GAMEWORK
homework gamified environment

ANALYSIS
OF THE
GAMIFICATION
FEATURES

ANALYSIS OF THE GAMIFICATION FEATURES

GAMEWORK
homework gamified environment

Index

Analysis of the gamification features
2022

ERASMUS+ Project
GameWork
KA220-SCH - Cooperation partnerships in school education

Authors
Carla Peixoto
Helena Azevedo
Ana Pontes

University of Maia - UMAIA
Av. Carlos de Oliveira Campos,
4475-690 Maia

Partners
University of Patras
Kaunas Juozas Grusas Art Gymnasium
Freixo School Cluster
Arsakeio Lyceum of Patras

Introduction

GameWork is an Erasmus+ Project financed by the European Union, that aims to motivate students to work on their homework and alleviate their reluctance to do it. Towards this goal, GameWork Team will develop a gamified homework environment that will use gamification techniques to motivate students to do their homework. So, GameWork have three precise objectives:

1

Homework organisation

Learners can access the environment with their smartphone or tablet and see the daily list of activities that they must perform to prepare for the next day, ticking the completed ones.

2

Student engagement

Engage students from the early stages of development, allowing GameWork Team to investigate their views and ideas about gamified homework, possible features and gamified mechanisms.

3

Progress monitoring (for students and teachers)

A verification process will be designed for a student not to skip the assignments and declare them untruthfully complete. The platform will ask for answers to one or more questions essential for each task.

Analysis of the gamification features

The present report will present a brief analysis of gamification features. In this sense, first we will approach the gamified elements and mechanisms that our students most wanted to see in GameWork platform. For that, we will present a definition of each gamified element/mechanism, explain how it can be implemented and, if possible, write about its impact on other projects and investigations.

Also, we will present other elements and mechanisms of gamification that could be helpful for technicians that are responsible for the development of our platform.

ANALYSIS
OF THE
GAMIFICATION
FEATURES

GAMEWORK
homework gamified environment

Gamified elements/mechanisms chosen by our students

Achievements/Mission/Goal

Definition

Achievements are defined by Groening and Binnewies (2019) as a secondary-system that tries to motivate players to adopt a certain behavior. For that, achievements are given to players as rewards when they demonstrate that they have performed this specific behavior.

Missions and goals are very similar to achievements, since these gamified mechanisms also want to promote a certain behavior. In this sense, missions and goals are define as a set of actions that players must perform to fulfill/achieve a certain objective (Metwally et al., 2019; Metwally et al., 2021).

Implementation

Instructions regarding achievements should be **clear and direct**, so the player can easily understand how he/she can reach it (Groening & Binnewies, 2019).
Additionally, missions and goals should have **different range of difficulty**, going from easy, to moderate and to hard missions.

Plus, these mechanisms should be aligned to player' level and should respect his/her history in completing previous missions/goals (Santana et al., 2016).

Examples

If we include a **level-system** that includes points:
"To receive 5 extra-points complete three math' tasks"

If we use **badges**:
"To receive this badge you have to ask for teachers' feedback for at least two times"

Impact

According to Groening and Binnewies (2019), implementing **achievements** in games can **improve players' performance**. This happens because this systems gives them a specific direction on what players should do. So, they tend to be more persistent and direct their efforts to complete their tasks. However, informations about the relationship between achievements and motivation are unclear. Players showing more persistence doesn't mean that they like the game or that they are motivated to play it.

Gamified elements/mechanisms chosen by our students

Another finding from Groening and Binnewies (2019) investigation is that lower quantity of achievements lead to higher persistence. This happens because players perceive the achievement as more difficult to reach. So, **we suggest to include clear, direct and low number of achievements in GameWork game.**

Regarding missions and goals, if these elements are too difficult, too easy or with an inadequate progression system can lead to demotivation for players (Santana et al., 2016). Which means that **it's essential to develop a congruent system of progression for missions and goals.**

Points

Definition

Point-based gamification has been studied in the past few years to understand its relation with motivation, performance, engagement and learning (e.g. Koppitsch & Meyer, 2022; Mekler et al., 2013a). Points as an **element** from gamification are defined as the score that is given to the student for performing a certain task. It can function as a positive reinforcement mechanism and be integrated into a system of levels (Butler & Bodnar, 2017; Goehle, 2013; Goehle & Wagaman, 2016; Metwally et al., 2021).

Implementation

There are several online platforms that uses a point-based gamification technique, like Kahoot or Quizizzis. As the definition itself indicates, the points must be given considering the fulfillment of a certain task. In this sense, in academic context, **points can be attributed according to the rating parameters of an answer**.

However, studies indicate that point-based techniques that require a correct answer and **reward the students also considering their response time** are more effective (Koppitsch & Meyer, 2022).

Examples

Considering the **rate parameters of an answer**:

For each *correct and complete answer*, the student receives *2 points*. For each *correct but incomplete answer*, the student receives *1 point*. For each *wrong answer*, the student *does not receive any points*.

If we could add the **time of response as a point factor**, we suggest to implement the next system of reward:

Gamified elements/mechanisms chosen by our students

Table 1. Points rewards for students' answers

Type of answer		
Correct and complete	Correct but incomplete	Incorrect
2	1	0
Response time bonus		
Less than 30 sec	Less than 1 min	More than 1 min
+2	+1	0

Impact

A study carried by Merkle and colleagues (2013a) showed that the use of points in gamification can **increase players' intrinsic motivation**. Additionally, a recent investigation suggest that a point-based gamification technique **improves students perception of engagement**, compared with traditional methods of learning (Koppitsch & Meyer, 2022).

Also, Koppitsch and Meyer (2022) believe that a speed-to-answer strategy can promote higher levels of focus. However, the authors alert for the fact that when we implement this students may be more interested in respond quickly than in thinking about the content of the question. So it's important to avoid competition and implement a reasonable point-system.

Progression

Definition

Progression is a dynamic usually implemented in point-based techniques (Dichev et al., 2014). Moreover, it can be part of the leveling mechanism and is defined as a graphical representation of the player's evolution.

Gamified elements/mechanisms chosen by our students

The main purpose of this gamified element is to provide players knowledge about their path and how much is left for a specific goal, which can improve their motivation (Dichev et al., 2014).

Implementation

It can be a percentage bar relative to how much XP the player has already acquired to pass a level. It can also be a percentage bar that indicates how many activities the student has completed to finish his/her homework (Goehle, 2013; Goehle & Wagaman, 2016; Metwally et al., 2019; Metwally et al., 2021). Also, it can appear evolving right after student finished a task as a reward (Dichev et al.,, 2014).

Examples

Percentage bar

72%

Score graphics

88%   20%

Impact

Progress bars and score graphics can help players to set goals and give a sense of competition between users (Westenhaver et al., 2022). Moreover, applying this gamified element allows teachers and caregivers to track students' learnings and establish new ones (Kiryakova et al., 2014). Basically, the great impact of using progression bars is to **promote the achievement of specific goals.**

Additionally, a recent investigation carried by Mazarakis and Bräuer (2020) aimed to understand the role of this gamified element in motivation. Results suggested that when playres have acess to their progress, their motivation on the next tasks increases.

Increasing difficulty

Definition

Increasing difficulty is a game feature that assumes a progressive increase in the questions' difficulty, passing a level or reaching objectives (Metwally et al., 2021).

Gamified elements/mechanisms chosen by our students

GAMEWORK
homework gamified environment

Implementation

This gamified mechanism should be used in a level-based game (Kumar, 2013; Metwally et al., 2021). In this sense, each level must be more complex when compared with the previous.

Examples

We can implement increasing difficulty in several ways. If we chose to have a level-based game we can include rules to increase level, like:

- **Level 1.** Starting level
- **Level 2.** To achieve level 2 collect 20 points
- **Level 3.** To achieve level 3 collect 40 points
- **Level 4.** To achievel level 4 collect 70 points
- **Level 5.** To achieve level collect 100 points
- **(...)**

Since we are approaching level-based gaming, it's important to reinforce positively students after they level up. This way, we are promoting their motivation and engagement. We can do this using the following badges righ after their achieved a new level:

Additionally, we can implement increasing difficulty in questions on homework. To do so, we have to **present first easier questions followed by increasingly complex questions**.

Impact

The aim of using gamified mechanisms like increasing difficultty is to promote students motivation and engagement (Metwally et al., 2021). A study carried by Cao and colleagues (2022) had as main objective understand if more challenging activities were related to more achievements in education. According to these authors (Cao et al., 2022) when students perceive an activity as easy, they tend to present positive emotions towards it. This means that students enjoy the proposed task.

Regarding students' motivation, students seems to have higher levels of motivation when they perceive a task as easy. Contrarely, they present lower levels of motivation with more complex activities (Cao et al., 2022).

Gamified elements/mechanisms chosen by our students

Despite high difficulty doesn't predict lower performance, when students were desmotivated they presented lower scores in activities and exams (Cao et al., 2022). Similar to achievements/goals/missions, **it's important to establish appropriate levels and rules for passing them.**

Chances

Definition

Chances are a mechanism that allows students to have the opportunity to re-respond to a task/activity (Metwally et al., 2021).

Implementation

To implement chances it necessary to have some challenge, questions, task or activity that allows students to fail without a consequence.

Examples

Inside each subject we could turn available students' activities regarding their homework, but also other tasks and challenges (see figure 1).

These challenges could be a brief questionnaire with questions that can help students to study for their exams. If students answer correctly to all questionnaire they should receive a reward, like 15 more minutes on exams, 2 points extra on exams, one help during oral presentations, turn in a late homework assignment without penalties, 5 extra points to level up and so on.

To promote students' interest in doing this challenges they could have one chance to correct wrong answers from these questionnaires.

This mechanism could also be implemented in extra tasks.

Figure 1. Subject page layout proposal

MATHS

Homework assignments

week from 17th to 21th of October

+ 10 POiNTS

START

Extra tasks

week from 17th to 21th of October

+ 5 POiNTS

DONE!

Challenges

week from 17th to 21th of October

+ 15MiN ON A EXAM

+ UP TO 4 POiNTS

START

Gamified elements/mechanisms chosen by our students

GAMEWORK
homework gamified environment

Impacts

Including chances allows students to **learn from their mistakes** and **turn the process of learning more meaningful** (Rincón-Flores et al., 2019). Plus, when we give a chance to students,, they can access immediatley to their wrong answer, given them **instant feedback** (Rincón-Flores et al., 2019), which is related with **higher levels of motivation and engagement** (Cao et al., 2022).

Moreover, Rincón-Flores and colleagues (2019) revealed that **challenges can increase intrinsic motivation**, since students know where they failed and want to solve their mistakes (problem solving and metacognition are highly use).
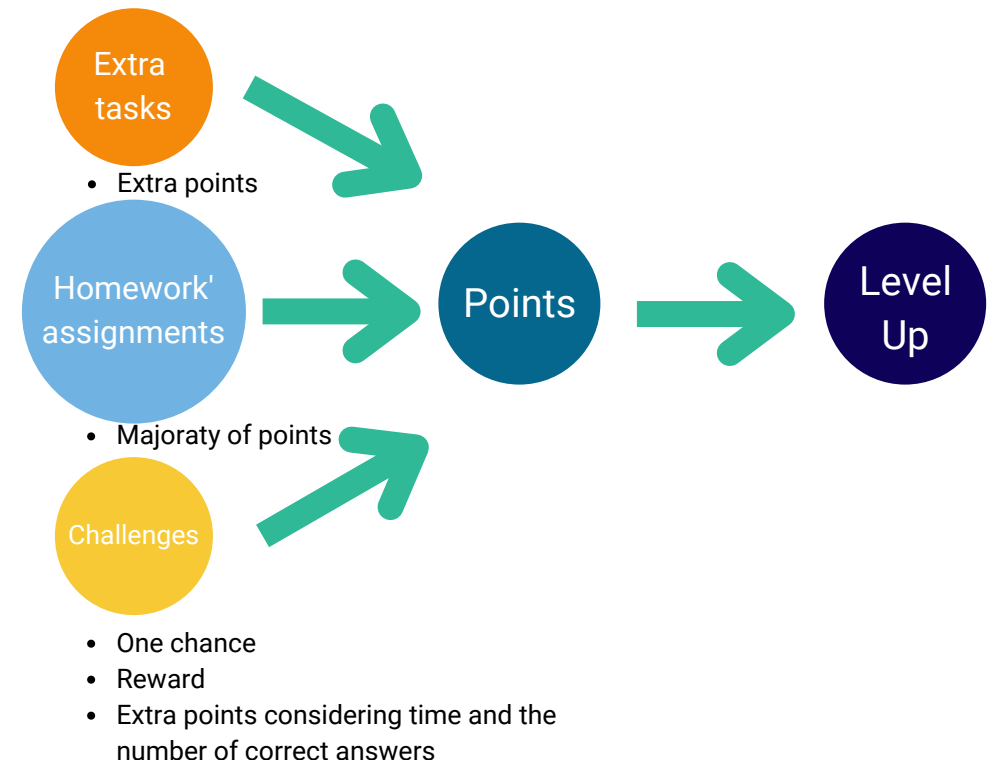
Levels

Definition

Levels are a gamified mechanism that gives players a sense of progress. Typically, the first levels are easier to achieve and require less effort and skills. Gradually, the difficulty of passing the levels increases and the time it takes players to reach a new one can be longer (Gohele, 2013).

Implementation

We previously presented a proposal concerning the conditions necessary to reach a new level. Next (in examples), we summarize through a schematic the game mechanism that can aggregate the various choices made by students regarding game elements, including levels.

Examples

Extra tasks
- Extra points

Homework' assignments → Points → Level Up
- Majoraty of points

Challenges
- One chance
- Reward
- Extra points considering time and the number of correct answers

16.

17.

Gamified elements/mechanisms chosen by our students

Impacts

According to a investigation carried by Mekler and colleagures (2013b) the use of levels in games can **promote the maintenance of players' performance** for longer than a basic point system. Performance is also maintained by the fact that participants understand what they must do to reach the next level. As if they adopted the conditions of reaching a new level as a goal.

It is important to note that some studies alert to the fact that the advancement of levels does not always mean better learning on the part of students (Goehle, 2013). However, other studies refere that levels can work as feedback, since they can help students and teachers to understand students' progress (Tulloch & Randell-Moon, 2018).

Other gamified elements/mechanisms

GAMEWORK
homework gamified environment

Feedback

Definition

Feedback is defined as a space where students receive teachers perceptions of their work, notes and suggestions to improve (Foucault et al., 2019).

Implementation

Feedback should be meaningful to the one who receive it. In this sense, is suggested to be short and actionable, which means that should explain briefly the students' doubts, helping them to improve (Foucault et al., 2019).

Examples

In GameWork it could be interesting to include a space dedicated to contact between students and teachers. In addition, it could be equally interesting to implement quick mechanisms for teachers to give quick feedback on a certain activity or question.

Impacts

Feedback is an essential tool in education, since it can lead to **higher quality education and better learning outcomes**. Also, when feedback is given effectively, **it can promote students' motivation, self-efficacy and confidence** (Ani, 2019).

Additionally, this mechanism can **improve the relationship between students and teachers**, creating a more friendly learning environment. However, for this to happen, feedback must be specific and individual, so students preceive it as meaningful (Pankonin & Myers, 2017).

There are several types of feedback, but Ani (2019) suggests that a **combination between positive feedback** - value the learning and academic achievements of students; **and negative feedback** - alert students to mistakes made and areas for improvement; can **helps students to achieve advance academic skills.**

Other gamified elements/mechanisms

Rewards

Definition

Rewards are element created to encourage players to be active in games. There are four types of rewards:

1. "Glory - Scores, leaderboards, medals, achievements, badges
2. Sustenance - Resources
3. Access - Unlocking mechanisms
4. Facility - Currency, points, level, virtual items/tangible rewards" (as cited in Zhao & Guo, 2019)

Implementation

In GameWork we suggest to use **glory rewards** through achievements and badges, and **facility rewards** through points and levels.

Examples

In increasing difficulty section we already presented examples of possible badges and rules to achieve new levels.

Also, in levels section we presented a map that explains the possible way to include different gamified elements, including these rewards.

Impacts

The main objective of rewards is to motivate players to continually participate in activities. In educational contexts, gamified rewards can **promote students achivements regarding knowledge and skills** (Liaw, 2008).

A recent investigation confirmed that rewards have positive impact in students participantion in activities, improving their engagement. Also, since rewards were assigned to recognize students effort, it promoted students' academic performance (Ricon-Flores & Santos-Guevara, 2021).

Other gamified elements/mechanisms

GAMEWORK
homework gamified environment

Badges

Definition

Badges are visual representations of students achievements (Metwally et al., 2020).

Implementation

It would be interesting if we could have a space in GameWork were students could see all badges that they can conquer. We could create badges not only for passing levels, but also for repond-quickly in challenges, complete homework assignements in time, complete extra tasks, improve their performance (given by teachers) and for collaborative work with their collegues (given by teachers) (Rincon-Flores & Santos Guevara, 2021).

Examples

Next we will present some badges that could be implement into GameWork (only as suggestion).
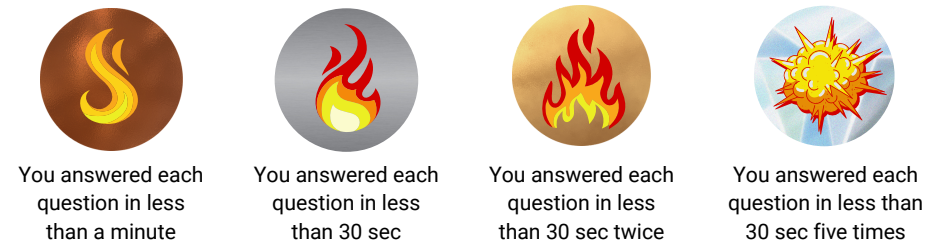
Passing levels

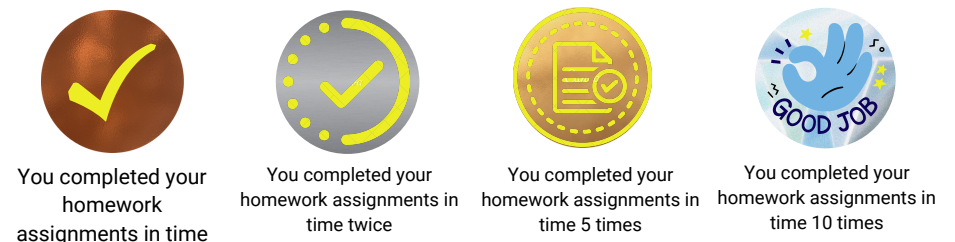Everytime a student achieve a new level (rules in increasing difficulty section).

Quick answer in challenges

When students respond to each question in less than 30 sec or in less than 1 min.

| You answered each question in less than a minute | You answered each question in less than 30 sec | You answered each question in less than 30 sec twice | You answered each question in less than 30 sec five times |

Complete homework assignments

When students complete their homework assignments in time.

| You completed your homework assignments in time | You completed your homework assignments in time twice | You completed your homework assignments in time 5 times | You completed your homework assignments in time 10 times |

Other gamified elements/mechanisms

Complete extra tasks

When students complete extra tasks proposed by their teachers.

You completed an extra task

You completed an extra task twice

You completed 5 extra tasks

You completed 10 extra tasks

Performance improvement

Teachers could be responsible for these badges and give them to students which they feel they have improved.

You improved!

Your effort was recognized!

Your teacher is proud!

Congrats for all your improvement!

Great colleague

Teachers could be responsible for these badges and give them to students who help others and work well in group.

You helped a friend!

Your group made a great job!

You all are an incredible team!

You are a great friend!

Impacts

The use of a reward system can **promote students motivation, engagement and participation**. Moreover, badges have a positive impact in students **extrinsic** but also **intrisic motivation**, since they have a better perception of their achievements. This leads to an **improvement of their academic performanc**e (Rincon-Flores & Santos-Guevara, 2021).

Also, badges can be perceived by students as fun, as a **booster of their confidence**. Addictionally, badges can help students on doing a **self-assessment** of their knowledges and learnings. To increase the power of the badges it is advised that they should be **multi-level, systematic and continuous** (Aldemir et al., 2017).

Other gamified elements/mechanisms

GAMEWORK
homework gamified environment

Quizzes

Definition

Quizzes could be a task that involves answering a set of questions (Metwally, et al., 2019; Panahandeh & Chalak, 2020). Also, quizzes are described as an element of a game that creates learning oportunities (Sanchez et al., 2020).

Implementation

We suggest to implement quizzes inside challenges. This way, students have the challenge of respond to brief quizzes to won rewards, points and badges. Also, we think that would be better if these quizzes were developed by teachers, so it could be in line with subjects that students were adress in classes.

Examples

There are some online platforms that allow you to create quizzes in a gamified way, such as Kahoot, Quizizz, Typeform, Google Forms.

Impacts

An investigation carried by Sanchez and collegues (2020) aimed to understand the impact of online quizzes in students grades. Acordding to this study, **students who completed only quizzes before tests, had better results on their grades**. Also, authors wanted to understand the difference of gamified quizzes and traditional quizzes. **Students who completed gamified quizzes had better grades**, comparing with ones who completed traditional quizzes (Sanchez et al., 2020).

Moreover, **chances/attempts** are important and **can lead to significant learnings**. The fact that students have more opportunities to take the quizzes, makes their **grade average increase**, the **response time decreases** and their **learning is solidified** (Cohen & Sasson, 2016).

Other gamified elements/mechanisms

GAMEWORK
homework gamified environment

Time constraints

Definition

Time constraints is defined as the amount of time the student has to complete an activity. It may appear on the gaming platform as a countdown. This mechanism encourages players to respond quickly. You can use it as a reward for giving students more seconds/minutes to complete a task (Metwally et al., 2019; Metwally et al., 2021).

Implementation

In GameWork Project time constraints can be implmented as a gamified mechanism in challenges.

Examples

There are several games that uses time constraints as a gamified mechanism. In GameWork, we suggest to implement this mechanism through a timer that appears once challenges are started.

1 2 : 0 0

Impacts

No investigations were found on the impact of limited time on games applied in an educational context.

Other gamified elements/mechanisms

GAMEWORK
homework gamified environment

Tutorials

Definition

Tutorials can be turn available in the first contact of students with the game platform, so that they learn to interact with it. They can also be used in the game's logo, showing instructions or illustrative images to help students complete tasks (Metwally et al., 2021).

Implementation

We suggest to include tutorials in GameWork in two different ways. The first one is to **help students on their first contact with our platform**. In this sense, in our opinion, it would be great if we could develop a brief video with instructions about how to use GameWork platform, and its main features and areas.

The second way regarding using tutorials is through explanations by teachers on how to solve an exercise, a video clarifying frequent doubts that arise from students, etc. Basically, to **create a space where teachers and students were closer to clarify doubts.**

Examples

There are numerous websites with tutorials, like KhanAcademy, CodeAcademy or Codingame. However, these sites are usually related to coding and are more useful for students or those interested in software development.

Neverless, there has also been an increasing number of videos made available by teachers on youtube, which explain specific parts of subjects.

Impacts

The use of tutorial may **increase students motivation** in activities (González et al., 2014), may minimize frustration and **prevent drop ou**t (Martin et al., 2005).

Conclusion

The purpose of writing this report was to describe the mechanisms and game elements most desired by students. In this way, the team responsible for the development of the GameWork platform will carry out its work in an informed manner and in accordance with the students' expectations.

As it was possible to understand through the writing of this report, there are several mechanisms and game elements, which impact the performance, motivation and involvement of students in academic tasks. However, to maximize the effects of these mechanisms, we can implement them together, as for example the map suggested in the section on levels.

In this sense, in addition to including the elements and mechanisms most chosen by students, we also describe those that can be easily integrated into the game system.

Aldemir, T., Celik, B., & Kaplan, G. (2017). A qualitative investigation of student perceptions of game elements in a gamified course. Computers in Human Behavior, 78, 235-254. https://doi.org/10.1016/j.chb.2017.10.001

Ani, A. (2019). Positive feedback improves students' psychological and physical learning outcomes. Indonesian Journal of Educational Studies, 22(2), 135-143.

Butler, B., & C. Bodnar. (2017). "Establishing the impact that gamified homework portals can have on students' academic motivation." Proceedings of the 2017 American Society for Engineering Education (ASEE) Annual Conference & Exposition, 25–28, 2017.

Cao, Y., Gong, S-Y., Wang, Z., Cheng, Y., Wang, Y-Q. (2022). More challenging or more achievable? The impacts of difficulty and dominant goal orientation in leaderboards within educational gamification. Journal of Computer Assisted Learning, 38(3) 845-860. https://doi.org/10.1111/jcal.12652

Cohen, D., & Sasson, I. (2016). Online quizzes in a vistual learning environment as a tool for formative assessment. Journal of Technology and Science Education, 6(3), 188-208. http://dx.doi.org/10.3926/jotse.217

Dichev, C., Dicheva, D.,Angelova, G., & Agre, G. (2014). From gamification to gameful design and gameful experience in learning. Cybernetics and Information Technologies, 14(4), 80-100. https://doi.org/10.1515/cait-2014-0007

Foucault, M., Blanc, X., Falleri, J-R., & Storey, M-A. (2019). Fostering good coding practices through individual feedback and gamification: an industrial case study. Empirical Software Engineering, 24, 3731-3754. https://doi.org/10.1007/s10664-019-09719-4

Goehle, G. (2013). Gamification and web-based homework. PRIMUS, 23(3), 234-246, https://doi.org/10.1080/10511970.2012.736451

Goehle, G., & Wagaman, J. (2016). The Impact of gamification in web-based homework. PRIMUS, 26(6), 557-569, https://doi.org/10.1080/10511970.2015.1122690

González, C. S., Toledo, P., & Munõz, V. (2016). Enhancing the engagement of intelligent tutorial systems through personalization of gamification. International Journal of Engineering Education, 32(1), 532–541.

Groening, C., & Binnewies, C. (2019). "Achievement unlocked!"—The impact of digital achievements as a gamification element on motivation and performance. Computers in Human Behavior, 97, 151-166. https://doi.org/10.1016/j.chb.2019.02.026

Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education. 9th international Balkan education and science conference.

Koivisto, J., & Hamari, J. (2014). Demographic differences in perceived benefits from gamification. Computers in Human Behavior, 35, 179.

Koppitsch, S. E., & Meyer, J. (2022). Do points matter? The effects of gamification activities with and without points on student learning and engagement. Marketing Education Review, 32(1), 45-53. https://doi.org/10.1080/10528008.2021.1887745

Kumar J. Gamification at work: Designing engaging business software. In A. Marcus (ed.) Design, User Experience, and Usability: Health, Learning, Playing, Cultural, and Cross-Cultural User Experience. Berlin, Germany: Springer, 2013, pp. 528–537.

Liaw, S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. Computers & Education, 51, 864-873. http://dx.doi.org/10.1016/j.compedu.2007.09.005

References

Martin, L. R., Williams, S. L., Haskard, K. B., & DiMatteo, M. R. (2005). The challenge of patient adherence. Therapeutics and Clinical Risk Management, 1(3), 189-199.

Mazarakis, A., Brauer, P. (2020). Gamification of an open access quiz with badges and progress bars: An experimental study with scientists. In J. Koivisto, M. Bujic, & J. Hamari (Eds.). Proceedings of the 4th International GamiFIN Conference, GamiFIN 2020 (Vol. 2637,pp. 62–71). CEUR-WS.org.

Mekler, E. D., Bruhlmann, F., Opwis, K., & Touch, A. N. (2013a). Disassembling gamification: The effects of points and meaning on user motivation and performance. Proceedings of the First International Conference on Gameful Design, Research, and Applications – Gamification' 13 (pp.66-73).

Mekler, E. D., Bruhlmann, F., Opwis, K., & Touch, A. (2013b). Do points, levels and leader boards harm intrinsic motivation?: an empirical analysis of common gamification elements. Proceedings of the First International Conference on Gameful Design, Research, and Applications. Toronto, Ontario, Canada: Association for Computing Machinery. pp. 66–73.

Metwally, A. H. S., Nacke, L. E., Chang, M., Wang, Y., Yousef, A. M. F. (2021). Does gamifying homework influence performance and perceived gameful experience?. Sustainability, 13, 4829. https://doi.org/10.3390/su13094829

Metwally, A. H. S., Yousef, A. M. F., & Yining, W. (2019) "Investigating the effects of gamifying homework on students' perceived satisfaction, behavioral intention and intrinsic motivation," in Proceedings of the 3rd International GamiFIN Conference, 2019, vol. 2359, pp. 47–57.

Metwally, A. H. S., Yousef, A. M. F., & Wang, Y. (2020). Learning Analytics and Perceived Experience of Gamifying Homework Assignments. In CSEDU (pp. 673-683).

Panahandeh, M., & Chalak, A. (2020). Role of gamification in doing homework by Irarian EFL learners. Journal of Studies in Learning, 9(1), 79-95.

Pankonin, A., & Myers, R. (2017). Teachers' use of positive and negative feedback: Implication for student behavior. OPUS SPRING. https://wp.nyu.edu/steinhardt-appsych_opus/teachers-use-of-positive-and-negative-feedback-implications-for-student-behavior/

Rincón-Flores, E. G., & Santos-Guevara, B. N. (2021). Gamification during Covid-19: Promotig active learning and motivation in higher education. Australasian Journal of Educational Technology, 37(5), 43-60. https://doi.org/10.14742/ajet.7157

Rincón-Flores, E. G., Montoya, M. S. R., & Mena, J. (2019, October). Engaging MOOC through gamification: Systematic mapping review. In Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality (600–606). https://doi.org/10.1145/3362789.3362831

Sanchez, D. R., Langer, M., & Kaur, R. (2020). Gamification in the classroom: Examining the impact of gamified quizzes on student learning. Computers & Education, 144, 103666. https://doi.org/10.1016/j.compedu.2019.103666

Santana, C. C. A., Azevedo, L. B., Cattuzzo, M. T., Hill, J. O., Andrade, L. P., & Prado, W. L. (2017). Physical fitness and academic performance in youth: A systematic review. Scandinavian Journal of Medicine & Science in Sports, 27(6), 579–603. https://doi.org/10.1111/sms.12773

Tulloch, R., & Randell-Moon, H. E. K. (2018). The politics of gamification: Education, neoliberalism and the knowledge economy. Review of Education, Pedagogy, and Cultural Studies, 40(3), 204-226. https://doi.org/10.1080/10714413.2018.1472484

References

Westenhaver, Z. K., Africa, R. E., Zimmerer, R. E., & McKinnon, B. J. (2021). Gamification in otolaryngology: A narrative review. Laryngoscope Investigative Otolaryngology 7(1), 291-298. https://doi.org/10.1002/lio2.707

Zhao, F., & Guo, D. (2019). Rewards in gamification. International Conference on Human-Computer Interaction, June 2019, pp. 453-462.

GAMEWORK TEAM

www.facebook.com/GamifiedTeam

@gamework2022_24

www.game-work.eu