

Home Computing and Digital Game Piracy in the 1980s in Portugal

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ABSTRACT

Historical narratives on the global digital games industry tend to neglect perspectives from the periphery. This paper contributes insights into the digital games piracy of the 1980s in Portugal, which was an integral part of early home computing culture as in other parts of the world. The paper is based on the content analysis of two Portuguese computing magazines, the publicly available interviews of two Portuguese game developers active in the 1980s, and the semi-structured interviews of Portuguese digital game collectors. We analyze the impact of digital games piracy and early computing on the development of the programming and computing skills of those who participated in this environment. We show how the Portuguese digital games pirate infrastructure fostered the creation and distribution of locally produced games.

Keywords

digital games, piracy, history of gaming, magazines, Portugal

INTRODUCTION

When drawing the timeline of the main events along the world history of digital games, there is a tendency to include only the major games and companies that have achieved notable success. Sometimes even specific digital game designers and developers are included in this narrative. This way of conceptualizing the world history of digital games is related to the “celebrity cult” that, according to Meda-Calvet (2016), has dominated the historical narratives about digital games. In contrast to this trend, a growing number of scholars have critically assessed the centrality of the United States

Proceedings of DiGRA 2023

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and Japan in these historical narratives. They have suggested that the historical study of digital games should consider its various aspects and actors, namely platforms, media and markets, artists, amateur programmers, hackers, publishers, and players who have emerged outside the established success circuit. These scholars also highlight that reading this history through static frames (ones that only consider the successful examples) conveys a biased narrative (Consalvo, 2013; Meda-Calvet, 2016; Nicoll, 2019; Jo, 2020; Liao, 2016; Švelch, 2018; Swalwell, 2012; Wasiak, 2014).

This biased narrative ignores home computer industries that led to the emergence of digital game creation and development practices in Europe, South America, and Australasia in the 1980s (Nicoll, 2019). It also ignores the lesser-known, playful educational software productions and their creators while neglecting the actual impact of these productions on the development of local and global gaming industries. Moreover, the biased narrative often excludes all of those who have not joined the mainstream digital games circuit, further propagating inequalities and stereotypes within this sector. Analyzing the digital game phenomenon through these neglected histories allows us to consider its multicentric reality at different (micro and macro) social levels. It also allows us to highlight the contributions, usually forgotten, of other actors who have spearheaded this history.

In this paper, we analyze how the practices of appropriation, duplication, and informal distribution of computer games in the 1980s had a key role in the mass production of digital games in Portugal and the emergence of the local community of computer game fans. We also examine how software piracy contributed significantly to building the foundations of a creative and technological base industry in which artists, amateur programmers, and hobbyists could creatively remix computer games in Portugal. As we did in a previous paper (Lima, Gouveia, and Gouveia, 2022), we propose to recover and analyze the narratives about computer games presented by specialized computer press coverage in the 1980s in Portugal.

We conducted a thematic analysis (Braun and Clarke, 2006; 2013) of two Portuguese publications specialized in computers and games, namely *Mini Micro's* magazine and *Microse7e*. The sample included 84 issues (66 *Microse7e* and 18 *Mini Micro's*) published between 1983 and 1988 in Portugal. All are available in the digital archive of the LOAD ZX Spectrum Museum and the Planet Sinclair blog¹. Furthermore, we analyzed the public available interviews of Portuguese digital game creators and former pirates from the 80s which were done as part of the Load ZX Spectrum Museum event and later uploaded to YouTube². We also conducted semi-structured interviews with hobbyists and game collectors who followed the birth of gaming culture in Portugal³ to gain further insights. This qualitative analysis method allows us to identify, organize, and systematize patterns of meanings (themes) in a data set. We carried out a careful reading of the entire sample and identified some categories related to the aims of our study. Categories emerged through a deductive process that allowed us to organize the information collected according to them. The patterns resulting from this analysis will be discussed here.

PIRACY AS DEMOCRATIZATION OF ACCESS TO SOFTWARE

Digital game piracy was, and to a large extent still is, a complex and pervasive transnational phenomenon (Nicoll, 2019). A growing number of scholars highlight the importance of piracy for the democratization of access to gaming and code language learning in a context where home computers were still seen as a luxury consumer product and challenged a popular perception of these machines as a curiosity or a fad (Jo, 2020; Meda-Calvet, 2016; Nicoll, 2019).

In the 1980s and 1990s, the reproduction of computer games was not carried out by experts in electronics or computing, neither by expert technology “pirates,” but was done by hobbyists and amateur programmers who were able to organize a technical infrastructure that created a new consumer need — computer games (Jo, 2020). This technical infrastructure was developed through the circulation of technological products and networks of information that the market enables. In this sense, ludic software piracy is a technical infrastructure that should be seen under the historical and economic framework of the infrastructures around it, as Brian Larkin (2007) argues. For this author, piracy influenced and shaped the forms of leisure and sociability, the ways of seeing and using new technologies, and the creation of new aesthetic productions. Larkin’s (2007) concept of *pirate infrastructure*⁴ is well suited to describe the Portuguese case since the concept refers to complex fundamental entities shaped through a variety of exchanges, relationships, and practices around the local production of playful software.

In the following sections, we analyze this *pirate infrastructure* around the Portuguese digital video games context of the 1980s. One of our assumptions is that the massive copying of computer games was one of the main ways in which the home computer was introduced to an audience that was still unaware of the capabilities of this “strange, mysterious, and magical black box,” as it was commonly described in the publications we analyzed. Finally, we discuss how the practice of duplicating digital games was initially a form of self-learning of programming and democratic software sharing in a context where Portuguese society was “infected” with the enthusiasm of the technological revolution.

The early days of access to home computers in Portugal

The American company *Timex* was based in Portugal and initially specialized in the manufacture and assembly of wristwatches. However, in the early 1980s, *Timex* began assembling home microcomputers, first the *ZX 81* model and later the *ZX Spectrum* (which had initially been produced in Scotland).

Between 1960 and 1980, computers played a key role in Portugal, mainly in administration, civil service, and organizations. In the 1960s, computers (like those made by the IBM corporation) were only accessible to institutions such as banks and large corporations. The 1970s witnessed a multiplicity of computer applications in other Portuguese organizations. According to Dias Figueiredo (2004), despite having had a problematic start regarding acceptance within the educational sphere, computer science has been a legitimate professional area associated mainly with typing activities since 1974. These activities eventually led to the establishment of the Portuguese Informatics Association. In turn, this Association launched a journal and organized congresses in an effort to validate informatics as an important and relevant area. The first university research groups in this area emerged with the recognition of government agencies, as is the case of INIC (National Institute for Scientific Research), active from 1976 to 1992, and JNICT (National Board of Scientific and Technological Research), active from 1967 to 1997. Other effects of this effort were the creation of the first degree programs in computer science and the first Portuguese computer — the ENER 1000 — in 1983.

Besides the Portuguese government’s initiatives to foster technological literacy in the most diverse sectors, technology companies led other initiatives. IBM, for example, promoted efforts to develop code literacy among Portuguese workers (Figueiredo, 2004). The company *Timex-Sinclair* had, in turn, an extraordinary impact on the Portuguese context. With the production of the *ZX Spectrum* for the national market, *Timex-Sinclair* contributed to the development of especially technological literacy in Portuguese society, not only among individuals who used this type of machine as a

work tool but, importantly, among those who had never previously used a computer. In this early period, these machines were advertised as indispensable for database management or business work and as an object that could fill people's leisure time (Lima, Pinto, and Gouveia, 2022).

In the United Kingdom, for example, the *ZX Spectrum* is regarded as one of the main catalysts for the development of the Portuguese digital game industry. According to Kerr (2012), the *ZX Spectrum* was a success because it was the most affordable and flexible alternative on the market at the time, leading to the phenomenon known as home computing, a phenomenon similar to what occurred in Portugal (Leão, 2022; Lima, Pinto, and Gouveia, 2022). The production and export of home computers in Portugal made it possible, as in the British case, to acquire the *ZX Spectrum* at a reasonable price, leading in mid-1986 to a domestic market of more than 150.000 computers, one of the highest penetration rates per family in Europe (Figueiredo, 2004). *ZX Spectrum* was sold in Portugal at the second lowest price in Europe (*Mini Micro's* 1, 1984). According to Leão (2022), the arrival of this computer to the Portuguese market in 1982 led several national stores and publishers to invest in selling and advertising ludic and utility software. Thus, a propitious scenario for the massive consumption of digital games emerged.

Electronics, coding, and the fascination with the home computer

The first people who were interested in home computers were directly or indirectly connected to areas related to technologies, such as electronics, radio amateur activity, and, in some cases, car modification (Lekkas, 2014; Meda-Calvet, 2016; Swalwell, 2008; 2012; Wasiak, 2014). Areas that, according to Meda-Calvet (2016) and Swalwell (2012), are linked to the notion of control.

According to the thematic analysis and interviews we conducted, the initial access to the microcomputer occurred in different ways: through electronics and contacts with radio amateurs; and through foreign computer magazines or local newspapers, where content about computers and video games was published, as three interviewees said.

Paula Silva's trajectory, for example, was based on a strong interest in electronics:

When I was little, the first time I played with electronics, I was about 5 or 6 years old. And what happened? There was an electrical appliance store that sold those little battery radios, and they sold a lot of them, they had hundreds of them (...), and some of them broke down... and there was a man who asked me "look, do you want some radios?" and I said "yes!" Moreover, he gave me two or three radios (...), and I said, "I'll try to make one" (...) My career was very focused on electronics, which is what I have followed ever since. Only afterward I went into computer science (...) and programming. (Electronics technician, 51 years old)

João Diogo's trajectory into computing was informed in part by their radio amateur uncle:

Whoever gave me the computer was my parents and my godfather. It was expensive, it cost 30 "contos", so the computer was a family effort. However, I had one person who was decisive, an uncle whom I greatly admire and that is a radio amateur. Radio amateurs work with electronics and, therefore, all the things we will see here in the Spectrum Museum start with electronics. So, people connected to electronics were the first ones to get their hands on it (...) (Curator at the Load ZX Spectrum Museum, 44 years old)

Filipe Veiga, in turn, discovered computing through newspapers:

My interest started mainly because of newspapers. The newspapers at that time had little sections devoted to games and computers, and I would collect them, cut them up, tear them up, and put them together, and in those clippings would come, sometimes, the analyses of the readers themselves, the guys writing at the time. There were drawings and maps of the games, so all this captivated me, fascinated me, and I wanted to have... the desire to have a computer. Moreover, since I was a child, I have always liked gadgets, electronic things (...) Thus, there was always this fascination, I wanted to have a computer because of that. (Programmer, and editor of magazines and blogs, 43 years old)

Another aspect of this phenomenon is that most Portuguese “micros” users, who consumed computer and game publications and could later become bedroom coders⁵ (Kirkpatrick, 2015; Stuckey et al., 2013; Swalwell, 2008), were primarily young males living in urban areas. They had two profiles: those who used the computer to play games and those who preferred to explore the potentialities of the computer (*Microse7e* 30, 1986, see Figure 1). Thus, both in Portugal and in other countries, most consumers of home computers were interested in using their machine as a form of entertainment, with video games being the main reason for purchasing a computer (Meda-Calvet, 2016; Lekkas, 2014; Swalwell, 2021; Wasiak, 2014).



Figure 1: “Our standard reader is a young student between the ages of 15 and 24”. Source: *Microse7e* 30, August 1986.

In an interview with Clive Sinclair that was translated into *Microse7e* (55, September 1987, 1), Sinclair acknowledged that the Spectrum was not intended for gaming:

If Sinclair intended to produce a “serious computer” for “serious users” from the beginning, we should admit that it failed. The ZX machines, which culminated in the Spectrum, although they gave many people the pleasure of familiarization with programming in Basic, became famous as the game consoles of all time. Furthermore, that is why Amstrad bought them (...) In a way, the product's purpose was misrepresented because we sold machines to people who wanted to learn to program, knowing that they would be used for games, but if that is what people wanted to do, that was fine.

Due to the specific characteristics of the machine itself, the user had to know some basic programming notions to play and use any program in the microcomputer. More specifically, the computer user had to type some lines of code in order to be able to use the computer. It was this compulsory initial contact that, according to some authors (Meda-Calvet, 2016; Swalwell, 2008; 2012), ended up awakening the need to explore the machine further.

Compared to other technologies whose use is part of their function or is implicit in their function, early home computers were a technology in search of a use. Programming thus became “the only use that was indigenous to the computer” (Swalwell, 2008, 194) in the early days when the computer, brought from large organizations into the private sphere of the home, did not yet have a specific meaning or function.

Digital game distribution networks were almost nonexistent in the early 1980s in Portugal. Since most people had acquired a home computer to play games, this was a problem for players. Existing digital games were costly for Portuguese consumers. Moreover, stores were mostly located in large urban centers, making it difficult to access the scarce original copies circulating in the country. These new computer owners needed affordable games, as well as places to buy these games. The solution was to clandestinely import original copies and duplicate them, as happened in other countries (see Jo, 2020; Kirkpatrick; 2015; Larkin, 2007; Lekkas, 2014; Nicoll, 2009; Saarikoski and Suominen, 2009; Wasiak, 2014). Thus, almost all games played in Portugal were pirated (Leão, 2022). Reproductions could be purchased at several stores, such as computer stores, electronics, photography, video stores, and stationery stores. However, most were in the shopping malls scattered over the major urban centers (Iglésias, 2019). Some stores even specialized in this type of business, creating game covers with exclusive designs and manuals translated into Portuguese.

André Leão (2022, 27) mentions the publishers’ *LOG* (based in Porto) and *Astor Software* (based in Lisbon) as the leading publishers dedicated to producing and disseminating digital games in Portugal (see Figure 2). According to this collector, in 1983, “the LOG dedicated itself to some piracy, releasing several compilations on the market with numerous games, mostly type-ins from English magazines.” Leão (2022) also recounts how works by bedroom coders began to appear more and more frequently in *Astor Software*. This publisher was the main disseminator of these original works by bedroom coders and ended up releasing about a hundred such programs by 1987.



Figure 2: Astor Software collection. Source: <https://videogamept.wordpress.com/museu-virtual/>.

Overall, digital game piracy in Portugal emerges from a particular socio-economic context in which the demand for computer games results in the circulation of pirated copies. Equally important are the efforts by bedroom coders towards learning coding and the general use of the computer, as well as the lack of legislation related to copyright and the sale of pirated copies in the Portuguese context. We will explore these topics further below.

PIRACY AS DEMOCRATIZATION OF ACCESS TO PROGRAMMING INFORMATION

In Portugal, programming practices were carried out by hobbyists and bedroom coders who, among friends and through trial and error, copied programs to learn the programming languages used at the time (namely BASIC and assembly). These programs were mainly computer games with code shared among friends and in specialized magazines. According to some interviewees, this software manipulation was generally done purely for recreational and not economic purposes.

In the 1980s, computer magazines and some Portuguese newspaper supplements not only showed how to manipulate the code of games, but also shared code of other applications, and, in some cases, explained in detail how to “open” an application to be able to duplicate it. These cracked games were being sold to the retailers by the “crackers” themselves. In addition, they published local digital game industry news and interviews with amateur computer game developers (Nicoll, 2019). According to some authors who have studied this phenomenon (Lekkas, 2014; Stuckey et al. 2013; Swalwell, 2008; 2021; Wasiak, 2014), the free form of information sharing was fundamental for encouraging bedroom coders and hobbyists to engage in the practice of learning programming techniques by cloning software. According to Kirkpatrick (2015, 98), “This is the culture of the bedroom coder, the kids sharing tapes in the playground and even the hours spent copying games programs from the magazines into home computers”. Thus, specialized publications encouraged processes of exploration and manipulation of the code of original applications in an educational way.

Another contributing factor to the massive duplication of digital games in Portugal was the copiers. According to Leão (2022, 55),

Since the early days of the Spectrum, Portuguese programmers developed copiers, that is, software utilities that allowed copying programs from cassette tapes to cassette tapes. This activity was widespread (and profitable), which was not surprising since, with rare exceptions, many of the programs sold in stores were pirated. In addition, cassette tapes were passed from hand to hand, and the most efficient way to obtain a higher-quality recording was through a copying machine.

Between 1983 and 1987, game piracy became hugely popular in Portugal, motivated mainly by the technologies and copiers accessible at the time, but also an effect of the need to learn in a self-taught way and to master the machine. In turn, software appropriation and manipulation practices could be associated with the issue of control mentioned previously. According to Meda-Calvet (2016), control bears some resemblance to hacker culture by suggesting that, in this culture, people are addicted to “playing” with the question of dominating something. And playing with this means constantly walking a narrow line between either keeping or losing what one controls. In this way, the manipulation of software, and the acts of programming themselves, are also forms of control (Lekkas, 2014).

As stated before, magazines and other specialized publications were used to encourage and teach users to crack, manipulate and duplicate software, presenting these to their readers as common and positive activities (Bootes, 2016; Kirkpatrick, 2015; Swalwell,

2008). Moreover, magazines and publications might even encourage the purchase of pirated programs. In issue 54 of *Microse7e* (1987), a reader criticizes how this publication was conniving with the sale and exchange of duplicate programs:

I want to criticize your position regarding piracy. It is a shame that the country's most widely read IT supplement encourages piracy through its advertisement section (...) The copyright revolution should start from the top, from the most important structures (the IT publications). If it doesn't, it will be complicated to make it happen — because this way, there will be many people with more than 500 games, which in a way makes it impossible for copyright to be successfully implanted, because who has so many games, will hardly pay 500 “escudos” or more for an original (...) In this matter, where we start at the same time as English and Spanish, we will also have to be the last. Does Portugal have to be the most backward Country in Europe in everything? And whose fault is it? In this case, it's the official piracy (the stores) and those who support them and encourage this piracy on their pages. (Section “The reader's word,” 2)

Besides being informative, the magazines and sections of some Portuguese newspapers also functioned as a form of communication between programmers and self-taught programmers. In the magazines we analyzed, for example, we identified many shares of information about programming and the encouragement of game production through its programming contests (see Figure 3). Thus, in the 1980s, programming (mainly digital games) was also seen as a collective and social process.



Figure 3: “The first programmers awarded by our contest, a respectable team.” Source: *Microse7e* 25, March 1986.

However, it was not only magazines that contained information on how to program. There were other ways to get information, including microcomputer clubs and technical programming books, often plagiarized, as was common in other European countries at that time (see Wasiak, 2014). Sometimes, questions and issues would arise unanswered in programming books. When this happened, the bedroom coder would turn to national and international magazine forums to communicate with their peers and solve their technical problems (Figure 4). This desire for communication led to a practice today among Portuguese developers, namely mutual aid among members of this subculture (see Pinto, 2019).



Figure 4: “Let’s exchange experiences?” Pedro Roquette is 15 years old and writes about software and game programming. Source: *Microse7e 2*, April 1984.

According to Rui Tito and Marco Paulo Carrasco (Portuguese game programmers in the 1980s), the information obtained during the process of copying a program (primarily games) was also transmitted by word of mouth among groups of friends and in the so-called “micro-clubs.” Therefore, any questions that arose about this process were cleared up among peers. However, some bedroom coders of the 1980s were also quite proud of their skills. As Meda-Calvet (2016) states, digital games were not only a playful artifact and learning objects but also an object of programming prowess, so they were seen as an activity with competitive aspects between members of the same group.

Piracy and the specialization of programmers

As stated before, duplicating software was also considered a way to dominate game programming techniques. This encouraged a competitive environment among the members of this community. The anti-piracy protection that many programs contained built into their source code was difficult to circumvent and remove, requiring programmers to have an increasingly sophisticated knowledge of the different code languages used in programs (Reunanen, Wasiak, and Botz, 2015). Therefore, piracy forced the development of copy protection mechanisms and, in turn, the professionalization of “pirate programmers” (Jo, 2020).

In this context, a new culture of boosting emerged, whereby these pirate programmers would include their “signature” as a crack intros⁶ on the home screen of the software they hacked to make it known to all who it was that was able to subvert the anti-piracy mechanisms of that application, a culture that persists in hacked software (Consalvo, 2013; Reunanen, Wasiak, and Botz, 2015; Saarikoski and Suominen, 2009). This “flaunting” of their skills, according to Reunanen, Wasiak, and Botz (2015), was a way to make their name and skills known to the rest of the community, to transgress the norms of the society they were in, and to display their programming skills and masculinity to achieve greater prestige among their peers.

There was also the negative connotation associated with video game programmers, amateur or otherwise. It was common to treat self-taught programmers as nerds or geeks. In Portugal, as one of our interviewees mentioned, young people who developed an interest in computer science and programming were treated as “computer freaks.” The negative connotations around “immaturity, obsession, isolation, and disconnection

from reality” (Jenkins, 2013, 9-10, as cited in Bootes, 2016, 168) combined with the notion of the immature-technophile (Bootes, 2016) may have contributed towards discrediting the professionalization of Spectrum generation digital game developers in the country and reinforcing the idea that Portuguese digital games were not worth investing in.

However, informal software duplication was not just about copying the code itself. The process involved reading, understanding, and remixing the code so that the copied software could be used, which was becoming increasingly complex, as we have seen. As the bedroom coders met these increasing challenges, their programming skills grew in response, resulting in highly specialized programmers. It is notable that at this time, formal education in programming and computer science was scarce in Portugal. Thus, the highly expert programmers were made up of individuals whose knowledge was accumulated through experience and self-education, something that, according to some authors, was quite common within this community (Jo, 2020; Leão, 2022; Lekkas, 2014; Meda-Calvet, 2016; Saarikoski and Suominen, 2009; Swalwell, 2012; Wasiak, 2014).

PIRATE INFRASTRUCTURE NURTURES THE EARLY PORTUGUESE DIGITAL GAMES INDUSTRY

As we can see, a network composed of different actors was indispensable for creating the Portuguese *pirate infrastructure*. As such, the central link of this network was the bedroom coder (amateur and self-learned programmer), who becomes an expert as they gain access to microcomputers and the technologies associated with them. They consume computer games and (national and foreign) publications about electronics and computing. Also, they become experts as they access the specialized communication channels that existed at the time. Finally, the increased demand for computer games and the low importation and distribution of these products in Portugal, associated with the lack of legislation on software sales and production, ultimately contributed to this pirate infrastructure emergence.

There were also other important actors. In particular, the sellers of pirated games, either in software and hardware stores or non-specialized stores, such as tobacco and stationery stores. These were essential elements of access both to information (specialized publications) and pirated software distribution, that is, computer games at a much lower cost. There were also the journalists, gaming critics, and editors of the Portuguese specialized publications that helped establish not only the community of digital game fans in Portugal (Lima, Pinto, and Gouveia, 2022) but also this pirate infrastructure.

Although paradoxical, the sale of pirated games is a relevant factor for understanding the development of the digital games industry in Portugal. The lack of legislation on the sale of software and copyrights allowed specialized and non-specialized stores to become the legitimate places of distribution and sale of pirated games, as well as “a meeting point,” as one of the interviewees of this study. The logic of informal buying and selling allowed programmers to have wider access to pirated foreign titles and access to games produced in Portugal since it was also possible for amateur programmers to sell their games in these stores. This ease of selling their games allowed them, in a way, to turn their hobby into economic activity. Thus, digital game piracy in Portugal also took on an economic aspect, as in other countries with similar pirate infrastructure (see Larkin, 2007; Lekkas, 2014).

Through allowing the sale of homemade productions by bedroom coders and offering a safe outlet for these products, the stores also nurtured an increase in Portuguese computer game production and the professionalization of programmers, creating a true

production chain that allowed, on the one hand, the dissemination of video games throughout the country and, on the other hand, contributed to the increased demand for microcomputers and peripheral items.

PIRACY AS A GENERATOR OF CULTURE AND CAPITAL ACCUMULATION

Having described how the early Portuguese home computing ecosystem was structured, let us return to Larkin's concept of *pirate infrastructure*. The concept refers to the operation modes that resemble the software appropriation and duplication process we have been analyzing in this paper. According to Larkin (2007), *pirate infrastructure* develops when certain conditions combine to create a network that enables technical modes of transmission and networks of exchange and consumption, culminating in developing its economic organization. A concept that, according to the data analyzed, describes well what occurred in Portugal during the 1980s.

For Larkin (2007), piracy is not only a phenomenon with economic purpose. It is also a phenomenon that generates culture by creating an infrastructure for the circulation and access to goods that society would otherwise not have access to. Thus, by enabling the circulation of new goods in the market, piracy helps to expand the collective cultural imaginary, influencing the creation and recreation of leisure practices, sociabilities, and new aesthetic forms.

Another important aspect of pirate infrastructure is the contribution of capital accumulation, wherein the capital accumulated is used to further invest in improving the structure on which the pirate infrastructure is technically based to operate, develop and evolve. In this sense, piracy allows the system to generate profit, giving it the necessary leeway to adapt to the technological advances needed to continue its activity. This was mentioned by Rui Tito and Marco Paulo Carrasco when they reported the need to constantly keep abreast of developments both in code language and new computer technologies that were being developed and entering the Portuguese market.

Digital games piracy in Portugal created a kind of informal production chain channeled into a parallel market with the help of legal entities, namely the software, hardware, and electronics stores that sold both pirated games and original productions developed by Portuguese bedroom coders. This system worked hand-in-hand with the free circulation of knowledge in magazines and programmers' groups (such as groups of friends, magazine readers, and software houses) and the clandestine import of copies of foreign productions. It is also this dynamic that constitutes the national *pirate infrastructure*. Thus, the creation of this infrastructure allowed the informal productive network to function fluidly that "covered 99.9% of the national video game market", according to a reader of the magazine *Microse7e* (5, 1988, 2).

If these games, "made in Portugal," were sold in computer stores, making the pirate infrastructure fully functional, then did this production chain, which included the stores, the bedroom coder, the publishers, and the consumers, generate the need for the legal regulation of this process? In the Portuguese case, no, it did not.

As mentioned previously, one of the peculiarities of pirate infrastructure is that the infrastructure generates capital which can then be reinvested in the infrastructure to keep up to date with technical improvements through purchasing equipment, for example (Jo, 2020; Larkin, 2007). In Portugal, unlike Spain and the UK, the national entities (namely the government and Portuguese software publishers) had no interest in creating legal conditions for this type of business. On the one hand, there was the stigma around digital games and the belief that they were not profitable. On the other hand, the Portuguese software publishers needed help to push through with the regulation of

the purchase and sale of computer programs, contending instead with the immediate profits generated by the informal supply chains they helped create.

By analyzing the formation of gaming culture in the UK through the discourses carried in gaming magazines in the 80s and 90s, Kirkpatrick (2015) highlights the creation of the Guild of Software Houses (GOSH) in 1983 as a key instrument in combating game piracy. According to this author (2015, 92), “lobbying the UK government, GOSH was instrumental in securing legal restrictions on copying in the 1984 video recording act, which made it technically illegal for anyone to copy a game or other software program”. Thus, “as the production and distribution of games becomes, with the assistance of the British government, a big business”, the copying of games and especially “the practice of selling copied ones is labeled as piracy” and increasingly considered a practice that threatens the burgeoning British gaming industry (Kirkpatrick, 2015, 92-93). Quite different from what happened in Portugal.

Some Portuguese game programmers have tried to break through this pirate infrastructure by resorting to the international market. For example, Rui Tito and Marco Paulo Carrasco published some games with foreign publishers (see Figure 5). The most successful case was the game *Alien Evolution*, marketed by a British publisher in 1987. Previously, other Portuguese programmers “had already participated as members of larger and international teams in consecrated games” (Leão, 2022, 89). However, this was not enough to end the Portuguese pirate infrastructure in the eighties.



Figure 5: “Rui Tito e Marco Paulo: your games are published in Great Britain.” Source: *Microse7e* 56, October 1987.

In general, although this infrastructure provided the necessary conditions for developing the Portuguese digital game industry by creating the context, resources, and skilled labor required, it also contained barriers that prevented a transition toward the legalization of the digital games business ecosystem.

Digital game piracy: destroyer or creator of new ways of using technologies?

Globally, personal computer software piracy was rife in the 1980s and early 1990s of the 20th century. According to Martin Campbell-Kelly (2005), it was estimated that there was one pirated copy for every legitimate copy of a software product.

It is important to point out that in many European countries at that time, software piracy was not considered illegal, as there were no laws protecting copyrights and regulating the sale and distribution of these types of products. It was only in May 1991 that the first legal protection measure for the rights of software authors within the European space was drawn up in Brussels. Portugal followed this European directive, publishing

in the Official Gazette the Decree-Law 109 of August 1991, the Computer Crimes Act, which, in its article 9, decreed illegal the illegitimate reproduction of protected programs. However, it was only in 1994 that, according to Ricardo Iglésias (2019, *Pushstart Magazine*), video game piracy was effectively fought in the country. "From this moment on, all stores that sold copies were forced to sell original software since this practice became a crime. Depending on the severity, the penalties were up to three years in prison, a fine, or temporary or permanent closure of the establishment.

According to Filipe Veiga, one of the interviewees,

starting in 1991, when the anti-piracy law was passed, a feeling of fear (of being caught) and guilt emerged, which became more and more pronounced as the years went by... The last time I went to a store to buy a pirated game (DOOM 2) happened precisely in 1994. It was necessary to make an appointment by phone and arrange a time, preferably at lunchtime with the store closed, to pick up an envelope with floppy disks of the games. That experience was so horrible that I didn't want to repeat it! The pirate stores, as I knew them, died that year.

With the anti-piracy law and its increased enforcement, the volume of pirated games decreased. In contrast, the circulation of original copies increased in the Portuguese market, officially stopping the operation of the national digital game piracy infrastructure that reigned in the Portuguese parallel market throughout the 1980s. Future research focusing on this transition from the implementation of the anti-piracy law in Portugal would help us better understand this new phase of the national digital games industry.

CONCLUSION

In the previous sections, we presented the different forms that digital game piracy took throughout its development in Portugal. It could take on a purely recreational character, in which the hobbyist just wants access to games and plays them. It could also have an autodidact purpose, that of teaching oneself programming in general, in which duplication and copying were a means for learning the programming language of the time. Game piracy could be about social aspects, in which programming habits in a collaborative environment and participation in magazine forums to expose and solve programming problems became modes of sociability specific to this community. Finally, we mentioned how piracy was a form of economic activity. Its main goal was commercialization and profit for the stores selling digital games and the programmers who reproduced them. It also functioned as an initial phase of the professionalization of this activity. However, there are other characteristics that piracy could take on.

The first one is the democratization of access to the software. This characteristic is related to the issues of accessibility to foreign productions that, at that time, had no official representation in Portugal, so the only way to access these productions was through piracy. It is also related to the decrease in sales and production costs of game cassettes, democratizing access to these new technologies for people with fewer economic resources. It also allowed digital games to reach individuals from locations farther away from the large national urban centers, where computer stores were usually located. Something very similar to this has happened in other countries in Europe, such as Finland (Saarikoski and Suominen, 2009) and Spain (Meda-Calvet, 2016), and outside Europe, such as in Asia (Jo, 2020; Nicoll, 2019) and Nigeria (Larkin, 2007). In Finland, for example, game piracy began to evolve as a cultural form in the mid-1980s. According to Saarikoski and Suominen (2009), even after home computer markets were established in the 1980s and 1990s, game piracy continued and developed as one of the subcultures of hobbyists.

The second characteristic is the possibility of preserving some productions through the creation of large-scale archives that, often, the companies, and publishers themselves, owners of these productions, could not maintain (Larkin, 2007). There is another feature that, as far as we know, needs to be studied more in Portugal. It refers to creating multimedia demos usually associated with computer art, which is the basis of the so-called *demoscene* (Reunanen, 2017). According to Saarikoski and Suominen (2009), the typical characteristics of this subculture include experimental and enthusiastic programming, the importance of competition and rivalry, community spirit, and some form of idealism regarding human-computer relations. Future research on this phenomenon will help us understand the real impact of this last characteristic of the pirate infrastructure on the development of the Portuguese digital game industry.

In this study, we emphasized the importance of software piracy for the technical development of the first specialists in digital game development in Portugal when access to knowledge in this area was scarce. We also demonstrated how the sale of pirated games, although paradoxical, was a relevant factor in understanding the development of the Portuguese game industry at that time. The lack of legislation on the sale of software and copyrights allowed specialized and non-specialized stores to become legitimate places for distributing and selling pirated games. Our results suggest that game piracy also contributed to establishing the community of digital game fans and to democratizing access to these new technologies for people with fewer economic resources in Portugal; after all, “if there were not so many different games appearing every day, for sure not even half of the computers would be sold” (*Mini Micro's 1*, June 1984, 13).

ACKNOWLEDGMENTS

This work was funded by the Portuguese Recovery and Resilience Program (PRR), IAPMEI/ANI/FCT under Agenda C645022399-00000057 (eGamesLab).

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ENDNOTE

1 Available in <https://loadzx.com/archive/> and <http://planetasinclair.blogspot.com/>

2 Namely Rui Tito and Marco Paulo Carrasco. Their interviews are available in <https://www.youtube.com/watch?v=KIrly2HfR90>
<https://www.youtube.com/watch?v=A3OprvC9ZB4&t=13s>

3 Namely the director of the Load ZX Spectrum Museum (Diogo Ramos), the creator of the blog Planeta Sinclair (André Leão), the creator of the RetroArquivo blog (Pedro Pimenta), the technician who is responsible for fixing old computers like the ZX Spectrum (Paula Silva), and the creator of the blog Planeta MS-DOS (Filipe Veiga). Note that the results presented in this paper are part of research conducted by a multidisciplinary team of researchers from the Game Art and Gender Equity project. For more details on this research, see <https://www.gameartandgenderequity.com/>

4 Larkin has analysed the infrastructures (such as organised supply chains, stores, video tape copying equipment etc.) that emerged to enable media piracy in the context of Nigeria. Larkin argues that even though these infrastructures initially emerge in order to disseminate pirated copies of various media forms, what is interesting is that these pirate infrastructures ultimately ended up enabling and facilitating the emergence of local media production of notable proportions. This is because local media creators were able to hitch onto the elaborate network of technologies, supply chains and other structures that were initially created in order to create and distribute pirated copies of media, creating what Larkin describes as “the structural precondition” (Larkin, 2007, 79) for the emergence of this local media industry. Larkin argues that, like all new technologies, new infrastructural forms “create and recreate conditions for everyday urban life... they organize sensory perception, provide new relationships between people and things, and give rise to different forms of affectivity, sociability, and leisure” (Larkin, 2007, 78).

5 Amateur programmers or home coders, often called bedroom coders in the literature, is a concept that refers to computer enthusiasts who embraced coding as a hobby. Some would remain amateurs, while for others, this autodidactic practice would form the foundations for a profession related to computing.

6 This culture of the crack intros is closely related to the emergence of the demoscene, another integral aspect of the early home computing context, but one beyond this paper’s scope.