Effects of Gamified Learning on Students of Different Player Traits in Malaysia

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Abstract

Diversified learning is the path to supplement students' needs in the contemporary generation. These students' lives have revolved around technology since birth; as such, the role of technology cannot be ignored. Furthermore, this was prevalent during the lockdown imposed by the global pandemic which compelled the incorporation of educational technology into student's lives. As gamification harnesses the power of game elements, identifying how gamified learning affects a student's game player traits will be vital in identifying whether specific learning methods can invoke, change and cultivate better learning outcomes. This quasi-experimental study involving two groups of students learning computer science in Malaysia was carried out over eight weeks. Findings revealed that most prevalent player traits changes were evident in the primary construct of social player traits, followed by subconstructs of customization, relationship, socializing, and mechanics. These changes are attributed to the need to reach out, communicate, and collaborate with their peers and look into how the system works for them individually, within the context of the learning and explorative needs of students. As such, gamified learning has not only managed to offer a new paradigm into the learning ecosystem but has also shown that positive changes can be cultivated based on these conditions.

Keyword: educational technology, gamification, diversified learning, learning ecosystem

As the world soldiers on past the restrictions imposed by the COVID-19 pandemic; many fields have turned to harness technology to ensure their survival and continuity in their respective fields (Mohd Nasir et al., 2021; Pongsakornrungsilp et al., 2021; S. Rashid & Ratten, 2020; Wagner, 2021). In the field of education, although an adaptation of technology has been gradually taking place in the past few years (Tomlinson, 2018), the sudden need for emergency remote teaching (Hodges et al., 2020; Schlesselman, 2020) to supplement the lessons taking place during lockdown has been dependent on technological innovations that were placed on the back burner before this scenario (Eradze et al., 2021). From learning management systems (Başal & Kaynak, 2020) to video conferencing tools (Correia et al., 2020; Gillies, 2008; Lawson et al., 2010; Martin, 2005), everything available has been put up front to ensure it is used to supplement and support the learning process. However, simply using a primary LMS platform may not be sufficient for the students from Generation Z (Kasasa, 2020; Widodo et al., 2020), as their needs may be different since their lives have been revolving around technologies since the day they were born. Although sophisticated and advanced technology like Mixed Reality or Augmented Reality might be suitable for simulation-based education (Eradze et al., 2021), it not be suitable to be implemented within the context of mainstream education, as this may require workforce training; as well as the equipping of students with the necessary tools. The most readily available tools for diversification are gamified learning tools such as Kahoot, Quizizz, and others, platforms which are freeware and are easily accessible.

Gamification-based learning is implemented to cater to the educational, technological learning process, which allows for the integration of technology and education laced with game elements to facilitate the learning process (Deterding & Dixon, 2011). By diversifying the method of learning, it is also hoped that these methods and the elements can trigger as well as cultivate player motivation that exists within a user (Monterrat et al., 2015; Mageswaran Sanmugam, Abdullah, Mohd Zaid, et al., 2016; Schoenau-Fog & Henrik, 2014). Thus, the purpose of this study will be to identify internal player traits that exist in students using gamification in learning and exploring the relationship between the player traits, game elements, achievement, and engagement levels.

Implementation of gamification on the teaching and learning process has been widely shown to positively impact the student's achievement (Wolf et al., 2018) and engagement levels (Molnar, 2018; M. Rashid & Suganya, 2017). As gamification uses game elements in a non-gaming context, students tend to relate the experiences of acquiring game elements as a part of the gaming experience. Therefore, game player traits or player motivation will play a vital role in regulating a better-suited learning model for students. Thus, eliminating the one size fits all model implemented in technology-based learning.

Literature Review

Infusing technology into the traditional classroom is the next phase or next upgrade in the teaching and learning method. Nevertheless, treating technology as an add-on to the learning process is a mistake as it leads to the students being disconnected (Selwyn, 2006) and bored (Craig et al., 2004), and their expectation of technology may be different from what is being offered (Sleeman et al., 2020). Hence, just absorbing technology in education has not reaped the same effects as games or using social networking services such as Facebook, Google+, Twitter, and Myspace (Boyd & Ellison, 2007) as when it comes to games, it is something intriguing (Cheng et al., 2015) and for some, it is part of their daily routines (Gardner & Eng, 2005; McGonigal, 2011). Therefore, with this arises the need to consider an approach that fulfills the needs of various students and allows them to be immersed in the learning process.

Finding a suitable tool that caters to the need of all users is near impossible, although finding a common mousetrap may be the best solution in hand – as such, using games as a tool to supplement learning may be the next best choice. Although game-based learning has long been proven to have a significant impact on learners achievement, cognitive and social development (Prensky, 2001; Sung & Hwang, 2013), it is to be noted that the creation of a full-fledged game for a certain subject or subtopic, especially digital games are beyond reach for an educator (Muntean, 2011). Despite the use of game generators to invoke students' critical thinking which are readily available now (Meishar-Tal & Kesler, 2021), they are yet to teach targeted topics. This approach is known as gamification – the use of game elements instead of creating the whole game itself (Deterding et al., 2011) – is the next best alternative for educators and the organization.

In the context of Malaysian education, gamification has been used to investigate the feasibility of usage (Ong et al., 2013), offline usage in teaching (Hong & Masood, 2014), rendering learning explicit while retaining fun factors (Tan et al., 2014), student attitude and acceptance towards usage in learning (Fah et al., 2016), how game elements affected their learning process (Mageswaran Sanmugam, Abdullah, Mohamed, et al., 2016), using analogue gamification to enhance learners attitude (Mee Mee et al., 2021). However, there was a need to look extensively into implementing gamification, where the identifying specialized need of the users will help understand and identify personalized learning to cater to students within the Malaysian education system.

When it comes to playing games, many types of player needs or motivation represent their player traits when engaged in a game (Deterding et al., 2011). Although in gamification, Iosup & Epema, (2014) looked into gamification using Bartle's player motivation scale (Bartle, 1996) and reported a high success rate, what seemed to bring dispute is the change in describing the player traits. A revised version of Bartle's player motivation scale by Yee (2006) considers the player motivation scale for online platform gamers compared to Bartle's player motivation scale created based on multi-user dungeon (MUD) gamers. The usage of player traits as an early indication system to identify the individual needs of students will help future researchers in either game-based learning, serious games, or gamification. Yee (2006) carried out research with 3000 multiplayer online role-playing games (MMORPG); based on 40 questionnaires (quantitative study), streamlined the previous research findings and came up with three main player traits; Achievement, socializer, and immersion. Users under the Achievement spectrum tend to get satisfaction gaining or achieving something within the gaming scenario. Users under the Socializer spectrum, on the other hand, find satisfaction in connecting with others. Moreover, finally, users under the Immersion spectrum strive to submerge themselves and their gaming persona within the game's lore.

The achievement player traits can be further expanded into 3 sub-components:

1. Advancement: – players/students who want to progress or gain something in their tasks or learning process
2. Mechanics: – players/students who prefer to explore the elements of the game or system to improve their learning task performances
3. Competition: players/students who use the challenge as the goal to achieve in their learning tasks

The Socializer player traits have 3 sub-components:

1. Socializing: – players/students who like to communicate and help other players/students
2. Relationship: – players/students who would like to create a bond with other players/students
3. Teamwork: – players/students who like to collaborate to achieve the game goals

The Immersion player traits has 3 sub-components:

1. Discovery:– players/students who like to find something unique or new that others do not find in a game or learning tasks given to them
2. Role-playing: – players who like to create an imaginary persona in a game or learning tasks
3. Customization: – players who like to change and modify the gaming persona that they have in a game or learning tasks

With the Gen-Z students being born into a world filled with technology (Fister Gale, 2015b), technology in entertainment, especially games, is not a significant surprise. Thus, instead of looking at the drawbacks of games and weeding them out, it would be more meaningful if interest in these games is adequately cultivated, to better suit educational outcomes. Many researchers have stated that harnessing the power of games can lead to not only meaningful learning (Muntean, 2011) but also engaging them to the lesson (Farhangi, 2012; Lister, 2015; Meluso et al., 2012; Morrison & DiSalvo, 2014; M. Sanmugam et al., 2017) as well as encouraging autonomous learning among the students (Jang, 2008). Nevertheless, before this level can be achieved, it will be essential to identify the explicit interest of these users to allow the creation of a personalized path of learning as it has to be noted that technological pedagogy in learning is not a one size suits all affair. Therefore, this current study used Yee's player motivation scale as it is a revised version of Bartle's player motivation scale, and it was based on online platform game player motivations. Besides that, Yee's player motivation will be suitable as it helps map out players' traits in participating in the gamified learning process.

Methodology

This study will implement a quasi-experimental study that applies quantitative methods (Cohen et al., 2007; Creswell, 2012). Convenience sampling was utilised (Creswell, 2012), and 53 participants completed the pre and post-intervention, with 25 participants from the treatment group and 28 participants from the control group. The research process began with the administration of the questionnaires involving both control and experimental group students - pre-intervention to identify the levels of player types before any intervention. Then both the experimental and control group students proceeded with their learning process; with the experimental group learning using a gamified e-learning method using Kahoot (exercises will be carried out in this platform), while, the control group learned with non-gamified learning using Google Classroom (The google classroom will be used to only share exercises of the lessons). Upon completion of the second topic, a questionnaire was administered again to see whether the learning process influenced the player types.

The selection criterion for the participants were students from boarding schools who were themselves selected and enrolled into these learning ecosystems based on their excellence in academics (Khalidah et al., 2014; Noriah Mohd Ishak, Ramlee Mustapha, 2006). As such, a

boarding school from the Southern state of Malaysia was chosen for the control and treatment group. The selection was also based on the availability of a computer laboratory. This is to eliminate factors of technology influence and experience among students. Besides that, to reduce learning style bias and impact on the learning process, both control and experimental batch were taught by teachers with the same level of teaching experience, between 5 to 10 years, which is sufficient to teach the subject properly (King Rice, 2010). For confidentiality purposes, the schools' identities are not revealed in this research. The data collection process was carried out over nine weeks.

The instrument /questionnaire which was administered in this research included the Game Player Types Inventory by Yee (2006), based on the technical specifications, the factor loadings of the survey items used are as follows: Advancement (Cronbach's α=.79), Mechanics (Cronbach's α = .68), Competition (Cronbach's α = .75), Socializing (Cronbach's α = .74), Relationship (Cronbach's α = .80), Teamwork (Cronbach's α = .71), Discovery (Cronbach's α = .73), Role-play(Cronbach's α = .87), Customization (Cronbach's α = .74), and Escapism (Cronbach's α = .65). Based on the principal components analysis the 10 factors were extracted with eigenvalues greater than 1. Together, these factors accounted for 60% of the overall variance.

The administration of the instruments was done in dual language (English and Bahasa Melayu) as the Malay language is the mother tongue for most of the students, and this will create easy access and responses by the participants. The instruments were rated using a Likert scale ranging from 1 (Strongly Disagree) to 5 (Agree) and was administered using SurveyMonkey.

As this study used a quasi-experimental design, the Pre- and Post-test design was applied to monitor the change in the measures throughout the study. The use of a control group in this research enhanced the ability to distinguish the effects of the intervention. Secondly, as there was multiple observation, this method did not require exploring a large number of samples. The design notation of the study is shown in Figure 1.

Figure 1
Design Notation of the Study

Time ⟶

Group 1	Obs	Tx	Obs
Group 2	Obs	—	Obs

Legend

Obs	Measurement
Tx	Treatment

The research utilized the mean analysis, paired sample tests, and independent-sample t-tests, supplemented by Cohen D's effect size. For the latter, Table 1 reveals the individual effect sizes.

Table 1
Cohen D's Effect Size

Relative Effect Size	Effect Size
Small	0.2
Medium	0.5
Large	0.8

Findings

For the mean analysis of the three main player traits, Achievement, Social, and Immersion, among the control group pre-and post-intervention, achievement player traits for post-intervention were higher (mean=3.712) than the Pre-intervention phase (mean=3.610). Meanwhile, the Social player traits for post-intervention were higher (mean=4.223) than the Pre-intervention phase (mean=3.679). Finally, the Immersion player traits for post-intervention were higher (mean=3.770) than the Pre-intervention phase (mean=3.758).

For the mean analysis of the ten-player traits sub-constructs, Advancement, Mechanics, Competition, Socializer, Relationship, Teamwork, Discovery, Role-playing, Customization, and Escapism; among participants from the control group pre-and post-intervention; it can be seen that Advancement sub-construct for the post-intervention score was higher (mean=3.935) than the Pre-intervention phase (mean=3.839). The Mechanics sub-construct for the post-intervention score was higher (mean=3.955) than the Pre-intervention phase (mean=3.768). The Competition sub-construct for the post-intervention score was higher (mean=3.134) than the Pre-intervention phase (mean=3.107). The Socializer sub-construct for the post-intervention score was higher (mean=4.223) than the Pre-intervention phase (mean=3.946). The Relationship sub-construct for the post-intervention score was higher (mean=3.560) than the Pre-intervention phase (mean=3.321). The Teamwork sub-construct for the post-intervention score was higher (mean=3.821) than the Pre-intervention phase (mean=3.679). The two mean values reveal that participants' Discovery sub-construct for the post-intervention score was higher (mean=3.839) than the Pre-intervention phase (mean=3.679). The Role-playing sub-construct for post-intervention score was higher (mean= 3.813) than the Pre-intervention phase (mean=3.750). The Customization sub-construct for the post-intervention score was lower (mean=3.762) than the Pre-intervention phase (mean=4.000). The two means of Escapism sub-construct for the post-intervention score was similar to the Pre-intervention phase (mean=3.631)

Meanwhile, the results of the repeated-measures T-test, in n Table 2, for primary constructs of the player traits and Table 3, for sub-constructs of the player traits, note that none of the constructs were found to be statistically significant at the 0.05 level.

Table 2
Paired Sample Test Statistics for the Control Group Pre- and Post-Intervention for Main Constructs

Paired Samples Test					
Main Construct (Control)		Paired Mean Differences	t	df	Sig. (2-tailed)
1	Achievement(Pre) –Achievement(Post)	-0.102	-0.762	27	0.452
2	Social (Pre) -Social (Post)	-0.218	-1.990	27	0.057
3	Immersion (Pre) - Immersion(Post)	-0.013	-0.123	27	0.903

Table 3
Paired Sample Test Statistics for the Control Group Pre- and Post-Intervention for the Sub-Constructs

Paired Samples Test					
Sub-Construct (Control)		Paired Mean Differences	t	df	Sig. (2-tailed)
1	Advancement (Pre) -Advancement (Post)	-0.095	-0.575	27	0.570
2	Mechanics (Pre) - Mechanics(Post)	-0.188	-1.549	27	0.133
3	Competition (Pre) - Competition (Post)	-0.027	-0.113	27	0.911
4	Socializer (Pre) - Socializer (Post)	-0.277	-1.792	27	0.084
5	Relationship (Pre) - Relationship (Post)	-0.238	-1.842	27	0.077
6	Teamwork (Pre) - Teamwork(Post)	-0.143	-1.008	27	0.322
7	Discovery (Pre) - Discovery (Post)	-0.161	-1.288	27	0.209
8	Role-playing (Pre) - Role-playing (Post)	-0.063	-0.482	27	0.634
9	Customization (Pre) - Customization (Post)	0.238	1.376	27	0.180
10	Escapism (Pre) - Escapism (Post)	0.000	0.000	27	1.000

The next phase of the analysis looks into the treatment group. For the mean analysis of the three main player traits, Achievement, Social, and Immersion, the achievement level for post-intervention was lower (mean=3.600) than the Pre-intervention phase (mean=3.671). Meanwhile, social player traits for post-intervention were lower (mean=3.593) than the Pre-intervention phase (mean=3.687). Finally, the Immersion player traits for post-intervention were lower (mean=3.629) than the Pre-intervention phase (mean=3.683).

For the mean analysis of the ten-player traits sub-constructs, Advancement, Mechanics, Competition, Socializer, Relationship, Teamwork, Discovery, Role-playing, Customization, and Escapism; some differences were evident between participants from the control group pre and post-intervention. From the two means, participants' Advancement sub-construct for the post-intervention score was lower (mean=3.787) than the Pre-intervention phase (mean=3.860). The Mechanics sub-construct for the post-intervention score was lower (mean=3.600) than the Pre-intervention phase (mean= 3.680). The Competition sub-construct

for the post-intervention score was lower (mean=3.320) than the Pre-intervention phase (mean=3.380).

From the two means for the Socializer sub-construct, the post-intervention score was lower (mean=3.820) than the pre-intervention phase (mean=3.880). The Relationship sub-construct for the post-intervention score was lower (mean=3.053) than the Pre-intervention phase (mean=3.573). The two means of the Teamwork sub-construct for the post-intervention score were higher (mean=3.770) than the pre-intervention phase (mean=3.580).

The Discovery sub-construct for the post-intervention score was lower (mean=3.510) than the Pre-intervention phase (mean=3.850). The Role-playing sub-construct for the post-intervention score was lower (mean=3.710) than the Pre-intervention phase (mean=3.740). The Customization sub-construct for post-intervention score was higher (mean=3.560) than Pre-intervention phase (mean= 3.480). The Escapism sub-construct for the post-intervention score was higher (mean=3.747) than the Pre-intervention phase (mean=3.587).

Meanwhile, when it came to the results of the repeated-measures t-test, as seen in Table 4, it was found that none of the primary constructs was significant at the 0.05 level or the 0.1 level. Meanwhile, according to Table 5, the relationship sub-construct was significant, $t(25) = 2.564$, $p<0.05$.

Table 4

Paired Sample Test Statistics for the Treatment Group Pre- and Post-Intervention for the Main Constructs

Paired Samples Test					
Main Construct		Paired Mean Differences	t	df	Sig. (2-tailed)
1	Achievement (Pre) - Achievement (Post)	0.071	0.666	24	0.512
2	Social (Pre) - Social (Post)	0.095	0.851	24	0.403
3	Immersion (Pre) - Immersion (Post)	0.054	0.496	24	0.625

Table 5
Paired Sample Test Statistics for the Treatment Group Pre-and Post-Intervention for the Sub-Constructs

Paired Samples Test					
Sub-Construct		Paired Mean Differences	t	df	Sig. (2-tailed)
1	Advancement (Pre) -Advancement (Post)	0.073	0.556	24	0.584
2	Mechanics (Pre) -Mechanics (Post)	0.080	0.684	24	0.501
3	Competition (Pre) -Competition (Post)	0.060	0.309	24	0.760
4	Socializer (Pre) - Socializer (Post)	0.060	0.458	24	0.651
5	Relationship (Pre) -Relationship (Post)	0.520	2.564	24	0.017
6	Teamwork (Pre) -Teamwork (Post)	-0.190	-1.527	24	0.140
7	Discovery (Pre) -Discovery (Post)	0.340	2.006	24	0.056
8	Role-playing (Pre) -Role-playing (Post)	0.030	0.277	24	0.784
9	Customization (Pre) -Customization (Post)	-0.080	-0.503	24	0.620
10	Escapism (Pre) -Escapism (Post)	-0.160	-0.681	24	0.503

Based on Tables 6 and 7, for the construct of Achievement, participants from the Pre-control group (mean=3.610) showed lower traits tendencies compared to the Pre-Treatment group (mean=3.671). For the construct of Social, participants from the Pre-control group (mean=3.679) showed a lower tendency than the Pre-Treatment group (mean=3.687). Participants from the Pre-control group (mean=3.758) showed higher Immersion Player traits tendencies than the Pre-Treatment group (mean=3.683). This difference was not significant for all three traits.

Table 6
Mean Analysis from the Treatment Group Pre-Intervention (Control/Treatment) for the Main Constructs

Mean Analysis				
Main Construct	Group	N	Mean	Std. Deviation
Achievement	Pre-Control	28	3.610	0.490
	Pre-Treatment	25	3.671	0.476
Social	Pre-Control	28	3.679	0.388
	Pre-Treatment	25	3.687	0.463
Immersion	Pre-Control	28	3.758	0.442
	Pre-Treatment	25	3.683	0.522

Table 7
Independent Sample test for the pre-intervention (Control/Treatment) for Main Constructs

Independent Samples Test						
Main Constructs		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Achievement	EVA	0.007	0.933	-0.464	51.000	0.644
	EVNA			-0.465	50.622	0.644
Social	EVA	1.091	0.301	-0.074	51.000	0.941
	EVNA			-0.074	47.114	0.942
Immersion	EVA	1.738	0.193	0.565	51.000	0.575
	EVNA			0.559	47.289	0.579

Key: EVA: Equal variances assumed; EVNA: Equal variances not assumed

Based on Table 8 and Table 9 below, on average, participants from the Pre-control group (mean=3.839) showed lower Advancement Player traits tendencies than the Pre-Treatment group (mean=3.860). Meanwhile, when it came to Mechanics Player traits, participants from the Pre-control group (mean=3.768) showed a higher tendency than the Pre-Treatment group (mean=3.680). For Competition Player traits, participants from the Pre-control group (mean=3.107) showed a lower tendency than the Pre-Treatment group (mean=3.380). This difference was not significant for all the sub construct traits.

For the Socializer player traits, participants from the Pre-control group (mean=3.946) showed higher traits tendencies than the Pre-Treatment group (mean=3.880). For the Relationship player traits, participants from the Pre-control group (mean=3.321) showed lower traits tendencies than the Pre-Treatment group (mean=3.573). Meanwhile, participants from the Pre-control group (mean=3.679) showed higher Teamwork Player traits tendencies compared to the Pre-Treatment group (mean=3.580). This difference was not significant for all the sub-construct traits. Participants from the Pre-control group (mean=3.679) showed lower Discovery Player traits tendencies compared to Pre-Treatment group (mean=3.850). Participants from the Pre-control group (mean=3.750) showed a higher Roleplaying Player traits tendencies compared to Pre-Treatment group (mean=3.740). Participants from the Pre-control group (mean=4.000) showed a higher Customization Player traits tendencies compared to Pre-Treatment group (mean=3.480). This difference was significant $t(51)=2.820$, $p<.05$; and representing a medium-sized effect size of $r=0.78$. Participants from the Pre-control group (mean=3.631) showed higher Escapism Player trait tendencies compared to the Pre-Treatment group (mean=3.587).

Table 8
Mean Analysis from the Treatment Group Pre-Intervention (Control/Treatment) for the Sub-Constructs

Mean Analysis				
Sub-Construct	Group	N	Mean	Std. Deviation
Advancement	Pre-Control	28	3.839	0.479
	Pre-Treatment	25	3.860	0.560
Mechanics	Pre-Control	28	3.768	0.531
	Pre-Treatment	25	3.680	0.503

Competition	Pre-Control	28	3.107	0.837
	Pre-Treatment	25	3.380	0.851
Socializer	Pre-Control	28	3.946	0.602
	Pre-Treatment	25	3.880	0.733
Relationship	Pre-Control	28	3.321	0.517
	Pre-Treatment	25	3.573	0.697
Teamwork	Pre-Control	28	3.679	0.518
	Pre-Treatment	25	3.580	0.562
Discovery	Pre-Control	28	3.679	0.466
	Pre-Treatment	25	3.850	0.505
Roleplaying	Pre-Control	28	3.750	0.549
	Pre-Treatment	25	3.740	0.557
Customization	Pre-Control	28	4.000	0.660
	Pre-Treatment	25	3.480	0.681
Escapism	Pre-Control	28	3.631	0.843
	Pre-Treatment	25	3.587	1.164

Table 9

Independent Sample test for the pre-intervention (Control/Treatment) for Sub- Constructs

Independent Samples Test						
Sub- Constructs		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Advancement	EVA	0.218	0.643	-0.145	51.000	0.885
	EVNA			-0.144	47.538	0.886
Mechanics	EVA	0.000	0.983	0.616	51.000	0.540
	EVNA			0.618	50.813	0.539
Competition	EVA	0.171	0.681	-1.175	51.000	0.245
	EVNA			-1.174	50.125	0.246
Socializer	EVA	1.312	0.257	0.362	51.000	0.719
	EVNA			0.358	46.608	0.722
Relationship	EVA	0.794	0.377	-1.504	51.000	0.139
	EVNA			-1.479	43.934	0.146
Teamwork	EVA	0.644	0.426	0.664	51.000	0.509
	EVNA			0.661	49.077	0.511
Discovery	EVA	0.076	0.783	-1.285	51.000	0.204
	EVNA			-1.279	49.109	0.207
Roleplaying	EVA	0.053	0.818	0.066	51.000	0.948
	EVNA			0.066	50.151	0.948
Customization	EVA	0.562	0.457	2.820	51.000	0.007
	EVNA			2.815	49.934	0.007
Escapism	EVA	4.335	0.042	0.160	51.000	0.874
	EVNA			0.157	43.305	0.876

Key: EVA: Equal variances assumed; EVNA: Equal variances not assumed

Based on Table 10 and Table 11, participants from the post-control group (mean=3.712) showed higher Achievement Player trait tendencies than the post-Treatment group

(mean=3.600). Participants from the Post-control group (mean=3.770) showed higher Immersion Player trait tendencies than the post-Treatment group (mean=3.629); both traits were not significant. Meanwhile, participants from the post-control group (mean=3.896) showed higher Social Player traits tendencies than the post-Treatment group (mean=3.593). This difference was significant t(51)=2.813, p<.05; and a small-effect size of r=0.32.

Table 10

Mean Analysis from the Treatment Group Post-Intervention (Control/Treatment) for the Main Constructs

Mean Analysis				
Main Construct	Group	N	Mean	Std. Deviation
Achievement	Post-Control	28	3.712	0.529
	Post-Treatment	25	3.600	0.439
Social	Post-Control	28	3.896	0.391
	Post-Treatment	25	3.593	0.393
Immersion	Post-Control	28	3.770	0.488
	Post-Treatment	25	3.629	0.429

Table 11

Independent Sample Test for the Post-Intervention (Control/Treatment) for Main Constructs

Independent Samples Test						
Main Construct		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Achievement	EVA	0.573	0.453	0.831	51.000	0.410
	EVNA			0.839	50.754	0.405
Social	EVA	0.019	0.891	2.813	51.000	0.007
	EVNA			2.813	50.271	0.007
Immersion	EVA	0.681	0.413	1.118	51.000	0.269
	EVNA			1.126	50.992	0.265

Key: EVA: Equal variances assumed; EVNA: Equal variances not assumed

Based on Table 12 and Table 13, on average, participants from the post-control group (mean=3.935) showed higher Advancement Player traits tendencies than the post-Treatment group (mean=3.787). Participants from the Post-control group (mean=3.134) showed lower Competition Player traits tendencies than the post-Treatment group (mean=3.320); both traits were not significant. Meanwhile, participants from the post-control group (mean=3.955) showed higher Mechanics Player traits tendencies than the post-Treatment group (mean=3.600). This difference was significant t(51)=2.734, p<.05; and a medium-effect size of r=0.76.

Participants from the Post-control group (mean=4.223) showed higher Socializer Player traits tendencies than the post-Treatment group (mean=3.820). This difference was significant t(51)=2.578, p<.05; it represented a medium-sized effect size of r=0.71. Participants from the Post-control group (mean=3.560) showed higher Relationship Player traits tendencies than the post-Treatment group (mean=3.053). This difference was significant t(51)=3.161, p< .05; and revealed a high-effect size of r=0.87. participants from the post-control group (mean=3.821)

showed higher Teamwork Player traits tendencies than the post-Treatment group (mean=3.770). This difference was not significant t(41.973)=0.401, p>.05; and a small-effect size of r=0.11.

Participants from the Post-control group (mean=3.839) showed higher Discovery Player traits tendencies than the post-Treatment group (mean=3.510). Participants from the Post-control group (mean=3.813) showed higher Roleplaying Player traits tendencies than the post-Treatment group (mean=3.710); neither trait was significant. Participants from the Post-control group (mean=3.762) showed higher Customization Player traits tendencies than the post-Treatment group (mean=3.560). This difference was significant t(51)=1.202, p<.05; and a small-effect size of r=0.33. Participants from the Post-control group (mean=3.631) showed lower Escapism Player traits tendencies than the post-Treatment group (mean=3.747). This difference was not significant t(47.266)=-0.497, p>.05; and revealed a small-effect size of r=0.14.

Table 12

Mean Analysis from the Treatment Group Post-Intervention (Control/Treatment) for the Sub-Constructs

Mean Analysis				
Sub-Construct	Group	N	Mean	Std. Deviation
Advancement	Post-Control	28	3.935	0.702
	Post-Treatment	25	3.787	0.453
Mechanics	Post-Control	28	3.955	0.536
	Post-Treatment	25	3.600	0.389
Competition	Post-Control	28	3.134	0.946
	Post-Treatment	25	3.320	0.724
Socializer	Post-Control	28	4.223	0.542
	Post-Treatment	25	3.820	0.597
Relationship	Post-Control	28	3.560	0.529
	Post-Treatment	25	3.053	0.636
Teamwork	Post-Control	28	3.821	0.593
	Post-Treatment	25	3.770	0.314
Discovery	Post-Control	28	3.839	0.537
	Post-Treatment	25	3.510	0.716
Roleplaying	Post-Control	28	3.813	0.592
	Post-Treatment	25	3.710	0.488
Customization	Post-Control	28	3.762	0.614
	Post-Treatment	25	3.560	0.606
Escapism	Post-Control	28	3.631	1.008
	Post-Treatment	25	3.747	0.669

Table 13
Independent Sample Test for the Post-Intervention (Control/Treatment) for Sub-Constructs

Independent Samples Test						
Sub-Construct		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Advancement	EVA	0.844	0.362	0.899	51.000	0.373
	EVNA			0.921	46.635	0.362
Mechanics	EVA	1.791	0.187	2.734	51.000	0.009
	EVNA			2.783	49.033	0.008
Competition	EVA	2.283	0.137	-0.797	51.000	0.429
	EVNA			-0.809	49.875	0.422
Socializer	EVA	0.001	0.972	2.578	51.000	0.013
	EVNA			2.563	48.790	0.014
Relationship	EVA	0.059	0.809	3.161	51.000	0.003
	EVNA			3.128	46.921	0.003
Teamwork	EVA	5.282	0.026	0.388	51.000	0.700
	EVNA			0.401	41.973	0.691
Discovery	EVA	0.568	0.455	1.907	51.000	0.062
	EVNA			1.876	44.219	0.067
Roleplaying	EVA	1.518	0.224	0.683	51.000	0.498
	EVNA			0.691	50.700	0.493
Customization	EVA	0.028	0.869	1.202	51.000	0.235
	EVNA			1.203	50.468	0.235
Escapism	EVA	5.714	0.021	-0.486	51.000	0.629
	EVNA			-0.497	47.266	0.621

Key: EVA: Equal variances assumed; EVNA: Equal variances not assumed

Discussion and Findings

For the Control Group, pre and post-test analysis, all player traits increased except customization based on the mean value. Meanwhile, based on the repeated measures t-test for the control group that carried out their lesson using Google classroom, no traits were significant. Based on the mean increase for all but one construct, it can be seen that the participants who were students aged 13-14 years old from the Gen-z batch seemed to have shown some form of preference and eagerness towards using the Google classroom platform to learn (Fister Gale, 2015b; Sparks&Honey, 2014). Any form of diversified learning triggered their interest. However, when it came to customization construct, a drop in mean value was evident, because the teacher fully controlled this platform (Finlay et al., 2004), and the participants could access the notes or tasks given within the platform. This is vital as students would like to have at least the opportunity to have some control when it comes to the interactive platform being used for learning (Javora et al., 2021).

For the treatment group that learned using a gamified platform (Kahoot), the pre and post-test analysis, based on the mean value, all player traits decreased except teamwork, customization, and escapism. Meanwhile, based on the repeated measures T-test, no main player traits were significant, but the sub-construct of the relationship was significant. The findings revealed that

all means saw a drop between pre-and post-test, yet an increase was evident in the teamwork, customization, and escapism part of the learning process. This can be attributed to the lockdown phase, where access to a fully-fledged game was more prevalent to the students (Alsaad et al., 2021), and when they were introduced to a low-level and gamified/game-based learning platform, they were feeling a little detached from the learning ecosystem (An & Oliver, 2021). The teamwork sub-construct player traits saw an increase as the students may have communicated to face the tasks together as a team or duo to make it easier for them and score better marks (Misra & Mazelfi, 2021; Subhash & Cudney, 2018). The customization trait can also be attributed to the fact that the students can access the Kahoot platform separately and test out the systems for themselves (Javora et al., 2021; Roberts-Mahoney et al., 2016). Finally, escapism can be attributed to the feeling of escaping the norms of online learning imposed on them during the pandemic lockdown (Hussain et al., 2021; Labrecque et al., 2011). Although not the best option, what was available to them allowed them to escape the hold of online learning.

Based on the results of the independent sample t-test, the pre-intervention condition from both groups (Control and Treatment), the Customization sub-construct of the player traits was found to be statistically significant due to the personal experience of these students when it came to real-life situations. For instance, under lockdown, a student may be constricted to a specific routine in the real world, which is fixed. Nevertheless, some students find the most superficial satisfaction in changing or modifying aspects around them (Javora et al., 2021). For example, changes in the theme or style of their digital devices may trigger these thoughts among the students. Based on the independent sample t-test, the post-intervention condition from both groups (Control and Treatment), it is evident that the social main player traits revealed a significance due to two aspects; 1) the social status needs of Gen-z students (Dewi et al., 2021) and 2) the interaction invoked by the game-like experience (Eck, 2006). Socializing status is the need for the students of the current generation to connect and communicate with others (Fister Gale, 2015a; Sparks&Honey, 2014). This further seemed relevant for them under lockdown conditions due to Covid-19. Besides that, the gaming ecosystem triggered the need to communicate with other players that play by their side (Tondello et al., 2019; Wölfl et al., 2021).

Meanwhile, when it came to the sub-constructs, Mechanics revealed a significant difference since the gamified platform offered numbers and statistics (Barata et al., 2011; Mekler et al., 2013; Thom et al., 2012) that can be observed based on the tasks carried out by the students, in comparison to the basic Google classroom. Meanwhile, socialization and relationships were triggered due to casual chats triggered by the need for the students to communicate and reach out to others to help or get help, thus creating a bond/friendship among their peers (Subhash & Cudney, 2018). Finally, the Discovery sub-construct was significant due to the feeling of trying out a gamified learning environment, which was unique and different from the usual lesson that the students were going through (Plass et al., 2015).

Conclusions

From the findings, it is to be noted that although using gamified learning to supplement learning was effective during the pandemic, diversified ways of learning were the best way to engage the student's interest. As such, the use of Google classroom and Kahoot as an add-on tool can help encourage the students to learn, since it motivated the students in testing times. However, one of the distinct traits that were evident in each group was customization. This can be attributed to the changes in the educational ecosystem seen before the lockdown, where the

teachers were merely facilitators and students took charge of their learning needs. Nevertheless, the Covid-19 lockdown reversed the path of learning, with the teaching and learning process being fully teacher-orientated sometimes leaving students as mere spectators. This scenario left the students craving more freedom and control when it came to their learning. The significant trait changes shown in Socializing, through the teamwork construct revealed a need for resilience among students under lockdown, through communicating and collaborating with their peers. The discovery, mechanics, and customization traits can contribute to the need-to-know attitude or digital literacy of the young participants who would like to explore what is put forth in a lesson. The curious findings of escapism, which reveals that the students felt trapped within the learning system imposed by the covid lockdown. However, the current situation falls under the emergency remote teaching phase, and it will be replaced slowly once schools start reopening. Yet, the infusion of education and technology will not recede; instead, it will be continually used as learning progresses in the new millennia. This may lead to face-to-face learning being one day restricted to certain subjects or topics, while others can be carried out from the comfort of the home.

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