The Influence of Digital Gameplay on Learner Profiles in the Japanese University Context

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Abstract
The researchers examined the relationship between informal digital gameplay and learner profiles in two Japanese private universities. Seventy-eight participants responded to 59 items on a digital questionnaire that consisted of four sections: 1) Learner Profiles, 2) Digital Game Usage, 3) Open-Responses, and 4) Demographics. The results of the study demonstrated that students positively identified with the learner profiles featured on the questionnaire (M = 3.80). The highest mean values were associated with the profiles of Digital Citizen (M = 4.30) and Knowledge Constructor (M = 4.15). It was discovered that participants engaged in digital gameplay most often with smartphones (M = 3.64) and game consoles (M = 2.79). Simulation (M = 2.81) and real-time strategy (M = 2.66) games were the most frequently played. The results of a Pearson Product Moment Correlation showed that there was no significant relationship between informal digital gameplay and learner profiles. Furthermore, self-identified gamers and non-gamers did not significantly differ on the Learner Profile Total Scale or subscales.
Keywords*:* digital games, game-based learning, higher education, ISTE Standards for Students, Japanese students, learner profiles.

Introduction

Students in the 21st century are exposed to an array of technology inside and outside the formal learning environment. Learning in this age can come from various sources, including digital games. It is estimated that over 3.24 billion people worldwide play digital games regularly (Statista, 2021). In recent years, smartphones and tablets, along with the increasing ease of accessibility to the internet, have made digital games available to a much wider audience. Research on digital game-based learning (GBL) has shown that the unique features of the medium, which include goal-based activity, immersion, problem-solving, and social interaction, provide a unique environment that can facilitate learning (Gee, 2007; Peterson et al., 2020; Prensky; 2001). Furthermore, digital games may offer learners additional benefits such as increased motivation, collaboration, self-esteem, and engagement with content (Dawes and Dumbleton, 2001). For second and foreign language learners, digital games, especially ones that provide a social environment within which players can use the target language to collaborate and solve problems, can aid in language acquisition (Sykes et al., 2010; Thorne et al., 2009).

The affordances of digital games can be particularly beneficial to Japanese students of second and foreign languages due to the unique profiles of those learners. The Japanese education system is characterized by a top-down approach, focusing on rote memorization and test preparation rather than student-centered activities promoting critical thinking, problem-solving, and collaboration (Aubrey, 2020; Gainey and Andressen, 2002). Furthermore, despite Japan's reputation as a center for innovation and technology, educational methods in the country are decidedly analog (Aoki, 2010; Funamori, 2017; Latchem et al., 2008). As the world becomes increasingly globalized, Japanese universities have recognized the need to produce graduates who are proficient in English and embody several characteristics that represent the profile of a 21st-century learner. This ideal profile includes the ability to communicate and collaborate with others and to effectively and efficiently use technology to accomplish one's goals. Previous research in Japan on the use of digital games for learning has focused on a variety of topics, including perceptions and usage (Bolliger et al., 2015), impact on classroom and online communication (Peterson, 2012a; 2012b; 2013), and vocabulary learning (Franciosi et al., 2016). One of the researchers recently studied digital games' influence on the development of 21st-century skills in Japan (Author, 2021). The research results showed a positive correlation between informal digital game usage, perceptions, and the 21st-century skills of Creativity, Critical Thinking, Communication, and Collaboration. The current research aims to build upon that study by examining how learner profiles, defined by seven characteristics in the ISTE Standards for Students (ISTE, 2017), are related to informal digital game usage.

Literature Review

ISTE Standards for Students

Twenty-first-century literacies are said to comprise a broad array of competencies, including critical thinking, technology literacy, life, and career skills, leadership, and responsibility (The Partnership for 21st Century Skills, 2019). Although the concept of a digital native (Prensky, 2001) has been criticized, subsequent generations of students have increased exposure to technology both inside and outside the formal learning environment (Van Eck, 2006). For students of the 21st century, it is essential to access media-rich resources and digital tools to help them "explore, understand, and express themselves in the world they will inherit tomorrow" (Aqel, 2021, p. 2). The ISTE Standards for Students (ISTE, 2017) make up one of five sets of standards that provide a framework for understanding learners' profiles in the current age. Due to technological advancements, these standards are updated regularly based on expert input and have been extensively recognized and implemented worldwide (ISTE, 2017).

The learner profiles identified in the ISTE Standards for Students are:

1. *Empowered Learner* - Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.
2. *Digital Citizen* - Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world. They act and model in safe, legal, and ethical ways.
3. *Knowledge Constructor* - Students critically curate various resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
4. *Innovative Designer* - Students use a variety of technologies within a design process to identify and solve problems by creating new, practical, or imaginative solutions
5. *Computational Thinker* - Students develop and employ strategies for understanding and solving problems that leverage technological power to develop and test solutions.
6. *Creative Communicator* - Students communicate clearly and express themselves creatively for various purposes using the platforms, tools, styles, formats, and digital media appropriate to their goals.
7. *Global Collaborator* - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

While these profiles provide a framework to describe the traits that successful 21st-century learners should process, research on how these profiles are influenced by informal technology usage, especially digital games, is not present.

Digital Games

The growth in the digital game market has been exponential due to the ever-decreasing cost of powerful computers, increased accessibility to the internet, and the continued development of attractive and engaging commercial off-the-shelf games (COTs). Due to a combination of the above factors, it is now estimated that over 3.24 billion people worldwide play digital games regularly (Statista, 2021). In their meta-analysis of the application of digital games, Peterson et al. (2020) highlighted that current literature provides evidence for the idea that games can support learning among particular groups (Clark et al., 2016).

When considering learner profiles, it is necessary to understand how they relate to digital games. Currently, no studies specifically relate to the ISTE Standards for Students (ISTE, 2017). However, research has alluded to the presence of these profiles within games. For the empowered learner pillar, digital games have been said to allow for social inclusion and empowerment (Peterson et al., 2020) cost-effectively. In addition, digital games have been reported to be especially adept at assisting individuals more prone to exclusion.

Additionally, digital games have been reported to empower learners in a range of traditional educational contexts, including mathematics, history, and foreign languages (Wastiau et al., 2009). They have been used to empower learners in various other life skills to create digital citizens. For example, *No credit, Game over* (https://gamewise.io/), a serious-minded game that aims to educate students on avoiding debt without exposing them to any real-life risk.

For the pillar of knowledge constructor, digital games have been reported in two recent meta-analyses to achieve knowledge over various domains and learners (Connolly et al., 2012; Wouters et al., 2013) Connolly et al., (2012). Their review of 129 papers suggested that knowledge acquisition (construction) was one of the most frequently occurring outcomes in digital game studies. The pillars of innovative designers and creative communicators closely align with the idea of affinity groups. The term affinity group (Gee, 2004; Gee and Hayes, 2010) is considered to be the concept of game fan communities. These fans create fan sites and virtual or face-to-face meetups, where fans, regardless of age, race, gender, and gaming experience, share the same space to develop and design such things as tools and tutorials for their game. In addition, the pillar of collaboration is also often referenced in digital game studies. For example, Sanchez and Mandran (2017) highlight how digital games allow for cooperation

through taking on challenges and engaging in collaboration via epistemic interactions with other players. While in second language acquisition (SLA) studies involving digital games, the game itself compels target language (TL) collaboration (Peterson et al., 2020).

Within Japan, the field of digital games research has increased in the last 15 years. Peterson (2008, 2011, 2012a, 2012b, 2013) has been at the forefront of this research with several studies using MMOGs in the informal context. In his studies, he has demonstrated the opportunities for learning created through the use of MMOG. Other studies (Swier, 2014; York, 2019; York and deHann, 2018; Franciosi, 2017; Franciosi et al., 2016) have also contributed to the field in Japan. One similarity between much of the current literature in Japan is the focus on the university level, with speaking often being the object of the investigations.

In contrast, Bolliger et al. (2015) examined Japanese students' perceptions of digital game use in education. They found that approximately 25% of the n = 222 students surveyed played games for up to 70 hours a week but were still reluctant to use digital games for formal learning purposes. The current research may help answer whether this perception is still the case and what areas of their profiles are most affected, if any.

Research Questions

1. What are Japanese university students' self-assessments of their profiles as empowered learners, digital citizens, knowledge constructors, innovational designers, computational thinkers, creative communicators, and global collaborators?
2. What is Japanese university students' actual usage of digital games outside the classroom?
3. What is the relationship between Japanese university students' informal digital gameplay and learner profiles?
4. Does self-identification as a 'gamer' affect learner profiles?

Methodology

Setting and Sample

Data were collected at two private universities in Western Japan. The first university had a population of around 32,000 undergraduate students distributed among three campuses as of 2018. The other university had a similar population of undergraduate students across its six campuses. The sample was drawn from students attending English as a Foreign Language (EFL) classes representing the following majors: 1) Economics, 2) Information and Computer Science, 3) Global Studies, 4) Humanities 5) Science. Seventy-three students responded to the questionnaire.

Participants

Participants ranged in age from 18 to 49 (M = 20.08). Most participants were 18 or 19 years old (60.2%), male (69.9%), and in their first year of study (67.1%). Only 37% of the participants self-identified as "gamers." but digital gameplay ranged from 0 to 60 hours a week (M = 10.15, Mdn = 5). Fifty percent of participants reported playing digital games for 1 – 10 years. Approximately one-quarter of the participants were either Japanese people who had lived and studied in a foreign country extensively or were non-Japanese international students studying at a Japanese university.

Survey Instrument

The survey instrument consisted of 59 items divided into four sections: 1) Learner Profiles, 2) Digital Game Usage, 3) Open-Response, and 4) Demographics. The first section on Learner Profiles was based on the 2017 International Society for Technology in Education Standards for Learners. These standards consist of seven learner profiles: empowered learner, digital citizen, knowledge constructor, innovational designer, computational thinker, creative communicator, and global collaborator. Using the description of these learner profiles, the authors developed a 24 Likert-item instrument where responses ranged from 1 (*strongly disagree)* to 5 (*strongly agree)*. The second section of the survey queried participants on their frequency of use of digital game devices and genres using a five-point Likert scale: 1 (*never)* to 5 (*very frequently)*. One open-ended question asked participants what skills they believed they could develop when playing digital games. The final section of the survey was comprised of five demographic questions. A Cronbach's alpha was calculated for each scale and subscale (See Table 1). All scales and subscales were acceptable.

Table 1: *Reliability Coefficients of Scales and Subscales*

Scale	α
Learner Profiles (Total)	.939
Empowered Learner	.806

Digital Citizen	.783
Knowledge Constructor	.812
Innovative Designer	.722
Computational Thinker	.778
Creative Communicator	.811
Global Collaborator	.831
Digital Game Usage (Total)	.889
Device	.764
Genre	.830

Data Collection and Analysis

Data collection occurred during the Spring semester of 2021 (April – July). The survey was provided via a Google Forms document to the participants through their universities' learning management systems. The survey and cover letter were in Japanese. The cover letter provided information about the study and the participants' rights as research subjects. Students were informed that their participation was voluntary and would not affect their course evaluation.

Following the data collection, the researchers transcribed the data into an Excel spreadsheet, which was later transferred to an SPSS worksheet for further analysis. Frequencies and descriptive statistics were calculated for the Learner Profile and Digital Game Usage scales and subscales. In addition, a Pearson's Product Moment Correlation test was conducted to determine the relationship between Digital Game Usage and Learner Profiles. Finally, *t*-tests were calculated to ascertain any significant differences in responses between gamers and non-gamers to the Learner Profiles scale items.

Results

Research Question 1: Learner Profiles

Empowered learner. More than 50% of participants agreed or strongly agreed with all the items on this scale. However, the highest mean scores were associated with items 2 and 3, where 69.9% agreed or strongly agreed that they used technology to seek feedback and 63% agreed or strongly agreed that they used technology to demonstrate their learning. The means (*M*) and standard deviations (*SD*) for each item in the subscale can be found in Table 2.

Table 2: *Means and Standard Deviations of the Subscale Empowered Learner*

Item		*M*	*SD*
1.	I use technology to define and achieve my educational goals.	3.67	1.259
2.	I use technology to seek feedback that will improve my learning.	3.88	1.066
3.	I use technology to demonstrate my learning in a variety of ways.	3.86	1.084
4.	I seek out new technologies to achieve my educational goals.	3.59	1.165

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Digital citizen. Over 80% of participants agreed or strongly agreed with each item on the Digital Citizen subscale. The highest mean was associated with Item 7, demonstrating that digital security and privacy is a significant concern of Japanese university students. See Table 3 for each item's means and standard deviations in this subscale.

Table 3: *Means and Standard Deviations of the Subscale Digital Citizen*

Item		*M*	*SD*
5.	I use the Internet and social networking sites in a positive, legal, and ethical way.	4.18	1.045
6.	I manage my digital identity and I am aware of the permanence of my actions in the digital world.	4.33	.958
7.	I understand the importance of keeping my personal data safe to maintain digital privacy and security.	4.41	.910

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Knowledge Constructor. Over 80% of participants were confident that the way they used technology contributed to their intellectual and creative growth (Item 8) and that they could evaluate the credibility and relevance of the

information they discovered through technology (Item 10). Table 4 contains each item's means and standard deviations in the Knowledge Constructor subscale.

Table 4: *Means and Standard Deviations of the Subscale Knowledge Constructor*

Item		*M*	*SD*
5.	I use technology to search for information that contributes to my intellectual and creative growth.	4.36	.888
6.	I build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.	4.00	.898
7.	I evaluate the accuracy, perspective, credibility, and relevance of information, media, data or other resources.	4.12	.881

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Innovative designer. While agreement with items was slightly lower than the previous sub-scales, over 60% of participants agreed or strongly agreed with all items. The highest mean value was associated with Item 13: When creating something new, I continually test, reflect, and improve the product until I am satisfied with the result. For the means and standard deviations of each item in the subscale, see Table 5.

Table 5: *Means and Standard Deviations of the Subscale Innovative Designer*

Item		*M*	*SD*
5.	I use technology to generate new ideas, test theories, develop works of art, and solve real problems.	3.62	1.113
6.	I have a tolerance for ambiguity and have the capacity to work on open-ended problems.	3.77	.965
7.	When creating something new I continually test, reflect, and improve the product until I am satisfied with the result.	3.89	.980

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Computational thinker. A majority (greater than 50%) of participants agreed or strongly agreed with Items 14 – 16 on the Computational Thinker subscale. However, participants seemed least confident in their ability to break down complex problems and develop models to help solve them (Item 16). Table 6 lists the means and standard deviations for each item in the Computational Thinker subscale.

Table 6: *Means and Standard Deviations of the Subscale Computational Thinker*

Item		*M*	*SD*
5.	I use technology to solve practical problems through a logical process.	3.84	1.000
6.	I can collect and analyze data using digital tools and present data in a way that demonstrates my problem-solving and decision making.	3.75	1.115
7.	I divide problems into their parts, extract key ideas, and develop descriptive models to understand systems or assist in problem solving.	3.53	1.015

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Creative communicator. The highest mean value on this scale was associated with Items 17 and 20, indicating that participants were confident in their ability to use various technologies to convey their message and that they could tailor it to their audience. Nevertheless, they were unsure of their ability to explain complex ideas using technology, with only 43.9% of participants agreeing or strongly agreeing with Item 19. See Table 7 for the means and standard deviations of the items in the Creative Communicator subscales.

Table 7: *Means and Standard Deviations of the Subscale Creative Communicator*

Item		*M*	*SD*
5.	I use a variety of technologies (visual instruments, models and simulations) to communicate complex ideas to others clearly and effectively.	3.71	.950
6.	I create original works or responsibly repurpose or remix digital resources into new projects.	3.45	1.424
7.	I explain complex ideas clearly and effectively by creating or using a variety of digital solutions.	3.34	1.145
8.	I am able to modify my message or content for a particular audience.	3.97	.897

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Global collaborator. The mean values of the Global Collaborator items were lower than the other subscales. Only 37% of participants were sure of their ability to work with others while exploring local and international issues (Item 24). Yet, they believed they could work well with others to discuss their viewpoint using technology. Table 8 displays the means and standard deviations of all items in this construct.

Table 8: *Means and Standard Deviations of the Subscale Global Collaborator*

Item		*M*	*SD*
5.	I use digital tools to communicate with learners from different backgrounds and cultures to exchange experiences and understand them.	3.60	1.210
6.	I use technology to work with others (peers, teachers, and others) to discuss problems from various viewpoints.	3.81	1.036
7.	I contribute constructively to team projects by assuming a role and responsibility to work towards a common goal.	3.64	1.159
8.	I explore local and global issues using technologies to work with others.	3.01	1.429

Note. Scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*.

Overall, responses to the Learner Profile scale were positive, which indicates that Japanese university students see themselves as 21st-century learners and are confident in their ability to use technology responsibly to learn, communicate, and collaborate with others. The highest mean scores in the subscales were associated with safely and ethically using technology to collect information for their learning. Subscales related to communication and collaboration exhibited lower mean values but were still positive. See Table 9 for the means and standard deviations of the Total Learner Profile scale and subscales.

Table 9: *Means and Standard Deviations of Learner Profile Scales and Subscales*

Scale	*M*	*SD*
Total	3.80	.695
Empowered Learner	3.75	.910
Digital Citizen	4.30	.812
Knowledge Constructor	4.15	.757
Innovative Designer	3.75	.818
Computational Thinker	3.70	.869
Creative Communicator	3.61	.897
Global Collaborator	3.51	.991

Research Question 2: Digital Game Usage

The most frequently used devices to play digital games were smartphones (*M* = 3.64) and game consoles (*M* = 2.79). The least used devices were tablets (*M* = 1.84), personal computers (*M* = 2.42) and personal game consoles (*M* = 2.64), respectively. The frequency of responses to Digital Game Usage (Device) can be found in Table 10.

Table 10: *Digital Game Usage: Device*

	Response (Percent)				
Item	N	R	O	F	V
34. Smartphone	15.1	13.7	9.6	15.1	46.6
35. Personal Computer	52.1	8.2	6.8	11.0	21.9
36. Game Console	42.5	8.2	6.8	12.3	30.1
37. Tablet	67.1	8.2	9.6	4.1	11.0
38. Portable Game Console	41.1	15.1	8.2	9.6	26.0

Note. Scale items: N = *Never*, R = *Rarely*, O = *Occasionally*, F = *Frequently*, V = *Very Frequently*

The most frequently used genres of games were simulation (*M* = 2.81), real-time strategy (*M* = 2.66), and adventure (*M* = 2.62). The least frequently used genres were augmented reality (*M* = 1.71) and fighting (*M* = 1.99). A complete accounting of responses to the Digital Game Usage (Genre) frequency scale can be found in Table 11.

Table 11: *Digital Game Usage: Genre*

	Response (Percent)				
Item	N	R	O	F	V

39. MMORPG	53.4	6.8	9.6	17.8	12.3
40. Simulation	39.7	6.8	9.6	17.8	12.3
41. Adventure	39.7	16.4	8.2	13.7	21.9
42. Real-Time Strategy	41.1	9.6	12.3	16.4	20.5
43. Puzzle	47.9	16.4	9.6	8.2	17.8
44. Action	47.9	13.7	6.8	13.7	17.8
45. Augmented Reality	64.4	19.2	6.8	0	9.6
46. Fighting	58.9	12.3	9.6	9.6	9.6
47. First Person Shooter	46.6	13.7	5.5	6.8	27.4
48. Sports	60.3	6.8	6.8	8.2	17.8
49. Role-Playing	52.1	11.9	6.9	13.5	14.9
50. Educational	41.1	19.2	16.4	15.1	8.2

Note. Scale items: N = *Never*, R = *Rarely*, O = *Occasionally*, F = *Frequently*, V = *Very Frequently*

Overall usage of digital games was moderate, with Device Usage displaying a relatively high variance in responses. The means and standard deviations for the Total Usage scale and the subscales of device and genre are contained in Table 12.

Table 12: *Means and Standard Deviations of Digital Game Usage Scales and Subscales*

Scale	*M*	*SD*
Total	2.44	.943
Device	2.66	1.16
Genre	2.34	.918

Research Question 3: Relationship Between Digital Game Usage and Learner Profiles

Correlation coefficients were calculated for the usage scales (Total, Device Usage, and Genre Usage) and the Total Learner Profile scale as well as its seven subscales (Empowered Learner, Digital Citizen, Knowledge Constructor, Innovative Designer, Computational Thinker, Creative Communicator, and Global Collaborator). The researchers used a Bonferroni approach to control for Type I errors across the correlations. For this reason, a *p* value of less than .005 (.05/10 = .005) was needed to demonstrate significance. Unfortunately, none of the correlations showed a significant relationship between Digital Game Usage and Learner Profiles. Table 13 lists the correlation coefficients between the 21st-century learner profiles and the usage of digital games.

Table 13: *Correlations Between 21st Century Skills and Digital Games Perceptions and Usage*

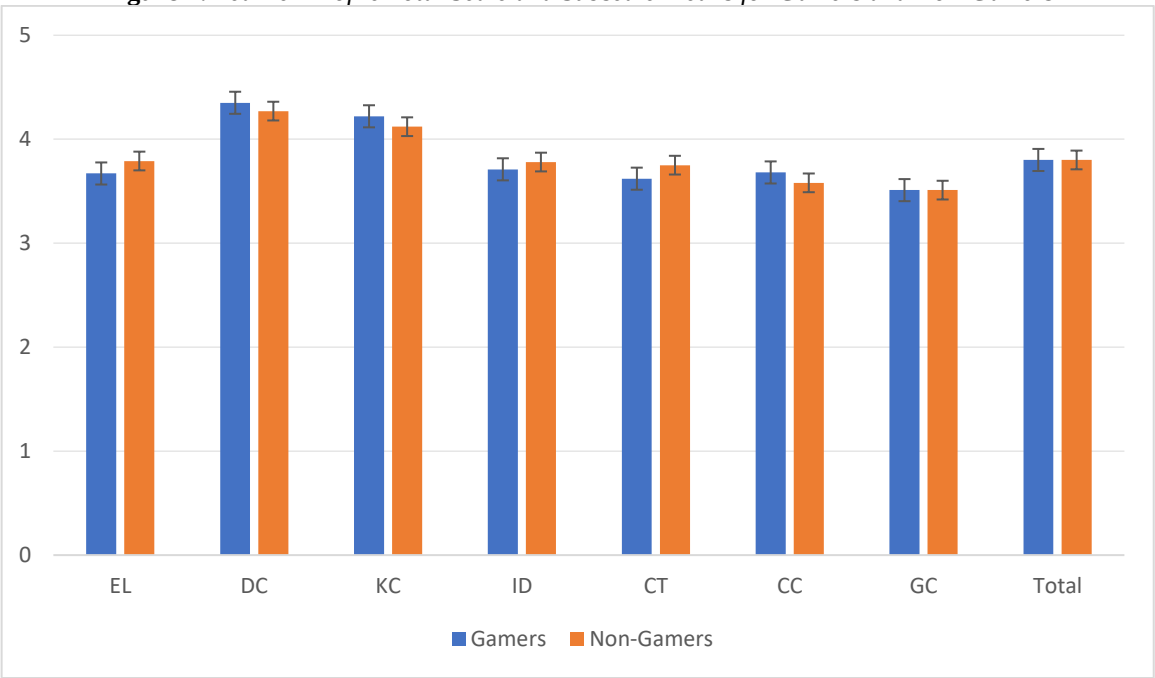
Learner Profiles	Device Usage	Genre Usage	Total Usage
Empowered Learner	.136	.131	.139
Digital Citizen	.113	.190	.172
Knowledge Constructor	.090	.204	.173
Computational Thinker	-.033	-.026	-.030
Creative Communicator	.015	.067	.051
Global Collaborator	-.072	-.054	-.063
Total	.058	.103	.092

Note. $*p < .005$

Research Question 4: Differences Between Gamers and Non-Gamers

Independent *t*-tests were calculated to determine whether participants who identified as gamers would display a significantly different mean on the Learner Profiles total scale or subscales. No significant difference was observed in the total scale or any of the sub-scales. A graphic representation of the means of gamers and non-gamers is shown in Figure 1.

Figure 1: *Learner Profile Total Scale and Subscale Means for Gamers and Non-Gamers*



Discussion

The results of the present study were surprising to the researchers in several key areas. Responses to the Learner Profile section of the survey instrument seem to point to individuals who value independent learning and are both empowered and technologically savvy. These results are inconsistent with the typical learner profile of university students in Japan. As mentioned previously, the Japanese education system is highly teacher-centered, emphasizing lectures and preparation for university entrance exams (Aubrey, 2020; Gainey and Andressen, 2002). Furthermore, despite Japan's reputation as a center for technological innovation and the Japanese Ministry of Education Sports, Science and Technology's (MEXT) efforts in recent years to integrate more technology into K-12 education settings, the methods used in most schools are still surprisingly analog (Aoki, 2010; Funamori, 2017; Latchem et al., 2008). A possible explanation for this is that more than a quarter of the participants were students in an Information Systems Science and Engineering program. Many students in the program are international students, and the Japanese students are often returnees that spent most of their educational careers in a foreign country. Therefore, the sample may not have represented the typical Japanese learner.

Patterns of digital game usage were similar to previous studies. However, some differences were observed. Smartphones were identified in this study and previous works by the authors (Bolliger, et al., 2015; Author, 2021) as the most frequently used device for digital gameplay. However, Author (2021) found that Adventure, Puzzle, and Sports games were the most engaged in genres, while the results of this study showed Simulations, Real Time Strategy, and Adventure games as those that were played most frequently. This might reflect a difference in the sample of participants used in this study or may show a change in user habits as specific games become more popular or fall out of favor.

Finally, the lack of results observed in the relationship between informal digital gameplay and learner profiles, as well as the lack of differences between gamers and non-gamers, could be explained in two ways. As previously stated, the sample used in this study was unique in that a relatively large proportion of participants were international students or Japanese people with considerable experience overseas. Considering that much of the world's education systems prioritize student-centered learning and technology usage, informal digital gameplay may not have been as much of a distinguishing factor as it had been with traditional Japanese learners. Another consideration is that the data for this study was collected during the COVID-19 Pandemic. Japanese university students needed to adapt to online learning for the first time and had more opportunities for autonomous study and technological interaction. This experience may have essentially leveled the playing field between two groups – gamers who frequently used technology to solve problems, collaborate, and communicate and non-gamers who only experienced teacher-centered learning through analog methods.

Conclusion

This study aimed to investigate the relationship between informal digital gameplay and Learner Profiles, as measured by the ISTE Standards for Students. The results demonstrated that Japanese university students at the private institutions where this study was carried out identified positively with the Learner Profiles presented to them and engaged in informal digital gameplay using various devices and types of games. Thirty-seven participants categorized themselves as gamers. Unfortunately, no significant correlations were found between digital gameplay and the Learner Profiles Total Scale or sub-scales. Furthermore, responses to the Learner Profiles Total Scale and sub-scales were not significantly different between gamers and non-gamers. Despite the lack of positive results in this study, the researchers were encouraged by the participants' responses to the Learner Profiles items, which indicated that they were digitally literate and empowered, autonomous learners.

Despite the best efforts of the researchers to reduce bias and increase the validity of the results, there were several limitations to the present study. Responses were collected from two private universities in Western Japan. The students are most likely of a higher socio-economic status than the general Japanese population, which can affect access to technology, free time to engage in digital gameplay, and positive views towards themselves as learners. Additionally, data collected in this study was self-reported and gathered by the course instructors in university classes. While the researchers made it clear that responses would not affect course grades, it is likely that the unequal power relationship between researchers and participants could have affected the responses (Creswell, 2014).

Future research conducted on this subject would benefit from a more extensive and more diverse group of participants that represent the Japanese population of university students more accurately. In addition, a mixed methods approach could be used to give researchers a richer understanding of the participants and the factors being studied and triangulate the quantitative results.

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