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DIGITAL TRANSFORMATION OF LEARNING PROCESS DUE TO COVID-19 CRISIS IN THE REPUBLIC OF NORTH MACEDONIA

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ABSTRACT

The paper focuses on ICT-enabled education and advanced Learning Management Systems (LMS) through introducing the concept of gamification on improving the learning processes of students in Higher Educational Institutions (HEIs) in the Republic of North Macedonia, which has become a requirement due to the measures related to the COVID-19 crisis. The main goal of the research is to examine the practical implications of gamified systems on improving student motivation and engagement in distant learning processes. The research indicates that HEIs can benefit by implementing gamification in their higher educational processes, especially prevalent when LMS are involved. In line with other research on the field, the paper brings new data and conclusions applicable for the country of interest, as well as the more expanded Balkan region. As the research focuses on primary data through case study and questionnaires, it moves forward the discussion on implementing gamification systems in the learning processes for students at a tertiary level, with significant improvement to student motivation, habits and participation in class even on a short term-basis. Data and analysis from the research enable new evidence and conclusions in the role of gamification in modern LMS.

KEYWORDS: Gamification, learning management systems, Distance learning, motivation, COVID-19

JEL CLASSIFICATION: I22, I23

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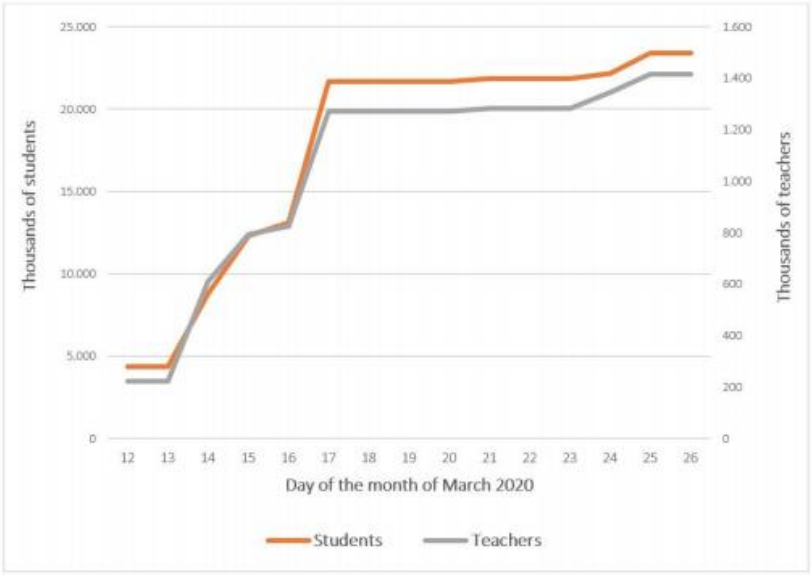
INTRODUCTION

The concepts of distance learning have gained traction with the recent changes due to the COVID-19 pandemic, forcing HEIs (Higher Educational Institution) to change traditional classes with the utilization of IT and Internet technologies and transform them into virtual classes. Latest numbers state that courses are already done mostly in a virtual working environment in the fall semester of the academic 2020/21, with this trend expected to continue throughout the next summer semester, as well as increased percentage of students with full-time employment, due to the flexibility that this system can offer (Athanvale, 2020). UNESCO (2020) predicts that the current crisis will leave a mark on higher education both on the short-term and the long-term, affecting both students and teaching staff. Students face uncertainty over many activities, which can be summarized in two broad categories: learning and evaluation processes. On the other hand, HEIs and teaching staff have to quickly adapt to the new situation, ensuring that both learning and evaluation processes can be transformed into a virtual environment, while maintaining the same level of quality when compared to the traditional methods.

Graph 1. Number of students and teaching staff affected by COVID-19



Source: COVID-19 and higher education: Today and tomorrow Impact analysis, policy responses and recommendations (UNESCO, 2020)

Graph 1 indicates the enormous impact of the current COVID-19 crises on higher education across the world. In a span of several days in March 2020, millions of students and teaching staff had their activities paused due to government regulations

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and lockdowns, with most of them continuing activities in a virtual learning environment. These measures are expected to last on a long-term basis, so as each solution has to be rolled out to students as soon as possible, there are concerns with the quality of the implementation and student feedback.

The paper focuses on the first category, which encompasses the transformation of student learning process from traditional into digital form. The student learning process involves three broad elements which are examined in the paper (Gogus, 2008):

- In-class activities
- Out of class activities
- Material for studying

METHODOLOGY

To research the main topic in detail, a combination of secondary and primary research methods is utilized. Literature review represents the main method for obtaining theoretical and background data through books, scientific papers and articles on connected topics. Primary research is done through implementing a case study method on two North Macedonian HEIs with students from second, third and fourth year of studies, selected to participate in the study. A total of 32 students were selected to participate in the study, which lasted for a time period of 2 weeks, which included extensive usage of the gamified application "Habitica[1]" and a period of evaluation through a research questionnaire. This entails establishing a baseline for current level of motivation for students before utilized a gamified system, as well as evaluating the level of improvement in aspects for motivation through a research questionnaire. The research questionnaire contains 15 questions mostly from the closed nature, which was distributed to the students after the completion of the case study period of utilizing the gamified application. Since there were no further restrictions on demographic characteristics or type of studies, students were selected at random, with the questionnaire being sent to them in a digital form, through the digital platform Google Forms. Results are analyzed focusing on several key points regarding improvement of learning processes and educational systems. The research was implemented from 01.02.2020 through 21.04.2020.

[1] https://habitica.com/static/home

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LITERATURE REVIEW

To successfully transform student learning processes with IT and Internet technologies, all three elements have to be taken into account during the implementation. The system and encompassing technologies that facilitate the provision of courses in a virtual environment (over long-distance) are termed as "Learning Management Systems" or LMS in short (Turnbull et al., 2019). Another definition of LMS is a web-based software platform that can create a virtual learning environment, automate the administration, organization, delivery, reporting and provide support for educational content and learning outcomes.

LMS can provide several advantages for students (Iqbal & Qureshi, 2011):

- Single point of availability for all courses and course related information
- Option to get regular feedback from teaching staff
- Possibility for interactive learning with various tasks and exercises directly on the LMS
- Convenient tracking of progress in a course
- Ease of use through various devices equipped with access to the Internet
- Location independence and opportunity to follow classes online and participate in all activities without any physical presence

However, the implementation of an LMS does not automatically guarantee the transformation of traditional class and learning activities in the virtual environment. Despite the technical nature of an LMS, HEIs must allocate time and resources in the organization of activities and supporting teaching staff to fully exploit the potential benefits and ensure the best possible implementation. In many cases, LMS implementations tend to be course-centric rather than student-centric, which tailors the activity across courses inequality and leaving students to adapt to each course differently based on the teacher's preferences. Not utilizing a holistic approach in LMS and virtual learning implementation can result in limited student motivation and ability to participate in activities.

Student motivation represents a significant psychological concept in education, since it directly drives and strengthens the students' ability to learn and improve in their academic performance. SDT (Self-determination theory) is a theory of human

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motivation that researches different types of motivation, with specific focus on autonomous motivation, controlled motivation and motivation as predictors of performance (Odanga, 2017).. The main goal of SDT is to determine how people can be motivated or demotivated due to different factors surrounding them. Motivation is a construct that explains goal-directed behavioural force to face severe and challenging circumstances characterized by initiation, direction, intensity, persistence, and quality of behaviour (Alsawaier, 2017). Student motivation has been in focus throughout the past, but with the virtual learning environment, new technologies introduce different complexities which usually results in reduced motivation in most cases. Furthermore, limited face-to-face contact with students results in difficulty to assess student (de)motivation for teaching staff, making it even harder to react in these types of situations. Students self-motivation is of prominence important when designing and implementing LMS and preparing to tackle learning in a virtual environment, for HEIs of all countries and educational areas.

When analyzing motivation, in can be divided in two main categories (Kiselicki & Josimovski, 2019):

- Intrinsic motivation, which is also referred to as student self-motivation in this case, which comes from the internal motivators/factors. This type of motivation is harder to achieve, but tends to be much more effective and last longer
- Extrinsic motivation, which comes from external factors imposed by the environment, in this case the teaching staff, parents etc. This type of motivation is easy to achieve, but is usually very short-term and with limited impact.

Throughout the past years, a new concept for increasing intrinsic motivation has been extensively researched by the authors of this paper, which has found to produce promising results in various working environments, especially when introduced in a virtual working environment. The concept of gamification can be defined as utilizing game theory, mechanics and certain elements of game design in an environment outside of (video) games, with the end goal being to motivate people to achieve their goals (Detering, 2011). Gamification as a system is starting to gain traction through various implementations in different sectors, though most of the

implementations so far have been focused in the business world. Companies utilize gamification systems to intensify customers' and employees' interest in a specific brand, leading to increased engagement and levels of satisfaction. Gamification can appear in many different forms, such as loyalty programs, hidden tokens, virtual avatars, competitions, game prizes and etc (Van Der Boer, 2013). Usage of gamification and game mechanics can boost learning skills by 40%, leading to higher level of commitment and task completion (Kiryakova et al., 2014). Student motivation is core in improving the student learning experience, which is difficult to monitor and managed remotely in an LMS. By introducing gamified systems and processes, students are engaged in an automated system that constantly guides them in their activities regardless of their location (Lopes et al., 2015).

Models for gamification can be implemented in the educational sector through a system of elements, mechanisms and rewards encompassing four different steps (Aparicio, 2012):

1.**Identification of the main tasks** - the classroom tasks that needs to be gamified

2.**Identification of transversal objectives** - other objectives besides the main objective that would be interesting and attractive for students to perform the activity

3.**Selection of gamification mechanisms** - depending on the main goal, related to the elements of intrinsic motivation

4.**Analysis and control** - through tests with specific metrics, questionnaires, or evaluation of experts on gamified processes and mechanisms applied, in order to compare the results before and after implementing gamification in activities.

RESULTS AND DISCUSSION

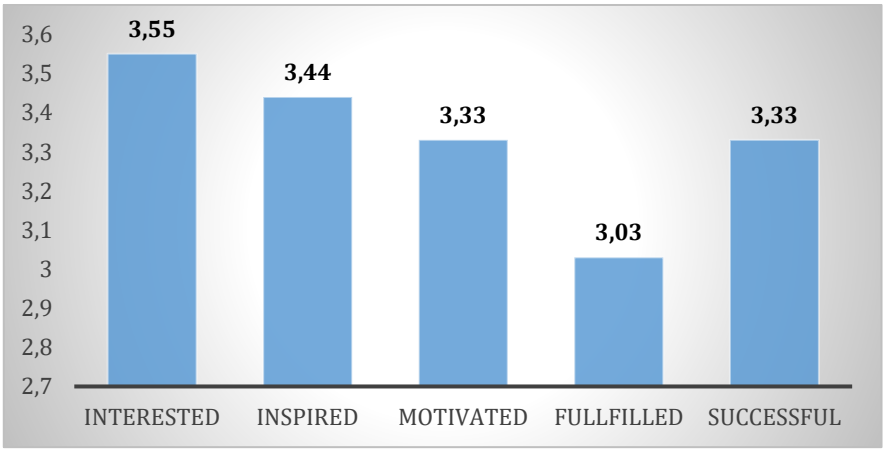
To assess the impact of gamification and gamified application on student motivation and view toward learning, a primary research was carried in a time period of 80 days. During this period, selected students were required to install and daily use the gamified platform Habitica, over the period of 1 to 2 weeks (based on preferences). Habitica can be described as a platform to improve real-life habits by gamifying all the tasks and habits[2]. Following the usage of Habitica, students were given a questionnaire,

[2] https://habitica.com/static/features

which was structured of 14 closed question and 1 open-ended question. Students were part of either private or public HEIs functioning on the territory of the Republic of North Macedonia. In the period of 01.02.2020 through 21.04.2020, a total of 27 students completed the given assignments and successfully completed the questionnaire, with 5 other students not being able to either finish using the platform or to deliver a filled questionnaire. The questionnaire in its original form is contained in the annex of the paper.

Most of the students are between the age groups of 20-22 (44,4%) and 18-20 (40,7%), followed by 22-25 (11,1%) and 30+ (3,7%). Gender distribution remains almost equal, with 51,9% of the participants being male and 48,1% of the participants being female. Demographic classification concludes with the type of studies that participants are enrolled with, where social sciences dominate with 74,1%, followed by applied sciences with 18,5%, as well as natural and humanistic sciences, both with 3,7%.

Graph 2. Student view towards classes



Source: Own research

Graph 2 pertains towards students' motivation during classes with physical presence. Due to the extensive focus of gamification toward intrinsic motivators, student self-motivation is crucial to provide a baseline before the implementation of the gamified platform. The answers were based on a 5-point Likert scale, with 1 being the lowest and 5 being the highest grade. General levels of satisfaction are above average (a menial 2,5), but fail to break the 4,0 barriers. During physical classes, students score the highest in interest with 3,55 (out of 5), followed by being inspired

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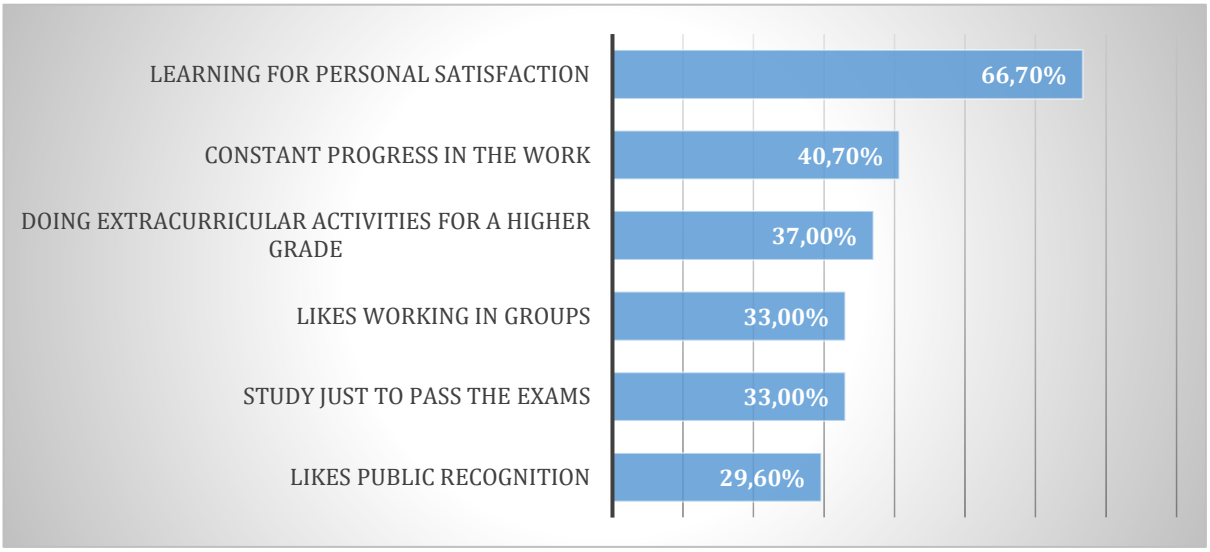
with 3,44 (out of five). These are above average levels which can certainly be improved through implementing gamification processes.

Graph 3. Student motivation for participating more in certain classes



Source: Own research

Breaking down the specific reasons for student participation in classes in Graph 3, the most prominent reason is “getting personal satisfaction” with 66,70%, followed by “seeing progress” with 40,70% and “doing extracurricular activities for a higher grade” with 37%. Student valuing personal satisfaction as a key component in motivation for studying and participating in class activities is in line with the intrinsic motivators which are targeted through gamification models. Additional data is gathered to discover the most frequent reasons for doing school activities. Students rate the highest “improving personal skills and knowledge” with 70,4%, “getting extra points/higher grade” with 59,3% and “getting public recognition with 29,6%. This also demonstrates that there could be definitive potential in implementing models for gamification to increase student motivation and participation in virtual classes.

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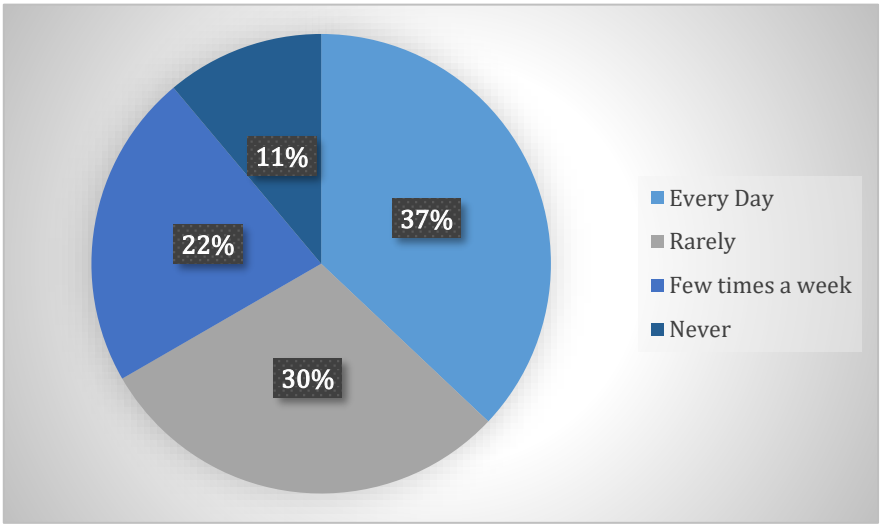
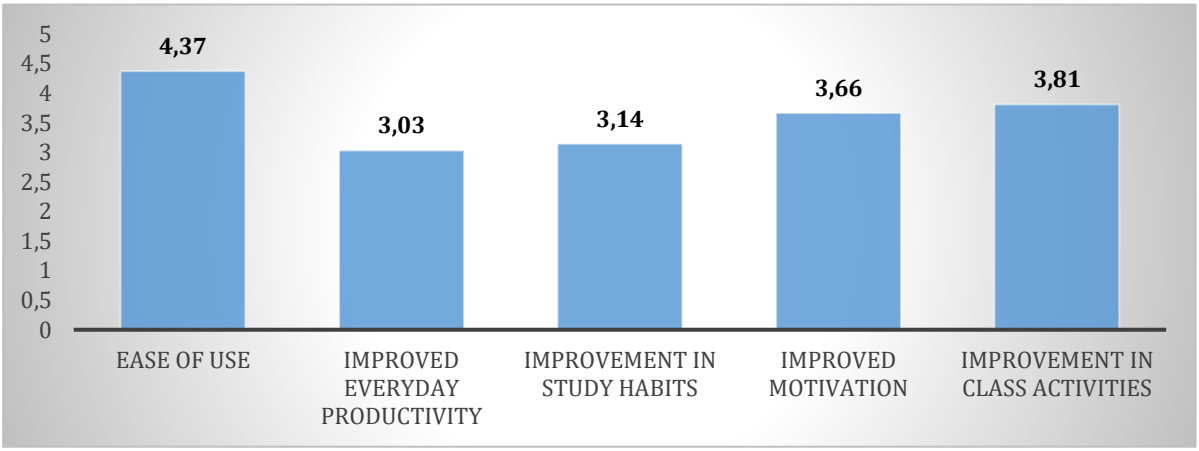
Graph 4. Frequency of playing mobile/video games



Source: Own research

The last qualifying question is how often students play mobile or video games, represented in graph 4. Most of the students (37%) play video games or mobile games on a daily basis, while only the smallest percent (11%) have never played. Since gamification utilizes mechanics often found in video games, exposure to games on a regular basis can significantly shorten the learning curve and adaptation to gamified platforms and applications.

Graph 5. Student view towards classes



Source: Own research

Graph 5 analyzes the student views after a period of one to two weeks of actively using the application as part of at least one subject in class. Since the situation with the COVID-19 pandemic, part of the study was conducted with combined classes (physical presence plus online activities in February 2020 and part of March 2020), while the other part in March/April 2020 was entirely conducted utilizing online classes and

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work. The situation can give us a better insight into the usefulness of this type of platform during both combined and online classes. After extensive daily use, students were asked to evaluate five relevant aspects of the application. The first evaluated aspect is the ease of use, which has scored very high on the Likert scale, with 4,37 (out of five). Across the other four aspects, which are related to different areas of student activities, we have above average grades (over 2,5) in two of them, including Improvement in study habits (3,14) and improvement in everyday productivity (3,03), as well as high grades (over 3,5) relating to improvement in class activities (3,81) and improved motivation (3,66).

CONCLUDING REMARKS

Current implementation of LMS focuses on content delivery, while student and teacher feedback and ease of use is limited, which can lead to poor implementation and dissatisfaction in the end. Conducted primary and secondary research shows that models for gamification can have significant impact if implemented properly into LMS and classroom activities:

- Current level of satisfaction from physical classes is above average (around 3,0 on a Likert scale), but the digital transformation of classes can result in loss of motivation and participation in learning activities
- Gamification focuses on the intrinsic motivation, which is more difficult to achieve, but also longer lasting than extrinsic motivation. Various case studies show that gamification can yield positive results, from higher attendance, higher engagement rates and ultimately higher average grades for the students.
- Different student generations (ranging from 18 to 30 years) have been regularly exposed to video games or mobile games at least a few times a week (67%), which is an indicator that they have already been exposed to certain mechanics of gamification, which are directly lifted from said games. This enables easier integration into the gamified platform and an advanced starting point when compared to older generations.
- Through an extensive case study and analysis, initial results demonstrate that students are relying on intrinsic motivators, which include learning for

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personal satisfaction and seeing constant progress in the work done, which is a precursor for susceptance to gamified systems. As gamification targets intrinsic motivators which are in line with current student motivations, we predict a greater chance of success than in other implementations.

- The study clearly demonstrates the benefits of introducing a gamified system to students, which has resulted in above average improvements in class activities, student motivation, everyday productivity and study habits. All four analyzed indicators have shown improvement, even in the relatively short period of implementation ranging from one to two weeks.

This research can be further expanded by including students from several different Balkan countries, as we believe that there could be significant cultural differences, resulting in potentially different results. Additionally, the research focused on a short-term implementation without direct integration in the LMS, which leaves the potential to evaluate integration on a deeper level throughout a whole semester in a single or multiple subjects.

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ANNEX I – Research questionnnaire

Анкета за гејмификација во датабази и образование

Почитувани студенти, ви благодариме за учество во овој прашалник, која е дел од истражувањето користење на бази на податоци и гејмификација. Вашите одговори се од огромно значење, но учеството е доброволно и може да се откажете од прашалникот во секој момент.

Одговорите на прашањата се целосно заштитени и доверливи, при што ќе бидат кодирани и прикажани како вкупни статистики, а не како посебни индивидуални податоци.

Ви благодариме однапред за соработката и одвоеното време.

* Required

Возраст *

- ◯ 18-20
- ◯ 20-22
- ◯ 22-25
- ◯ 25-30
- ◯ 30+

Пол *

- ◯ Машки
- ◯ Женски
- ◯ Не би сакал/а да специфицирам

Вид на студии *

Одберете поле на студирање според факултетот на кој сте запишани

- ◯ Општествени науки
- ◯ Природно-математички науки
- ◯ Технички/применети науки
- ◯ Хуманистички науки

Додека сум на факултет/предавање се чувствувам: *

Оценете ги изјавите од 1 (најниско) до 5 (највисоко)

	1	2	3	4	5
Заинтересиран/а	◯	◯	◯	◯	◯
Инспириран/а	◯	◯	◯	◯	◯
Мотивиран/а	◯	◯	◯	◯	◯
Исполнет/а	◯	◯	◯	◯	◯
Успешен/на	◯	◯	◯	◯	◯

Одберете со кои изјави се согласувате за вашето студирање? *

- ☐ Студирањето и учењето ми дава лична сатисфакција
- ☐ Целта ми е да ги положам предметите со најмалку вложен напор
- ☐ Сакам да гледам постојан напредок во задачите ги правам
- ☐ Сакам да работам во група за време на часовите и надвор од нив
- ☐ Сакам да добијам јавно признание за мојот труд
- ☐ Правам дополнителни активности за повисока оценка

Одберете причини заради кои ги извршувате обврските со факултет? *

Под обврски се сметаат присуство и активност на час, домашни задачи, работа во групи на час, решавање задачи итн...

- ☐ Постои можност да добијам награда/поени за извршување на задачата
- ☐ Постои можност да добијам пофалба од професорот за време на часот
- ☐ Постојат негативни последици (казни) доколку не ја завршам задачата
- ☐ Бидејќи сите останати студенти ја прават задачата
- ☐ Бидејќи ќе ги подобрам моите вештини и способности
- ☐ Не ги извршувам

Колку често играте мобилни игри или видео игри? *

Под терминот „мобилни игри" се сметаат игри за вашите паметни телефони

- ◯ Секој ден
- ◯ Неколку пати неделно
- ◯ Ретко
- ◯ Никогаш

Дали успеавте успешно да ја инсталирате апликацијата Habitica? *

- ◯ Да
- ◯ Не

Колку лесно ги внесовте вашите податоци во базата на апликацијата? *

	1	2	3	4	5	
Најтешко	◯	◯	◯	◯	◯	Најлесно

Со кој степен апликацијата влијаеше врз зголемување на вашата секојдневна продуктивност? *

	1	2	3	4	5	
Најниско	◯	◯	◯	◯	◯	Највисоко

Со кој степен апликацијата влијаеше врз зголемување на вашите секојдневни навики? *

	1	2	3	4	5	
Најниско	◯	◯	◯	◯	◯	Највисоко

До кој степен постоењето на виртуелни аватари и виртуелни награди влијаеше врз вашата мотивација? *

	1	2	3	4	5	
Најниско	◯	◯	◯	◯	◯	Највисоко

До кој степен би можела да се користи гејмификација за извршување на вашите активности на факултет? *

	1	2	3	4	5	
Најниско	◯	◯	◯	◯	◯	Највисоко

До кој степен гејмификацијата може да послужи кај студентските вработувања? *

	1	2	3	4	5	
Најниско	◯	◯	◯	◯	◯	Највисоко

Дополнителни коментари:
наведете дополнителни коментари кои не се опфатени во прашањата

Your answer

Submit