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Review Article

Massively multiplayer online games and social capital: A systematic literature review

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ABSTRACT

Video gaming has historically been regarded as a pastime with addictive potential and has subsequently been the subject of public scrutiny, in media and academia. In the early 2000s, massively multiplayer online games (MMO) in particular were the locus of addiction-centred debates. However, over time different avenues of research into the outcomes of MMOs have opened up, honing in on social and psychological consequences. The present systematic literature review organises and examines research on the social impact of playing MMOs on their players, analysing a sample of 22 studies leaning on the PRISMA framework. The results indicate that a number of facets adhering to MMO gameplay, such as collective play, game involvement and being part of a community are beneficial to an individual's social capital and related concepts, while gaming time was a significant negative predictor. Offline social capital and leadership research were scarcely present in the collected studies, however the results imply a positive relation between MMO gameplay and these variables. Overall, the results suggest a high potential for transferability of social capital, even so there seems to be diminishing returns. Beyond a certain threshold of gaming time, the relation becomes negative, indicating the importance of balanced engagement.

1. Introduction

It has been argued that the new digital media have been replacing more traditional leisure activities and eroding the associated social values. Activities on digital devices and engaging with digital media forcibly takes up time previously allocated to other activities, such as meeting in a bowling alley, or frequenting a pub (Bolet, 2021; Bryant & Fondren, 2009; Putnam, 1995; Putnam, 2000). By consequence, the established social structures, norms and etiquettes change or fade. This shift brings about a decline of social capital, strengthens individuality and weakens the ties within communities. With respect to this observation, the question arises whether certain domains of digital media are capable of either nourishing social capital or complement offline social capital.

In this direction, over the past decade, research into massively multiplayer online games (MMO) gathered momentum. In spite of being past their peak popularity relative to other and more recent game genres, such as Multiplayer Online Battle Arenas (MOBA) or Battle Royales (BR), they are still being engaged with by millions of players daily (MMO Population, n.d.). While the genre was once primarily scrutinised under an addiction focused lens, in both media (Greenwald, 2007; Lush & Press, 2011; Reimer, 2006) and academia (Chuang, 2006; Lee, Cheung, & Chan, 2020; Sibilla, Musetti, & Mancini, 2021; Yee, 2002; Zhong, 2011), over time different avenues of research into MMOs became increasingly prevalent (De Larios & Lang, 2014; Ducheneaut et al., 2006; Trepte et al., 2012; Zhong, 2011), hailing from the genre's unique intersection between human actors and digital space. One area of interest became whether MMOs could be beneficial for their player base, outside of being an enjoyable time sink, originating from the unique gameplay experience offered by the genre (Barnett & Coulson, 2010; Casañ-Pitarch, 2021; Hsu et al., 2009).

We will argue that MMO gameplay and involvement with this game genre may be conducive to amassing online social capital, acquiring leadership skills and gaining access to a variety of social affordances. The relation between MMO gameplay and its potential benefits is further predicted to be transferable to the offline environment. The reason for this conjecture are the numerous similarities between society, as it is known to us and the in-game worlds contained in MMOs (Barnett and Coulson, 2010; Petrică, 2015). Featuring many elements such as personal responsibility, social codes, etiquette, and common goals, MMOs

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have been described as an amalgam, being made up from both a community of play and a community of practice (Barnett & Coulson, 2010; Dinsmore & Wenger, 2006; Pearce, 2011; Petrică, 2015). Early research into MMOs concluded for them to be suitable "third places" where individuals can accrue social capital too (Putnam 2000a; Steinkuehler & Williams, 2006). Investing time and resources into these games can therefore reasonably be predicted to bear fruits in the areas where the game overlaps with the offline world.[1] With the constant connectivity to the online world enabling social interaction, the possibility of new friendships, the associated responsibilities and expectations entangled in the gameplay, it stands to reason that corresponding skills are being fostered and that due to the closeness of the environments, the skills and relationships that have been acquired online, can be utilised to an extent to aid in the offline world (Snodgrass et al., 2011; Sourmelis et al., 2017).

Due to the aforementioned shift in perspective on the genre, a number of studies have focused on MMOs and their effect on social capital, leadership and general social affordances. Research on MMOs has expanded to explore their potential benefits seeing that they offer such a unique environment where social interactions can be observed. While recent reviews such as Korkeila (2021) have examined social capital in video games, including online games, their focus lies in the methodological approaches used across studies. In contrast, the present review contributes to the field by emphasizing the directionalities of social capital and the specific social affordances of online video games, including studies focused on individual titles. Advancing identity-centred view of gaming communities, recent work by Sachan et al. (2025), focuses on inclusivity and structural challenges. While this perspective adds nuance, the present review emphasizes a broader framework of social affordances, including motivational and role-based dynamics.

Tushya et al. (2025) similarly examine social outcomes in gaming contexts but adopt a broader inclusion criterion for what qualifies as an MMO. Their findings complement our own, particularly in the area of social capital, though our review extends this by addressing a wider range of affordances such as leadership structures and in-game collaboration.

The present review systematically analysed the available literature on MMOs, social capital and its transferability between the game and offline worlds, in an attempt to present the current research on the topic and provide an overview of the current findings.

2. Background

2.1. Social capital

Social capital is a concept popularised by Bourdieu and Passeron (1964; 1986), and later built upon by Coleman (1988), Putnam (1995) and Halpern (2005). The concept refers to an individual's or group's resources which can be drawn from the respective social network. What resources are available and the extent to which they can be accessed are dependent on the nature and strength of the relationships and their sum, the network. In 1995, Putnam proposed two different kinds of social capital, namely bridging and bonding.

Bridging capital can be generally understood as coming from a "weak tie" network (Aral, 2016; Granovetter, 1973). It is an inclusive network of loose connections and mainly provides social and informational support. Members of a bridging network are heterogeneous, stemming from different backgrounds and bringing with them different experiences (Castillo, 2019). Given the nature of online interactions, it can be predicted that bridging ties are more frequently formed online, when compared to the offline world, as the online world brings together people from different backgrounds that might interact among each other solely based on convenience.

On the contrary, bonding capital is the result of "strong tie" networks (Aral, 2016; Granovetter, 1973). These networks are exclusive, and its members are mostly homogeneous. Bonding capital results in emotional and social support (Castillo, 2019). While bonding capital might be rarer in online environments, it has still been found in online environments and is subsequentially strengthened once the relationship is taken outside the online space and the interlocutors meet in real life (Ducheneaut & Moore, 2005; Spottswood & Wohn, 2020).

A further distinction can be made between online and offline social capital (Zhong, 2011), mainly based on the nature on how it is being acquired. Offline social capital is built from face-to-face communication which is richer in information, be it in body language or the appearance of the participants when compared the computer-mediated communication (Kiesler et al., 1984; Zhong, 2011). On the one hand, this difference can allow to overcome hierarchical, geographical and economical barriers, potentially acting as lubricant for the development of a social network (Kavanaugh et al., 2005; Kubota & Garcia, 2020; Vergeer & Pelzer, 2009). On the other hand, research has found that the barrier between online and offline behaviour to be a blurry one (Hargittai, 2007; Vergeer & Pelzer, 2009) as offline personas may bleed into the online world. MMOs, with their persistent game world, which in contrast to popular social networking sites, presents users with specific goals to work toward over a significant amount of time, may entangle the offline and online worlds further, while also providing an environment with the potential to foster collaboration (Ducheneaut et al., 2006; Taylor, 2009). It stands to reason however that individuals with an inclination towards social interaction or playing for social motivations are through the same mechanisms able to gather more social capital than those with opposite dispositions (Antheunis et al., 2015).

2.2. Massively multiplayer online games

Contrary to the majority of popular online games, where the player is able to queue into individual matches to be given teammates or opponents of similar skill, MMOs present their player base with a persistent game world, which continues to be played in and evolve irrespective of a user being online (Barnett and Coulson, 2010; Hsu et al., 2009). The game worlds bring about the formation of communities, formed to achieve common goals while simultaneously social etiquettes are being construed from repeated interactions between a large number of people as sanctions are applied to those that deviate from the expected behaviour. Through this lens, MMOs can be viewed as a miniature version of human society. It reflects reality in the sense that outside of the established laws, or in the games' case the developers' code of conduct, individual and group behaviour is governed by norms, expectations and ethics imposed by other inhabitants of the same environment. Consequentially, similar to the offline world, players could accrue social capital through their avatars and potentially transfer the online social capital outside of the MMO through the interaction with the other players and draw on social resources to aid them outside the game world (Putnam 2000; Steinkuehler & Williams, 2006). These worlds are hosted on game-servers, sometimes referred to as *realms*, and traditionally, inter-server activities are strictly limited. Players connect through their server and control an avatar in the virtual world. Being represented by an avatar, allows the players to distance the game from the offline world, while simultaneously allowing for freedom of expression by offering numerous customisable features. In this environment players repeatedly encounter the same players across multiple gameplay sessions as they would in a city which further enticed by the design of MMOs, promoting player interaction. For example, the overwhelming majority of MMOs feature built-in text and voice chats or have objectives that are impossible to complete without a dedicated team thus strongly encouraging group play. On a more technical level, some opt to limit the available resources required for a quest or an objective on the map, promoting team play as competition over the resources would lead to scarcity,

[1] In this review, the term "offline" will refer to the physical world.

impeding all competing parties (Ducheneaut et al., 2006; Taylor, 2009).

Sprouting from this design philosophy, the persistent worlds existing in MMOs mirror the offline world in many aspects of civil engagement. The continuous co-existence of the same pool of players leads to the creation of social relationships, a social etiquette, sanctions, as well as benefits on an individual and collective level (Barnett & Coulson, 2010; Petrică, 2015; Zhong, 2011). These are crucial elements for the constitution of social capital (Coleman, 1988), and, consequently, studies have investigated the connection between online social capital and MMO gameplay (Castillo, 2019; Hsu & Chang, 2022; Kaye et al., 2017; Mandryk et al., 2020; Reer & Krämer, 2014; Skoric & Kwan, 2011; Williams et al., 2006; Zhang & Kaufman, 2015; Zhong, 2011). MMOs come in various forms, with different sub-genres dictating the nature of gameplay, be it massively multiplayer online roleplaying games (MMORPG), first person shooters (MMOFPS) or a different sub-genre.

To facilitate engagement with the game, most MMOs allow for the creation of guilds or clans which are largescale player groupings which persist potentially over years.[2] The games provide the guild members with features such as exclusive communication channels, a common calendar or an internal hierarchy upheld by ranks assigned within the guild feature implemented in the game (Billieux et al., 2013). These guild ranks dictate for example, who can invite or remove players from the guild, organise events or communicate in restricted channels. While guilds can have varying goals, they share the purpose of establishing a closer relationship between individual players and to provide a trustworthy network to call upon if help is needed or company wanted. Popular guild types include raiding guilds, which feature large player groupings with scheduled events in order to tackle the most difficult content the games have to offer, player-versus-player guilds, aiming to find skirmishes against other players and social guilds, where the focus lies on interacting with others and finding or giving support. Consequently, core members within longstanding guilds tend to know each other by first name and meet up in real life from time to time. Seeing that guilds aim to provide a trustworthy environment, a guild's reputation is paramount to their success. While their reputation stems in part from their success in achieving their set goal, be it a raiding, a player-versus-player or social guild, another sizeable chunk stems from their individual members' behaviour while interacting with people outside of the guild. For example, if a guild is known to host players that frequently make derogatory comments towards others, they will have a harder time recruiting new players once their current roster starts losing reliable players.

A further consequence of a guild's hierarchy is that people are designated and responsible for leading the guild. These players must manage schedules, interpersonal conflicts, relationships and unexpected occurrences all while keeping their members motivated to continue pursuing their goal with the guild (Ducheneaut & Moore, 2005). With this set of expectations, it may be argued that leadership skills are being fostered within these environments.

These elements result in a social etiquette, a set of expectations held by the community related to individual and group behaviour in the game, be it in terms of conduct when grouping with another player, competing for quest objectives, or even player-versus-player combat. The social etiquette extends far beyond the code of conduct laid out by the game's developers and includes but is not limited to details such as greetings when joining a party, priority on rewards, and not pointlessly inconveniencing other players. For instance, when competing for a limited quest objective, players have been observed to form orderly lines and wait for an extended duration for their turn or when two players approach a mineral deposit at the same time, it is considered polite to share it equally.

The expectations that a game's community sets for its players are different from MMO to MMO. Some communities are extremely receptive to newcomers and go as far as prohibiting third party applications with the function of measuring players' performances, while others are ruthless in their expectations for new players and often present a frictional entrance into the genre.

Especially, when engaging in combat with other players, some behaviour is frowned upon and may lead to retaliation. When fighting another player in an agreed upon one-on-one, it is considered bad etiquette to use rare consumables or other out of the box tools. When defeating another player in the open world, it is also courteous to not wait at the player's respawn location and proceed to kill them over and over again, commonly referred to as corpse camping or spawn camping.

Players violating the social etiquette may face consequences enacted by the game's or server's community. When encountering unsavoury behaviour, players are encouraged to report such behaviour on either a forum or a Discord server for example, and if the reported behaviour is severe or the offense has been committed multiple times, the offending individual might be put on a "blacklist" – essentially a searchable document containing unsavoury players' names and the reason they have been put there. This method can be particularly severe, as the note on the blacklist will also mention the players affiliated guild, assigning each member a responsibility that goes beyond the individual. Another form of repercussion could be that a group of vigilantes takes it upon themselves to grief the offender, this is frequently employed to avenge the aforementioned corpse camping. In essence, the victim of corpse camping will call out the location, and a group of players will band together to return the favour to the offender.

To explore the nature of the relation between MMO gameplay and social capital, social affordances and leadership, research has moved beyond measuring MMO gameplay through simple playing time. Game involvement encompasses not only time spent inside the game, but also the time the individual spends on message boards, organising events and, in general, the time spent engaging with the game's community. The collected sample presents extra-ludic factors, i.e. factors outside the game which have as potential drivers to the acquisition of social capital including the individuals' motivation for playing their game of choice, the nature of their passion for the game, their offline activities as well as their intrinsic enjoyment of relationships. Concerning ludic elements, variables of interest are the individuals' familiarity with the people they play with, their communication frequency as well as the degree of self-disclosure online. Online social support and collective play, the act of playing with an organised guild, were also of essence.

Taking into account the nature of MMOs and its potential relations to the aforementioned concepts, the following review aimed to synthesise the current state of research into MMO gameplay and its consequences for the online and offline social relations of its players. Given the immersive nature of the games and comparability to a micro-cosmos of the offline world, the present systematic literature review aims to answer the question whether facets of MMO gameplay bear on the creation of online social capital, operationalised through online bridging capital and online bonding capital. The review further investigates whether MMO gameplay has an influence on the offline counterparts of the aforementioned elements of social capital and whether social affordances, such as the number of friends or online and offline social support, are related to MMO gameplay. Finally, the question is examined whether MMO gameplay is conducive to leadership skills in both the online and offline realms. Through the provision of an environment which allows to nurture social competences as well as granting a number of social affordances, the assumption prior to conducting the research was that MMO gameplay would be beneficial to an individual's social capital, both online and offline, operationalised through bridging and bonding capital. The hierarchical structure within large groups on the other hand, was predicted to potentially foster leadership skills as players must cooperate towards a long-term goal without souring relationships.

[2] The present review will refer to these communities as guilds, but the terms are interchangeable in gaming terminology.

3. Methods

3.1. PRIMSA framework

This review was guided by the PRISMA framework, following relevant steps (Page et al., 2021).

3.1.1. Eligibility criteria

Studies were included in the synthesis if they focused either on one or more aspects of social capital, or leadership. Further they needed to focus on any one subgenre of MMOs. In addition, the selected studies needed to analyse some form of data, be it from server logs, interviews, surveys or collected during an ethnographic process. Finally, all studies included are in either French, English, German, Luxembourgish or Dutch, due to limitations in language skills on the side of the authors.

Studies were excluded if they focused on virtual environments which are not MMOs, such as Second Life or Meta.

3.1.2. Information sources

For this review, 5 data bases were searched: Web of Science (370 results), ProQuest (49 results), Scopus (780 results), PsycInfo (145 results), JSTOR (246 results). The search was conducted between June and July 2023.

3.1.3. Search strategy

The search strategy focused on title and abstract only. The exception to this is the search on JSTOR, as they flagged that the majority of their articles do not have an abstract and the search was therefore focused on title only.

Strings that were used to search the data bases can be seen in Table 1.

3.1.4. Selection process

The search through the 5 databases yielded a total of 1590 records. All records were entered into CADIMA.[3] CADIMA is a free webpage offering an interface to perform systematic literature reviews. Utilising their automatic duplicate removal feature, 1039 records remained.

The remaining records were then screened by the first author and one independent researcher, and the results compared. After discussion of differences and discrepancies, 173 articles were left.

The first author then proceeded to screen the full texts of the remaining 173 articles, resulting in 22 articles being included in the final review, validated by the second author (see Fig. 1). Most of the excluded articles were put aside as the relevance of the content could not be assessed from the abstract and title screening alone. A few more were excluded as they were duplicates missed by the automated process.

Whether a study was suitable for the review, was guided by its outcome variables. Studies were assessed on whether they included one of the aforementioned outcome variables in relation to MMO gameplay.

3.1.5. Data collection process

Number of studies, sample size of the individual studies and methods applied were assessed by the first author and validated by the second author.

3.1.6. Data items

Data items of interest were the previously mentioned factors of social capital, namely offline and online social capital, operationalised through offline and online bridging and bonding social capital (see Fig. 2). Given the varying definitions and conceptualisations of social capital, the present review also took into account social affordances of different nature when analysing the literature.

Focusing on inter-ludic factors, elements which dangle between the online and offline world, game involvement and playing time were the two principal variables of interest. While gaming time simply captures the time spent online playing the game, game involvement, goes beyond plain playing time. Different game behaviours have been predicted to lead to different outcomes, social or otherwise, including but not limited to, the nature of friends the players game with, the players involvement in their respective communities' administrative duties and communication on dedicated message boards. Additionally, for the purpose of this review, gaming addiction or problematic gaming has been classified as an extreme form of involvement (Dupuis & Ramsey, 2011; Kaye et al., 2017; Reer & Krämer, 2014).

Extra-ludic factors, elements from outside the game bearing on in-game behaviour, varying natures of motivation for playing the games have been considered, namely escapist, social and individualistic motivations (Castillo, 2019; Kaczmarek & Drążkowski, 2014; Zhang & Kaufman, 2015). The individuals' passion for playing their game was also considered and operationalised through harmonious and obsessive passion (Mandryk et al., 2020; Utz et al., 2012). In addition, the degree to which individuals inherently enjoy relationships, and the amount of offline activities were also used to predict social capital and social

Table 1
Search strings used to search the data bases.

Web of Science	((TI=(Massively Multiplayer online) OR TI=(MMO*) OR TI=(multi-user virtual environment) OR TI=(World of Warcraft) OR TI=(Everquest) OR TI=(Guild Wars)OR TI=(Final Fantasy) OR TI=(Elder Scrolls) OR TI=(Lost Ark) OR TI=(Aion) OR TI=(Runescape) OR TI=(MapleStory) OR TI=(Ultima Online) OR TI=(Eve Online)) AND (AB=(social capital) OR AB=(social skill*) OR AB=(social network) OR AB=(social tie*) OR AB=(bridging) OR AB=(bonding) OR AB=(leadership) OR AB=(trust) OR AB=(friend*)OR AB=(sociability) OR AB=(social support) OR AB=(community) OR AB=(Homophily) OR AB=(network*) OR AB=(weak$tie) OR AB=(strong$tie) OR AB=(instrumental capital)))
ProQuest	title ((MMO*) OR (Massively multiplayer online) OR (World of Warcraft) OR (multi-user virtual environment) OR (Everquest) OR (Guild Wars) OR (EVE online) OR (Final Fantasy) OR (Elder Scrolls) OR (Lost Ark) OR (Aion) OR (Runescape) OR (MapleStory) OR (Guild Wars) OR (Blade & Soul) OR (Wizard101)) AND abstract ((Social capital) OR (social skill*) OR (bridging) OR (bonding) OR (leadership) OR (social network) OR (social tie*) OR (trust) OR (friend*) OR (sociability) OR (social support) OR (community) OR (homophily) OR (network*) OR (weak?tie) OR (strong$tie) OR (instrumental capital))
Scopus	TITLE ("MMO*" OR "Massively Multiplayer Online" OR "World of Warcraft" OR "multi-user virtual environment" OR "Everquest" OR "Guild Wars" OR "EVE Online" OR "Final Fantasy" OR "Elder Scrolls" OR "Lost Ark" OR "Aion" OR "Runescape" OR "MapleStory" OR "Blade & Soul" OR "Wizard101") AND TITLE-ABS-KEY ("Social capital" OR "social skill*" OR "Digital capital" OR "Bridging" OR "Bonding" OR "Leadership" OR "Social network" OR "trust" OR "community" OR "social tie*" OR "friend*" OR "sociability" OR "social support" OR "homophily" OR "network*" OR "weak$tie" OR "strong$tie" OR "instrumental capital")
PsycInfo	"MMO*" OR "Massively Multiplayer Online" OR "World of Warcraft" OR "multi-user virtual environment" OR "Everquest" OR "Guild Wars" OR "EVE Online" OR "Final Fantasy" OR "Elder Scrolls" OR "Lost Ark" OR "Aion" OR "Runescape" OR "MapleStory" OR "Blade & Soul" OR "Wizard101".ti. and ("Social capital" OR "social skill*" OR "Digital capital" OR "Bridging" OR "Bonding" OR "Leadership" OR "Social network" OR "trust" OR "community" OR "social tie*" OR "friend*" OR "sociability" OR "social support" OR "homophily" OR "network*" OR "weak$tie" OR "strong$tie" OR "instrumental capital").ab.
JSTOR	Title searches (MMO*) OR (Massively multiplayer online) OR (World of Warcraft) (multi-user virtual environment) OR (Everquest) (Guild Wars) OR (EVE online) OR (Final Fantasy) (Elder Scrolls) OR (Lost Ark) OR (Aion) OR (Runescape) (MapleStory) OR (Guild Wars) OR (Blade & Soul) OR (Wizard101) ALL search query 1: (social capital) OR (social skill*) OR (social network) OR (social tie*) OR (bridging) OR (bonding) OR (leadership) OR (trust) OR (friend*) ALL search query 2: (sociability) OR (social support) OR (community) OR (Homophily) OR (network*) OR (weak$tie) OR (strong$tie) OR (instrumental capital)

[3] CADIMA. Quedlinburg, Germany: Julius-Kühn-Institut; 2017.

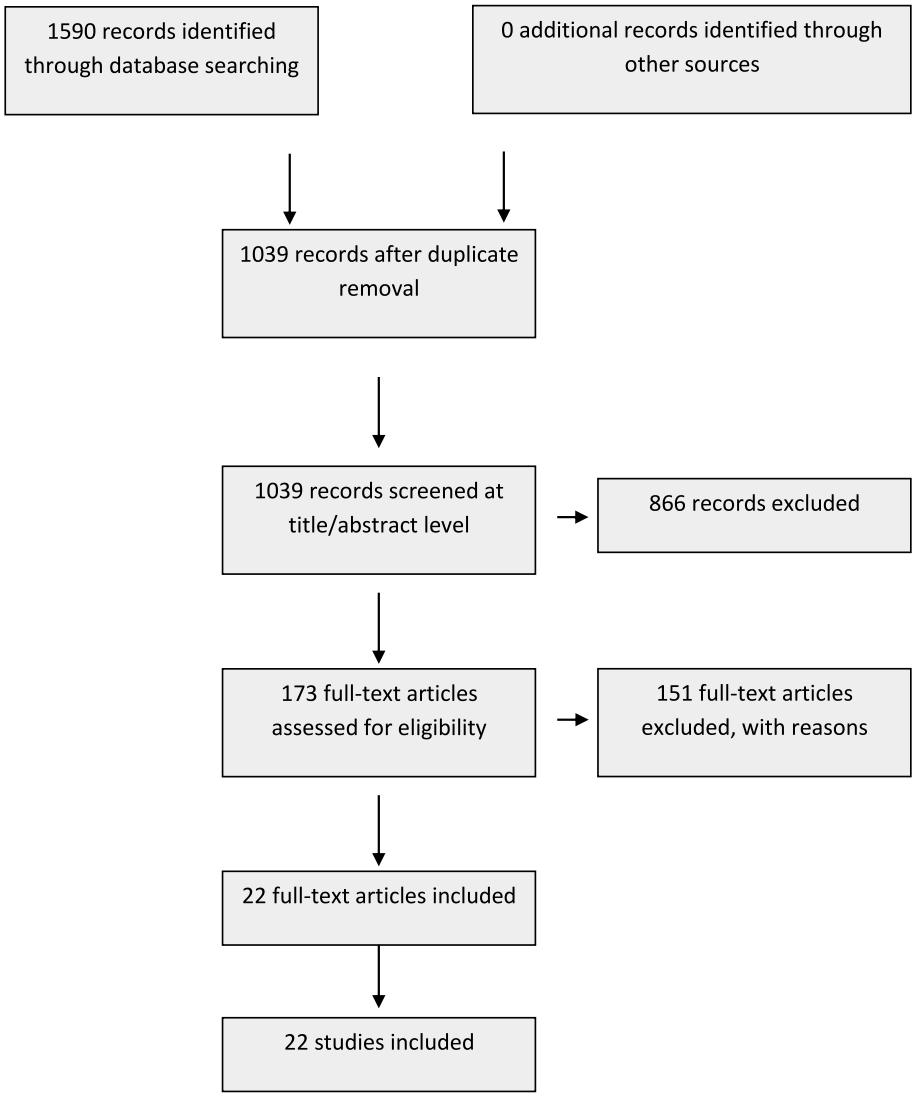

Fig. 1. PRISMA chart of the selection process.

affordances.

With regards to ludic factors, collective play, familiarity, communication frequency, self-disclosure and social support have been included. The effect of collective play, the act of playing in consistent and organised groups, was an additional variable correlated with a number of social affordances and social capital. In addition, online social capital functioned as a predictor for offline outcomes, such as well-being, loneliness. Familiarity with co-players and associated, the degree of self-disclosure, and communication frequency were associated dependent variables of interest (Reer & Krämer, 2014). Social support, a benefit resulting from civic engagement, constituting the resources the entity can avail (Cohen & Hoberman, 1983; Longman et al., 2009). was used to check for well-being and offline social support

In-game leadership skills were taken into account with the intention of linking them to leaderships skills outside the game. Fig. 2 presents an overview of the data items and their associations.

In an additional step, a number of the studies used to online outcomes of social capital, social affordances and leadership to link them to their offline counterparts, including but not limited to whether online social support leads to offline social support, online leadership skills translate to the offline world, or whether online social capital can used to draw on resources offline. The probed relation between the variables can be seen in Fig. 2.

3.1.7. Study risk of bias assessments

All studies were checked for conflicts of interest and whether an incentive was provided to participants. This was first done by the first author and then independently by another researcher, different from the one who assessed the title and abstract. The differences were then discussed until a unanimous agreement was reached. The second author screened the final selection for their viability.

4. Results

4.1. Publications

Twenty two studies were retained in the final sample. Three of these studies were published between 2006 and 2010, ten between 2011 and 2015 and nine between 2016 and 2022 (Fig. 3).

Of the studies investigated, a number of them pertained to the different outcome variables of interest, social capital, social affordances and leadership. An overview of how often an outcome of interest was the subject of interest in the included studies can be seen in Fig. 4. A detailed discussion of the mediators on the independent variables follows in Section 5.

The following results will be grouped by independent variable. For each independent variable, the section describes the findings in the literature in relation to one of the variables of interest. For effect sizes

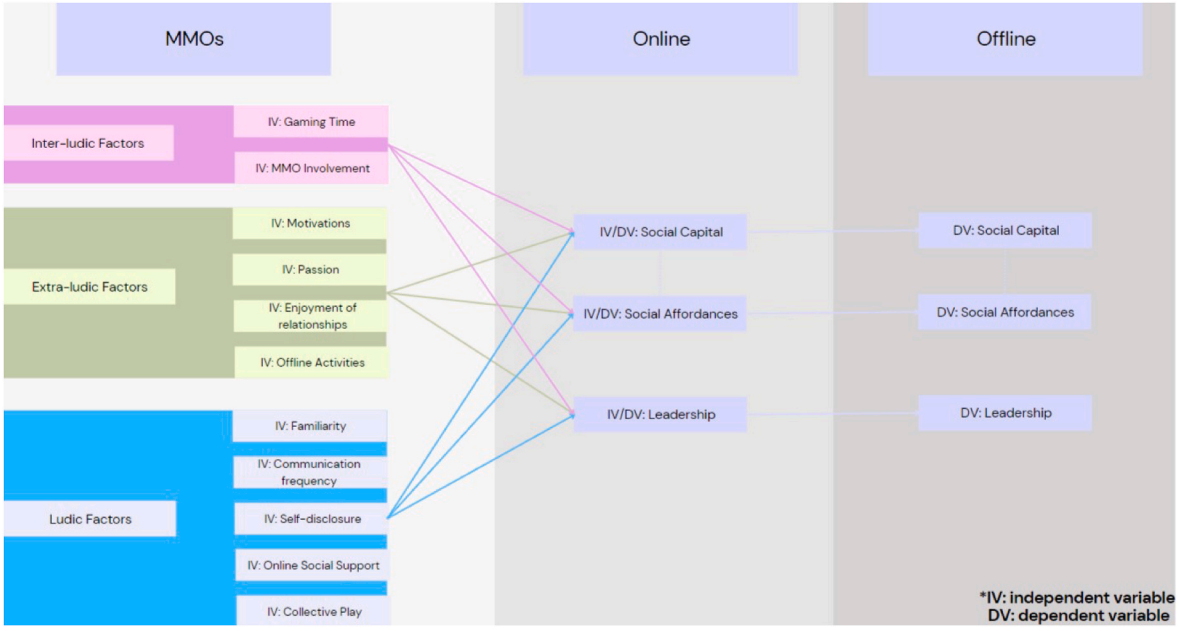

Fig. 2. Association between included data items.

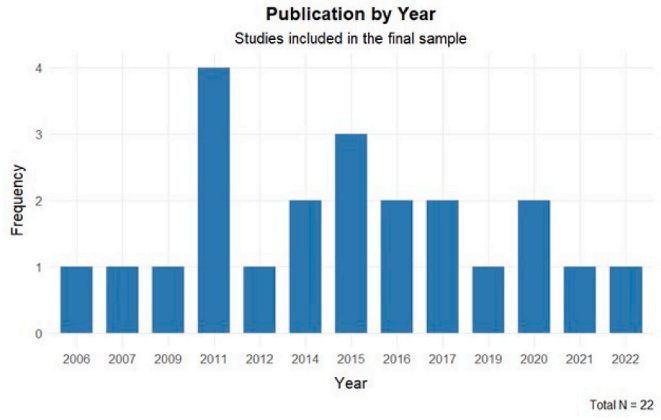

Fig. 3. Publications for each year in the final sample.

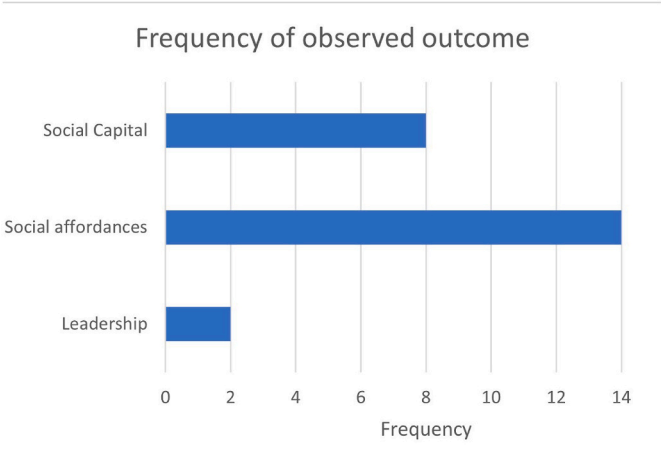

Fig. 4. Outcomes of interest in the retained sample.

and methods of analysis, please refer to Supplementary Material A and B.

4.2. Game involvement

Nine studies investigated game involvement as a predictor of social capital, leadership and social affordances.

In an early qualitative work, Williams et al. (2006) already observed the creation of bonding and bridging capital among MMO gamers, with many of the interviewees likening their online friends to their offline relationships. Skoric and Kwan (2011) observe the creation of online bridging capital through the civic gaming experiences lived through by MMO gamers. Kaye et al. (2017) link MMO involvement to both bridging and bonding online social capital as well as gamer identity. In this study, gamer identity is further linked to social competence and a reduction of loneliness.

In a mixed method study, Koptur (2016) found that many MMO gamers indicated that their leadership skills outside the game have improved as a consequence of playing the genre.

Reer and Krämer (2014) defined social proximity as a player's involvement in the administrative side of the community and linked it to both online bonding and online bridging capital.

In a qualitative study, O'Connor et al. (2015) found that game involvement correlated positively with offline social support.

Three studies linked game involvement to offline social support. Zhang and Kaufman (2017) note that in their sample of older adults, intensity of interaction is not related to social support and that the respondents have difficulties integrating their online relationships into their real life. Dupuis and Ramsey (2011) found that problematic gaming, an extreme form of game involvement, is detrimental to offline social support but correlates with increased online social support. The study concluded that online social support cannot replace offline social support, as it does not help against depression to the same extent as its offline counterpart. Similar results were also found by Longman et al. (2009), whose study similarly concluded that online social support is being derived from game engagement, but contrary to Dupuis and Ramsey (2011), the received online social support was associated with lower levels of depression, stress and anxiety.

4.3. Gaming time

6 of the sampled papers investigate gaming time as a predictor on multiple outcome variables of interest.

Zhong (2011) found a negative correlation between gaming time and online and offline bridging capital as well as online and offline bonding capital. This negative correlation further applied to both online and offline civic engagement. Longman et al. (2009) found that for the intense gamers in their study, their playing habits resulted in reduced offline social support. Utz et al. (2012) investigated the effects of passion for their game of choice on interpersonal relationships and unearthed that gaming time leads to an increase in the number and quality of online friendships while having the opposite effects for offline friendships. Zhang and Kaufman (2015) relate time spent playing to deepening bonding relationships, however, stresses that the focus of the gameplay the effect is more pronounced if the focus is not exclusively on the game's explicit objectives, but also on the act of socialising. Looking into the escapist motivation for playing MMORPGs, Kaczmarek and Drążkowski (2014) conclude that higher escapist motivation leads to higher in-game time, but that both variables independently negatively correlate with offline social support. In return, these participants reported higher online social support. Finally, Wingsiong (2020) found no correlation between gaming time and loneliness, well-being or online social support.

4.4. Extra-ludic elements

Motivations for playing MMOs were the subject of 4 studies. Castillo (2019) differentiates between individualistic and social motivations. The aspects of individualistic motivation of interest in the study are advancement and competition, both of which had no correlation with online bridging social capital. On the other hand, both social motivations, namely socialisation and the volition to form relationships, did positively correlate with online social bridging capital. The study further notes a stronger effect for females over males. In a network level analysis, Zhang and Kaufman (2015) find social motivation for gameplay to be a strong predictor for bridging social capital in older adults. The Kaczmarek and Drążkowski (2014) study, focusing on escapist motivations, correlated it to decreased offline social support and increased online social support. Zhang and Kaufman (2015) found that enjoyment of relationships was the single strongest predictor of online social capital in the study, beating out network level, communication methods and quality of guild play. Gallup et al. (2016) interviewed a sample of neurodivergent adolescents, who were found to have a desire to interact and socialise in MMOs, as it presents them with an outlet where they can interact on equal footing.

Turning our attention to passion, Mandryk et al. (2020) observe the effects of harmonious and obsessive passion on online bridging social capital, online bonding social capital, loneliness and well-being. Utz et al. (2012) check for the effect of harmonious and obsessive passion on the number and quality of online and offline friends. With regards to harmonious passion, Mandryk et al. (2020) find a positive correlation to both online bridging social capital and online bonding social capital. Further, they observe a negative correlation to loneliness and a positive correlation to well-being. These last two effects were indirect and mediated by social capital. The study by Utz et al. (2012) found no correlation between harmonious passion and the quality and quantity of offline friends, while discovering a positive correlation between harmonious passion and online friends. In terms of obsessive passion, Mandryk et al. (2020) relate it to increased online bonding capital, but find no relation to online bridging capital. In addition, obsessive passion was found to positively predict loneliness, while correlation to well-being was discovered. Utz et al. (2012) link obsessive passion to a decline in the number and quality of offline friends, an increase in the number of online friends, but they found no relation to the quality of online friends.

Two studies used offline activities to observe their impact on social affordances. Offline activities were a significant predictor in the study by Reer and Krämer (2014) for both self-disclosure and communication frequency. Hsu and Chang (2022) linked offline social activities to both online bridging social capital and online bonding social capital.

4.5. Ludic elements

Reer and Krämer (2014) included familiarity, defined as "frequency players practice together with their clan mates" (Reer & Krämer, 2014, p. 3), positively linking it to communication frequency and self-disclosure. These in turn were positively correlated with online bridging social capital and online bonding social capital respectively. Zhang and Kaufman (2015) also found a positive link between communication frequency and online bridging capital. Further, Snodgrass et al. (2011) looked into the effects of playing with offline friends and found that not only did playing with offline friends reduce the odds for problematic video gaming, but the pastime also helped strengthen the offline bonds.

Focusing on their quantity, Hsu and Chang (2022) related online interactions to online bridging social capital. They found that the number of online interactions correlated positively with online bridging capital. In an early work, Cole and Griffiths (2007) collected data on player's social interactions in the game and found that the majority of MMORPG players draw enjoyment from social interactions in the game, indicating anonymous self-disclosure as a strong motivator, especially among female players.

Kaczmarek and Drążkowski (2014) investigated online social support in relation to well-being and found a positive correlation between online social support and their participants' well-being. Zhao et al. (2021) in turn found a negative relation between online social support and offline social support. Dupuis and Ramsey (2011) compared the benefits of online social support and offline social support for the individual and found that online social support was not as beneficial for the individual's well-being than offline social support.

Two studies looked explicitly into the effect of collective play on the elements of social capital of interest. Zhong (2011) probed the relationship between online bridging and bonding social capital, offline bridging and bonding social capital as well as online civic engagement and collective play. With regards to both online facets of social capital, the researcher found a positive relationship between these constructs and collective play. Collective play was further positively associated with online civic engagement. However, looking into the offline counterparts of social capital, the study could not find a link to collective play.

Jang and Ryu (2011) connected collective play and in-game leadership skills, indicating that playing in a group more frequently lends itself to the development of leadership skills.

Eight more studies included guild affiliation or quality of the guild play as covariates on their variables of interest. All of them showed positive relationships between the social outcome variable or leadership. Guild play and guild membership have been associated with online bonding social capital (Skoric & Kwan, 2011; Williams et al., 2006), social support (Kaufman & Zhang, 2015, pp. 527–535; O'Connor et al., 2015), socio-emotional well-being (Zhang & Kaufman, 2017), in addition to self-disclosure and administrative involvement which themselves predicted social capital (Reer & Krämer, 2014). Koptur (2016) related guild affiliation to increased social and leadership skills. Finally, recognising the importance of guild membership, Hsu and Chang (2022) suggest the implementation of additional guild features to further enhance social interaction in their MMO of interest.

4.6. Online social capital as independent variable

While the previously mentioned studies focused on social capital as an outcome of different predictors, three studies explored the

consequences of online bridging capital accrued from MMO gameplay on loneliness and well-being. Mandryk et al. (2020) and Kaye et al. (2017) found a positive link between online bridging capital and loneliness, indicating increased loneliness in relation to online bridging capital. Hsu and Chang (2022) found that online bridging capital builds psychological capital.

Finally, Mandryk et al. (2020) found no significant relationship between online bridging social capital and well-being.

On the flipside, Mandryk et al. (2020) discovered a negative relation between online bonding social capital and loneliness, as well as a positive relation to well-being. The negative relation of online bonding social capital on loneliness was also found by Kaye et al. (2017).

4.7. Leadership

Jang and Ryu (2011) investigate the outcome of team play and being a part of a game community on in-game leadership. Their findings indicate that there is a positive effect for both being in a team and being part of a game community on in-game leadership.

Two studies focused on the development of offline leadership as a function of in-game leadership. Jang and Ryu (2011) not only found that MMO gameplay can foster in-game leadership but also found a link between the in-game leaders and improved offline leadership. In a mixed methods study, Koptur (2016) checked for various learning skills stemming from MMORPG gameplay, amongst them leadership. The study found that while some participants did not feel as if the in-game acquired leadership skills aided them in real life, the overall trend showed a positive attitude towards the transferability, which was further enforced by interview data.

5. Discussion

MMOs present a unique canvas, allowing the players to re-invent themselves in an alternate world with a distinct environment, new goals and within a new social context. The persistent world and real-time interaction open up avenues for fluctuation in social resources, enabled through the interaction between human and digital. The elements of social capital that were off interest in this systematic literature review were online bridging and bonding capital, offline bridging and bonding capital. Bridging capital constitutes loose networks with open borders and is generally established between people with loosely connected interests from different backgrounds. Bonding capital on the other hand represents close knit networks, featuring a high degree of homophily and these networks tend to offer its members emotional support. Leadership skills were another outcome of interest, seeing how the game features implemented by the games' developers lend themselves as a practice ground. Off further interest was, whether these resources could be transferred from the virtual to offline world, interactively entangling social elements from both worlds. The following section synthesises the relevant findings by dependent variable as extracted from the literature reviewed (see Fig. 2 and Sections 4.2 to 4.7).

5.1. Online bridging and online bonding social capital

Off the 22 studies included in the final review, 9 observed online bridging capital as an outcome variable using a total of 11 independent variables to predict online bridging capital. Game involvement (Kaye et al., 2017; Skoric & Kwan, 2011; Williams et al., 2006), collective play (Zhong, 2011), social motivation (Castillo, 2019; Zhang & Kaufman, 2015), familiarity (Reer & Krämer, 2014), communication frequency (Reer & Krämer, 2014; Zhang & Kaufman, 2015), online (Hsu & Chang, 2022) offline interactions (Reer & Krämer, 2014) and harmonious passion (Mandryk et al., 2020) all correlate positively with online bridging social capital, indicating that these elements and consequences off MMO gameplay are positively associated with online bridging social capital.

Individualistic motivations for playing the game (Castillo, 2019) and obsessive passion (Mandryk et al., 2020) have been found to not correlate with online bridging capital. Meanwhile, gaming time has been linked to lower online bridging social capital, indicating the excessive time spent in the game does not increase online bridging social capital but rather leads to a decrease of the resource.

Seven individual studies looked into online bonding capital as an outcome variable of facets of MMO gameplay, relating 8 variables to the concept. Game involvement (Kaye et al., 2017; Williams et al., 2006), collective play (Zhong, 2011), familiarity (Reer & Krämer, 2014), self-disclosure (Reer & Krämer, 2014), offline activities (Hsu & Chang, 2022; Reer & Krämer, 2014), administrative involvement (Reer & Krämer, 2014), harmonious as well as obsessive passion (Mandryk et al., 2020), and enjoyment of relationships (Zhang & Kaufman, 2015) were positively linked to online bonding social capital.

Gaming time (Zhong, 2011) was the only negative indicator for online bonding social capital among the sampled variables.

5.2. Offline bridging and offline bonding social capital

Zhong (2011) was the only study delving into the relation between different elements of MMO gameplay and offline bridging and bonding social capital. The results of the study mirror themselves across the variables under scrutiny. Investigating collective play and its relation to offline social capital, the study found no significant link, indicating that offline social capital is not affected by collective play. On the contrary, Zhong (2011) found that gaming time was a negative predictor on the players offline social capital.

5.3. Social affordances

Turning to offline civic engagement, offline social support, social competences as well as the number and quality of online and offline friends, the results are diverging.

Zhong (2011) found that offline civic engagement was in negative relation to gaming time but in contrast increased as collective play increased.

Offline social support was a dependent variable in 7 studies. Linking it to game involvement, Dupuis and Ramsey (2011), as well as Zhang and Kaufman (2017) found a negative relationship between these elements. In addition, O'Connor et al. (2015) found that offline social support increased with game involvement, while on the other hand, game engagement was found to positively correlate with offline social support by Longman et al. (2009). The latter study also found that gaming time was negatively associated with offline social support, a finding also supported by Wingsiong (2020) and Kaczmarek and Drążkowski (2014). Kaczmarek and Drążkowski (2014) further found that offline social support decreased if MMOs are being played for escapist motivations. Enjoyment of relationships was positively linked to offline social support (Kaufman & Zhang, 2015, pp. 527–535; Zhang & Kaufman, 2017) while Zhao et al. (2021) could not establish a relationship between online and offline social support. Online social support was looked into by two studies. Gaming time was found to be unrelated to online social support (Wingsiong, 2020), while escapist motivations were positively linked to online social support (Kaczmarek & Drążkowski, 2014).

Social competence was the subject of one study and was found to increase in proportion to the strength of an individual's gamer identity (Kaye et al., 2017). Meanwhile, number and quality of offline and online friendships was kept count of by Utz et al. (2012) and related to gaming time, harmonious and obsessive passion. Gaming time proved to be detrimental to the number and quality of offline friends but increased both number and quality of online friends. Harmonious passion for playing MMOs was not affecting the number of offline friends in terms of number and quality, while simultaneously being associated with an increase in the number and quality of online friendships. Obsessive

passion for playing MMOs was linked to a decrease in the offline friendship circle across both metrics, while it increased the number of online friends and left the quality of online friends unaffected.

5.4. Leadership

Acquisition of leadership skills was the subject of two studies in the selected sample. Jang and Ryu (2011), analysing data from 300 Korean MMORPG players, found that collective play is conducive for the development of in-game leadership skills. Furthermore, the study found that in-game leadership skills correlated positively with leadership skills in the offline world.

Koptur (2016), drawing on online survey data, as well as qualitative interviews, probed for the transferability of different learning skills promoted by MMORPG gameplay. The results indicate that not only are leadership skills fostered from engagement with MMORPGs but also suggest that these skills are applicable to the offline realm.

5.5. Implications

The present review set out to evaluate the social potential of MMOs in the face of the digital age, utilising features of the PRISMA framework for systematic literature reviews. It has been postulated that in light of the limited time and resources at an individual's disposal, the rise of digital media is displacing more traditional leisure activities (Bolet, 2021; Bryant and Fondren, 2009; Putnam, 1995; Putnam, 2000). The substitution of previously established leisure activities by modern alternatives has raised concerns about an erosion of social capital. Given the unique features of MMOs, however, allowing the game environments to mirror social concepts and structures found in society, may position them as potential counterbalance to the negative effects of digital media on social capital.

Looking at online bridging social capital, many elements of MMO gameplay promote the acquisition of bridging social capital, such as game involvement, communication frequency and familiarity with those the individual plays with, among others (Kaye et al., 2017; Reer & Krämer, 2014; Skoric & Kwan, 2011; Williams et al., 2006; Zhang & Kaufman, 2015). Next to these four elements, harmonious and obsessive passion, offline activities, collective play, and enjoyment of relationships were found to be conducive to access to online bonding social capital (Hsu & Chang, 2022; Mandryk et al., 2020; Reer & Krämer, 2014; Zhang & Kaufman, 2015; Zhong, 2011).

MMOs have additionally been found to be capable of providing a number of different social affordances, such as offline and online social support, social competence or the quality and quantity of online and offline friends (Dupuis & Ramsey, 2011; Kaufman & Zhang, 2015, pp. 527–535; Longman et al., 2009; O'Connor et al., 2015; Wingsiong, 2020; Zhang & Kaufman, 2017).

While these findings indicate that MMO gameplay can build up social capital, it is important to note that there is also one pivotable predictor that consistently undermines potential benefits: gaming time (Kaczmarek & Drążkowski, 2014; Longman et al., 2009; Utz et al., 2012; Wingsiong, 2020; Zhang & Kaufman, 2015; Zhong, 2011). Gaming time almost universally being a negative predictor, cautions against hailing MMOs as the perfect replacement of traditional social capital building exercises. This finding seems to indicate that while MMO engagement can promote some social features and aspects, excessive engagement in the medium seems to lead to opposite results. Determining beneficial or detriment levels of engagement and potential tipping points is an area for further research, next to determining the gameplay practices associated with social gains. This cautionary tale carries on into different variables and in the same vein, obsessive passion (Mandryk et al., 2020) for MMOs also has detrimental effects on their social outcomes. Different frameworks provide possible avenues for explanation. A possible explanation proposed is that excessive time invested into these games can displace the opportunity for offline engagement putting the two worlds at odds rather than co-existing in a complementary relationship (Kraut et al., 1998; Putnam, 2000a, 2000b). From a Uses and Gratification perspective (Katz, Blumler, & Gurevitch, 1973-1974; Sundar & Limperos, 2013), excessive gaming may result because of escapist motivations and further exacerbate its initial causes (Kaczmarek & Drążkowski, 2014; Lemmens et al., 2011).

Shifting the focus from social capital to leadership skills, the literature is sparse. From the final sample, merely two studies focused on leadership as an outcome (Jang & Ryu, 2011; Koptur, 2016). Both studies found that MMORPG gameplay correlated positively with leadership skills, in and outside the games.

Finally, based on the collected literature, while social benefits can be the outcome of MMO gameplay, the studies have shown that these benefits are strongest for those that engage in a community, guild or clan (Hsu & Chang, 2022; Jang & Ryu, 2011; Kaufman & Zhang, 2015, pp. 527–535; O'Connor et al., 2015; Skoric & Kwan, 2011; Williams, 2006; Zhong, 2011). Considering the design and goals of MMOs, joining an organised group is incentivised, as certain goals or achievements are made to be unattainable if engaged with alone. Given the findings, this feature is a promising avenue to compensate for the ailment of social capital suffered through the displacement of traditional pastimes. However, whether this difference stems from the fact that individuals in these social structures are further prone to social engagement or have systematically started out with more social capital than those not in these social structures remains to be determined and should be subject of further studies.

The present findings can be regarded under a uses and gratification theory lense (Katz, Blumler, & Gurevitch, 1973-1974) seeing how different users engage with MMOs for various reasons and consequently draw different consequences from the activity. Similarities emerge when comparing MMOs to other online platforms for social interactions, such as social media. For example, Liu and Yu (2013) found that Facebook use was related to increased online support but did not lead to offline assistance – a result also reported by Dupuis and Ramsey (2011).

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Parallels between MMOs and other online media also appear with respect to social capital. A considerable body of literature presented here suggests that the way a player engaged with the MMO, their underlying reasons and goals lead to different outcomes - most prominent is the finding regarding community engagement leading to more social benefits (Hsu & Chang, 2022; Jang & Ryu, 2011; Kaufman & Zhang, 2015, pp. 527–535; O'Connor et al., 2015; Skoric & Kwan, 2011; Williams, 2006; Zhong, 2011). Similar patterns are evident in social media use. Phua et al. (2017) found that user motivations and social capital gains varied across platforms, with differences in both the type (bonding or bridging) and amount of social capital acquire. These findings highlight the heterogeneity of online social places, a phenomenon also observed in the present review, which in conjunction with the restrictions imposed on the data collection of the present review renders generalisation a challenging task, underscoring the need for more research into the area.

5.6. Further research

The ambiguous results laid bare by the present review highlight three principal areas for further research. First, the positive correlation between game involvement and social benefits on the one end, and the negative relation between gaming time and social benefits on the other end, points towards a need to identify the conditions under which the

investment in the games becomes detrimental to the individual's social benefits. Second, while gaming time is one variable weighing on this relation, the findings from the studies also suggest that guild or community membership, is beneficial to social competences and social capital. Research into these structures could identify the pivotal elements to this connection, so that the features can either be learned from or enhanced. Third, the research area is scarce in causal studies, making it difficult to disentangle correlational and causal mechanisms, while also obscuring potential covariates, such as an individual's intrinsic social disposition. Further studies could focus on identifying causal mechanism through appropriate designs.

6. Conclusion

The present systematic literature review set out to investigate the effect of MMO gameplay on social capital, social affordances and leadership, considering the displacement of traditional social havens by digital alternatives and the resulting strain on social structures, as interaction becomes computer mediated. The results indicate that MMO playing can contribute to an individual's social capital, grant a number of social affordances, and is conducive to building leadership skills. However, the worries forwarded with regards to digital media shifting the social paradigm find their merit in the unambiguously negative relation between gaming time or obsessive passion and social benefits, indicating that excessive engagement with MMOs can bear detrimental consequences.

One foregrounded element which deserves special mention is guild membership – being part of a gaming community enhances the benefits drawn from the activity, akin to traditional group-oriented pastimes. The findings on leadership were scarce, however the numbered findings suggest a positive relation between playing MMOs and developing leadership skills. Overall, the review suggests that MMOs can foster social capital, but overconsumption of the genre is likely to negatively affect social capital and social affordances.

CRediT authorship contribution statement

Gilles R. Scheifer: Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Robin Samuel:** Conceptualization, Data curation, Funding acquisition, Project administration, Supervision, Validation, Writing – review & editing.

Data availability statement

No data was collected for the present article. All articles collected are available online and can be found using the methodology detailed in the article.

Declaration of generative AI and AI-assisted technologies in the writing process

The authors declare no use of generative AI, neither for drafting, writing, reviewing, spell checking, or language improvement.

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Appendix A. Supplementary data

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