



**HAL**  
open science

# On the Move: Played Characters Circulations through Online Landscapes and Infrastructures

Bruno Vétel

► **To cite this version:**

Bruno Vétel. On the Move: Played Characters Circulations through Online Landscapes and Infrastructures. Valérie Schafer; Fred Pailler. Online Virality, De Gruyter Oldenbourg, pp.227-248, in-Press, Studies in Digital History and Hermeneutics, 978-3-11-131035-0 (hardcover) ; 978-3-11-1311371 (eBook). 10.1515/9783111311371-012 . halshs-04598271

**HAL Id: halshs-04598271**

**<https://shs.hal.science/halshs-04598271v1>**

Submitted on 18 Oct 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

Bruno Vétel

# On the Move: Played Characters Circulations through Online Landscapes and Infrastructures

**Abstract:** This chapter addresses a complex issue: The reconnection of player mobility to the circulation of their in-game characters. Within the context of Massively Multiplayer Online Games (MMOGs), players often develop deep emotional attachments to their in-game characters over time. These attachments, cultivated year after year, anchor players to specific gaming territories and in-game relationships. Our study investigates the intricate socio-technical relationships between players and their in-game characters, a phenomenon we term the player-character “assemblage”. At the level of each gaming server’s infrastructure, commonly referred to as a “shard”, these assemblages exert profound influences on the broader gaming dynamics, giving rise to distinct social contexts. Our research draws upon empirical investigations conducted within the MMOG Dofus (2010–2016), encompassing 40 semi-structured interviews with players and employees of Ankama Company in Roubaix, complemented by quantitative data collected from gaming servers. As a supplementary investigation, we also extend our scrutiny to League of Legends (Riot Games 2009) during the years 2022 to 2023, utilising online observations on platforms like Discord and Reddit to provide a comprehensive examination of these sociotechnical dynamics.

**Keywords:** migration, mobility, circulation, infrastructure, assemblage, video game

After the recent acquisition announcement for \$44 billion of Twitter by Elon Musk on 26 October 2022, the “Migration of users” from an online service to another comparable challenger became both, a hot topic and a common language analogy. Customer choice instability was reinforced by dramatic changes Musk made to the design of Twitter, the acceleration of its monetisation and a degradation of its moderation quality.

During the following month, the “migration issue” had become viral, with online media promoting a Twitter alternative called Mastodon, a non-commercial open-source social network, based on less centralised network architectures.

Seven new hashtags<sup>1</sup> aggregated most of the discussions about “migration opportunities”, while dozens of online media published tutorials to help users move from Twitter to Mastodon, even issuing a “Movetodon” service to help them.

During this month period, researchers (Zia et al. 2023) conducted statistics analysis showing a steep rise of Mastodon subscriptions coming from Twitter users, with more than 136,000 accounts’ “migration”. Reinforcing the migratory analogy, they gave it the title “Flocking to Mastodon: tracking the great Twitter migration”.

This media effervescence created a scale change in the number of Mastodon users but didn’t do much harm to Twitter’s user base of hundreds of millions. Whereas during 2023, other more commercial alternatives like Thread, Bluesky, Hive, Cohost, or Post tried to take advantage of this “migration trend”, starting to attract a significant number of users<sup>2</sup>, those 10 months of ongoing “migration” media coverage shed light on a central strategic issue for these companies proposing online services relying on massive social “network effects” (Hendler and Golbeck 2008): How to retain users to monetise their attention and their digital content productions? It also naturalised the migratory terminology, when addressing highly political issues regarding weaknesses of State regulation to guarantee ethical equilibrium between protection of users’ private lives, content moderation and freedom of speech. Nevertheless, the issue addressed by the media is not really dealing with “migration” of refugees and border polices, but rather with customers subscribing and unsubscribing to online services, presumably without moving from their couch.

It is trickier to figure out geographical migrations’ issues “inside an online service”. A service based on a digital geographical space would be a prerequisite. Cartographic online services like OpenStreetMap or Google Map meet this requirement, but most of them are not embedding complex online social interactions of users that could legitimate the use of the concept of migration. The most complex geographical online services are to be found elsewhere, among those being crossed mostly by teenagers or adults that are still fans of Fantasy, Manga, or Science Fiction. Those huge geographical digital spaces, densely crossed by online users, are Massively Multiplayer Online games (MMOGs).

Our proposed scope of research defines online gaming platforms as a dynamic assemblage influenced by its Client-Server network architecture and the sociotechnical features of played characters. It is therefore essential to consider the Sciences and Technologies Studies (STS) perspective of online video games

---

1 #Mastodon, #MastodonMigration, #ByeByeTwitter, #GoodByeTwitter, #TwitterMigration, #MastodonSocial and #RIPTwitter.

2 <https://edition.cnn.com/2023/07/07/tech/meta-social-media-dominance-threads/index.html>.

and played characters, taking into account social effects of infrastructures (see Bowker et al. 2010), for instance the effects of “infrastructure inversions” (Bowker 1994), in our case blurring the intelligibility of circulations of played characters among gaming servers and naturalising infrastructural constraints.

In this current chapter we answer the following question: If we consider gaming servers and video gamer characters as a software infrastructure, what does it imply for the analysis of the circulation of characters within a game itself? And what are their notable effects on players’ sociability? To provide an initial answer, we show how gaming servers and played characters are “infrastructuring” (see Pipek and Wulf 2009) specific sociotechnical relations to online social neighbourhoods – i.e., creating infrastructural alignment and navigation.

As for the literature review, investigations of the circulation of characters encompass two primary areas of study, namely, video game and online platform studies. The former deals with MMORPGs, encompassing ethnographic investigations (see Auray 2003; Lofgren and Fefferman 2007; Pearce and Artemisa 2009; Piéron 2019) and surveys of online gamers’ community platforms (see Hou et al. 2011; Bergstrom and Poor 2021). These studies focus on forms and dynamics of players’ sociability while their in-game environment is changing. The latter takes advantage of various non-ethnographic methodologies to emphasise motivations for user online accounts creations on multiple platforms and its subsequent uses, non uses, or deletion (see Brubaker et al. 2014; Fiesler and Dym 2020; Rogers 2020; Edwards and Boellstorff 2021).

The methodology is based on the investigation of two Massively Multiplayer Online Games (MMOGs)<sup>3</sup>. The first game is Dofus (Ankama Games 2004) which was studied between 2010 and 2016 by mean of 40 interviews of players and employees, supplemented by technical data retrieved from gaming servers. The second game, League of Legends (Riot Games 2009), was studied in 2022 and 2023 and investigated thanks to online observations conducted on Discord and Reddit<sup>4</sup>.

The first part of the chapter presents a literature review. The second part exposes a layered infrastructure model of gaming servers called “shards” and

---

<sup>3</sup> The game design of these two MMOGs differs mainly on the following points. Dofus is a Massively Multiplayer Online Role Playing Game (MMORPG), which proposes a real time geographical exploration where inter-players sociabilities are focused on informal chats and trading of digital assets useful for their character. From time to time, the game can switch to turn-by-turn combat sessions, like a chess game. League of Legends is a Multiplayer Online Battle Arena (MOBA) game, where the player embodies a “Summoner” who is leading an army. This is a real-time game, where players must defend their individual base and destroy that of the opponent’s.

<sup>4</sup> The main subreddit investigated was named *r/leagueoflegends*. The three Discord channels targeted were “League of Legends”, “League of Legends FR” and “r/leagueoflegends”.

played characters, which are used in the rest of the essay to analyse the different constraints imposed to player's social dynamics. The third part describes our results as a typology of player's character circulations.

## 1 Literature Review

Our literature review can be divided in two primary sections. First, studies related to online video games, and second, those focused on online platforms centred on textual, image and video sharing.

### 1.1 Online Game Studies

Regarding studies on online video game character circulation, they can be classified into two categories: Four ethnographic research works and two data scraping analyses from video gamer bulletin boards or public channels on Discord. These studies exclusively concentrated on MMORPGs.

The circulation of played characters within a single online geographical environment has been discussed by two epidemiologists (see Lofgren and Fefferman 2007). They briefly examined a specific migration phenomenon within the realm of online gaming, exemplified by a virtual pandemic in World of Warcraft (WoW) in 2005. During a special event raid, players faced the challenge of combating the demon Hakkar the Soulflayer. However, an unintended computer code leak caused Hakkar's spell named "Corrupted Blood" to spread beyond the instance of the raid, repeatedly affecting and killing players' characters across the game world. The two epidemiologists discuss the WoW Pandemic as an alternative to computer simulations, as they qualified it as an *in vitro* social experiment, resembling a "Petri Dish". In contrast, for most social science researchers, circulations described by the WoW Pandemic were represented by *in vivo* research settings, as player behaviours were influenced by both in-game and many other kinds of social constraints.

Another study deals with ingame played characters' mobility, inside one game but also outside of it. The anthropologist Celia Pearce conducted a detailed study on the coordinated circulation of played characters both within a game and between multiple online games, akin to narrating an "epic exile" (see Pearce and Artemisa 2009). Tens of thousands of players of the beta version of *Uru: Age beyond Myst* (Cyan World, 2003) were forced to exit the game after the shutdown of the gaming servers by the company. A leading part of the group worked to maintain a strong Ururian identity, even though it moved from game to game.

A bulletin board named “Koalanet” provided an intermediate space of cultural sharing and maintenance. It was also used to organise the quest for a new game to settle the community. This communication device is not analysed further by Pearce, but it is worth underlining that it is not a game, but an asynchronous textual communication platform, used in alternation, or simultaneously, with gaming sessions.

After 18 months of investigation, hundreds of players established themselves on Second Life (see Linden Lab 2003) and There.com (Makena Technologies 2003), forming what could be described as a “multigaming guild”. Tensions arose with existing players on these platforms as the latter were anxious about the Uru’s collective being in There.com, and afraid that the strange cultural traits they consolidated and their strong cohesion as a community could cause destabilisation of There.com social equilibriums. All this led to the harassment of Ururians who tried to negotiate with Makena Technologies to move to more secured and distant places inside the game which was an isolated island<sup>5</sup>. This very detailed study underpins the importance of the shared and also the conflicting dimensions of the culture of collective gaming, as factors influencing the circulation of played characters, in-game and between different online games. Following Pearce, we adopt an *in vivo* perspective to interpret our data about played characters circulations.

Two French-speaking researchers, Auray (2003) and Piéron (2019) presented ethnographic accounts of played character circulations in MMORPGs. Auray primarily explored individual inter-game migration histories as an incentive for preferential homogamous friendly ties in Anarchy Online (Funcom 2001), while Piéron focused on describing player circulations between guild structures within a game in Albion Online (Sandbox Interactive 2017) and Black Desert Online (Pearl Abyss 2015)<sup>6</sup>.

Circulations of players between different online video games are investigated by two other research works using quantitative methodologies. The migration of gamers outside of World of Warcraft (Blizzard Entertainment 2004) was examined by Hou et al. (2011) using a survey conducted on Taiwanese videogame fan websites. They applied the migratory push-pull-mooring (PPM) model to investi-

---

5 In 2004, hackers managed to reverse engineer the original Uru game and then negotiate with Cyan World for the right to reopen their own Uru servers under the name “Until Uru”. The Ururians “assimilated” on There.com refused to go back, and “Until Uru” became a place for newcomers and a memorial for ancient players, but not a place of collective immigration.

6 This researcher has spent time in two guilds as a participant ethnographer. She focuses its analysis on guilds structures and their instability as observed in a multigaming guild, the community bulletin board of a guild and inter-guilds circulation in Albion Online.

gate player incentives for switching to new video games<sup>7</sup>. This model states that the migration is a consequence of the interaction between the incentives pushing away from the place of origin and those pulling at the destination, and mooring factors that generate inertia in the migration decisions, like lifestyle, cultural and spatial factors. Two authors in the field of Information Systems Studies (see Gerhart and Koochikamali 2019) explain why in the context of switches between information technologies like video games, migrations framework are more adapted than classical adoption ones. The adoption refers to the use of a brand-new system, whereas migration modelises particular cases where the user is adopting a system that fills relatively similar needs.

Hou et al. (2011) collected 167 responses of players with no information provided on the destination video games and their specificities. Thus, methodological biases make the validation of the hypothesis difficult to generalise. The transposition of the PPM model to an online gaming context is stimulating, but nonetheless it relies on a problematic analogy that is not discussed in depth by the authors. The PPM model is developed as a conceptual framework to describe physical movement of people, whereas Hou et al. state it is applied to customer's gaming switches, without spatial constraints. Their proposed model remains consistent with the investigated object: Based on a PPM model highly focused on social incentives for making coordinated choices, it analyses switches between video games, themselves relying on socially intense dynamics.

A study of Reddit based on web scraping of 10 million posts investigates communications within gamer communities centred on the *Fallout*, *Elderscroll*, and *Civilization* franchises. It was conducted by Bergstrom and Poor (2021)<sup>8</sup> who focused on the communication characteristics of gamers who engaged with multiple games within a franchise, sometimes choosing to disengage from their former preferred game.

Notably, these studies share several common biases, including, first, a lack of consideration for infrastructure constraints on played character circulations, as among all the gaming servers' structure is often not mentioned. Second, the use of the term "player" instead of "player's character", generates a blurry comprehension of the interaction between the social dimension of the game and software infrastructures, thus keeping research questions away from those analysing the player-character assemblage. Third, these studies are reluctant to distinguish the specific and similar aspects of online games from other online platforms.

---

7 In the realm of online services, the PPM model was formerly used to investigate Chinese and Singaporean students uses of Social Network Sites (C. Zengyan et al. 2009).

8 Another paper investigates the same subreddits but focuses on the comment structure (length and frequency) of fans faithful to the old game and the other gamers (see Bergstrom and Poor 2022).

## 1.2 Online Platform Studies

Online platforms literature deals with all kinds of online services. Fiesler and Dym (2020) conducted 28 in-depth interviews and 1,886 survey responses from transformative fandom participants of the Archive Of Our Own (AO3), a website for fans of cultural remixes. They defined “online migration” as the shift from one online platform to another without deleting the previous account. Even if the practice depicted as an “online migration” is absolutely valuable as well as an empirically dominant one, the terminology is a bit confusing. Hence, “online migration” does not specify explicitly any link between the switching of an online service and the decision to preserve its account on a former service.

We would rather follow Edwards and Boellstorff’s (2021) alternative, who propose a “digital exodus” analytical framework, observing three major forms of non-use on Tumblr following a pornography ban initiated by the platform itself: breaking of patterns of use, logging out as social protest, and archiving and deleting one’s blog. The non-use has the particularity to be a technologically disincentivised action of protest. It is also a removal without replacement, while comparatively migration always has a destination which creates a continuity of existence. Migrations are defined by the fact of leaving a platform (see Brubaker et al. 2014) or being left behind by the platform (see Pearce and Artemisa 2009). This last modality is investigated by Richard Rogers (2020) as a “deplatformization” which entails the specific case of the imposed deletion of a user account for the sake of applying content moderation rules. It describes a suppression of an account, which only implicitly infers that there will be a subsequent transfer of the account to another platform. Its methodology aims at tracking the circulation of “deplatformed” users, based on ethnographic investigations, crossed with the scraping of a massive amount of data originating from several social networks, with a special emphasis on Telegram, a social network of destination for far-right influencers.

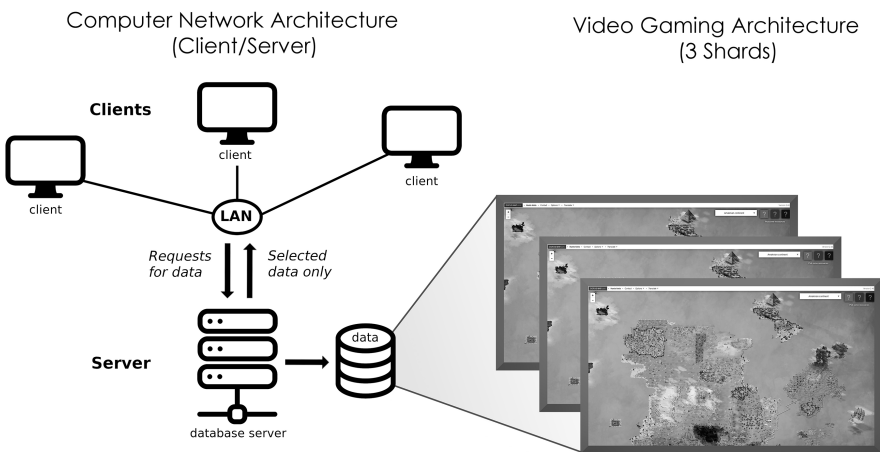
## 2 Digital Assets Circulations Modelled by Infrastructure Constraints

Players’ behaviour has a significant role in shaping an online circulation system that operates at the convergence of two distinct dimensions. The first one pertains to the flow of players’ digital assets (DAs), encompassing their in-game characters as well as valuable assets such as skins, consumables and equipment. The second dimension centres on the underlying computer infrastructures: These circulations



occur both within gaming servers called “shards”<sup>9</sup> (intra-shard) and across shards (inter-shards), occasionally facilitated by outlaw third-party platforms that offer paid services enabling players to transfer their assets within a designated shard. For our inquiry, we concentrate on a specific digital asset with notable inter-shard circulation prevalent in most of the MMOGs: the played character.

We conceptualise an online video game as a three layer infrastructure inspired by the Open Systems Interconnection model (OSI) of Hubert Zimmerman, now widely used in computer network engineering (see Schafer 2009). The figure below (Fig. 1) illustrates the two external strata within the gaming infrastructure.



**Fig. 1:** A scheme of the two outer layers infrastructure of our model, the Computer Network and the Video Gaming Shards.

Our foremost layer is denoted as the “Computer Network Infrastructure”, as these games are often rooted in a Client/Server architecture. This organisational framework delineates data and software stored on the gaming company computers – the server – from those stored on the gamers’ computers – the clients.

The subsequent layer, termed the “Video Gaming Infrastructure”, is anchored by gaming servers – finite digital geographical space where a player’s character operates. Gaming servers are hosted in the computer server. Notably, a single physical computer server can host multiple parallel gaming servers for the same video game

<sup>9</sup> Similar to software’s “forks” analogy designating a software derivation from an original version, shards refer to subproducts which follow their own independent operating life cycles after having been wildly extracted from a bulk material, namely an online platform infrastructure.

environment, which has led game designers to alleviate the ambiguity by commonly calling these autonomous environments “shards”. For players, shards are embodied as the software instantiation of a game. Each shard effectively represents a distinct geographical gaming environment, which has persistence: Its evolution is continuously maintained, even when a given played character is disconnected.

The third and most abstract layer refers to the character infrastructure, which is integrated within each shard and encapsulates most of the game digital assets as characters’ belongings. When a player creates a character, an exclusive shard is allocated to it until the player opts to delete it. Consequently, distinct shards accommodate separate group of players who engage via their individual characters. Hence, each shard would evolve independently according to the interaction sequence of characters simultaneously connected.

Digital assets (DAs) possess the capacity to transition between different players on the same shard, thereby grounding the foundation of an autonomous online community within each shard, supported by a small digital economy. Although shard databases are separately stored by the gaming company, sometimes digital assets attached to one player might circulate between different shards. Often, this capability results from an unintended creative bricolage created by players, or paid services. In the ensuing section, we present a non-exclusive categorisation of character circulations organised around distinct types of major incentives.

### **3 The Circulation of a Player’s Character between Shards**

This section is divided into three subparts. The first describes the technical modalities of player characters’ shard circulations. The second gives in-depth details on the main social contexts encountered for these circulations. The third makes use of the classical push-pull migratory model to sketch common patterns of characters’ circulations.

#### **3.1 The Modalities of Player Character Circulation**

The circulation of player characters within the realm of MMOGs is underpinned by three binding rules, which appeared progressively in MMOGs and continue to serve as a fundamental design principle today. The initial and secondary rules adopt a player-centric perspective, wherein the player gains access to a character on a new shard.

Initially, a player is granted the ability to create a limited number of characters on alternate shards. This allows players to venture onto new shards while retaining access to their former shard along with their pre-existing character. While this procedure is often free, it requires a time-consuming restart from the outset of the game. The second and third binding rules deal with character transfer between players and shards respectively, as represented in the following table (Tab. 1):

**Tab. 1:** The second and third character circulation modalities.

	Player Y	Player Z
<b>Shard A</b>	Character	⇒ <i>Player Transfer (2)</i>
<b>Shard B</b>	⇒ <i>Shard Transfer (3)</i>	⇒ <i>Shard &amp; Player Transfer (2+3)</i>

The second binding rule defined by a character ownership transfer is performed through the sale or the gift of a character. This time-saving procedure involves one player acquiring an already-developed character from another player. A paid version of this service is often proposed by outlaw third party companies, whereby individuals can purchase or lease customer accounts situated on disparate shards. For instance, this happens in cases where non-resident players seek access to Chinese shards, as Chinese governmental mandates compel gaming companies to relinquish control of domestic shards to national companies, necessitating official national Chinese ID registration for player access.

Given the historical inadequacy of customer needs in regard to online game official services, outlaw websites have exploited vulnerabilities in customer authentication procedures to propose to order gaming accounts on their website for real currency oftentimes facilitated through services such as PayPal. Upon receipt of payment, an email is sent to the player containing login credentials for the purchased account. After nearly three decades of operation, those services based on outlaw bricolage are still popular among players. An illustration of these services is shown on the upper banner of the following screenshot.

Those outlaw companies serve as intermediaries, focusing on various digital assets selling services (Fig. 2a and 2b). Among them, three specifically target player characters. First, there's the sale of game accounts (illustrated below on Fig. 2 a & b with a Dofus Character Selling), where former players directly resell their characters – those who want to give up the game, or instances of petty theft through phishing, targeting players who would have liked to continue the game. Second, there are boosting services, such as power levelling which involves the temporary “babysitting” of players’ characters to advance their in-game progress during the

(a)

Ingame Currency   Game Accounts   Ingame Items   Boosting   Gamepal   Followers   Gift Card   Others

### Famous Products

Product	Description	Price	Rating
WOW GOLD	Cheap WoW Classic WoW K Gold, Fast service for WoW Wrath of the Lich King Gold WoW WoW K Classic	From 4.79 USD	★★★★★
FUT COINS	Buy Cheap FUT 23 Coins on PlayStation, Xbox and PC	From 3.29 USD	★★★★★
Fortnite acc with hot OG outfits	Black Knight, Ikonik, Renegade Raider, Skul... Fortnite	From 5.59 USD	★★★★★
Ascendant 3-all agents	Ruin dagger Champions 2021 Set Reaver... Valorant	From 6.69 USD	★★★★★
Rocket League hot items	Fennec, Octane, Halo, Zomba, Non Crate, ... Rocket League	From 1.19 USD	★★★★★

(b)

**Best Seller !! ENU 199 Orukam !! Jamais Certifie, 100% Safe.**  
 4.5 ★★★★★   89.42%   2,466

45 Days Warranty   Delivery in 5 Min   enu   orukam   enu 199

**Delivery Guaranteed**  
 We offer guaranteed delivery and state the delivery date on the checkout page.

**Money Back guaranteed**  
 If there is any issue during the warranty, you can apply for a refund of order.

**Products Warranty**  
 Products are covered by seller with a warranty upon delivery.

**Free Refund**  
 iGV does not charge any fees. You will receive a refund for as much as you pay.

**PAPY SHOP**  
 4.6 ★★★★★   89.42%   2,466

**Price:** 19.99 USD (19.99 USD/1X)

Sold: 1   Stock: 1

Add to cart   Buy Now

**Fig. 2a and 2b:** Screenshot of a third-party outlaw web site specialising in virtual assets for-profit services. Accessed 4 March 2024. [www.igv.com](http://www.igv.com).

owners' absence. Lastly, gamepal services, entail renting gaming companions, bridging the gap for players who lack social connections within their shard.

These profit-driven services heavily rely on the labour of extractivist players primarily motivated by real money gains. These players, referred as “goldfarmers” are focused on massive production of in-game digital assets. They engage in long term highly effective and scripted in-game tasks to generate valuable digital assets that they subsequently sell on outlaw websites. To ensure widespread accessibility of their service, the goldfarmers create characters distributed across all the game shards. They tend to focus their efforts on the most populated shards with a higher demand. Often, programmed character’s scripts called “bots” (see De Paoli and Kerr 2010, 2012) fulfil an automated pilot function for their character to lighten their burden. This type of players is primarily motivated by the economic profit derived from their in-game endeavours.

Such services require a highly social commitment from third-party companies. While an official secondary market could be established by gaming companies, in order to pull the rug out from under these outlaw servers, it would come at a substantial cost requiring considerable economic expertise and specific resources to organise a massive surveillance of the identity of buyers, sellers and to control the nature, quantities and prices of their exchanges. Additionally, precise logging of exchange trajectories is crucial for addressing potential scam issues. Consequently, gaming companies have been reluctant to implement monetising services, like reselling characters or renting gaming partners, all of which are offered by third-party companies.

This predicament has led gaming companies to promote a third technical binding rule in the form of a legitimate paying service for so-called “character transfer”, whereby players pay the gaming company to modify their databases, resulting in the character’s removal from the origin shard and its emergence on the designated target shard. This process constitutes a legal inter-shard “character transfer”, offered as a paid service in euros or an intermediate digital currency, as exemplified in Fig. 3 for the game Dofus.

The screenshot shows the Dofus store interface. At the top, there is a navigation bar with icons for various game features and a search bar. Below the navigation bar, the breadcrumb trail reads: Home > Dofus > Services > Character transfer to new server. On the left side, there is a sidebar menu with categories: SUBSCRIPTIONS, OGRINES, SERVICES, ITEMS, CLASS PACKS, and SEASON 4 OF WAKFU. The main content area features a large image of two Dofus characters, one of whom is being transferred from one server to another, indicated by a large white arrow. To the right of the image, the title 'CHARACTER TRANSFER TO NEW SERVER' is displayed in bold black text. Below the title, the price is shown as 9,000 in a light blue box, with a 'BUY' button underneath. A small text block below the price reads: 'Are your buddies on another server? Teleport your characters and join them!' followed by a link 'See all details'. Below the main content area, there is a 'DETAILS' section with a dark blue header. The text in this section states: 'Transfers are done during the weekly maintenance on Tuesday mornings, for transfers requested up until Sunday at 11:59 p.m. (Paris time). Transfers requested after 12:00 a.m. (Paris time) on Mondays will be processed on the following Tuesday.' Below this, it says 'Elements linked to your character are transferred:' followed by a bulleted list:

- your inventory, your kamas, your equipped items
- your equipped mount, and its inventory

**Fig. 3:** Screenshot of Dofus graphical interfaces showing the legally paid inter-shard “character transfer” and the associated commercial interface. Accessed 4 March 2024. <https://store.ankama.com/en/729-dofus/797-services/a-15144-character-transfer-to-new-server>.

In the case of Dofus, the character transfer costs are 9,000 Ogrines, a currency that is pre-purchased for a nominal amount of euros. As with other similar games, this lawful transfer of characters is often subject to restrictive quotas, strategically limiting the number of character circulations between shards. This quota system is implemented to minimise any potential unbalancing to the in-game economy of each shard.

In summary, each of the three binding rules has its own advantages. Informal inter-player character gifting or temporary lending operates on a foundation of trust and is cost-free, although it provides access to a limited pool of characters confined to a select number of shards. Third party services, while addressing a broader spectrum of needs such as offering characters on every shard, face legal and moral issues, particularly concerning the provenance of possibly stolen characters. Additionally, these services offer hieratic customer services, suffering an overall unfavourable reputation. On the other hand, official paying character migrations offer simplicity, reliability, but come at significant expense. Unlike other binding rules, official migration does not allow multiplication of characters on different shards. Instead, they compel players to make the decision to leave one shard to gain access to a new one.

### 3.2 The Player's Character Circulation as a Sociotechnical Interaction

The mechanisms of character circulations having been well circumscribed, it is time to focus our analysis on the social contexts of those circulations. In the realm of player character circulation, we can propose a typology for the circulation of characters with six different roles assumed by player involvements summed up as follows (Tab. 2):

**Tab. 2:** Typology of player circulation.

<b>Player Involvement</b>	<b>Type of Character Circulation</b>	<b>Main Service Provider</b>
<b>Digital Asset Fence Customer</b>	Character ownership change	Third Party Website
<b>Challenger seeker</b>	Character ownership change	Third Party Website
<b>Purchasing Power Optimizer</b>	Character ownership change OR Character creation on a new shard	Independent Migration OR Third Party Website

Tab. 2 (continued)

<b>Player Involvement</b>	<b>Type of Character Circulation</b>	<b>Main Service Provider</b>
<b>Country Migrant</b>	Character inter-shard migration	Gaming Company
<b>Socializer &amp; Explorer</b>	Character creation on a new shard OR Character inter-shard migration	Independent Migration OR Gaming Company
<b>Victim of Discrimination</b>	Character creation on a new shard OR Character inter-shard migration	Independent Migration OR Gaming Company

The “Digital Asset Fence Customer” takes advantage of a third-party website to buy a cheap and interesting character, which could be located on a different shard. He engages in fence activities relying on account theft, based on phishing strategies: Fake gaming websites are advertised on the web or directly on populated shards using dedicated bots (see Vétel 2020). These activities are profit oriented and stolen properties are sold on third-party websites like those mentioned in the previous part of this chapter. Their customers are players looking for a cheap but experienced and well-equipped character. In this context, the shard location of the stolen character can be tolerated more than actively sought.

The “Challenger Seeker”, also called “Power Gamer” (see Taylor 2006; Nardi 2010), is often confronted with a progressive depletion of valuable competitors on his shard. For games with an e-sport level of popularity like League of Legends, a player can even be told that other nationalities are training hard on their own shards to become e-sport players. The need for a stable and responsive connection to the game shard is an absolute necessity as competitive gameplay relies on fast in-game reactions as in League of Legends (see Hoang et al. 2017).

It represents players looking for an opportunity to move to a shard with more competitive players to train with. The Reddit post below depicts the usual incentives for shard switches of players from League of Legends looking for optimal competitive game experience.

I also noticed that because SEA [South East Asia] isn't one big server and PH [Philippine] is region locked to PH players only or TW [Taiwan] to TW [players]; the competitive level of teams in different countries stagnate and when they compete in the PCS [Pacific Championship Series] the power level of the different countries are clearly different and some cannot compete. If the SEA server were like the one in Valorant [another online game with easier character's migration] the competitive landscape would allow players and teams from different countries to learn better and practice against each other rather than being in one bubble and it can help queue times on higher ranks as well. (author: Dapper-Two8223, subreddit: r/leagueoflegends)

The South East Asia (SEA) Region, regroup shards managed by the independent Singaporean GArena company, which locked the players based on their country of residency. Consequently, the players in Philippines are locked to the PH shard, whereas the Taiwanese are confined to the TW shard. The mechanism creates training discrepancies by country. Competitive players are often trying to enter semi-professional leagues of E-Sport. In the quote above, the player discusses the possibility of training on other shards at a higher level to give him more chance to participate to the Pacific Championship Series (PCS), one of the main League of Legends E-Sport competitions in Asia. Finding difficult challenges and maintaining gaming performance are the two main purposes of those players. In this context, the impossibility of transferring its character on another shard of course fuels the parallel market for selling outlaw characters.

The “Purchasing Power Optimizer” looks for a better cost effectiveness for its gaming fees on an alternative shard. It takes advantage of in-game economic asymmetries: on different shards the in-game market shows price discrepancies due to the variations in the supply and demand of digital assets, which are influenced by the character’s population daily economics activities. These players are focused on economic strategies and profit making. The table below (Tab. 3) summarises prices for League of Legends in different national currencies of “Riot Points”, an intermediate currency comparable to casino tokens.

**Tab. 3:** Comparison of the exchange rate of Riot Points in different national currencies.

<b>Europe West (EUW)</b>						
<b>Euro</b>	€4.99	€10.99	€21.99	€34.99	€49.99	€99.99
<b>Riot Points</b>	575	1380	2800	4500	6500	13500
<b>North America (NA)</b>						
<b>US Dollar</b>	US\$4.99	US\$10.99	US\$21.99	US\$34.99	US\$49.99	US\$99.99
<b>Riot Points</b>	575	1380	2800	4500	6500	13500
<b>Philippines (PH)</b>						
<b>Philippine Peso</b>	₱49	₱149	₱349	₱649	₱999	₱2090
<b>Riot Points</b>	200	625	1525	2900	4600	10000

The current exchange rate for one euro is 60.8 Philippine pesos and 1.09 US dollars, and the price of a player’s character transfer is 2,600 Riot Points for every-



body<sup>10</sup>. Therefore, the price of a transfer of a player's character is linked to the purchasing power of the country assigned to the player's account.

The "Country Migrant" is moving to another country, seeking out a new local gaming shard with improved connection responsiveness. Players who are migrating relocate or move their character in proximity to their new place, hoping to improve their network performances and to lower the Client/Server ping latency. The following student describes how he maintained the quality of its gaming service:

I've been playing League for three years now. It's my hobby and it doesn't matter if I suck at the game, playing LOL is my way of relaxing and having fun (yes, before you ask: I only play w/ friends and muteall). I've recently moved to EUW [Western European Union] and started making some friends in my class who also play LoL. I knew that at some point, I had to change regions [for its character] (I can't play with the 200 [milliseconds] ping that I get from in my original [server's] region) [ . . . ] Currently, my options are: 2375 RP [Riot Points] at 19.3 euro, 4175 RP at 35 euro [ . . . ] this is around 5% of my monthly income. I know that' it might not mean a lot to some of you, but trust with the current inflation + rent + taxes + incoming winter, 35 euros is a LOT of money. With 35 euro I can have food for 2 weeks. 35 euros is half of the money I spent monthly visiting my girlfriend who lives 2.5 hours from me. 35 euros is heat + TV taxes each month. 35 euros is half of the money I need to buy shoes before the winter starts. Why is it so expensive? I could understand that you're doing to prevent high elo<sup>11</sup> smurfs<sup>12</sup> cheat on their MMR<sup>13</sup>. But for low elo players who are mostly students . . . is a bit abusive (Gabpinto, League of Legends player, r/leagueoflegends).

Here the motivation to move a character to a shard located in another country is not profit motivated but often driven by the quest for a good quality of service, in the hopes of maintaining the in-game competitive level, or to play with foreign friends. Ironically, the cost of a shard transfer to a new region is not always favourable to the player's purchasing power and can unfortunately lead to game churn.

---

**10** Riot Game has an elaborate inter-server transfer policy for its game League of Legends. The company manages every game server, except the Chinese servers delegated to Tencent and hosted in China, and the South East Asian servers delegated to Garena and hosted in Singapore until early 2023 when Riot Game decided to take them back. Furthermore, three regions prohibit character transfer between them (Turkey, Russia and Latin America but without restriction regarding other destinations: Source: <https://leagueoflegends.fandom.com/wiki/Servers>).

**11** The Elo system was invented by Arpad Elo as an improved chess rating system and is now adapted to many other games, including video games. High Elo's are experimented players of League of Legends (Source: [https://leagueoflegends.fandom.com/wiki/Elo\\_rating\\_system](https://leagueoflegends.fandom.com/wiki/Elo_rating_system)).

**12** Smurfing consists of creating multi-accounts on the same server to gain advantage in certain gaming contexts. It is considered cheating in most of the MMORPGs the moment the accounts are played simultaneously during the same game session.

**13** The MMR stands for Match Making Rating. It is a number used in League of Legends to represent a player's skill level and to determine a fair competitor with a similar MMR.

“Socializer & Explorer” are players who are hopping between shards, because they are frequently interested in making new friends or exploring new gaming environments. When, explorers are driven by their curiosity for new in-game dynamics (see Auray and Vétel 2013), socialisers are seeking to contribute to social bonds and collective dynamics (see Auray 2003; Taylor 2006), as explained by this Japanese interviewee:

I play every 2 days averaging 3 hours of playtime. It will be longer if I'm with friends. LoL is more fun with friends than playing alone. I never stopped playing LoL but I did stop playing ranked. I lost motivation to climb for higher rank. I will play this season because I have a friend. [ . . . ] I didn't fear language barrier. Part of the reason for the transfer [from the Japanese (JP) to the North American (NA) server] is I want to communicate with people from around the world. Most people use English and I can speak English too. (Asuka, League of Legends player, 22 years old).

Despite the eventual ping latency, Asuka underlines the importance of social bonds to sustain commitment to playing, its enjoyment and to extend playing through friendships that carry on for the rest of one's life. Their language proficiencies and those of their close friends greatly determine their choice of shards. Social incentives to circulate between shards can also be found in coordinated hops by guild members who organise themselves using external digital communication channels like bulletin boards or discord channels (see Piéron 2019).

Finally, the “Victim of Discrimination” is a player who plans to change its shard to flee diverse kinds of repeat discrimination. He often claims to be victim of toxic behaviour by other gamers within the game environment (see Kwak et al. 2015; Brookey and Ecenbarger 2016). This category encompasses instances of sexism or racism, where players feel the need to migrate in order to escape negative and discriminatory experiences. The lack of adapted regulation can foster inter-shard migrations to escape the worse regulated shards. The following Reddit comment advises a player who moved to China for several weeks:

You do need a VPN in order to connect to Japanese sever from China and there is still a latency about 100 ms. Unfortunately, the players in Chinese server are known for toxicity, but it is the best choice if you want a smooth game experience and staying in China for a longer period. Leveling from 1–30 may take you a couple of months. Also if you are creating an account on Chinese server, remember to check and choose a one that has healthy population. (author: Mist\_ball, reddit:r/leagueoflegends, 2017)

For instance, the League of Legends South East shards (SOE) knew of regulation issues under the supervision of the Garena company that led to massive migration towards shards administered by Riot Games and later in 2023 the returning of LoL Garena activities to Riot Games.

### 3.3 The Player's Character Circulation as a “Push-Pull” Incentive Pattern

As a character's circulation is mainly due to game design and marketing incentives, but also “real world” migratory ones, social dynamics appears in all those cases to remain at the centre. Therefore, below we make use of a “Push-Pull model” (Hou et al. 2011) to sketch patterns of circulations. The Mooring dimensions specific to on-line games is not explored further, as it is similar to those analysed by Hou et al (2011) and mainly caused by switching costs, the risk of inter-players losing social bonds, and also by the amount of time or money invested in the first main player character.

If we adopt a simple “push-pull” model used to analyse population migrations (see Lee 1966), we can propose patterns that structure the incentives explaining the player's character circulations. Hence, our typology can be refined as follows (Tab. 4):

**Tab. 4:** A Push-Pull model describing a player's character circulation, distinguishing incentives endogenous to the game (END) from those exogenous to the game (EX).

<b>Player Involvement</b>	<b>Pushing incentive</b>	<b>Pulling incentive</b>
<b>Digital Asset Fence Customer</b>	Boredom due to progression issues (END)	Experienced character equipped with original gears (END)
<b>Challenger Seeker</b>	Lack of experienced competitive opponents (END)	Plenty of experienced competitive opponents, Low Latency (END)
<b>Purchasing Power Optimiser</b>	Low purchasing power (EX)	Cheap Shard Digital Assets (END)
<b>Country Migrant</b>	Career or family (EX)	Better Latency, Ingame Progress Preservation (END)
<b>Socialiser &amp; Explorer</b>	Exhaustion of in-game relationships or lack of in-game novelty (END)	Renewal of strictly ingame relationships And renewal of relationships extended beyond the game (END and EX) New in-game socioeconomical dynamics to discover (END and EX)
<b>Victim of Discrimination</b>	Bullying because of gender, racial, linguistic or cultural identity (EX)	Tolerance reputation of players on another shard (END)

Three patterns of incentives are exhibited by the following players' involvements: First, Digital Asset Fence Customer and Challenger Seeker exhibit incentives endogenous to the game. Second, Socialiser & Explorer constitute a pattern with endogenous pulling incentives and a distinct mix of endogenous and exogenous pulling incentives. Those two patterns share a content depletion issue concerning the original shard. But they are distinguished by the pulling incentives of Socialiser & Explorer which exceed the strict in-game dynamics.

Finally, Purchasing Power Optimiser, Country Migrant and Victim of Discrimination constitute a third pattern which differs mainly by its pushing incentives which are exogenous to the game. Most often, this last pattern is qualified by the players as a "migration", while it is not explicitly referring to as a cause of geographical displacement, but an exogenous cause for a change of social neighbourhood. Thus, the geographical migration is not involved in online platform circulations, even if users talk of "migration"; it only qualifies a change of social surrounding in their online platform environments.

## 4 Discussions: Digital Circulations in Media Platforms Versus In Video Gaming

In addition to the played character circulation patterns that we established above, the rest of our analysis has delineated the principal technical mechanisms governing the migration of players' characters across shards, referred to as player transfer and shard transfer. These migrations occur within distinct social contexts and delineate six non-exclusive player's involvement, each characterised by varying degrees of dependence on gaming companies. These types include the Digital Asset Fence Customer, the Challenger Seeker, the Purchasing Power Optimiser, the Country Migrant, the Socialiser and Explorer, and the Victim of Discrimination.

At a broader level, when discussing the circulation of digital assets within shards, the user's actions pertain to their played characters, whereas at the game level, the user interacts with their customer account. Historically, shards were designed in response to limited computer network capacities, serving to restrict the size of the online world inhabited by real-time interacting characters. Today, they are explicitly integrated into game design by companies or non-authorized organisations, serving as elements of gameplay and monetisation. Inter-shard character transfers and multi-shard character creation have become standard features in contemporary MMOGs. The infrastructure of shards in an online game is therefore tightly aligned with the played characters' infrastructure that conditions the sociotechnical relations to online social neighbourhoods.

The phenomenon of inter-shard migration is a distinctive feature within the domain of online games and has no equivalent in other prominent online platforms, such as popular dating applications or social networks. To illustrate it, let us consider the platform Discord, where chat channels seemed to liken themselves to gaming shards. In both instances, a single user account allow participation in each of these isolated communication environments. However, in contrast to Discord channels, online game shards firmly associate distinct played characters with each of these social spaces, thus functioning as a concentrator for social investments. They effectively structure more compact and interconnected social networks.

In contrast, the scale of inter-game migrations is analogous to migrations between distinct platforms, such as Twitter or Telegram. In the absence of agreements between companies, transferring user accounts becomes unfeasible. Consequently, migration options are limited to creating a new user account and facing a mooring effect because it entails the partial loss of accumulated values from the previous platform and the investment cost of developing a fully functional profile on the new platform. At this level of observation, the user account assumes a central role in the infrastructuring (see Pipek and Wulf 2009) of specific sociotechnical relations to online social neighbourhoods.

This can manifest as migration to a similar platform or the adoption of a slightly different one, with ensuing dynamics of non-use. The phenomenon often referred to as the “emergent platformisation” of video games may be construed as a novel transition in which the emphasis shifts from the played character to the customer account. This shift is facilitated by the gradual obsolescence of the need for game shard clustering, a change attributable to the significant advancements in computer performance. Consequently, it leads to the expansion of the geographical dimensions within the gaming environment.

However, the insights from Pearce’s (2009) account of Uru’s community suggest the potential for cohesive player communities to reintroduce clustered spaces, primarily driven by gameplay and sociocultural motivations. They may advocate for the restoration of segmented shards or platforms within the gaming landscape. This phenomenon finds a concrete manifestation in the persistence of “private servers”, a trend that has endured for decades (see Debeauvais and Nardi 2010; Vétel 2013, 2017, 2022). These outlaw gaming platforms, managed independently of gaming companies, breathe new life into forgotten versions of games abandoned by the parent company. Furthermore, they explore previously unreleased variations of the original game.

## References

- Auray, Nicolas. "L'engagement des joueurs en ligne." *Les Cahiers du numérique* 4, no. 2 (2003): 83–100.
- Bergstrom, Kelly, and Nathaniel Poor. "Reddit Gaming Communities During Times of Transition." *Social Media + Society* 7, no. 2 (2021). <https://journals.sagepub.com/doi/full/10.1177/20563051211010167>
- Bergstrom, Kelly, and Nathaniel Poor. "Signaling the Intent to Change Online Communities: A Case From a Reddit Gaming Community." *Social Media + Society* 8, no. 2 (2022). <https://journals.sagepub.com/doi/full/10.1177/20563051221096817>.
- Bowker, Geoffrey. *Science on the run: Information management and industrial geophysics at Schlumberger, 1920–1940*. Cambridge, MA: MIT Press, 1994.
- Bowker, Geoffrey, Baker, Karen, Millerand, Florence, and David Ribes. "Toward information infrastructure studies: Ways of knowing in a networked environment." In *International handbook of internet research*, edited by Jeremy Husinger, Lisbeth Klastруп, Matthew Allen, 97–117. Berlin: Springer, 2010.
- Brookey, Robert A., and Charles Ecenbarger. "Our Country, Our Language, Our Server." In *Race and Gender in Electronic Media*, edited by Rebecca Ann Lind, 179–194. London: Routledge, 2016.
- Brubaker, Jed R., Ananny, Mike, and Kate Crawford. "Departing glances: A sociotechnical account of 'leaving' Grindr." *New Media & Society* 18, no. 3 (2014): 373–390.
- De Paoli, Stephano, and Aphra Kerr. "The Assemblage of Cheating: How to Study Cheating as Imbroglia in MMORPGs." *The Fibreculture Journal* 16 (2010). <https://sixteen.fibreculturejournal.org/the-assemblage-of-cheating-how-to-study-cheating-as-imbroglio-in-mmorpgs/>.
- De Paoli, Stephano, and Aphra Kerr, A. "On crimes and punishments in virtual worlds: Bots, the failure of punishment and players as moral entrepreneurs." *Ethics and information technology* 14, no. 2 (2012): 73–87.
- Debeauvais, Thomas, and Bonnie Nardi. "A qualitative study of Ragnarök Online private servers : In-game sociological issues." *Proceedings of the Fifth International Conference on the Foundations of Digital Games* (2010): 48–55.
- Edwards, Emory J., and Tom Boellstorff. "Migration, non-use, and the 'Tumblrpocalypse': Towards a unified theory of digital exodus." *Media, Culture & Society* 43, no. 3 (2021): 582–592.
- Fiesler, Casey, and Brianna Dym. "Moving Across Lands: Online Platform Migration in Fandom Communities." *Proceedings of the ACM on Human-Computer Interaction* 4 (CSCW1) 2020: 1–25.
- Gerhart, Natalie, and Mehrdad Koohikamali. "Social network migration and anonymity expectations: What anonymous social network apps offer." *Computers in Human Behavior* 95 (2019): 101–113.
- Hendler, James, and Jennifer Golbeck. "Metcalfe's law, Web 2.0, and the Semantic Web." *Journal of Web Semantics* 6, no. 1 (2008): 14–20.
- Hoang, Duc Chi, Doan, Khoi D., and Linh Thai Hoang. "Lag of legends: The effects of latency on league of legends champion abilities." *Worcester Polytechnic Institute*. 2017. <https://core.ac.uk/download/pdf/212965599.pdf>.
- Hou, Avus C. Y., Chern, Ching-Chin, Chen, Houn-Gee, and Yu-Chen. "Migrating to a new virtual world": Exploring MMORPG switching through human migration theory." *Computers in Human Behavior* 27, no. (2011): 1892–1903.
- Kwak, Haewoon, Blackburn, Jeremy, and Seungyeop Han. "Exploring Cyberbullying and Other Toxic Behavior in Team Competition Online Games." *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (2015): 3739–3748.

- Lee, Everett S. A theory of migration. *Demography* 3, no. 1 (1966): 47–57.
- Lofgren, Eric T., and Nina Fefferman. “The untapped potential of virtual game worlds to shed light on real world epidemics.” *The Lancet infectious diseases* 7, no. 9 (2007): 625–629.
- Nardi, Bonnie. *My life as a night elf priest: An anthropological account of World of Warcraft*. Ann Arbor: University of Michigan Press, 2010.
- Pearce, Celia, and Artemisa. *Communities of play: Emergent cultures in multiplayer games and virtual worlds*. Cambridge, MA: MIT Press, 2009.
- Piéron, Damaris. “Les impacts des migrations virtuelles sur les dynamiques sociales des guildes de jeux en ligne massivement multijoueurs : Le cas d’Albion Online.” *Sciences du jeu* 12 (2019). <https://journals.openedition.org/sdj/1940?lang=en>.
- Pipek, Volkmar, and Volker Wulf. “Infrastructuring: Toward an integrated perspective on the design and use of information technology.” *Journal of the Association for Information Systems* 10, no. 5 (2009). DOI: 10.17705/1jais.00195
- Rogers, Richard. “Deplatforming: Following extreme Internet celebrities to Telegram and alternative social media.” *European Journal of Communication* 35, no. 3 (2020): 213–229.
- Schafer, Valérie. “D’une informatique centralisée aux réseaux généraux: Le tournant des années 1970.” *Interstices* (2009). <https://interstices.info/dune-informatique-centralisee-aux-reseaux-generaux-le-tournant-des-annees-1970/>.
- Taylor, T. L. *Play between worlds: Exploring online game culture*. Cambridge, MA: MIT Press, 2006.
- Vétel, Bruno. “Déviance en ligne. Enquête sur les serveurs illégaux de jeux vidéo.” *Terrains & travaux* 1, no. 22 (2013): 115–134.
- Vétel, Bruno. “Le travail sur les serveurs illégaux de jeux en ligne.” *Poli: politique de l’image* 13 (2017). <https://shs.hal.science/halshs-01493882>.
- Vétel, Bruno. Se jouer des cadres de l’expérience: Arnaques et prises de tête dans un jeu vidéo. *Communiquer* 28 (2020): 141–163.
- Vétel, Bruno. “La conception des émulateurs de jeux en ligne.” In *Penser (avec) la culture vidéoludique*, edited by Selim Krichane, Isaac Pante and Yannick Rochat. Liège: Presses Universitaires de Liège, 2022.
- Zengyan, Cheng, Yinping, Yang, and John Lim. “Cyber Migration: An Empirical Investigation on Factors that Affect Users’ Switch Intentions in Social Networking Sites.” *2009 42nd Hawaii International Conference on System Sciences. HICSS-42* (2009): 1–11.
- Zia, Haris Bin, He, Jiahui, Raman, Aravindh, Castro, Ignacio, Sastry, Nishanth, and Gareth Tyson. “Flocking to Mastodon: Tracking the Great Twitter Migration.” *IMC ’23: Proceedings of the 2023 ACM on Internet Measurement Conference*, October 2023, 111–123. <https://arxiv.org/abs/2302.14294>.