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GAME FOR DIDACTIC INNOVATION. *CLASSCRAFT* IN ITALIAN SECONDARY SCHOOL

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Abstract

Developing new didactic methodologies in a fast-changing world is increasingly important for teachers. Students are immersed in technological devices outside the school, and engaging them is getting more complicated. *Classcraft* is a gamification platform that transforms class activities into a fantasy game. This study examines gamification and game-based learning features that affect students' marks, engagement, inclusivity, and flow in Italian middle schools. The secondary research question concerns the border till which gamification is positive.
The literature review led to exciting results confirmed by the first part of data collection. "Point system, achievements, quests and challenges, and narrative structures," "gamified reward mechanics," "interactive settings," and "collaborative tasks" contributes to growing of marks, engagement, inclusivity, and flow. This first part of the project was conducted with a third-year middle school classroom in Lombardy during Italian Language, History, and Geography classes. The researcher was also the teacher, who proceeded with a quasi-experimental design. Students completed a pre-test (Likert scale based, 6) and a post-test that included some open-ended questions. Throughout the whole experimentation, the researcher wrote an observation diary. During the second half of the experiment, five significant students were interviewed.
The next phase of the study wants to collect more data from different middle schools in Italy and to use teachers, determinants on results, for discussing them. The design of the second part will follow the one of the beta tests.

Keywords: *Game-based learning, gamification, secondary school, Classcraft, augmented reality.*

1. Introduction

Gamification is becoming a more commonly used practice in the teaching field. As students deal with virtual realities, technological devices, and networks, teachers are finding new strategies to speak a language as close as possible to them. Gamification is «using game design elements in non-game context» (Deterding et al., 2011). It has strictly related to game-based learning, «an approach to encouraging positive affect, engagement, and motivation in learning activities by utilizing game-like features and environments» (Gee, 2003; Sabourin & Lester, 2014), which is the principal didactic theory behind it. This study focuses on a platform called *Classcraft*, which was launched in Canada in 2014 and then spread to many countries worldwide (Sanchez et al., 2017). In January 2022, when the project started going on the field with its first part of data collection (that from now on it is going to be called "beta-test"), *Classcraft* headquarter confirmed the gap that has emerged from the literature review. In Italy, there was no specific research on *Classcraft*.

The study utilizes learners' everyday experiences to determine gamification relevance in the learning process. This paper provides a report of the beta-test, which started with experimenting with platform functioning before addressing its usage on a larger scale during the following phase. It has translated into a preparatory study of *Classcraft* to notice flaws or malfunctions inside platform dynamics, but, even more, in researcher's procedures. This work aims to verify the best modus operandi, reflecting on decisions, actions, and other involved people's feedback (especially the ones inside the school context) to deliver to teachers who will be an active part of this project and in other future experiments.

2. Study design

The research question that leads the whole study wants to investigate which features of gamification and game-based learning affect students' marks, engagement, inclusivity, and flow in Italian middle schools, with particular attention to *Classcraft*. Following the scheme of SPIDER Tool (Cooke et al., 2012) and confronting study designs collected with this step of literature review, the scheme of beta-test that is going to be explained emerged from Çakıroğlu and Güler's paper (2021). It consists of a quasi-experimental design with a control group, a pre and post-test questionnaire, interviews with significant students after the experiment's first half, and an observation diary during the process.

The researcher who conducted the project and the teacher coincided. He was in his fifth year of teaching, his first time at the public institute "Falcone e Borsellino" in Bellusco (Lombardy, Italy). The sample was a third-year-middle-school class composed of 9 girls and 17 boys. The experimentation started on February 1st, 2022, after compiling the pre-test questionnaire, and ended on May 31st, 2022. In the beginning, a trial week was planned without direct consequences on game dynamics to let students get confident with the platform; it had an important role and will be suggested in future phases to other involved teachers. *Classcraft* concerned 12 hours per week, during Italian Language, History, and Geography classes, for 130 hours.

3. Gamification design

The word «features» in the research question is a broad concept. It is helpful to introduce some authors who emerged from the literature review and highlight a few critical components to understand it better. In 1958, Caillois described four principal kinds of game, even if there were still ambiguity around the terms «game» and «to play»: «agon» is physical or intellectual competition; «alea» represents the out-of-control event, randomly determined; «mimicry» is interpreting another role, different from player's one; «ilinx» provoked by the game is the sense of vertigo (Caillois, 2000). These are not exclusive, or rather, classic games are not just one of them, but their combination. Suits defined the verb «to play,» which is still one of the most famous: it is the voluntary attempt to overcome not-necessary obstacles (Suits, 2021). According to this statement, it is possible to point out four components: «prelusory goal» that exists regardless of game rules; «lusory tools» inside game dynamics; «constitutive rules»; «lusory attitude,» or voluntary participation. McGonigal agreed with Suits' definition with an interesting additional element. She confirmed the prelusory goal and lusory attitude, with some slight terminological differences; she identified lusory tools as part of constitutive rules and added the «feedback system» as one of the fundamental components (McGonigal, 2011). More recently, Ramirez and Squire found some design features used in gamification that can be overlapped: «point system, achievements, quests and challenges, and narrative structures» (2014). In conclusion, according to a systematic review, *Classcraft* embodies conditions of optimal gamification learning experiences, which consist of «gamified reward mechanics,» «interactive settings,» and «collaborative tasks» (Zhang et al., 2021). Some of the listed features coincide or overlap others or include more than one, such as constitutive rules; others will be evaluated inside data analysis, like lusory attitude. Later, some key features will be analyzed according to the beta-test gamification design.

Teams in *Classcraft* are crucial. Usually, they are mainly related to «agon,» but here, they are thought of as a collaborative game situation («collaborative tasks»). In four months of beta-test, teams changed three times. From February 1st to March 12th, there were five teams, four composed of 5 students and one by 6. The teacher decided on their composition to balance them, according to the didactic attitudes of the pupils. From March 12th to May 2nd, the number of teams became eight: six composed of 3 students and two by 4. Two main reasons conditioned this choice: the importance of balancing continuatively between different parts that changed their previous position throughout the game (Antonacci, 2012; 2019) and to empower each student by forcing them to be more involved and to push other pupils, considered able to do it, to become a leader inside their team. From May 2nd - May 31st, teams were reduced from eight to seven: all composed of four students, except for two that consisted of 3. The teacher decided on this last change because they wanted pupils to deal closely with different classmates, especially by who participated more and better understand how to take advantage of game dynamics. It seemed that avoiding the teacher's decision about teams' composition is problematic because it guarantees fairness. In this sense, a possibility for the future could be asking for students' preferences and considering them. «Agon» emerged when teams, bounded together by a strong feeling of collaboration, fought against a common enemy (Bertolo & Mariani, 2020): the game itself. It has not to be too simple; otherwise, the virtuous circle that leads to a flow state cannot happen, and players risk getting bored. To match this requirement, as suggested by De Koven (2020) too, the teacher immediately reduced supply of crystals, which help to activate avatars' powers, to a quarter per day, instead of one per day; moreover, he periodically stopped it, when stocks were

full. «Quests and challenges» are present in *Classcraft* and are one of the principal elements. For the future phase could be interesting to take advantage of:

- «narrative structures» that can be created in quests;
- formative reviews, a quiz with whom to challenge single students or teams;
- quick reviews, a new tool that did not exist when the beta-test was done.

The «Alea» component is represented by **random events**. It happened regularly once per week (mostly on Friday), and on that occasion, differently from usual, the school day started with *Classcraft* on the digital board screen. The teacher prepared twenty unexpected events that students did not know: they could be positive or negative for the whole class or a part of it, or they could cause funny repercussions on class life for that day. Another *Classcraft* feature related to alea is the random picker, which randomly selects a single student or team. The difference between other types of random selection mechanics outside *Classcraft* is that the selected student or team appears on the class board screen.

At the beginning of the experience, every student chose an **avatar** between a guardian, healer, and mage. Guardians protect mates from damage; healers remove damages already suffered, and mages re-energize mates so that they can use their powers. This system of characters, typical of a role-playing game, allowed players to experiment «mimicry» component. The teacher could have chosen for them, but he let pupils decide the best solution together with their first teammates, considering that each team had to include at least one of every avatar. It was revealed to be an excellent custom to reproduce even in future experimentation elsewhere. Each character acquires different **powers** and specializes by leveling up (1000 XP required during beta-test). According to students' words, their usage of them can be counted as «ilinx» because they felt fulfilled and powerful. Powers could be universal, which means familiar with the other avatars from the beginning; specific, which are the ones that characterize avatars; collaborative, which affects the team and individual experience points. The teacher personalizes characters, changing powers that could be modified to create a specific solution for his class. The second part of the experiment could verify if they could work even in other contexts; eventually, it could lead to other good practices about powers.

«Feedback system» is evident in *Classcraft*. It is regulated by **positive behaviors**, which consent to gain experience points and golden pieces, and **negative behaviors**, which cause health-points loss. The goals of behaviors chosen by the teacher were:

- stimulating all students to be more engaged in lesson activities;
- training them to be responsible for themselves, their classmates, and the school;
- reading more books from the list, the teacher proposed.

Two of the most common positive behaviors had been «participating actively in the lesson» and «answer to a difficult question»; one frequent negative behavior had been «homework done partially or badly.» In the beta-test, the teacher assigned bonus and malus on *Classcraft* after the end of lessons. This method does not guarantee immediate feedback because students do not know if their actions will come to a consequence in the game, but it does not oblige the teacher to interrupt his speech any time there is something to note. It is essential not to create a system reward that depends exclusively on marks; otherwise, that would become a copy of the school's evaluation system already in force. Not all the pupils could yearn for the maximum amount of available XP. During the experimentation, according to classroom reality, it is also helpful to change the amount of XP and gold pieces as a reward for good behavior or the life-point loss for bad behavior.

4. Acknowledgment

As a didactic methodology, a teacher can freely experiment *Classcraft* or other gamification platforms with his students. The only requirement is the availability of a digital device by each student, which can be brought to school if the teacher permits it. During the beta-test, the researcher had to ask permission from different levels to collect data. It was fundamental to tell a well-structured proposal and be comforting about the project because behind was a path decided by the university. The aims were to raise students' engagement in disciplines without losing content and reflect on the effects the Covid-19 virus had on engaging in distance learning. *Classcraft* is not the miracle cure for school institutions: today, there is this platform, and in five years or even less, there could be another. It is an attempt to meet pupils' sensibility and to get closer to them to school.

The first step was communicating with the principal and informing the vice-principal and the school coordinator. At the beginning of January, after the principal's positive answer, it was possible to present the project to students' parents, colleagues, and members of the Teaching Staff. Representatives of parents reacted positively as well. In a second moment, the teacher asked the principal for authorization to administer pre-test questionnaires and to acquire students' evaluations in aggregate form. He successfully got his parents' authorization and proceeded with tests. On February 2nd, the teacher invited pupils to a

"solemn oath" in the classroom, through which they promised to accept all the consequences *Classcraft* would imply and all future constitutive rules that would be introduced or changed due to game dynamics. On April 22nd, the principal gave the authorization for the interviews, and four days after, during a reunion with parents, the teacher informed them. Afterward, he asked their permission to all of them, even if only a few of their sons and daughters would be interviewed, through the document indicated by the University Ethics committee. In particular, it was necessary to ask permission for audio recording, which was not done before because the idea was born after the beginning of the beta-test. For future phases, it will be useful to ask preemptively for these parents' permission.

5. Tools for data collection

In this paragraph, tools for beta-test data collection will be analyzed, keeping together the steps, justifications, and emerging considerations. Pre-test questionnaires, evaluations chart, interviews, and post-test questionnaires will be described in this order. They were all selected to answer specifically to the research question, with particular attention to marks, engagement, inclusion, and flow. Secondary research questions came out during the process and were noted in a research diary, together with the teacher's observations.

The primary goal of the **pre-test questionnaire** for students and parents was to describe the sample to establish a starting point (t-0), which was not just the teacher's point of view. It consisted of 18 items with multiple choice answers, including the first one that asked about gender; ten of them had a Likert scale structure with 6 levels, to oblige them to take a more defined position. As marks would be already evaluated by another instrument, beyond engagement, inclusion, and flow, there were items on students' perception of their progress at school in involved disciplines. The pre-test questionnaire was based on validated tools found during the literature review (Mustafa, 2018; Watson, 2018), and it passed a peer-review process of two fellow researchers. It was set that the number of items had to be reduced to 18 and that the questionnaire would be simple yet incisive for thirteen-year-old pupils. A control group represented by another third-year middle school class at the same institute was involved with their parents, thanks to a colleague's collaboration. The pre-test questionnaire was administered through a Google module. It required access with a Google account (data that had not been collected) to limit to one compilation because it was assigned as homework on January 31st. The beta-test experience made parents' engagement complex because they are not always easy to reach. Moreover, their perception of children's school progress is very partial even thou sometimes could be interesting. Control group is another operation that implies a waste of energy but has many limitations. Classrooms did not have the same professor and no superimposable characteristics, even though they were in the same institute and were the same age. During the next phase, the enlargement of the sample with related data analysis and data comparison will consider the context's preliminary description of the experimentation setting to be able to compare data results. This operation will cover the control group role.

Data on **marks** were collected in aggregate form, taking them from school report numbers at the end of the first half of the year, which coincided with the pre-test questionnaire, and at the end of the year, which coincided with the post-test questionnaire. The sample and control group's evaluations were about Italian Language, History, and Geography, and they were represented by numbers that went from a minimum of 4 to a maximum of 10. The experimentation period would be different in the future, according to the involved teachers' necessities. They will provide this data following the same mode, photographing starting and final points (pre and post-test), even if it does not coincide with school reports.

On May 6th, five selected students were interviewed by the support teacher they had known for three years in a quiet place outside the classroom during morning school time. These **short interviews** (less than five minutes) were audio recorded. Their goal was to ask five questions different from the ones there would be in the post-test questionnaire to five informants, before the end of the beta test but after half of it. These significant students were not chosen for their learning level or marks but because they represented some interesting profiles who reacted peculiarly to *Classcraft* experimentation. It is an excellent method to collect qualitative data, which can add exciting considerations from students' points of view. However, replicability conditions are not simple, especially considering the interviewer in charge.

Post-test questionnaires were administered on May 31st during the morning-class time. All 18 items of the pre-test questionnaire were reproposed to compare pre-test and post-test data collected. Open-ended questions about the experience with *Classcraft* and class dynamics during the beta-test were added only to the sample. Giving them time during morning classes guaranteed them to answer primarily open-ended questions well. Future experiences with this platform should last at least two months so that the novelty effect can decrease and disappear. Four months is a period that can lead someone to disaffection towards this environment, especially if it coincides with the end of the school year when students are usually tired. It would be interesting to see the consequences of *Classcraft* after the end of its usage. Through this

beta-test, it was not possible to observe because the school year had finished, and pupils were at the end of their middle-school path. In the subsequent phases, different solutions and timing will be verified to solve some of the secondary questions that emerged during the beta-test, like the border till which gamification has a positive impact.

6. Conclusion and future developments

Beta-test was a positive experience, not considering data analysis in itself but dealing with procedures. In these paragraphs, there is a list of practices followed, the reasons behind their choices, and considerations about what will come in the next phase. A proper data analysis of the beta test is necessary to go deeper into the results and compare those data with the others that will be collected during 2023. One of the riskiest fallacies that must be avoided is *post hoc ergo propter hoc* one: distinguishing *Classcraft* consequences from other projects schools have already planned, which may have similar aims for students.

Beta-test design will be substantially reproposed in the next phase of data collecting, curing considerations for previously outlined. The second phase of the study wants to collect more data from different middle schools in Italy and to use teachers, determinants on results for discussing them. At the moment, seven teachers in six different institutes have been selected. However, the aim is to enlarge the sample further, guaranteeing the researcher's possibility to follow and support all of them.

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