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TAKING DIFFERENT PLAYER TYPES INTO CONSIDERATION WHILE IMPLEMENTING EDUCATIONAL GAME - EFFECT ON STUDENT EXPERIENCE AND ACADEMIC RESULTS

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Abstract

In our paper Using player types to develop implementation of educational game presented in EDULEARN22 we suggested that even though Bartle's and Marczewski's typologies of player types are more commonly utilized in the context of game design, they can be applied also when developing implementation of educational games. In this paper we presented some game elements that could be included in the implementation of business simulation game to make it more engaging and motivating to students in Finnish university of applied sciences. We claim that if we can motivate students to participate in educational games, we can support and reinforce learning outcomes attained through the game.

This paper furthers the discussion about how player types from game design disciplines can be used when developing and planning course implementations in educational institutions. We will test the method we presented in our previous paper to see if our proposition is feasible in the context of higher education.

To test our presumption of the usability of player typologies in implementing gamified pedagogy, we will conduct a case study in Haaga-Helia University of applied sciences Porvoo Campus during spring 2023. We ask students to fill in a player typologies test by Marczewski and share their results with us. Based on these results, we add elements suggested to be motivating for our dominant player type. After the implementation of the business simulation game, we will analyze if the engagement to the game, feedback and academic results were different from the previous implementations. In this paper we will then share the results to provide a starting point for future discussions and development.

Keywords: educational game, player types, business simulation, course development.

1 INTRODUCTION

Several studies have shown that using games and gamified elements in teaching increases engagement, enjoyment, and motivation to learn. Games also foster our natural tendency to learn through inquiry. When using simulation games in education, the students might also be able to see the connections more clearly between what is been taught and the reason that kind of competence is needed [1]. Therefore, both the actual games and gamification have been applied in all levels of education with promising results. However, even though there are benefits from using games and gamification in education, one should note that not all students are interested in or enjoy the same kinds of games. Also, as in all education, not one method of delivering content suits all. One must be willing and able to adapt the implementation of a game so that it meets the needs of the students as much as possible.

In the field of game design, the idea of player types has been used to modify the games so that they would be enjoyable and engaging for their audience by including certain elements to a game, that feel appealing to those types of players that are the most optimal or most common for that game in question. One of the most used and cited player typologies is the one presented by Richard Bartle [2] illustrated in Fig. 1. In Bartle's taxonomy the players are divided into four archetypes based on if they are more interested in the world or the other players and if they are more into acting or interacting with others. The focus in Bartle's taxonomy is the interest of action of the players, what they enjoy doing the most during the game.

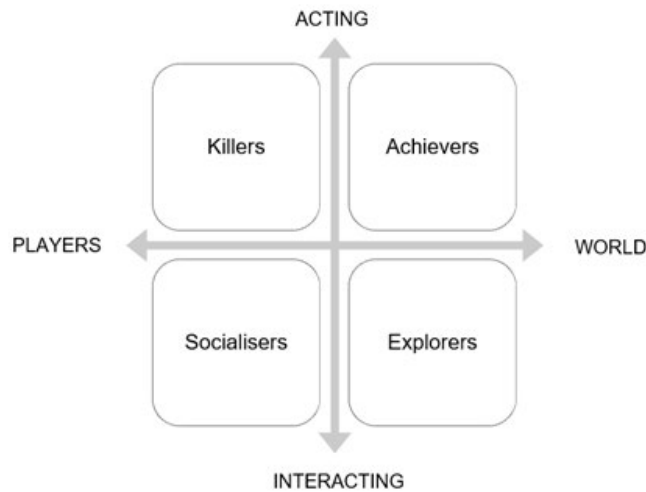


Figure 1. Bartle's player types by sources of interest [2].

Another commonly used taxonomy of player types is the Hexad model presented by Andrzej Marczewski [2] (Fig. 2). As the Bartle's taxonomy is mostly describing the orientation of the interest of players, the Hexad model is more interested in describing the primary motivations of different players. [3] Because motivation is also key element in learning, we claim that this model would be useful also in the context of higher education.



Figure 2. Marczewski's Gamification User Types Hexad [3].

Player or user types are not a tool for assessing how well an individual can play the game, nor is any type better than the other. These taxonomies are a tool for designing the game so that its' elements serve the needs of the players, support their actions, and enhance their experience. One must know the potential users of the game to design the game for that audience. There are also theories about, for example personalities and psychology [4] behind these taxonomies, so of course one might design the game, and then use the model to understand for whom the game is most suitable for.

In our paper [5] presented at the EDULEARN22 conference we introduced a summary of different player types and the game elements that are considered to be most suitable for each player type from Bartle's and Marczewski's taxonomies. This time we are concentrating on Marczewski's taxonomy. The elements supporting different player types from Marczewski's Gamification User Type Hexad [3] can be seen in Table 1:

Table 1. Game elements positively impacting Marczewski's player types.

Element \ Player type	Player	Socialiser	Philanthropist	Disruptor	Free spirit	Achiever
Achievements	X [4], [6]	X [6]	X [6]	X [6]	X [6]	X [4], [6]
Points	X [4]					
Levels	X [4]					X [4], [6]
Badges, certificates	X [4]					X [4], [6]
Story						
Teamwork, co-operation		X [4]				
Gifting			X [4]			
Leaderboard	X [4]					
Communication		X [4]	X [4]			
Exploring					X [4], [6]	
Building, creating				X [3]	X [4]	
Open world, free choice					X [4], [6]	
Problem solving, puzzles						X [4]
Detailed instructions						
Collecting			X [4]			
Trading			X [4]			
Customization					X [4]	
Hidden features, surprises					X [4]	
Epic challenges						X [4]
Quests						X [4]
Competition		X [3]				
Voting				X [3]		
Anonymity				X [3]		

In our paper [5] we suggested the process of designing and developing the implementation of an educational game based on identified dominant player type(s) of the participants. After identifying player types, one should find out what kind of game elements are said to be supporting the motivation and engagement for that type of player that has been found to be the most dominant in the group. The game elements included in the chosen educational game should be compared to these preferred game elements to find out if there is some essential element that is missing and should be added to the implementation of the educational game. It is important to understand that it is not necessary to have all suggested elements included in each implementation, but we claim that adding at least one or two of them might enhance the results.

2 METHODOLOGY

We started to study whether the player type taxonomies could be utilized when developing a course implementation in spring 2022. We asked the students that had participated in our implementation of an educational simulation game to fill in survey about their perceptions and attitudes towards gaming. Based on the survey, our participants could be identified as being player type "Achiever," with "Philanthropist" as the secondary player type. We stated in our paper that the results of the survey might be effected by the fact that the survey was conducted right after the students had participated in implementation of an educational game and this might have directed their answers towards the player type "Achiever." [5]

To test our assumptions about player type taxonomies being useful tool for developing the implementation of an educational game, we followed process presented in Fig. 3.:

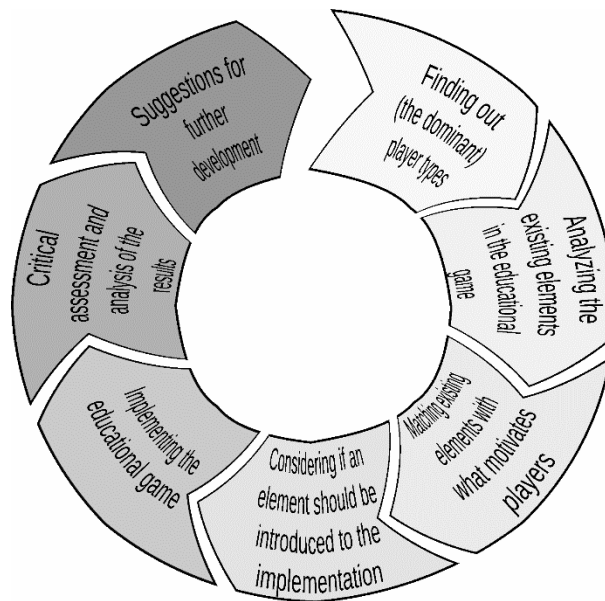


Figure 3. Process used for developing the implementation.

In spring 2023 we had Cesim Business Simulation included in our course implementation. Before we started the actual Business simulation, we asked students to fill in the player type test that can be found and filled in the Marczewski’s website ([7], [8]). This test includes 12 statements that are assessed with 7-point Likert scale whether they agree or disagree with the statement. Based on their responses, the website draws a diagram that shows in hexad-model which types of players the respondent represents. Each respondent has traits from more than one player type, but one is usually the most dominant one.

This time our students represented the following player types:

- Achiever (Philanthropist, Player)
- Player (Achiever)
- Player (Philanthropist, Free spirit)
- Player (Philanthropist, Socialiser)
- Philanthropist (Achiever, Socialiser)

It seems that this time the type “Player” was the most common one, with “Philanthropist” being the second most common of the player types. To get clearer image of the results, we gave the identified player types of scores so that the player type that has been identified as the dominant one for each respondent gets a score 3, the second gets a score 2 and third gets a score 1 if it can be identified. The results of this can be seen in Table 2:

Table 2. Summary of the identified player types amongst participants.

ACHIEVER	PLAYER	PHILANTHROPIST	FREE SPIRIT	SOCIALISER
3	1	2		
2	3			
	3	2	1	
	3	2		1
2		3		1
7	10	9	1	2

When calculating the sum of scores for each of the mentioned player types, one could see that the most common player types in this group are “Player” and “Philanthropist,” the “Player” being slightly more dominant one.

As the “Players” are most motivated by winning the game and earning points [3], their experience can be enhanced by adding elements like achievements, points, levels, prizes and rewards, badges, certificates, and leader boards ([4], [6]). Trying to reach and win these extrinsic rewards and getting acknowledged by the ability to play the game feels motivating and engaging for this type of players.

On the other hand, the “Philanthropists” are motivated by the purpose of their actions. They are willing to give with altruistic motives, without waiting for any rewards [3]. For this type of player, it is most motivating to engage with a game that has elements like achievements, gifting, communication, collecting, and trading included ([4], [6]). These types of players feel enjoyment when they can help others.

It is interesting that these quite contradictory types can be found to be the most dominant in such a small sample of respondents. One explanation for this can be that the respondents also have been replying based on both the image that they want to give of themselves (being willing to help others without expecting anything back) and in the other hand based on the presumption that they are going to play the game in during this course, where their performance will be assessed. It was surprising that the type “Achiever” was not as dominant as the two other types. It might be that when students were filling in the survey beforehand, they were not able to think of upcoming game as part of their learning assignment, and therefore achieving goals, learning, and understanding did not get that much attention.

The simulation game that we are here concentrating on is Global Challenge by Cesim Business Simulations. This game is a simulation through which students can practice competences needed in strategic and international business management [9]. Even though the game is designed to help students understand business strategic management, we have noticed that it can also be used when teaching bachelor level students to read and utilize financial statements and other financial figures. In our implementation the game provides context where students can analyze financial information. They also learn how they can use financial information as the basis of their decision making in business management. These are such competences that will have value in their future careers, no matter in which profession they will end up in.

Next phase in our process is comparing the game elements that can be found in Global Challenge by Cesim Business Simulation and the game elements that have been identified to enhance the experience of the identified dominant player types. By this comparison we will find out the game elements already existing in the simulation game and what should be added to the implementation (see Table 3).

Table 3. Summary of the existing and needed game elements in Cesim.

Element	Already in included in Cesim game/implementation	Player	Philanthropist	To be added
Achievements	Grades	x	x	
Points		x		
Levels		x		
Badges, certificates		x		
Story	Business case			
Teamwork, co-operation	Teamwork			
Gifting			x	
Leaderboard	Results available	x		x
Communication	Discussion board, teamwork		x	x
Exploring				
Building, creating				
Open world, free choice				
Problem solving, puzzles				
Detailed instructions	Manuals and guides, assessment criteria			x
Collecting			x	
Trading			x	
Customization				
Hidden features, surprises				
Epic challenges				
Quests				
Competition	Winning team			x
Voting				
Anonymity	Only teams visible			

Cesim Business Simulation has versatile reports and key performance indicators (KPI) that users can view and study. There are no leaderboards as such, but the teams can be placed in order based on, for example, certain financial ratios. The game suggests that one could use cumulative total shareholder return percentage as the criteria for winning the game: the team that manages to create highest return for the shareholders can be considered as winner. Also, other financial figures, like for example profit for the round could be used to rank the team's performance. Players can see certain financial and performance-related ratios, so listings can be used as a leaderboard. As seeing who leading team at the market is important for the "Player" type of users, we have added extra emphasis on rankings, and we present the results in form of leaderboards. This time we teachers also played as one of the teams. This fosters both the competition element and the communication element; not only are we increasing competition in the markets, but we are also able to communicate decisions and results as we have played the game.

As simulation game is part of students' assignments, they are given grades based on how well they are able to explain and reason their decisions and results in the game. This element of achievement is something that can be considered motivating for both the "Players" and the "Philanthropists." Students also see their progress in Moodle learning platform, so they get a feeling that they accomplish something during the game rounds.

There is a message board inbuilt in the Cesim business simulation, so it would provide a platform for teams communicating. Instead of Cesim messaging the teams tend to use other platforms and applications for communication. They are also able to use contact lessons for discussion with their team and teachers facilitating the implementation of the business simulation. We try to encourage communication between all participants as much as possible.

3 RESULTS

In this paper we wanted to study if the engagement, feedback, and the academic results are impacted by us taking player types into consideration when designing the implementation of Cesim Business Simulation. For assessing the engagement of students, we use the time they have been actively playing the Cesim Business Simulation game. This information can be found from the log files of the business simulation software. For assessing the academic results, we use the grades of the assignments the students must turn in during the game. We compare the average grades of reports from previous implementation and current implementation. Feedback is collected from the oral presentations in the end or during the simulation game.

The average time spent in the business simulation game is 2 hours 36 minutes per round this year. In previous implementation the average time spent was 3 hours 37 minutes per round, and the year before that 1 hour 46 minutes. If we use the time spent as the measurement of engagement, we can say that these findings do not support the assumption that taking player types into consideration would effect on the time spent in the game. However, one could argue if the amount of time spent logged in the game and interacting with it is measuring the engagement of a student. Other measures should be introduced to get a better understanding of the situation. In this kind of simulation game students make decisions once in a round and then they check the results; the need for spending time logged in the game might not give the full picture of the engagement.

Next, we can look at the academic results by reviewing the grades received from the learning assignments connected to the Business Simulation. Previously the average grades (in the scale from 0 to 5) varied from 2.76 to 3.34. This year the variation has been from 3.17 to 3.5. The assessment criteria and the teachers have been the same in both implementations, so the differences in average grades are not affected by changes in these. It must be acknowledged that there are multiple things that may affect the academic performance of the students. However, the results seem to have been better after taking dominant player types into consideration. More research would be needed to confirm these findings.

The feedback received from this current implementation is similar to the ones received from previous implementations. It takes a little time to get familiar with the simulation game platform and the causalities in the game. Sometimes students may feel unmotivated because they are not able to figure out the game and its' mechanics. Even though the game might have been a bit challenging, all the students confirm that they have learned a lot when playing the game. They also have said that the game itself makes learning content more interesting and engaging. In spring 2023 implementation we have added briefing sessions, where we study thoroughly the results and the possible reasons behind the results. This has increased the motivation of the students, as now they are more competent to play the game and make such decisions that will lead to positive outcomes in the leader board.

The number of participants in our research was quite low, which might have effect on the results and the generalizability of them. The participants were also representing only one degree programme, all being in our implementation for the full-time students. However, both female and male students were represented, and there was also slight difference in the age groups of the participants.

4 CONCLUSIONS

Based on this study we are not able to reliably confirm that using player types as a basis of development of educational game would have considerable benefits compared to other approaches. The academic results seem to be a bit better after considering the player types, but after just one implementation, the difference could be due to other factors than actions performed by teachers or the changes in simulation game. Even though the results might be yet inconclusive, player type taxonomies give a systematic approach to developing implementation of an educational game.

This paper illustrates the way we have systematically developed the implementation of educational business simulation game. Even though we were not able to confirm the results, we have presented a process model that could be used for future development in any educational game.

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