

Video Games, Flow and Subjective Well-Being. An Exploratory Study With University Students in Portugal

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ABSTRACT

Immersive technologies have transformed online gaming into a multiplayer mode of play in a social presence logic characterised by a flow. This concept is often termed as “optimal experience” and reflects the state in which the individual is fully involved immersed in the action. Flow is a state of mind related to how a person is immersed, has the pleasure and is engaged in performing a particular task.

“A flow of experience in video games reflects subjective well-being?” is the research question that guided the exploratory study with the objective of assessing if there is a correlation between immersion and subjective well being through technological mediations in video games. The study was developed with a sample of 120 university students and operated through an extensive qualitative methodological strategy. The majority of respondents are male, with an average age of 27, a public higher education student in an area within the Exact Sciences, living in an urban area and not living with the parents.

The results showed that the experience of flow does not reflect into subjective well-being, mobilising negative affection instead. It was verified that the flow is directly related to an immersive experience, a dimension of absorption of video games and the idea of presence. In this regard, it was found that the higher the flow, the more significant are the other dimensions of engagement in video games (absorption, immersion, and presence). It was concluded that there is a prevalence of subjective malaise associated with the gaming experience in its four dimensions. It follows that emotions such as fear, nervousness, and disturbance are present in the negative affection that correlates with the dimensions of engagement in video games. The more involvement in the game, the higher the negative affect and the less the positive affection.

Keywords: Flow; Subjective Well-Being; Immersive Experience; Emotional Experience

Introduction

The use of technology in Portuguese society is evidence proven by several scientific studies. According to a report of the Regulatory Entity for Social Communication, "96.3% of individuals between 15 and 24 years of age are regularly enrolled in the network; in those over 65, this figure is only 11.5%" (ERC, 2016, p.15). One of the relevant aspects referring to different studies is that video games are an integral part of the everyday life of the younger generations.

A report by OBERCOM (2014) indicates that the generation of 15-25 refers to playing video games over the Internet as the 11th activity (27.9%). Amaral, Reis, Lopes and Quintas (2017) analysed practices and consumption of Portuguese youth in digital environments, concluding that 43% of respondents consider playing online as the 3rd preferred. A study developed by Brand, Lorentz, and Mathew (2012) reveals that 90% of people between 16 and 25 years old play video games. However, video games are no longer a solitary activity, 70% of gamers does it collectively (Brand et al., 2012).

Ortoleva (2009) emphasises the impossibility of dissociating technology from social processes, which inevitably refers to its condition of "social presence". The author considers that the social processes are directly associated to the technical alterations, affirming thus that "technology being as much a socio-cultural reality as literature or religion, modern societies being made of people and artefacts" (Ortoleva, 2009, p. 2).

The appropriation of technology and technological mediations in online games often allow the construction of the persona and the extension of the self (Amaral, 2008). Turkle refers to virtual environments as "self-consciously reflexive space, an arena where 'you are who you pretend to be' and where the self is the sum of these mythologies distributed over the net as a whole" (1995, p. 192). Virtual spaces as immersive environments (Amaral, 2008) refer to the notion of flow.

Flow is one of the concepts that begin to arouse interest in the scientific community for the study of virtual environments. This concept was developed by Csikszentmihalyi and reflects a state in which the individual is fully involved in the action, occurring when the subject consider that the challenges are balanced with their skills and take pleasure only for the execution of the task itself. Flow is a state of

mind related to how a person is immersed, takes pleasure and is involved in the process of performing a specific task (Csikszentmihalyi, 1990). It is a state also referred to as the optimal experience.

This exploratory study aims to answer the following research question: "A flow of experience in video games reflects subjective well-being?". The purpose of this paper is to assess whether there is a correlation between immersion and subjective well-being through technological mediations in video games.

Video Games

The advancement of technologies has contributed to video games becoming part of the daily lives of Internet users, particularly in the context of youth cultures. Amaral considers that "the phenomenon of 3D environments on the Internet that provides immersive experiences and the growing adherence to these alternative universes has been a dominant note in the evolution of Cyberculture, giving it its own socio-cultural character" (2008, p. 325).

The idea of transcending boundaries of space and time, associating virtual spaces of play with "shared social construction" that allows the significations shared by groups "that presence is replaced by belonging" (Amaral et al., 2017, p. 110). In the same line of argument, Gadamer (1997) suggests that gambling is the extreme of art and vice versa. Thus, the work of art and the game itself have always transcended the limits of temporality and, consequently, of spatiality, by allowing the encounter of horizons separated by different distances and differences.

Ramos explains that the human "has made use of instruments to ensure their survival. These instruments function as mediators between man and the world, expand their physical and mental capacity, make it possible to overcome barriers and enable their own evolution" (2008, p.52). Given this relationship we establish with the instruments, Galimberti (2006) states that we are in the age of technique. In this sense, it is essential to understand the appropriation that individuals, singularly or in groups, make of technology.

According to Ramos (2008), video games agglomerate possibilities of development and relational and cognitive transcendence. Cognitive in that work the reasoning speed, manipulation of variables and controls, concrete and abstract

challenges, command and control strategies. And relational because from these arise new relationships with the device, the video game itself or with other users. In communities and with players, the relational dimension occurs in a mediated way through online or online communication technologies.

The technical evolution allows us to understand that we are in an era where the technological resources of the games are materialised to work ludic aspects, imaginary, fictional and immersive. These types of games turn to an audience able to manipulate various resources of Communication and Information Technologies (ICT). According to Rushkoff (1999), this generation is called “screenagers” and interacts with remote controls, joysticks, mouse, Internet, as well as thinks and learns in a differentiated and discontinuous way.

Video games have been analysed from emotions that trigger the players. Bernhaupt, Boldt, Mirlacher, Wilfinger and Tscheligi (2007) argue that one of the main reasons players engage in a game is to change their emotions. Happiness, irritation, surprise, and anxiety are expected emotions that encourage players to play.

Gallo (2003) emphasises that many considerations are divided into two approaches to the nature of video games and their influences on man and contemporary society. These two approaches are summarised as apocalyptic and integrated. The first is the most widespread and alleges that, by trivialising violence, the game provokes aggressive behaviour among its users. Such statements are usually supported by tests and experiments of the type comparative between the social behaviour of people who play with those who do not play video games. The integrated approach understands that the contact with a video game is an almost irreversible process in contemporary culture and should be used for more “useful” activities, such as in the treatment of problems of motor coordination, development of exercises of reasoning, logic, reflex and integration, initiative and cooperation activities. Gallo argues, “‘the medium is not the message’, that is, the video game can acquire its own characteristics according to its use” (2003, p. 2).

Alves (2003) states that violence presented in these technological supports favours a therapeutic effect that enables subject a catharsis, in which channel their fears, desires, and frustrations in the other, but also the characters that represent them in games of images universe. Gamers identify themselves with the winner, sometimes with the loser. Thus, “violence is considered constructively, as a driving force for the development of these individuals” (Alves, 2003, p. 438).

An investigation developed by Alves aimed to study the influence of electronic games on players' daily lives and their possible implications for "violent" behaviour. The findings have revealed the video games allow "the construction of concepts related to social aspects, cognitive, affective and cultural" (2003, p. 437). According to Alves, video games of different narratives and contents "act in the Zone of Proximal Development of the subjects, in a playful, pleasant and attractive" (2003, p. 437).

Well-Being And Subjective Well-Being

Defining well-being is a difficult task because it can be influenced by several variables such as gender, age, socioeconomic level and sociocultural level. Well-being is identified when a person experiences satisfaction with life. The frequent presence of positive emotions and the relative absence of negative emotions translate the notion of well-being. Giacomoni states, "the relative preponderance of positive affect over negative is referred to as hedonic scales" (2004, p. 44).

Paiva (2014) reports that the hedonic tradition began with the philosophers Aristippus, Epicurus, Bentham, Hobbes and Lock, who argued that well-being was related to the positive emotional states arising from the satisfaction of desire. In this sense, "the experiences of pleasure, unconcern or happiness translate the concept of well-being" (Paiva, 2014, p.19). According to Giacomoni, (2004), different approaches regarding the quality of life of individuals were analysed over time:

Economics evaluates the quality of life of societies through the number of goods and services that are produced by the communities. Social scientists, on the other hand, add critical social indicators such as low crime rates, life expectancy, respect for human rights, and equitable distribution of resources to the objective assessment of the economy. A third approach to defining and assessing the quality of life is subjective well-being (2004, p.43).

Galinha and Ribeiro (2005) consider that the concept of subjective well-being in the last decades has been of interest in the field of Psychology. The authors explain that

Subjective well-being is a positive dimension of health. At the same time, it is considered a complex concept, which integrates a cognitive

dimension and an affective dimension, and a field of study that encompasses other significant concepts and areas of research such as Quality of Life, Positive Affect, and Negative Affect. It is a recent concept that has aroused in the last decades the widespread interest of many aspects of Psychology, and that has been reinforcing its identity, as studies confirm its structure and system of associated concepts (2005, p. 204).

In this line of thought, Galinha e Ribeiro define subjective well-being as

an enduring (long-term) affective state that is composed of three components: the accumulated experience of Positive Affect in salient domains of life; accumulated experience of Negative Affect in salient domains of life; and evaluation of Global Life Satisfaction or in important domains of life (2005, p. 211).

According to Giacomoni, the main theories and models that explain subjective well-being can be divided into "two large opposing blocks called bottom-up versus top-down" (2004, p. 45). The author states that "the main initial theories of subjective well-being were focused on identifying as external factors, sociodemographic situations and variables affected happiness" (Giacomoni, 2004, p. 45). These approaches were called bottom-up and explained that satisfying needs produced happiness. The constant search for answers to needs could, in reverse, lead to unhappiness. The researcher explains that the degree of satisfaction that leads to happiness depends on several factors such as past experiences, personal values, level of aspiration, ability to adapt. Giacomoni argues that "other factors associated by these theories are the experiences of daily pleasurable events being related to positive affection, as well as their opposite, events that are not pleasurable associated with negative affection" (2004, 45). The top-down approaches to subjective well-being presuppose that individuals have a predisposition to interpret situations. This assessment can be positive or negative and directly influences how the individual understands their life experiences. Subjective well-being, depending on an assessment of the individual's life events, is directly related to "personality theories and their different models, the so-called discrepancy theories and the theories regarding coping and adaptation processes" (Giacomoni, 2004, p. 45).

Measuring subjective well-being is possible through the correlation of different variables that contribute to it (Giacomoni, 2004; Galinha & Ribeiro, 2005).

Satisfaction, positive affect, and negative affect are the primary components of subjective well-being.

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Flow

Flow is a state of mind that concerns the immersion of an individual in the performance of a specific task (Csikszentmihalyi, 1990). As we have previously mentioned, it is also termed “the optimal experience.” Although the concept was not initially explicitly defined for the field of video games, over time researchers have found similarities between flow and game characteristics (Sherry, 2004).

Csikszentmihalyi (1990) has developed some theories to help people enter the state of flow. Since then, these theories have been applied to various fields of interactive experiences. One of his most inspiring achievements in these theories is the definition of the flow zone, also known as “the zone”.

To maintain a person’s flow experience, the activity to be developed needs a balance between the challenges and the abilities of the participant. If the challenge is higher than the participant’s skills, the action generates anxiety for the inability to complete it. If the challenge is less than the individual’s ability, it can lead to boredom. According to Csikszentmihalyi (1990), humans have tolerance, and there is a fuzzy safe zone where activity is neither too challenging nor too dull. Due to the unique relationship between challenge and skill/ability, the concept of flow has been used in areas such as sport (Csikszentmihalyi, 1990).

Csikszentmihalyi (1990) identified eight main components of flow: challenging activity requiring skill; merger of actions and awareness; clear goals; direct and immediate feedback; concentration on the on-going task; a personal sense of control over a given situation; loss of self-awareness; the sense of time. However, it is important to note that not all components are necessary for a flow experiment to be possible. In this sense, the flow can occur in any activity performed.

According to O’Neill, flow can be characterized as a state in which “the activity in which the individual engages takes to surrender totally offering all its capabilities, as these skills are going thus developing challenges have 3 to be larger to achieve the flow state” (1999, p. 35).

Nunes (2015) developed a study with the primary objectives of exploring the influence of the type of perspective (first person vs third person) in the flow, identifying

the avatar and the feeling of presence in a virtual environment, and analysing the association between these variables according to the type of perspective. The research results revealed that the kind of perspective in video games influences the immersion and flow. The author stresses that participants who played in the perspective of the third person had higher levels of absorption and flow. The author also points out that from the study developed was found “a greater association between flow and identifying the avatar, between the flow and the sense of presence, between the flow and pleasure and between the flow and cognitive difficulties” (Nunes, 2015, p.37). Therefore, the video games are designed to maximise and prolong player engagement, increasing pleasure, which includes flow (Nunes, 2015).

Exploratory Study: Video Games, Flow And Subjective Well-Being

Methods

This empirical study aims to answer the following research question: “A flow of experience in video games reflects subjective well-being?”. The primary purpose of this paper is to assess whether there is a correlation between immersion (flow) and subjective well-being through the technology in video games. This assumption implies the following specific objectives: i). Analyse the flow dimensions in the gamers; ii). Assess whether there is a correlation between flow and subjective well-being as measured by the individuals’ emotional experience in online gambling; iii). Understand whether there is a link between subjective well-being and online gaming activity. The working hypotheses outlined for this research are as follows: H1). Flow is associated with subjective well-being; H2). The sensation of immersion is associated with the experience of flow; H3). Subjective well-being is related to the feeling of belonging.

The empirical study was operationalised through a quantitative-extensive methodological strategy using an online questionnaire survey. Sampling is non-probabilistic collected through the snowball process. The research involved the application of a set of instruments for data collection, which were grouped into a single questionnaire made available online to the participants. For the analysis and data processing, we used the software Statistical Package for Social Sciences (SPSS), version 23.0. Data were analysed using descriptive and inferential (bivariate) statistical analysis.

Descriptive statistical analyses were carried out allow to explore the socio-demographic characteristics of our sample. In the bivariate analysis, we used the

non-parametric Mann-Whitney U tests, the Kruskal-Wallis H test, the Chi-square test, and Pearson's parametric correlation coefficient.

The instruments applied in our research were four: 1). Socio-demographic questionnaire – the socio-demographic questionnaire is composed of open and closed questions, which allowed to collect more detailed information about the characteristics of the study sample, through the following variables: age, sex, educational establishment, the area of study, worker-student, professional occupation, workplace, residence, cohabitation with parents. 2). Questionnaire on digital consumption - the questionnaire on digital consumption consists of open and closed questions with the objective of collecting information about the frequency of access to the Internet, number of hours online (for daily access), equipment for accessing the internet, online play, the frequency of playing online, devices to play. 3). Game Engagement Questionnaire - the scale we used to measure the flow was the Game Engagement Questionnaire (GEQ) by Brockmyer, Fox, Curtiss, McBroom, Burkhart and Pidruzny (2009). It is composed of four dimensions of the flow: absorption (items 3, 4, 8, 9 and 14), flow (items 5, 6, 7, 10, 11, 12, 15, 16 and 19), immersion (item 18) and presence (items 1, 2, 13 and 17). This scale has been translated into Portuguese by Nunes (2015). Participants had to respond through a Likert scale of 1 to 7 (1 = Strongly Disagree and 7 = Strongly Agree). This scale presents a general Cronbach alpha of .80, .75 for absorption, .66 for flow and .28 for presence. Once the flow had a low Cronbach's alpha, Nunes (2015) decided to withdraw the items 12 (Play it seemed automatic) and 16 (Play made me feel calm), and the alpha has risen to .74. As the presence had a meagre alpha value, even removing two items, this measure was not used. 4). PANAS scale - the scale used to measure subjective well-being was the reduced version of the PANAS (Positive and Negative Affect Schedule), developed by Watson, Clark and Tellegen (1988) to measure Positive Affect and Negative Affect, defined as general dimensions which describe the affective experience of individuals. The negative affection translates displeasure and subjective discomfort, allowing understand that includes fear, nervousness, and disorder (Galinha, Pereira, & Esteves, 2014). The positive affection refers to pleasure and well-being positive, including emotions such as enthusiasm, inspiration, and determinism (Galinha, Pereira, & Esteves, 2014). Galinha and Ribeiro (2005) adapted the scale to the Portuguese version (PANAS-VRP). The temporal references used for the study sample were: "how you feel today", "in the last days",

“in the last weeks” and in general. The Cronbach’s alpha value of this instrument was 0.77 for positive affect items and 0.84 for negative affect items.

Procedures

To collect a non-probability sample, it was decided to build and operate an instrument in digital format and simplified data collection. The questionnaire was submitted to a pre-test, sent by e-mail to 7 individuals, with the purpose of ascertaining if everything was working as intended. All responses from this step were not included in the final result database.

Participants were recruited through the Internet (via email and Facebook promotion - groups and personal profiles), and the instrument hosted in Google Drive, accompanied by the identification, scope, and objectives of the study.

All responses were anonymous and accompanied by informed consent that ensured informed participation. Obtaining informed consent was a prerequisite for completing the survey. Data collection took place from April 12 to July 12, 2017.

Participants

The study was developed with a sample of 120 participants. The requirements to participate in this study were to be a college student, to play online and, consequently, to access the Internet. All respondents accessed the Internet and are university students aged 17 to 39 years. Of the 120 participants, despite the stated requirement, 17 respondents do not play online. Concerning the conciliation between work and education, we found that 35% of respondents are student-workers. We found that 46 of the participants did not cohabit with the parents (38.3%), and the remaining 74 lived in the parents’ home (61.7%). Our sample has a predominantly urban population (65.8%).

Results and Discussion

Table 1 presents the socio-demographic characteristics of our sample. The majority of respondents are male ($n = 62$), with an average age of 27.43 ($SD = 33.17$). Most of the participants are students of public higher education (64%) in an area within the Exact Sciences (65.4%), are working students (65%) and perform functions in security services and selling (28.8%), live in urban areas (65.8%) and do not cohabit with parents (61.7%).

Table 1. Socio-demographic characterization (N = 120)

Age	<i>n</i>	%
(<i>M</i> = 27.43; <i>MO</i> = 21; <i>SD</i> = 33.17)		
17 - 20 years	21	17.5
21 - 30 years	66	55
31 – 39 years	7	5.8
No answer	26	21.7
Sex		
Male	62	51.7
Female	32	26.7
No answer	26	21.7
Educational establishment		
Public	75	64
Private	45	36
Study field		
Exact Sciences	77	65.4
Social and Human Sciences	43	34.6
Working Student		
Yes	78	65
No	42	42
Professional occupation		
Military professions	3	2.4
Intellectual and scientific activities	3	2.4
Security service workers and sellers	36	28.8
Work Regime		
Full-time	21	17.5
Part-time	25	20.8
Residence		
Rural	41	34.2
Urban	79	65.8
Cohabitation with parents		
Yes	46	38.3
No	74	61.7

Table 2 presents the digital consumption of our sample. It is worth mentioning that 77.5% of the participants access the Internet daily, with the majority (48.8%) spending no more than 5 hours online. We also point out that 8.8% of respondents stated that they were online between 12 and 15 hours and 5.6% spent between 16 and 18 hours a day on the Internet. The relevance and preponderance of mobile devices are also evident in the data presented in particular regarding Internet access (laptop computer - 65%, mobile phone - 69.2%). Regarding online gaming activity, the laptop (63.3%) is the most used device, and the desktop computer (22.5%) and the mobile phone (18.3%) have relatively close values.

Table 2. Digital consumption

	<i>n</i>	%
Frequency of daily Internet access		
Daily	93	77.5
No answer	26	21.7
Daily number of hours online		
0 to 5 hours	54	45
6 to 10 hours	40	33.3
12 to 15 hours	12	10
16 to 18 hours	9	7.5
No answer	5	4.2
Devices to access the Internet		
Desktop computer *	29	24.2
Laptop *	78	65
Mobile phone *	83	69.2
Tablet *	18	15
Play Online		
Yes	103	85.8
No	17	14.2
Devices to play online		
Laptop *	76	63.3
Desktop computer *	27	22.5
Mobile phone *	51	18.3
Console *	9	8.3
Tablet *	2	3.3

* Only respondents who answered yes

In this study, we sought to assess whether there is a relationship between the variable sex and the activity of playing online. Using the Chi-square test of independence was found that there was no significant association between variables “play online” and “sex” (, as demonstrated by the table 3.

Table 3. Double entry table with the variables “play online “ and “sex”

	Play Online		Chi-Square Test
	Yes	No	
Sex	n (%)	n (%)	
Female	35 (29.2%)	6 (5.0%)	= .011 <i>gI</i> = 1
Male	68 (56.7%)	11 (9.2 %)	<i>p</i> = .916

In this phase of the study proceeded to the analysis of correlations between the variables under study, by calculating Pearson’s correlation coefficients. Preliminary analyses were performed to guarantee the non-violation of the assumptions of normality, linearity, and homoscedasticity.

Table 4 shows the correlation between the dimensions of the Game Engagement Questionnaire (absorption, flow, presence, and immersion) and PANAS scale (positive affect and negative affection) to understand the direction and the force between the variables. The associations between the different variables are most significant. It is possible to verify that the absorption has a strong correlation ($r > .50$) and positive with the dimensions of the flow, immersion, and presence, also relating positively but moderately ($r > .30$) with the negative affection. The results further demonstrate that the absorption has a negative ratio and poor ($r < .7$) with the average of the positive affection, which indicates that the higher the absorption is less positive affection. The flow dimension is positively and actively correlated with immersion and presence ($r > .50$), and is also positively and moderately related to negative affect ($r = .298$). We further noticed that the flow has a negative and low positive affect the relationship ($r = -.082$), which allows understanding that the higher the flow is less positive affection. These results contradict our first working

hypothesis (flow is associated with subjective well-being) and reinforce the second working hypothesis we outlined (the sensation of immersion is associated with the flow experience). The mean of the immersion dimension is positively and significantly related to the presence ($r = .568$) and the negative affection ($r = .267$), and it is negatively and weakly associated with the positive affection ($r = .021$). Therefore, the higher the immersion, the lower the positive affection. The present relates to small and negative to positive affect, wherein the ratio is also low but positive linked to negative affect. Also, this result shows that the third working hypothesis that we advanced is not verified (subjective well-being is associated with the sense of belonging), and the higher the presence - and, therefore, the feeling of belonging - the less positive affection. The mean of the positive affect is weakly and negatively related to the negative affect.

Table 4. Pearson's correlations between the means of the dimensions of the Game Engagement Questionnaire and the PANAS scale

Dimensions of the scales	1	2	3	4	5	6
1. Mean of absorption	—	.771**	.639**	.546**	-.084**	.357**
2. Mean of flow		—	.656**	.747**	-.082**	.298**
3. Mean of immersion			—	.568**	-.021	.267
4. Mean of presence				—	-.183	.172
5. Mean of positive affect					—	-.013
6. Mean of negative affect						—

Dimensions of the Game Engagement Questionnaire: absorption, flow, immersion, and presence. Dimensions of the PANAS scale: positive affect and negative affect.

** Correlation is significant at the 0.01 level (bilateral).

Table 5 presents the analysis of the “flow” dimension in independent samples. The non-parametric Mann-Whitney U test was used to compare two different groups (female and male) whose requirements to apply Student's t-test were not verified. In the Mann-Whitney U non-parametric test no statistically significant differences were found regarding the “flow” dimension between males ($Md = 3.11$, $n = 70$) and females ($Md = 3.88$, $n = 33$), $U = 929$, $p = 0.111$.

The nonparametric Kruskal-Wallis test did not present statistically significant differences in the three age groups of the participants regarding the “flow” dimension (17 to 20 years, $n = 29$, $Md = 3.11$; 21 to 30 years, $n = 68$, $Md = 3.28$; 31 to 39, $n = 6$, $Md = 4.06$; $p = 0.392$).

Table 5. Analysis of the variable “flow” according to sex and age (categories)

		<i>n</i>	<i>md</i>	<i>U/H</i>	<i>p</i>
Sex	Male	70	3.11	929	0.111
	Female	33	3.88		
Age	17 to 20 years	29	3.11	1,873	0.392
	21 to 30 years	68	3.28		
	31 to 39 years	6	4.06		

Conclusions

In this paper, we aimed to assess whether there is a correlation between immersion, flow, and subjective well-being through technological mediations in video games. We analysed the flow dimensions in gamers, measured the individuals’ emotional experience of online gaming, and sought to understand whether there is a link between subjective well-being and video games.

The study conducted shows that the flow experience is not associated with subjective well-being. It is found that the higher the absorption, the flow, the presence and the immersion, the less positive affect there is, that is, the less is the satisfaction with life and the subjective well-being. Conclusively, the correlations between the dimensions of the Game Engagement Questionnaire and the PANAS scale show that there are statistically significant differences. The results express that there are weak correlations between engagement dimensions in games (absorption, flow, presence, and immersion) and positive affect. In this sense, working hypothesis H1 is not proven (flow is associated with subjective well-being). We conclude that the flow experience does not translate into subjective well-being, mobilising instead negative affect.

The study results also allow concluding that the higher the absorption, the higher the flow of experience. As well as the higher the flow, the higher is the presence. The results show that the flow dimension is positively and strongly correlated with immersion and presence ($r > .50$), also being related positively and moderately to the negative affect as mentioned above. It was verified that the flow is directly related to an immersive experience, a dimension of absorption of video games and an idea of presence (which can be classified as a feeling of belonging). Accordingly, the higher the flow, the more significant are the other dimensions of engagement in video games (absorption, immersion, and presence). We then validate the working hypothesis H2 (the immersion sensation is associated with the flow experience).

The results also demonstrate that the presence is weakly and negatively related to the positive affect, and the relationship is equally weak but positive with the negative affect. Indeed, we note that subjective well-being is not associated with the sense of belonging, and the higher the presence - and, therefore, the feeling of belonging - the less positive affection. This result allows us to conclude that the working hypothesis H3 (subjective well-being is associated with the sense of belonging) that we have advanced is not verified. Being the feeling of belonging materialised in the presence, we found that the higher this dimension of the engagement in the video games, the less the positive affect. An important issue to highlight is that we have confirmed that there are no differences in the activity of playing online in independent samples such as sex and age groups.

The main conclusion of this paper is that there is a prevalence of subjective malaise associated with the gaming experience in its four dimensions. It follows that emotions such as fear, nervousness, and disturbance are present in the negative affect that correlates with the dimensions of engagement in video games. In this sense, the more involvement in the game, the higher the negative affect and lower positive affect.

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