Demographic differences in accumulated types of capital in Massively Multiplayer Online Role-Playing Games

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ABSTRACT

This paper examines how the demographic attributes and extra-game habits of players of a Massively Multiplayer Online Role-Playing Game (MMORPG) predict the accumulated capital of their avatars. An online survey (N=905) was conducted amidst the players of Final Fantasy XIV (FFXIV). Four types of capital were measured to map out the concrete and intangible resources of the avatars; social, economic, cultural and symbolic. The results show that weekly time spent playing the game is the strongest predictor of avatar capital and was associated with all types of capital. Time subscribed to the game was associated with cultural, economic, symbolic and bonding social capital. Social capital was found to be highest amongst both young and female players. Forum activity was associated with symbolic capital.

CCS CONCEPTS

•Human-centered computing~Human computer interaction (HCI)~HCI design and evaluation methods~User studies•Human-centered computing~Human computer interaction (HCI)~Empirical studies in HCI•Information systems~Information systems applications~Multimedia information systems~Massively multiplayer online games

KEYWORDS

Demographics, MMORPG, Avatar, Capital

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1 Introduction

The way we understand and comprehend the inhabitants of virtual worlds, and users of digitalized services, has been studied widely [16][25][39][42]. Today, there are more game options and platforms to play on than ever before, thus increasing the possibilities and freedom to choose what, how and when to play. The increasing amount of choices have also contributed to the widening of the player base. The ubiquitousness of games means that players today come from a wider demographic background than ever before.

The phenomenon of people living other lives in games has been dubbed “the exodus to virtual worlds” [10]. Players are spending increasingly significant segments of their lives in these worlds, living through their avatars in virtual environments that are normally thought to be separated from the daily life [9][35].

Unsurprisingly, a large amount of game research has focused on how these virtual worlds and environments affect our everyday lives, be it through studies of problematic aspects, such as aggression [24] or addiction [23], or the positive effects from e.g. cognitive and social benefits of games [17][33] to gamification of various parts of our everyday lives [20][37]. However, as games become an increasingly pervasive part of our lives, our investigation needs to reach into those outcomes relevant in the context of the virtual worlds, to better understand how and why video games have lasting effects in our increasingly digitalized societies. To get closer to accomplishing this task, it is important to look at persistent virtual worlds which contain the affordances for players’ characters, their avatars, and see how they accumulate and consume resources in them [2][36].

Massively Multiplayer Online Role-Playing Games (MMORPG) are a highly popular genre of games characterized by the persistent virtual worlds. Persistent virtual world describes a game world that exists, and events continue to happen, regardless of whether the player is online or not unlike in shooter games where the game world is re-initiated every time game session begins anew, for example. MMORPGs are played by people from a wide variety of

backgrounds [39][42]. In MMORPG-worlds players create a customized avatar and through it experience the game world that contains a different set of rules and boundaries when compared to the real world [2][26]. This difference between offline and online lives raises the question what aspects of ourselves are reflected as resources in virtual worlds.

In this study, we investigate how demographic attributes predict and affect the types of capital players' avatars have in virtual contexts. The relationship between demographic attributes, such as age and gender, and the types of capital an avatar has in a virtual world is approached via Bourdieu's [7] theory on types of capital, which includes four types of capital: social, economic, cultural and symbolic. In this study, the theoretical framework of capital is applied to a virtual world to assess the amounts and types of capital of the inhabitants of a virtual world.

This paper contributes to the growing literature on player demographics by investigating demographic differences in resources avatars have available in a virtual world. The study presents empirical data on the effects of age, gender, time used to play an MMORPG, forum activity and loyalty to the game on the resources available to an avatar in the MMORPG. The data was gathered over a period of one month through an online survey (N = 905) amongst the players of Final Fantasy XIV (FFXIV).

2 Background

2.1 Capital

The term capital in the English language has evolved in the daily communication to refer mostly to available and collected resources [6][31]. In contemporary societies, the usage of the term capital can be roughly divided into five distinct categories: 1) societal level [21][29][30]; 2) sub-types of capital, such as bonding social capital [29] and embodied cultural capital [7]; 3) combination of types of capital, for example human capital [3] that is based on Bourdieu's [7] framework of types of capital; 4) extended types of capital of which prime example is gaming capital presented by Consalvo [12] that further develops Bourdieu's [7] cultural capital framework to fit certain contexts; 5) and interconnected types of capital, such as symbolic capital presented by Bourdieu [7] that does not concretize unless social capital is legitimizing it [38].

Following Bourdieu's division of capital into its different types, game research exploring capital in digitalized contexts commonly narrows down the type of capital examined with prefixes. Prior research has explored for example "group social capital" [28] and "online social capital" [40]. Sometimes the prefix overrides its origin, such as "gaming capital" [12] that is an extended version of Bourdieu's cultural capital. Bourdieu's framework for approaching types of capital as distinctive from each other has been used in the video game context, even though the publications rarely cite Bourdieu's work. Most commonly, game research has employed the social capital framework by Putnam [30] that was popularized in the digital context by Williams [41] in the form a survey. Beyond the social and extended cultural capital frameworks, the capital gathered within games has not gained much attention in the academic study of games. To bring more light into this underexplored field, this study utilizes Bourdieu's [7] categorization of types of capital in the game environment and investigates how the respondents' demographic aspects affect the types of capital their avatar has.

It is important to note that transferring and transforming a previously discussed framework from a context as wide as a country or a society to a different one is not straightforward. Firstly, for this study, the context has been limited from tens of millions of citizens to hundreds of thousands of players. Secondly, the player group is formed of individuals from all around the world and having varying backgrounds and reasons to play [42]. Thirdly, the context is transformed to a digital environment, with small traces of offline life being present in how some types of capital could be beneficial outside the context of MMORPGs. With all this considered, the resources accumulated in virtual worlds essentially operate in similar manner. An avatar can, and will, have social interactions, receive payments in tradeable currency, gain knowledge to learn and advance, and to recognize others' accomplishments.

Furthermore, some of the avatar's numerous types of capital can be accumulated and consumed outside the game. To exemplify the blurry lines between the game world and the "real" world, a group of players formed in the game can chat via a voice chat after the evening program, or one can find a new group of similar-minded players to play with from Reddit or other online discussion sites. These actions outside the game affect the amounts of capital an avatar has. Even though, the forms of capital of an avatar are mostly relevant and in effect only inside the persistent game worlds, the relationship between real and game worlds is interactive.

The socialness of the virtual worlds has been studied from numerous angles to gain better understanding of how the players spend their time inhabiting fictional worlds and why so many choose to do so [4][13][23][34][40]. While there exist studies where capital and virtual worlds are discussed in accord, there exists relatively little literature on player and avatar capital and particularly little quantitative research (see e.g. [4][40][43][44]). One of the few exceptions is a study by Walsh and Apperley [38]. They utilized Bourdieu's [7] framework of four types of capital to inquire how adolescents see themselves as a gamer and view other gamers. They concluded that social capital is needed for the exchange of types of capital to occur. Walsh and Apperley's study demonstrate that gamers, in fact, do have multiple types of capital at their disposal simultaneously. This finding does support the feasibility of transforming Bourdieu's framework of types of capital to other, albeit more limited, contexts, such as game research and subsequently to virtual worlds.

Some aspects that build the core part of activity inside a virtual world can be visualized and quantified in ways not possible outside the game. *Social capital* in virtual worlds consists of the quality and quantity of social networks and ties between avatars. Social capital

is visible and quantifiable through features such as friend lists, groups, and specialized communities. They can, for example, add avatars to a friend list from where they can choose how to interact with other avatars. Similarly, it is possible to block all communication from certain avatars. Avatars can show their allegiance to a group with a visible tag such as guild name. They can be part of numerous in-game communities.

Economic capital in MMORPGs manifests very differently than assets and currencies in our everyday lives do. Furthermore, economic capital in the "real" world has multiple sub-types and functionalities that are not present in MMORPGs, such as stock trading and liquid capital. In an MMORPG, there is often one main currency which is used to value all other items and their prices. The tools of the trade are limited mainly to direct trading, auction houses and owning tradeable resources using the main currency. Other ways of generating the game's main currency also commonly exist, but the volume of the currency is aimed mostly towards paying running costs like repairs and travel. However, as MMORPGs are digital games, resources found in the game are virtually limitless as the only limiting factor for gathering ores or picking flowers is the time taken to do so. This creates a market that highlights the flux of prices depending purely on demand-supply-ratio. In MMORPGs every avatar starts from zero and therefore are competing for resources, money and collectibles, such as vanity pets.

Cultural capital is a more abstract type of capital than social or economic capital. Cultural capital depicts the understanding and habitus of an entity. Manifestations of cultural capital can be seen in-game in the form of answering questions in zone chat, efficiency in combat, understanding how the game functions by utilizing available tools to their maximum and understanding the game world's lore, locations and people including avatars and non-playable characters. As MMORPGs are a genre of game, some knowledge of the games' systems can be transferable to and from other games. Navigating in the game, utilizing user interface, understanding D&D style character building and combat rolls are just couple of examples of skills that are increase over time for both the avatar and player behind them.

Finally, *symbolic capital* manifests in the forms of being recognized for one's accomplishments in one way or another. Recognition, both good and bad, can originate in many ways. An avatar can gain recognition by dressing beautifully or in a provocative manner, being part of a hardcore player group, displaying rare collectibles (titles, pets), standing out by behaving in a certain way or by just being active on the server's chats. In order to an avatar gain symbolic capital, an accomplishment must be acknowledged by other players. For example, having a rare title is somewhat meaningless unless others recognize it as rare. A rare title can be gained from defeating the hardest boss in the game, and to reach that point in the game, an avatar must have enough knowledge of the game's systems (cultural capital) to beat the encounter, which rewards a title to show the completion of the feat. Only after being recognized by other players, can an accomplishment's value be actualized into symbolic capital, such as the recognition of a rare title worn by someone. Thus, social capital is needed for the exchange of types of capital to happen.

For example, according to Bourdieu [7], high amounts of economic capital that parents have can buy their children better education leading to gains in cultural capital. This in time turns into social capital as they have higher and better education than others, in the form of titles and credibility. All around this symbolic capital is accumulated as a combination of all three. However, symbolic capital cannot be accumulated on one's own, because it is tied to other people's acknowledgment (social capital) of one's skills (cultural capital) that one has "unlocked" with studies in a private school (economic capital). In virtual worlds, however, the circulation of types of capital avatar has is not similar as they are not so interchangeable due to limited contexts and limitations of the game world.

2.2 Demographic differences in the habitus of virtual worlds

Differences in age and gender distributions between various role-playing games have been studied and reported to exist. According to the ESA report role-playing games are in the top three most popular genres [14]. This gives more importance to the studies of the populace and communities of (online) role-playing games at global scale. A study conducted by Ghuman and Griffiths [16] reported that the average age of those who mainly play role-playing games (RPG) was 25.6 years and they spent on average 23.7 hours per week playing them. Yee's [42] study showed the average age of players to be 26.57 and they spent on average 22.7 hours per week playing their chosen MMORPG. It is noteworthy that these values are very similar to Ghuman and Griffiths' report due to the time difference between publications, which is 6 years. In both publications, average age of female players was reported to be higher than their male counterparts. Williams, Yee and Caplan [39] examined the players of EverQuest 2. They found that the average age of players was over 30 years, and gender distribution was like in Yee's [42] study. Additionally, a recent study by Castillo [8] reported females to make up to 33.3 percent of players and that the average of players of a MMORPG was 29 years, both of which are considerably higher than in Ghuman and Griffith's (19.5%) [8] and Yee's study (14.6%) [42]. Each study [8, 16, 39, 42] reported that females play more than males. The trend of maturing and more active audience can be inferred from these studies as Yee's [42] study is the oldest and Castillo's [8] study was published over a decade later. MMORPGs seem to attract a fairly mature and committed audience, both male and female players, even though majority of players are still male.

3 Data and Measurement

3.1 Data

An online survey was administered through SurveyGizmo, an online survey tool, among the players of Final Fantasy XIV (N=905). Final Fantasy XIV (FFXIV) is a MMORPG, released in

2010 by Square Enix, that essentially is a mix of other Final Fantasy titles in terms of story focus, narrative and world building, and traditional MMORPGs with expansive game world, player created avatars and structural social aspects. Players undertake the role of an adventurer with the aim of completing heroic triumphs. FFXIV was selected for the study due to authors' immense prior experience in and understanding of FFXIV, which guaranteed prominently better operationalization of the types of capital. Additionally, FFXIV is quite archetypal of a standard MMORPG as it shares many characteristics with other MMORPGs, such as the subscription model, strictly defined roles, character progression with power and level caps, and so on.

Link to the survey was shared across several forums and social media channels that are purely focused on FFXIV. The respondents were recruited from the official forums' English speaking section, a subreddit of FFXIV, a Discord (a program that combines VoIP and IRC functions for communication) server and three Facebook groups: a global one, where players of FFXIV from all around the world share their comments, screenshots and ideas about the game; a group aimed towards Nordic players of the game; and a Finnish group. Admins and moderators of each group and server were contacted beforehand to acquire permission to share the link to the survey. The respondents were able to fill the survey from March 16th to April 14th, 2017. When the survey was taken down, 1002 players had completed it. A total of 905 of valid responses remained after filtering incomplete responses from the data. It should be noted that it was not possible to verify the age of respondents as the survey conducted was self-select and forums where the survey was linked are anonymous.

Table 1 outlines the descriptive statistics of the 905 respondents, the gender distribution of the sample consists of slightly more males than females. The reported age difference between the youngest (14) and the oldest (55) player was 41 years with average age of respondents being 27.2 years. Veteran rank acts as the game's loyalty meter as it depicts the time a player has been subscribed to FFXIV. At the time of data collection, maximum rank was 14, and was achieved by being subscribed for 4 years. The amount of time required to advance from one veteran rank level to the next rank varied: to reach ranks 1 through 3, additional 30 days was needed; for ranks 4 through 11 additional 90 days; for ranks 12 and 13 additional 120 days and for the last rank, 14, an additional 360 days was needed. This veteran rank system has changed after the data collection as it currently has 4 ranks that can be reached with total of 330 days subscribed. The demographic details of the respondents correspond to those in prior studies [16][42]. The average age (27.2) and weekly game-time (25 hours) differ minimally from the previous studies. However, the number of female players has increased when compared to studies conducted a decade earlier [42], up to 34.1 % from 19.5 %.

3.2 Measurement

For measurement of social capital, a previously validated measurement instrument was utilized [41] by adjusting it to fit the scope of the study. Williams [41] developed online social capital scale based on Putnam's [30] arguments on how social life changes as online activities become more pervasive in our everyday life. For this study social capital measurement was measured using bonding and bridging social capital perspectives. Bonding social capital measures the strength, intimacy and quality of social ties in virtual contexts, whereas bridging social capital measures the quantity, distribution and circulation of social ties at more superficial level. The items of the scale were adjusted to measure accurately social capital within the framework of FFXIV. Two items were omitted, as no comparable in-game counterpart exists. These items were related to offline life currencies, and because in-game currencies are purely digital and have value only within the limited contexts of FFXIV, they have no impact on offline life. After omitting these items from Williams' [41] scale, 18 items were used to measure social capital.

For measuring the other forms of capital, there currently are no validated measurement tools. Thus, for cultural, economic and symbolic capital items were developed and generated by the authors based on hundreds of hours and over three years of experience with FFXIV. Economic capital was measured with 22 items divided into three sub-topics: how much economic assets and resources an avatar has, and how those are gained and spent. In FFXIV, the main game currency is gil, like euro or dollar, and other in-game currencies are directly or indirectly changeable to gil. Cultural capital was measured using 16 items. These items followed Bourdieu's [7] definition of cultural capital that included player's knowledge of FFXIV from numerous angles, and how the avatars might share the accumulated knowledge with others. These items measured the avatars's knowledge and understanding of the game's functionalities, mechanics, lore and the amount of achievement points collected. Symbolic capital was operationalized to measure the legitimacy of other types of capital, such as being a known avatar in-game. Items included the ownership of rare mounts, pets and titles, and how well-known the avatar was in the server based on achievements, completed deeds, name, gear, titles and behavior, for example. This was accomplished with 20 items. For the measurement items used in this study, please see the supplementary material.

The data was analyzed using component-based structural equation modeling (in SmartPLS 3.0 program) which is suitable for prediction-oriented studies and when the research model includes both reflective latent variables and formative variables [19][27][32]. Measurement setting in SmartPLS was done by path modeling each demographic variable to each construct of type of capital. Figure 1 depicts the simplified path model used for this study.

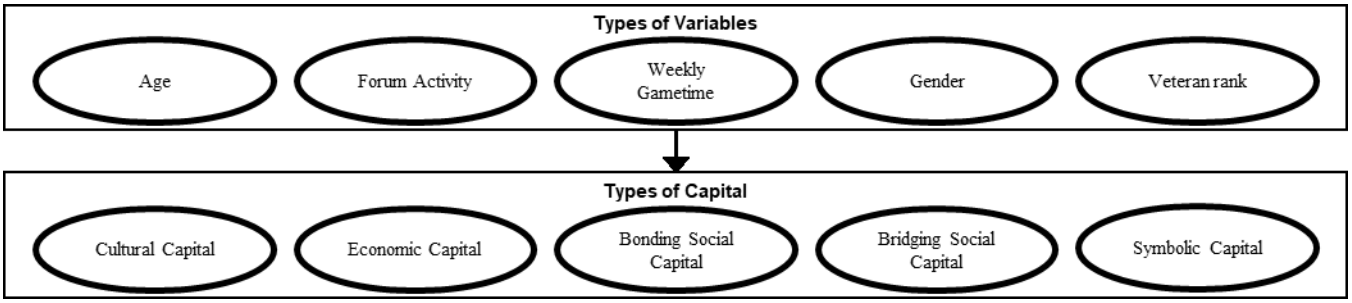

Figure 1: Simplified path model.

Table 1. Descriptive statistics of the respondents (N=905).

	f	%		f	%		f	%
Gender			**Platform**			**Datacenter**		
Female	309	34.1	PS3	5	0.6	NA	599	66.2
Male	573	63.3	PS 4	224	24.8	Europe	273	30.2
Other/nonreport	23	2.5	PC	674	74.5	Asia	33	3.6
			Mac	2	0.2			
Age (mean = 27.18. median = 26)						**Frequency of reading FFXIV related forums**		
–19	66	7.3	**Hours played per week**			None at all	26	2.9
20–29	556	61.4	0	2	0.2	Once or twice a week	244	27.0
30–39	255	28.2	1-5	31	3.4	Almost daily	301	33.3
40–49	26	2.9	6-10	81	9.0	Daily	169	18.7
50–59	2	0.2	11-15	109	12.0	Several times per day	165	18.2
60-	0	0	16-20	124	13.7			
			21-25	109	12.0	**FFXIV Veteran rank**		
Country of residence[1]			26-30	119	13.1	0	7	0.8
United States	447	49.4	31-35	64	7.1	1	6	0.7
United Kingdom	91	10.1	36-40	92	10.2	2	10	1.1
Canada	90	9.9	41-45	40	4.4	3	30	3.3
Germany	39	4.3	46-50	44	4.9	4	31	3.4
Finland	31	3.4	51-55	10	1.1	5	34	3.8
France	25	2.8	56-60	30	3.3	6	68	7.5
Australia	21	2.3	61-	50	5.5	7	63	7.0
Sweden	21	2.3				8	70	7.7
Netherlands	12	1.3	**Current occupation**			9	63	7.0
Belgium	9	1.0	Full-time	363	40.1	10	91	10.1
Brazil	9	1.0	Student	243	26.9	11	65	7.2
Spain	9	1.0	Unemployed	144	15.9	12	71	7.8
Denmark	7	0.8	Part-time	99	10.9	13	204	22.5
Norway	7	0.8	Retired	9	1.0	14	92	10.2
Switzerland	7	0.8	Other	47	5.2			

[1]Country of residence contains 15 most commonly reported countries. Altogether, there were reportedly respondents from 45 different countries. The countries not listed in the table were reported as country of residence by six or less respondents each.

3.3 Validity and Reliability

The average variance extracted (AVE) and composite reliability were calculated to evaluate the convergent validity for each variable. AVE should exceed the value of 0.5 to indicate the convergent validity and the CR value for reliability should be greater than 0.7 [15]. It can be established the convergent validity was met as can be seen from Table 2 that illustrates the AVE and CR analysis results for variance and reliability. However, as AVE and CR are not fit for formative constructs, variance inflation factors (VIF) were calculated for each item of the formative constructs to assess validity. VIF-values are advocated to remain under the threshold of 5 [32]. All values were lower than 3.

To assess the discriminant validity, heterotrait-monotrait (HTMT) values were calculated (see Table 2). The Fornell-Larcker-criterion [15] has been in use for multiple decades when assessing the discriminant validity. However, Henseler et al. [22] showed through a simulation study that Fornell-Larcker criterion does not reliably detect the lack of discriminant validity. For this reason, to assess discriminant validity in this study, Fornell-Larcker criterion is not used, but HTMT criterion. To satisfy the heterotrait-monotrait criterion, each value must be lower than 0.85. [22] Thus, it can be determined that discriminant validity was met. HTMT discriminant validity assessment only applies to reflective constructs, and thus,

formative constructs (cultural, economic and symbolic capital) are not displayed in Table 2.

The filtered sample size that consists of 905 respondents greatly surpasses lower limits for the minimum recommended sample size. A model that has constructs with three to four items, at least 150 respondents are needed for validity [1]. Bentler and Chou [5] have proposed a far stricter minimum number of respondents, five cases per observed variable. For this study, that number would be 405 respondents. Consequently, it can be concluded that the number of respondents is sufficient for the analyses.

Table 2. Hetero-monotrait, CR and AVE values.

	1	2	3	4	5	6	7	CR	AVE
1 Age								1	1
2 Forum Activity	0.081							1	1
3 Weekly Gametime	0.098	0.246						1	1
4 Gender	0.015	0.049	0.045					1	1
5 Veteran Rank	0.316	0.086	0.032	0.023				1	1
6 Bonding SC	0.097	0.036	0.167	0.211	0.105			0.907	0.554
7 Bridging SC	0.163	0.047	0.173	0.168	0.077	0.732		0.912	0.510

Table 3. Results (* = p < 0.05, ** = p < 0.01, significant associations bolded)

	Beta	p	f^2	Beta	p	f^2
	Cultural Capital (R^2 = 0.304)			***Economic Capital (R^2 = 0.158)***		
Age	0.155	0.119	0.030	0.074	0.550	0.006
Forum Activity	0.105	0.114	0.015	0.054	0.287	0.003
Weekly Gametime	**0.170***	**0.030**	0.039	**0.307****	**0.000**	0.104
Gender[a]	-0.012	0.767	0.000	0.057	0.304	0.004
Veteran Rank	**0.429***	**0.036**	0.235	**0.187***	**0.007**	0.037

	Beta	p	f^2	Beta	p	f^2
	Bonding SC (R^2 = 0.083)			***Bridging SC (R^2 = 0.070)***		
Age	**-0.105****	**0.003**	0.011	**-0.138****	**0.000**	0.018
Forum Activity	-0.030	0.393	0.001	0.006	0.861	0.000
Weekly Gametime	**0.149****	**0.000**	0.023	**0.145****	**0.000**	0.021
Gender[a]	**0.195****	**0.000**	0.041	**0.152****	**0.000**	0.025
Veteran Rank	**0.125****	**0.001**	0.015	-0.003	0.941	0.000

	Beta	p	f^2
	Symbolic Capital (R^2 = 0.415)		
Age	-0.007	0.835	0.000
Forum Activity	**0.134****	**0.000**	0.028
Weekly Gametime	**0.303****	**0.000**	0.146
Gender[a]	0.048	0.133	0.004
Veteran Rank	**0.513****	**0.000**	0.399

[a]Males were coded with the lower variable value in the analyses.

4 Results

The player's demographic attributes accounted for 8.3% of the variance for bonding social capital, 7.0% for bridging social capital, 30.4% for cultural capital, 15.8% for economic capital and 41.5% for symbolic capital. Based on the suggestions of Cohen [11] it can be determined that the effect size for social capital is weak ($0.02 < x < 0.13$), for economic capital moderate ($0.13 < x < 0.26$), and for both cultural capital and symbolic capital substantial ($x > 0.26$). Table 3 reports full results with significant values bolded. Regarding the effects of player's demographic attributes to cultural capital of the avatar, weekly time spent in game ($\beta = 0.170$*) and total time subscribed to game ($\beta = 0.429$*) were found to be associated with cultural capital. Economic capital was found to be associated with weekly time spent in game ($\beta = 0.307$**) and veteran rank ($\beta = 0.187$*) of the player. Bonding social capital was found to be associated with player's age ($\beta = -0.105$**), weekly time spent in game ($\beta = 0.149$**), player's gender ($\beta = 0.195$**) and total time subscribed to the game ($\beta = 0.125$**). Bridging social capital was found to be associated with player's age ($\beta = -0.138$**), weekly time spent in game ($\beta = 0.145$**) and player's gender ($\beta = 0.152$**). Symbolic capital was found to be associated with forum activity ($\beta = 0.134$**), weekly time spent in game ($\beta = 0.303$**) and total time subscribed ($\beta = 0.513$**).

5 Conclusions

In this study, we have examined the effects of age, gender, time playing FFXIV on a weekly basis, loyalty to the game and forum activity on the amount of different types of capital an avatar has in the game world of the Massively Multiplayer Online Role-Playing Games (MMORPG), Final Fantasy XIV (FFXIV).

The results indicate that demographic attributes of the player do affect the formation of different types of capital for an avatar. Each demographic attribute was associated with at least one type of capital, most with two or more. Weekly game-time was found to be associated with every type of capital. Players of FFXIV present a demographically typical MMORPG player base, as can be seen from the age, gender, and weekly game-time distributions that are like the demographic statistics of prior studies [14][16][42]. Therefore, the instrument used to survey avatars' types of capital and the implications of the results could be utilized to study players and avatars of other MMORPGs. Following discussion regarding analysis results are looked at more general level of MMORPGs where FFXIV works as an example rather than a limiting factor.

The results of the study indicate that the cultural capital is strongly associated with the weekly time spent in the game, but not veteran rank nor forum activity. This finding may suggest that in order to accumulate cultural capital in-game, continuous in-game activity increases the understanding of a game and its systems more than reading forums related to a game or simply being subscribed to a game. One interpretation of this finding might be that simply being subscribed to a game does not reveal how much the game is played on a weekly basis; subscription is needed to access the game and its contents, but the actual game time is what contributes to the knowledge and understanding of the game world.

Economic capital was found to be associated with time spent in the game and veteran rank, which suggests that for an avatar to become wealthy, or start capitalizing on owned assets, one must play a game actively and for a lengthy period. The relationship between economic capital and veteran rank most likely originates from one of the game's systems where not stepping foot into personal or free company's estate for a long time, 45 days to be exact, will trigger an automated demolition destroying all items and putting the lot for sale. Thus, for players to keep their estates, at least one owner of an estate must log in and step inside the estate roughly every 40 days. The ability to collect money in order to buy an estate in FFXIV requires an immense amount of time played as the amount of lots are limited and they are very coveted. Additionally, avatars gain levels, gain skills and items during gameplay, and it can be implied that avatars who are active for prolonged time will gain skills in more than just combat scenarios, such as crafting, that are more profitable in most cases.

Social capital was split into two variables as the instrument for measuring social capital has been previously validated and used in numerous studies (see e.g. [34][43]). This allowed for a more precise analysis on which kind of social actions, external (bridging) or internal (bonding), avatars engage in their lives in the game. For bonding social capital, only forum activity was not found to be associated. Time spent in the game and veteran rank are somewhat straightforward as the more the game is played, more close and intimate relationships the player will form over time within the game. The findings indicate that female players are more likely to form more close and intimate relations with other avatars, thus increasing their bonding social capital. Additionally, the younger the player, the more bonding social capital the avatar has based on the analyses of the data.

For external, bridging, social capital, very similar results were found as for bonding social capital except for veteran rank shifting from very significant to not significant at all. This suggests that time subscribed to the game does not manifest as increased sociability within the server an avatar lives in. One possible reason is that over the time span of months and years those one plays with, but is not particularly close with, are bound to change as some stop playing the game, change groups or servers. Moreover, females and younger players have more social ties compared to their counterparts, both thus reporting higher bridging social capital. These findings about social capital suggest that older players do not have as big social networks as younger players do and that female players are more social than males.

Finally, symbolic capital was found to be associated with forum activity, time spent in the game and time subscribed. These findings suggest that, much like economic capital, building up symbolic capital takes time and commitment. Symbolic capital was measured by touching the topics of recognition and collections. Becoming a recognized avatar on a server or at large in the whole community of an MMORPG does not happen overnight. Many players could most likely name a couple well-known avatars known for, for example, making video guides to encounters in the game or identify some active members of their server community that have done something noteworthy or stand out in the community for some reason. Collections of vanity items, such as pets, titles and mounts are often rewards for completing a triumph, be it reaching a certain point in the story or defeating the last boss in a group dungeon. The larger the collection, the higher the chance of being renowned in the server or game community, as some vanity items are incredibly rare and hard to obtain.

6 Discussion and future studies

The results of the study support Walsh and Apperley's [38] claim that players and gamers are in the possession of multiple types of capital at any given time. These findings denote that social capital alone does not holistically explain and explore the reasons why we choose to have many lives in games. Additionally, it should

be noted that non-existent associations do not mean an avatar is not as knowledgeable of the game as someone who plays very actively, but the more active player has just spent more time acquainting themselves with the game's systems. As FFXIV is a representative game of its genre, these results could be used as a grounding for what to expect should this survey be repeated in other MMORPGs. The older the avatar is, the more resources the avatar has at their disposal, which is also true for many other multiplayer games even when the types of resources differ between genres. Thus, it could be expected that per this study and Walsh and Apperley's article an avatar is in possession of more than one type of capital in other MMORPGs where biggest differences between games are in the demographics of the players and the distribution of types of capital. Demographics will differ between games as players find things they (dis-)like and commit to certain genre or game. For example, one might dislike heavily the amount of skill present whereas one finds the offered complexity as a challenge to master.

The instrument for measuring types of capital is not yet validated on a large data set spanning multiple games or genres. It is possible that types of capital utilized in this way will need to be extended in the future iterations of the instrument, similarly, to what Consalvo [12] did with cultural capital, or there is a need to describe new ones that are tailored to fit for digitalized and virtualized online lives. Furthermore, online video games use unique, game-specific, terminology even though the functionality does not differ much, if at all, between games. Thus, studying types of capital of an avatar does necessitate attention to context-specific content. For the practitioners of the video game industry, approaching avatars this way opens new concrete means to understanding player behavior regarding how tangible and intangible resources are collected and consumed as the survey gives more meaning to the numbers extracted from play data.

It should be noted and emphasized that the survey was self-reported and the players who chose to fill the survey were self-selected. This is common with the web-based survey methodology. Self-reporting is likely to affect the results somewhat as the respondents might have answered to make themselves look good or have tried to answer in a way they would consider to be beneficial for the study. For the most part, the respondents followed the link to the survey through a forum or focused chat rooms revolving around the game and it is sometimes postulated that only small fraction of the player base ever reads forums or discussions related to a game. Thus, the representation of the players of FFXIV might be biased towards more active players, who are engaged in the game's communities. Additionally, the effect of the respondent's socio-cultural and socio-economic background on the perceptions of certain themes or items of the survey, for example, perceptions of what is considered a close friend in-game, might vary. In the future, it would be beneficial to acknowledge these possible effects. These are also limitations that hinder slightly the generalizability of the results to cover all the players of the game or all players of different MMORPGs. The future endeavors on the research of digitalized and virtualized lives should aim to develop and validate the measurement tools in cross-game and genre-specific frameworks.

Furthermore, inferring causalities from the results is not possible in SEM-based studies with acceptable confidence, as the survey data is cross-sectional. Nonetheless, independent variables used in this study can be thought to be more steady traits of the players, while the dependent variables linked to avatar's capital can be anticipated to change over time more promptly.

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