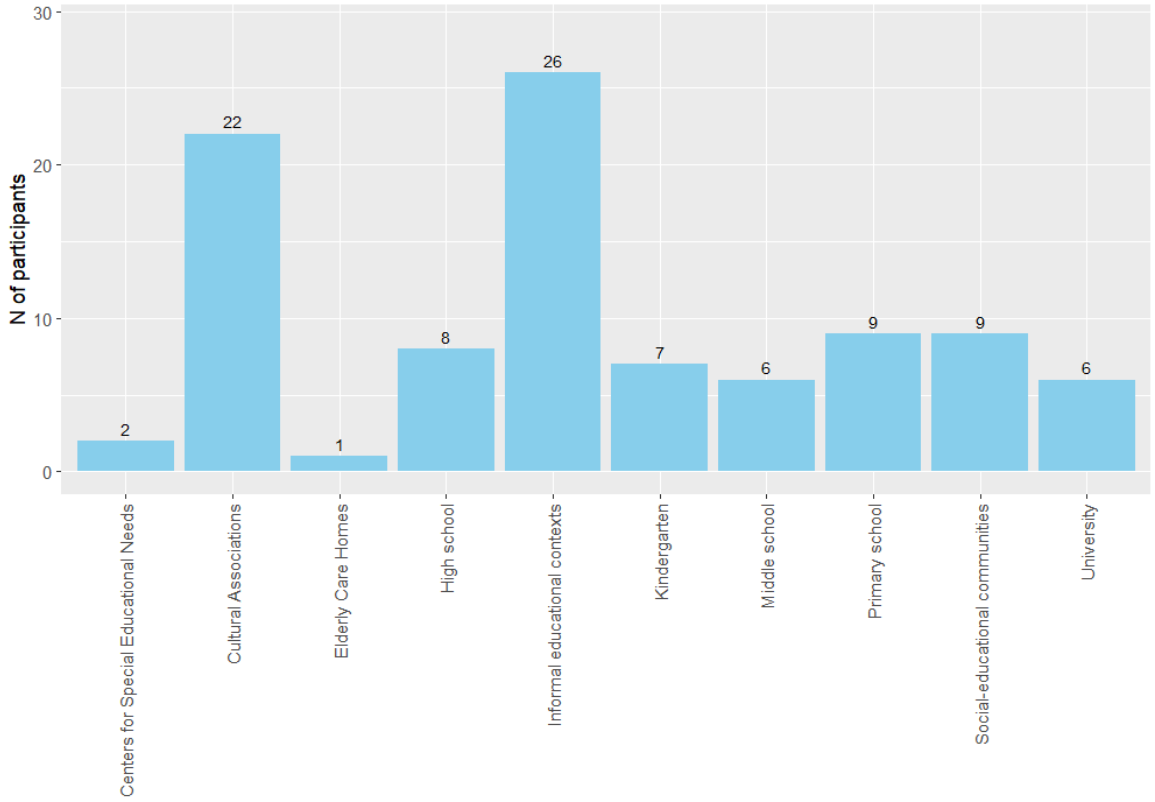

Figure 1: Educational contexts of work of the participants

Participants were asked regarding their use of games in their professional endeavours. Sixteen individuals (23%) stated they frequently and consistently incorporate games into their work, another sixteen reported occasional usage, and a further sixteen indicated sporadic use. Twenty participants confirmed they have never utilised games in their professional activities. Three participants did not provide a response; Most of the sample (N = 59, 83%) had not yet participated in a training course on games.

4.2 Participants' Expectations

Participants were asked regarding their expectations about the course. 54 responses were given. From the responses, 9 main themes emerged, as depicted in Table 4.

Table 4: Participants' expectations

Themes	*Description*	*N*
Educational skills	How to use board games as educational tools to foster learning and social development	19
Knowledge and understanding of boardgames	Deepen the knowledge of the world of boardgames, better understand their mechanics, and discover new ones	16
Application in professional contexts	Integrate the use of games into current professions	13
Dissemination	Make the world of board games better known to a wider audience	9
Psychological and social knowledge/theories	Explore the theoretical foundations of games, including psychological and social aspects	8

Themes	*Description*	*N*
Inclusion and diversity	Ways to make games accessible to various age groups and special needs, promoting inclusion	5
New professional career	Expand professional skills to open new possible career developments (new job)	3
Networking	Opportunities for networking and building collaborations	3
Formal recognition	Obtain a certification or formal recognition of acquired skills	2

Participants are primarily interested in expanding their educational skills. Additionally, they appear to be interested in the value of board games as tools for inclusion and for acquiring psychological and social skills. Given the introductory nature of this course, it is not surprising that many participants are interested in learning more about the world of board games in general. Expectations related to the workplace emerge, both in terms of acquiring new skills to be applied at the current workplace and in seeking and creating new work opportunities. For some participants, it is important to be able to improve their skills in spreading the culture and practice of board games. There is interest in formal recognition, but it is not very widespread, perhaps because the role of a game facilitator is not officially recognized at the moment and the certificate obtained from the course is only valid within the association that promotes it.

4.3 Participants' Playing Habits

The gaming habits of participants have been investigated. Table 5 shows how frequently the participants are involved in different types of gaming activities. The results indicate that the sample consists of individuals who are more accustomed to playing board games and card games. Video games are played quite frequently, with PC/console games being surprisingly more common than smartphone video games. Role-playing games are the least frequently played, particularly LARPs.

Table 5: Gaming habits of the participants

	Board Games and card games	Role playing games	PC/console Videogames	Smartphones videogames	Live action role playing games
Never	1	17	17	19	48
Once a year	2	14	9	6	16
Once a month	19	11	11	16	4
Once a week	20	16	10	6	1
Several times a week	21	10	17	6	0

Chi-square tests were conducted to examine whether there was an association between gaming habits and the use of games in professional activity. The results do not show any significant association (BG: ($\chi2 = 14.389$, df = 16, p = 0.570; RPG: $\chi2= 15.521$, df = 16, p = 0.487; VG: $\chi2= 13.294$, df = 16, p = 0.651; SVG: $\chi2= 17.711$, df = 16, p = 0.341; LARP: $\chi2= 10.296$, df = 12, p = 0.590).

Figure 2 illustrates responses to three questions regarding individuals' perceived expertise across three different types of games: board games, RPGs, and videogames. Each bar represents the frequency of responses indicating different levels of expertise, categorised as 'No', 'Small', 'Medium', 'Good', and 'Expert'. Overall, the graph provides insights into the distribution of self-perceived expertise levels within each gaming category, offering a glimpse into participants' confidence levels in their gaming abilities across varied gaming genres. From the data depicted in the graphs, it appears that participants feel more expert in board games compared to role-playing games, with videogames falling in between.

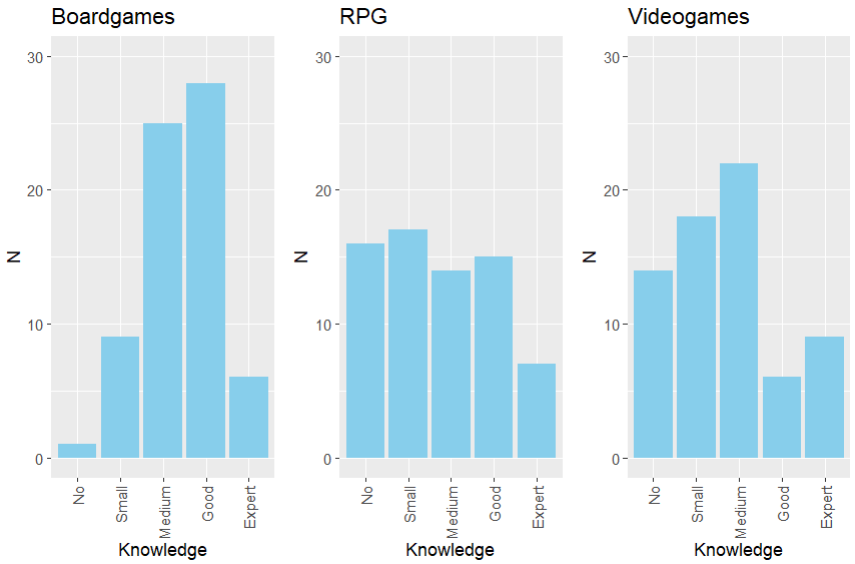

Figure 2: Participants' reported experience levels across three different types of games

Again, no significant correlations were found between perceived level of expertise and use of games in professional activities (BG: $\chi2=16.953$, df = 16, p = 0.389; RPG: $\chi2=12.024$, df = 16, p = 0.742; VG: $\chi2=22.97$, df = 16, p = 0.115).

4.4 Perception of Games as Educational Tools. Participants Were Asked to What Extent, in Their Opinion, Gaming Could Stimulate and Promote a Range of Skills and Abilities. Items Used a 5-Point Likert Response Scale Ranging From 'not at all' to 'Very Much' on a 5-Point Scale. The Results are Presented in Table 6.

Table 6: Perception of how games can promote abilities and skills

Item	*N*	*Mean*	*SD*	*Min*	*Max*
Disciplinary content	66	3.98	0.79	2	5
Cognitive skills	67	4.48	0.61	3	5
Metacognitive abilities	66	4.35	0.71	2	5
Emotional-motivational aspects	69	4.32	0.78	2	5
Visuomotor skills	67	3.99	0.75	3	5
Social, relational, and communicative skills	69	4.62	0.6	3	5
Logical-mathematical abilities	69	4.16	0.76	2	5
Inclusion strategies	67	4.45	0.70	2	5

4.5 Self-evaluation of bGBL Competencies

Finally, several other pieces of information have been asked to the participants regarding their competencies. Most of them usually teach games when they play with friends and families (33,3% do it “often” and 21,7% “always”). Five-point Likert scale questions, ranging from 'very little' to 'very much', were employed to examine participants' self-perception of their gaming skills and knowledge. Participants were asked to respond to the question 'To what extent do you feel capable of...' with each item exploring a specific aspect of their gaming

knowledge and competence. Table 7 shows descriptive statistics of each question. Most of these items have scores around the midpoint, except for 'have a collaborative attitude' (M = 4.09) and 'learn games' (M = 3.88). This initial assessment provides a snapshot of the sample at T0 and will be compared with the results of the same questionnaire administered at the end of the L1 training program to assess whether participants perceive an improvement in their gaming knowledge and skills after the training.

Table 7: Perceived knowledge and competences about gaming

Item	*N*	*Mean*	*SD*	*Min*	*Max*
Learn games	68	3.88	0.84	2	5
Assess suitability of games	67	3.30	0.90	1	5
Teach rules	67	3.48	0.84	1	5
Adapt games	68	3.34	0.97	1	5
Share management of games activities	68	3.53	0.97	1	5
Seek information about boardgames	67	3.58	1.12	1	5
Assess efficacy of a game activity	67	3.30	1.00	1	5
Study and teach rules	67	3.25	0.96	1	5
Change rules to adapt a game	67	3.09	1.16	1	5
Have a collaborative approach	68	4.06	0.73	2	5
Knowledge of boardgames	68	3.04	1.04	1	5
Feel comfortable ad playworker	68	3.59	0.87	1	5
Ensure all players know what to do	68	3.41	0.85	2	5
Adapt a game to the social context	68	3.41	0.97	1	5
Make people enjoy working with me	68	3.51	0.74	2	5

5. Discussion

In this work we propose a model for evaluating a board game training aimed at individuals operating in both formal and informal educational settings and geared toward the development of bGBL facilitator skills. We used Kirkpatrick's four levels of evaluation as a reference framework and integrated it with the self-assessment paradigm of Castoldi (2016). This model guides the evaluation of the course's effectiveness and its outcomes, considering the participants' initial level, their subsequent achievements, and intentions by integrating pre- and post-data, self-assessments, and performance evaluations. We developed two different questionnaires for the pre- and post-assessment. The response rate to the pre-intervention questionnaire (97% of participants answered almost all the questions) suggests that the tool was of a manageable complexity and length. This has made it possible to collect initial data useful for assessing the effectiveness of the intervention. The initial profiling of participants indicates that those who chose to enrol in the L1 course are not entirely new to the world of board games. Generally, they have a particular interest in the educational (28%) or inclusion (7%) aspects of board games and are interested in developing or maintaining a career in this field (85%). They have a good knowledge of board games but would like to deepen their understanding of them. A third of them have at least occasionally used games in their professional activities. They seem to already have a certain predisposition to facilitate others, being mostly those who explain the rules when playing games. Their interest in games is not limited to board games: more than half of the participants engage with video games or role-playing games at least once a month, preferring PC or console video games over smartphone video games. The level of initial competencies, as it emerges from self-assessment, is quite high: the lowest average score is above 3 (*Knowledge of board games,* 3.09), the highest exceeds 4 (*Have a collaborative approach,* 4.06). It will be interesting to see how this self-assessment may change at the end of the course, especially L2. Another preliminary observation concerns the lack of correlation between participants' gamer habits and professional use of games - this might suggest that the training is indeed able to appeal both "expert gamers" who aim to professionalise or disseminate their passion for games, as well as educators who wish to deepen their knowledge of games, considered a prerequisite for successful bGBL (Hsu *et al.*, 2013).

The current study is subject to several limitations: first, the nature of L1 training, which takes place throughout the year in different locations, requires constant upgrade of the dataset; each analysis is to be considered a freeze frame of a continuous process. The second, related limitation concerns the current lack of *ex post* data, which are required for the comprehensive evaluation of the training; self-assessment data are being collected and do not allow yet significant pre-post comparison. Lastly, due to format limitations we could not incorporate analysis of the participants' level of understanding of board game mechanics. This data significantly deepens our insights into educational strategies within game-based learning environments. Additionally, integrating the evaluation of L1 with that of L2 courses would provide a comprehensive assessment of the entire training path, particularly the use of facilitation methodology in L1 and instructional design in L2.

Taken together, this study provides a snapshot of the entering profile and expectations of individuals who have taken interest and enrolled in the first nationwide training course on bGBL. This ongoing research will help design future training to better fit participants' interests and help the initiative achieve a greater reach. Integration of current analysis with the other levels of the evaluation model will allow a comprehensive picture of how h the training can elicit changes in the participants' learning, attitudes, and individual and professional career paths. In conclusion, through the creation of a new model for evaluating the impact of bGBL training, the study provides precious evidence to support the improvement of training programs aimed at the development of professional bBGL competencies.

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