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(Dis)Connected: Finding the Link Between Problematic Use of Internet, Parent-Child Communication and Academic Performance in Emerging Adults

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Abstract

Information and Communication Technologies (ICT) play a central role in the lives of emerging adults, offering both opportunities and challenges. While ICT facilitates communication and access to information, its problematic use has raised concerns about its impact on family relationships and academic performance during this developmental stage. This cross-sectional study aims to describe the use of ICT in academic context and analyse differences between groups considering the problematic use of the internet, the perception of academic performance and parent-child communication in a sample of college students (N = 201, aged between 18 to 29). In addition to instruments for sociodemographic characterisation and of ICT use, Generalized Problematic Internet Use Scale-2 and Perception Scale of Parenting Communication-Emerging Adults were used. The results suggest that young people with problematic use of internet for non-academic purposes tend to report poorer communication with their parents, particularly their fathers. Additionally, half of the sample exhibited moderate problematic use of the internet. These results are relevant for professionals working with young adults, such as college professors, as well as for young adults themselves and their parents. Professors may benefit from implementing structured guidelines for ICT use in the classroom to promote academic engagement while minimizing distractions. For young adults, the findings emphasize the importance of developing self-regulation strategies to balance digital life, enhance academic performance, and maintain healthy relationships. Parents are encouraged to foster open communication and support positive family dynamics to mitigate the negative effects of problematic internet use.

Keywords: emerging adults; information and communication technologies; parent-child communication; academic performance; problematic use of internet

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Introduction

Information and Communication Technologies and Emerging Adults: From Benefits to Problematic Use

Information and Communication Technologies (ICT) is a challenging term to define (Zuppo, 2012). Generally, it refers to a broad range of technological tools and systems designed to manage information and facilitate communication (European Commission, n.d.). These technologies include email, social networks, mobile phones, and video games, all of which have become integral to modern life (Carvalho et al., 2015).

Eurostat data (2024) reveals a progressive increase in internet access in all European Union member states. For example, in 2014 80% of European Union households (27 countries) had computers with internet access and in 2024 this number increased to 94%. In some cases, the increase was highly significant, as is the case of Portugal, which rose from 65% in 2014 to 91% in 2024. In the USA, according to a survey from the Pew Research Center (2024), adults aged 30 to 49 years are the most likely to report using the internet (99% for both groups). Additionally, young people aged 18 to 29 are the group that uses smartphones the most (98%). Furthermore, 41% of U.S. adults reported being online almost constantly, with younger adults (ages 18 to 29) leading at 62%. Young people use ICT to access mainly (1) social networks and search for information in general, (2) email services and (3) chat rooms (Pontes & Patrão, 2014). Thus, it is possible to observe that the most chosen applications are of a social nature, as they allow users to communicate among themselves. Pontes and Patrão (2014) reveal that, without this type of applications, about three out of ten users would choose not to access the internet.

The extensive use of ICT by young people is driven by their accessibility and developmental factors (Arnett, 2014; Barrie et al., 2019) which are related to the emerging adulthood stage of development. This stage occurs between the ages of 18 and 29 and is defined as a period in which most of young people begin to take on structural commitments of adult life (e.g., professional stability, marriage; Arnett, 2014). This developmental stage is characterised by normative and transversal tasks that describe the milestones of the young adult's individual development (Arnett, 2014) and of the family (Parra et al., 2015; Vangelisti, 2004), given that individual transformations promote family transformations, particularly in the relationship between parents and children. At this stage of development, the movement towards the peer group (and distancing from the nuclear family) is reinforced, with social networks (Subrahmanyam et al., 2008; Veiga et al., 2019) and text messages (Pontes & Patrão, 2014) performing a very important role in establishing communication with friends. In contrast to other age ranges, in emerging adulthood there tends to be a greater time availability (young people have fewer commitments and responsibilities in their lives) that promotes intensive ICT use (Arnett, 2014). On the other hand, it is also at this stage of development that young people continue their identity exploration, using ICT, especially social networks, to validate others' perceptions of themselves and thus helping them to shape and express their self (Arnett, 2014, 2018; Manago, 2015).

Massive access to ICT has led to the increase of technology dependency problems (Savci & Aysan, 2017), with a particularly high prevalence among emerging adults. According to a Pew Research Center (2024) survey, smartphone dependency among young people aged 18 to 29 increased by 9% between 2013 and 2024. The excessive use of the internet is the main focus of this type of problem, as it causes several addictions, associated with the use of social networks, digital games and mobile phones (Savci & Aysan, 2017). Benzi et al. (2023) conclude that one in four emerging adults exhibited at least a moderate level of problematic internet use. The internet applications that most contribute to problematic and excessive use of internet are chat rooms, social networks, games and blogs (Savci & Aysan, 2017). Dependency behaviours are characterised by a repetitive pattern of habits that increase the risk of illness and/or associated personal and social problems (Griffiths, 2005). These behaviours are often associated with loss of control, that is, the behaviour continues to occur despite attempts by the individual to abstain or moderate use (Griffiths, 2005). The addictive behaviours described by Griffiths (2005) include a set of components associated with addiction which, when present, allow to affirm the existence of problematic use of the internet: (a) salience (internet use dominates the user's thoughts, leading to cognitive concerns and distortions), (b) mood modification (engagement in a specific activity results in a subjective experience of mood alteration), (c) tolerance (need for increasing amounts of the specific activity to achieve previous effects), (d) withdrawal symptoms (unpleasant sensations or physical effects occur when the activity is suddenly reduced or discontinued), (e) conflict (dependence on the activity can lead to relational difficulties with others and with oneself) and (f) relapse (repeated returns to previous patterns of the activity, including more extreme behaviors from the time when the addictive behavior initially emerged; Griffiths, 2005).

Thus, according to Caplan (2002), problematic internet use is a multidimensional construct characterized by an unhealthy relationship with the internet, driven by cognitive and behavioral symptoms. Caplan's model identifies several key components. First, individuals with problematic internet use often exhibit a preference for online interaction over face-to-face communication, perceiving online interactions as less threatening and more controllable. Second, cognitive distortions play a significant role, as individuals may overvalue the significance of online interactions or believe the internet serves as a solution to emotional or interpersonal difficulties. Third, the excessive and maladaptive use of the internet is a defining feature, with such use interfering with daily responsibilities, academic or work performance, and social relationships. Finally, problematic internet use is associated with various negative outcomes, including impaired academic or work performance, deteriorating relationships, and emotional distress such as loneliness, depression, or anxiety. These negative outcomes often reinforce the preference for online interaction, perpetuating a vicious cycle of problematic use.

According to Pontes et al. (2016), there are several problems of psychosocial nature associated with the problematic use of the internet, namely increased social anxiety, depression, deconcentration and hyperactive symptomatology, dissatisfaction with family functioning, loneliness in the educational context, emotional fragility, and addictive behaviours. Tokunaga's study (2014) corroborates these indicators, suggesting that the problematic use of the internet by college students translates into difficulties in family relationships, friendships and academic or professional responsibilities. Naik et al. (2017), for example, ascertained that 37% of a sample composed of university students showed signs of concern when they did not have their mobile phone nearby and sought to check it frequently. In addition, 33.3% of the participants exhibited behaviours of excessive mobile phone use. Symptoms associated with excessive mobile phone use include anxiety, compulsive usage, and feelings of panic (Rosales-Huamani et al., 2019). The study conducted by Amendola et al. (2023) suggests that problematic internet use in a sample of college students may act as a risk factor, moderating the relationship between prolonged social withdrawal and psychotic-like experiences (e.g., perceptual disturbances, unusual thinking, suspiciousness, grandiosity, and disorganized communication), highlighting the psychosocial impact of problematic internet use in emerging adults.

The Relationship Between Information and Communication Technologies and Family Relations

Emerging adults often share the perception of "feeling in between" (Arnett, 2014), as they move away from the struggles of adolescence and begin to take responsibility for themselves, while still remaining closely connected to their parents and family. Consequently, this transition to emerging adulthood requires families to adapt to new relational dynamics (Parra et al., 2015). According to Arnett (2018), these changes often lead to more satisfying parent-child relationships. This shift towards horizontal relationships typically results in reduced conflict (Arnett, 2018; García-Mendoza et al., 2024; Zambianchi & Ricci Bitti, 2014). During this developmental stage, parents tend to relinquish constant monitoring of their children's activities, fostering friendlier, open relationships characterized by mutual respect (Parra et al., 2015). Effective family communication plays a crucial role in shaping perceptions of relationship quality and the family's ability to adapt to structural changes throughout its lifecycle (Fincham, 2004). Segrin and Flora (2005) define communication as “a transactional process from which individuals create, share and regulate meanings” (p. 15). According to Pragmatics of Human Communication (Watzlawick et al., 1967), it is impossible not to communicate, that is, all communication is behavior, and all behavior translates a communicative intention. While some authors suggest that communication frequency and displays of affection between parents and children may decline during emerging adulthood (Parra et al., 2015; Sneed et al., 2006), others, like Zambianchi and Ricci Bitti (2014), emphasize the importance of open parent-child communication for young people's well-being. Additionally, Portugal et al. (2019) found that there are differences between emerging adults living alone and those living with their parents, with the latter tending to exhibit children confidence/sharing (e.g., sharing everyday problems) with their mother.

This evolving relational dynamic between parents and emerging adults is also influenced by the increasing use of ICT, which plays a significant role in how young adults maintain connections within their families. Parents tend to consider that ICT interferes with the healthy family functioning, harming quality time together and leading to a climate of tension (as emerging adults tend to prioritize technological contact over face-to-face contact with family members) and, also, that their children spent too much time using ICT (Barrie et al., 2019). Young people, on the other hand, consider that the use of technology facilitates communication with people out of and consider that their parents were excessively present in their lives through ICT (e.g., constant comments on social networks; Barrie et al., 2019). Furthermore, some evidence suggests that excessive parental involvement, overcontrol, and

developmentally inappropriate behavior (conceptually known as helicopter parenting) may be linked to problematic internet use in emerging adults, with such use functioning as an emotional defense mechanism (Carone et al., 2023). Similarly, Mota and Monteiro (2024) found that the perception of inhibition and limited exploration of one's individuality by parents tends to predict problematic internet use in adolescence and emerging adulthood. The study conducted by Mosley et al. (2021) suggested that attachment anxiety mediates the relationship between communication with both parents and problematic cell phone use. Specifically, poor communication with the mother was linked to problematic cell phone use, indicating that communication influences problematic use indirectly through attachment anxiety. The Sotero et al. (2019) study revealed that the existence of indicators of Facebook addiction tends to be positively correlated with a negative communicational pattern between parents and children. Nonetheless, some concordant aspects emerge between parents' and children's perspectives: (a) both consider ICT to be useful for maintaining contact in situations of geographical distance and (b) both agree that ICT can promote family conflicts (Barrie et al., 2019).

The Relationship Between Information and Communication Technologies and Academic Performance

Emerging adulthood often coincides with young people's transition into higher education (Arnett, 2014, 2018). This transition confronts young people with multiple challenges, inherent to the demands posed by the new educational context (Almeida et al., 2000; Cooke et al., 2006). Academic performance is the most visible feature of student success or failure and is a complex and multi-causal phenomenon, which encompasses personal, socio-demographic, institutional and pedagogical aspects (Almeida et al., 2000). It is related to the student's ability to preserve and reproduce what has been learned, therefore, to measure academic performance, the student is subject to several assessments in order to evaluate the levels of knowledge learned and retained (Oliveira & Santos, 2006). The numerical classification obtained does not always express the student's real performance. However, no assessment can encompass the complexity inherent to academic performance. Thus, it is possible to say that the final classification partially expresses the student's performance (Oliveira & Santos, 2006).

Information and communication technologies are widely used in higher education, as students spend significant amounts of time online, both to meet academic requirements and to engage in recreational activities and social interactions (Arnett, 2014; Rouvinen et al., 2021). Studies suggest a positive impact on student learning, including increased motivation, greater collaboration and greater productivity (Corbeil & Valdes-Corbeil, 2007; Kukulska-Hulme, 2007; Roblyer & Doering, 2012; Traxler, 2009). However, other authors identify negative effects of ICT use in classroom settings, including distraction, lower concentration and lower academic performance (Carcelén et al., 2019; Yunita et al., 2018). For example, Uğur and Koç's study (2015) revealed that 95% of participants in a sample consisting of young university students, admitted having checked their mobile phone notifications at least once or twice during class. Furthermore, 56.9% assume to check WhatsApp, 41% send messages, 33.8% surf the internet and 22% use Facebook during classes (Uğur & Koç, 2015). Also Carcelén et al. (2019) concluded that the use of mobile phones in an academic context tends to be abusive, although they point out that students seem to be increasingly aware of the negative impact that these behaviours have on their academic performance. The study conducted by Simbrón Espejo et al. (2022) during the COVID-19 pandemic suggests that ICT was used more intensively for leisure, social, or cultural activities than for completing academic tasks. Students themselves consider that the use of mobile phone has negative repercussions on their academic performance, forcing them to devote more time to study outside the school context (Carcelén et al., 2019). Díaz-López and colleagues (2021) conducted a study with a sample of adolescents, showing that more than 50% of students believe they would spend more time studying if they did not have continuous access to technology. Additionally, 20% of students identified ICT as a factor contributing to the decline in their academic performance. These findings highlight the importance of emphasizing that students perceive study time as more valuable and having a greater influence on academic performance than time spent in class (Carcelén et. al., 2019; Diaz-López et al., 2021). This belief may lead to a decrease in the use of mobile phones in study moments, but an increase on their use in the classroom context (Carcelén et. al., 2019).

The Present Study

Emerging adulthood is a developmental stage characterized by significant challenges in family relationships (Parra et al., 2015; Vangelisti, 2004) and pressures related to academic performance (Almeida et al., 2000). During this period, the widespread access to ICT increases the likelihood of problematic internet use, adding another layer of complexity to the challenges young people already encounter (Barrie et al., 2019; Savci & Aysan, 2017). While much

of the existing research has focused on the impact of ICT on family communication, this study uniquely explores its dual influence on parent-child communication and academic performance among emerging adults. This contribution is particularly valuable given the limited literature addressing significant familial and parental factors associated with problematic internet use (Nannatt et al., 2022).

The main objective of this study is to describe the use of ICT in academic context, as well as, to analyse differences between groups considering the problematic use of internet, parent-child communication and the perception of academic performance. Based on the literature review presented above, specific objectives and hypotheses were formulated:

Objective 1: Describe the use that college students have of ICT.

H1: It is expected that at least 25% of college students will exhibit a moderate level of problematic internet use (Benzi et al., 2023);

Objective 2: Compare college students with and without indicators of problematic use of internet in terms of (a) their use of ICT in academic context and (b) parent-child communication.

H2a: College students with indicators of problematic internet use are expected to report higher levels of ICT usage for non-academic purposes in academic contexts compared to those without such indicators (Díaz-López et al., 2021; Simbrón Espejo et al., 2022);

H2b: College students with indicators of problematic internet use are expected to report experiencing poorer parent-child communication compared to students without such indicators (Mosley et al., 2021; Sotero et al., 2019);

Objective 3: Compare college students with and without the perception that ICT has been harmful to their academic performance in terms of preference for online social interaction, mood regulation, negative outcomes and deficient self-regulation (GPIUS-2 scale factors).

H3: College students who perceive ICT as harmful to their academic performance will exhibit a stronger preference for online social interaction and will report higher levels of mood regulation, negative outcomes, and deficient self-regulation compared to those who do not perceive ICT as harmful (Amendola, 2023; Pontes et al., 2016; Tokunaga, 2014).

Methods

Participants and Procedure

The sample consisted of 201 participants aged between 18 and 29 years (M = 20, SD = 2.1), 71.6% (n = 144) of whom were female. It was found that 61.2% (n = 123) were single, 33.8% (n = 68) were in a non-cohabiting relationship, 4% (n = 8) were in a cohabiting relationship and 0.5% (n =1) were married. None of the participants had children. It was found that 82.1% (n = 165) lived with family, 8.5% (n = 17) with friends and/or colleagues, 5.5% (n = 11) lived alone and 3% (n = 6) lived with a boyfriend/girlfriend or partner. At the professional level, 81.1% (n = 163) of the participants were not working, only studying, 9.5% (n = 19) were occasionally employed, 7% (n = 14) were employed part-time and 1.5% (n = 3) were employed full-time. Additionally, 56.7% (n = 114) of the participants considered the socioeconomic status of their family to be medium, 29.4% (n = 59) medium low socioeconomic status, 8% (n = 16) high socioeconomic status and 5% (n = 10) low socioeconomic status. Furthermore, 91.5% (n = 184) attend a college degree and 8.5% (n = 17) attend a master's degree. With regard to the courses, 36.8% (n = 74) of the participants attended a Psychology degree, 17.9% (n = 36) Communication, Culture and Organisations, 7.5% (n = 15) Computer Engineering, 6.5% (n = 13) Nursing, 5.5% (n = 11) Management, 3.5% (n = 7) Biochemistry and 21.8% (n = 44) attended other degrees (e.g., Tourism, Medicine, Pre-School and Basic School Education, Law, Fine Arts and Multimedia). Finally, 48.8% (n = 90) were in the second year of the course, 31.8% (n = 64) in the first year and 22.9% (n = 46) in the third year of the course.

Participation in the study implied that the participants attended a higher education course (1st or 2nd study cycles, with frequency of curricular units, that is, classroom classes) and that they were aged between 18 and 29 years old. The research protocol was disclosed and filled out (duration of approximately 20 minutes) in two formats: (a) online, through the Google Forms platform (disclosure carried out through social networks) and (b) paper and pencil. It was thus a non-random convenience sampling (Coutinho, 2013). Both the online and face-to-face

applications included an informed consent that contained an explanation of the purpose of the research and the conditions for the participation. Also, in this consent the confidentiality of the data was ensured, and the research team's contact details were also made available. All procedures performed in this study were in accordance with the ethical principles of psychologists and code of conduct standards of American Psychological Association as well as the 1964 Helsinki declaration and its later amendments. The study was approved by the Scientific Council of the researchers' University. Data collection took place between February and March 2020, immediately after the regular season evaluation periods.

Measures

Sociodemographic Questionnaire and Questionnaire for the Characterization of the Academic Context and the Use of ICT

These questionnaires were specifically designed for the purposes of the present study, considering the necessary identification of socio-demographic factors, the academic context and the use of ICT that would be relevant to the research. In addition to socio-demographic questions (e.g., gender, professional situation, relationship situation, cohabitation in the last six months), it was requested information on the level of education, degree and year.

It was also sought to obtain information on the use of ICT in the classroom for academic and non-academic purposes, exploring which devices were used more often and the motivations behind this use. In addition, participants were asked about their perceived attention/concentration during classes, their perception of whether ICT would be harmful to their academic performance and the student's subjective perception of their academic performance. The time frame of reference for the participants' responses was for the last six months.

Generalized Problematic Internet Use Scale 2 (GPIUS-2; Pontes et al., 2016)

This is a self-response measure that aims to assess cognitions, behaviors and negative consequences related to problematic and widespread internet use. It comprises 15 items distributed by four first-order factors, namely: (a) preference for online social interaction (refers to the belief that online interactions are safer, more effective, and comfortable compared to face-to-face interactions), (b) mood regulation (concerns the motivation to use the internet as a mood regulator), (c) negative outcomes (pertains to obsessive thought patterns associated with internet use) and (d) deficient self-regulation (refers to the failure on self-monitoring of internet use). Responses are given on a Likert-type response scale (1 = *Strongly Disagree* to 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Neither Agree nor Disagree*, 5 = *Somewhat Agree*, 6 = *Agree* and 7 = *Strongly Agree*), with the scores ranging from 15 to 105 points. In the present study, the scale reveals good indicators of internal consistency (Nunally, 1978), with a Cronbach's alpha for the whole scale of .89. Specifically, it was verified the following values of internal consistency per factor: α = .84 (preference for online social interaction), α = .80 (mood regulation), α = .87 (negative outcomes) and α = .80 (deficient self-regulation). These values are similar to those obtained in the validation study of the instrument.

Perception Scale of Parenting Communication - Emerging Adults (COMPA-AE; Portugal et al., 2019)

It is a self-report scale aimed at assessing the perception of young emerging adults about the communication established with their parents. The instrument is comprised by 17 items that are distributed over four dimensions: parental confidence/sharing (five-item subscale referring to sharing personal problems and intimacy issues in parental perspective about work, personal relationships, friendships, family issues; sharing issues should be balanced with an individual's own privacy), children confidence/sharing (five-item subscale referring also to sharing personal problems and intimacy issues in child's perspective about personal relationships, friendships, family issues), emotional support/affect expression (four-item subscale refers to the availability of a family member with whom one can discuss problems, concerns, and feelings; affect expression refers to how affection is expressed by nonverbal, verbal, and supportive modes of communication) and negative communicational patterns (three-item subscale focuses on the negative aspects of communication, such as: hesitancy to share, negative styles of interaction and selectivity and caution in what is shared). Answers are given on a Likert-type response scale (1 = *Never* to 5 = *Always*). COMPA-AE includes two answer sheets: one regarding the father and another regarding the mother (or equivalent figures who fulfil parental functions), each of which includes the 17 items, ascertaining the communication specificity according to the parental figure.

In the present study, the internal consistency values proved to be good (Nunally, 1978), with a α = .93 for Total Mother and α = .94 for Total Father. These values were similar to the values obtained in the original study of the instrument.

Statistical Analysis

For the description of the sample and to answer objective 1 (H1), descriptive analyses were performed; to analyze the reliability of the instruments used, it was used the analysis of internal consistency determined by Cronbach's alpha. To address objective 2 (H2a and H2b) and given the absence of established cutoff points for the GPIUS-2, the results from the GPIUS-2 scale were recoded to create two groups. Participants with average responses between one (*Strongly Disagree*) and two (*Disagree*) were included in the group with no problematic use of internet (Group 1), participants with average responses between three (*Somewhat Disagree*) and five (*Somewhat Agree*) were included in the group with moderate problematic use of internet (Group 2), and participants with average responses between six (*Agree*) and seven (*Strongly Agree*) were included in the group with severe problematic use of internet (Group 3). It should be noted that the number of participants who scored above six was quite small (*n* = 4) and, for this reason, this group was not considered for the mean comparison. It was used the *T-student* parametric mean comparison test to analyze the differences between these groups. Objectives 2 and 3 (H3) were analyzed using the *T-student* parametric test for comparison of means. To assess the perception of ICT being harmful, we used the item: *Do you believe that the use of Information and Communication Technologies for non-academic purposes during class in the past 6 months may have been harmful to your academic performance?* from the Questionnaire for the Characterization of the Academic Context and the Use of ICT. Responses to this item were recorded in a dichotomous format (*yes* or *no*).

The statistical recording, processing and analysis of the data collected was made through use of the *Statistical Package for the Social Science* (SPSS v26.0).

Results

Describe the Use That College Students Have of ICT (Objective 1, H1)

With regard to the use that college students have of ICT for academic purposes during classes, it was found that 29.9% (*n* = 60) used ICT in 50% to 75% of classes, 27.4% (*n* = 55) used ICT in 75% to 100% of classes, 23.9% (*n* = 48) used ICT in 25% to 50% of classes and, finally, only 18.4% (*n* = 37) used ICT in 1% a 25% of classes. Of the college students surveyed, it can be observed that the majority opts to use the mobile phone for academic purposes (53.2%, *n* = 107), followed by the computer (44.3%, *n* = 89) and the tablet 2% (*n* = 4).

When asked about the reasons for using ICT during classes for academic purposes, it was found that 71.1% (*n* = 143) use it to consult the students' platform, 65.7% (*n* = 132) use it to search for information related to the subject of the course, 60.2% (*n* = 121) use ICT to follow the class slides, 49.8% (*n* = 100) use it to consult scientific articles, and 46.3% (*n* = 93) use it to carry out assignments for the course. Other reasons, such as taking notes and downloading supporting documents for the class, were mentioned by 1% of the participants (*n*= 2).

Regarding the use of ICT in the classroom context for non-academic purposes, it was found that 28.9% (*n* = 58) of the participants reported using it only 25% to 50% of the classes, 28.4% (*n* = 57) in 1 % to 25% of the classes, 24.4% (*n* = 55) used it in 50% to 75% of the classes and 17.9% (*n* = 36) used it in 75% to 100% of the classes. Mobile phones were used by 93.5% (*n* = 188) of the participants during classes for non-academic purposes; computers were used by 5.5% (*n* = 11), and tablets by only 0.5% (*n* = 1). Regarding the reasons for using ICT during classes for non-academic purposes, it was found that 78.1% (*n* = 157) used ICT to browse social networks, 67.2% (*n* = 135) to exchange messages, 57.7% (*n* = 116) to exchange messages in chats on social networks, 44.3% (*n* = 89) to do searches on Google. Other reasons for using ICT during classes for non-academic purposes were also identified, such as the use of football-related applications, checking appointments, playing games, browsing *YouTube* and watching *Netflix*. In this sense, the motivations that lead to the use of ICT in the classroom context for non-academic purposes were questioned, and it was found that 70.1% (*n* = 141) said they were bored, 58.8% (*n* = 117) justified it by the fact that they were having a conversation with a friend and/or boyfriend/girlfriend, 38.3% (*n* = 77) used ICT so that the class would pass more quickly, 30.8% (*n* = 62) justified that they were not interested in the subject of the class, 20.4% (*n* = 41) were interested in knowing what was new in the social networks, and 6.5% (*n* =

13) stated that they wanted to be online. Other reasons, such as the professor not discussing the topic of the class, family reasons, urgent situations, and/or hobbies, were identified by 2% (*n* = 4) of the participants.

Finally, the problematic use of the internet was analysed, and it was found that 52.7% (*n* = 91) of the participants report moderate problematic use of the internet, 45.3% (*n* = 92) report no problematic use of the internet and 2 % (*n* = 4) of the participants report a severe problematic use of the internet. Therefore, H1 was confirmed.

Compare College Students With and Without Indicators of Problematic Use of Internet in Terms of (a) Their Use of ICT in Academic Context and (b) Parent-Child Communication (Objective 2, H2a and H2b)

The analysis carried out reveals the existence of statistically significant differences between young people who report moderate problematic use of internet and those who do not report problematic use of internet on the variables *perceived attention/concentration during classes*, $t(193) = -2.356$, $p = .019$ and *perception that ICT has been harmful,* $t(193) = -2.680$, $p = .008$. More specifically it can be verified that students who report moderate problematic use of the internet show lower attention/concentration in class ($M = 2.95$, $SD = 0.785$) than students who do not report any problematic use of internet ($M = 2.71$, $SD = 0.593$); it can also be verified that students who report moderate problematic use of internet have a higher perception that ICT use are harmful to their academic performance ($M = 1.58$, $SD = 0.496$) compared to students who do not report indicators of problematic use of internet ($M = 1.76$, $SD = 0.431$). There are no statistically significant differences in the variables use of ICT during classes for academic purposes and the use of ICT during classes for non-academic purposes. The results can be seen in more detail in Table 1. Hypothesis 2a was thus confirmed.

Table 1. *Comparison of Means Between Students With and Without Indicators of Moderate Problematic Use of the Internet Considering the Use of ICT in Context (T-Student for Independent Samples).*

								95% CI	
		n	*M*	*SD*	*t*	*df*	*p*	Lower	Upper
Attention and concentration in class	Without problematic use of internet	91	2.71	0.704	−2.356	193	.019	−0.437	−0.039
	Moderate problematic use of internet	104	2.95	0.702					
Perception that ICT use were prejudicial	Without problematic use of internet	91	1.76	0.431	2.680	193	.008	0.047	0.308
	Moderate problematic use of internet	105	1.58	0.496					
ICT use during classes for non academic purposes	Without problematic use of internet	91	2.19	1.14	−1.827	194	.069	−0.582	0.022
	Moderate problematic use of internet	105	2.47	1.00					
ICT use during classes for academic purposes	Without problematic use of internet	91	2.67	1.13	0.024	194	.981	−0.299	0.307
	Moderate problematic use of internet	105	2.67	1.02					

Note. 95% CI: 95% confidence interval for the difference between group means.

Table 2. *Comparison of Means Between Students With and Without Indicators of Moderate Problematic Internet Use Considering the COMPA-AE Scale (T-Student for Independent Samples).*

								95% CI	
		n	*M*	*SD*	*t*	*df*	*p*	Lower	Upper
COMPA-AE Father version									
Total COMPA-AE-Father	Without problematic use of internet	76	3.32	0.902	2.055	172	.041	0.010	0.515
	Moderate problematic use of internet	98	3.06	0.782					
Parental confidence/ sharing	Without problematic use of internet	77	3.50	1.012	0.804	174	.423	−0.164	0.390
	Moderate problematic use of internet	99	3.38	0.851					
Children confidence/ sharing	Without problematic use of internet	76	2.68	1.059	1.770	172	.078	−0.030	0.547
	Moderate problematic use of internet	98	2.42	0.867					
Emotional support/ affect expression	Without problematic use of internet	77	3.50	1.019	2.378	174	.019	0.061	0.653
	Moderate problematic use of internet	99	3.15	0.962					
Negative comunication patterns	Without problematic use of internet	77	3.64	0.817	2.924	174	.004	0.118	0.609
	Moderate problematic use of internet	99	3.27	0.820					
COMPA-AE Mother version									
Total COMPA-AE-Mother	Without problematic use of internet	88	3.95	0.648	2.100	191	.037	0.013	0.426
	Moderate problematic use of internet	105	3.73	0.782					
Parental confidence/ sharing	Without problematic use of internet	88	4.03	0.785	1.184	192	.238	−0.095	0.380
	Moderate problematic use of internet	106	3.89	0.874					
Children confidence/ sharing	Without problematic use of internet	88	3.68	0.877	0.738	191	.461	−0.165	0.363
	Moderate problematic use of internet	105	3.58	0.977					
Emotional support/ affect expression	Without problematic internet use	88	4.26	0.706	2.776	188	.006	0.098	0.576
	Moderate problematic use of internet	106	3.92	0.980					
Negative comunication patterns	Without problematic use of internet	88	3.70	0.716	3.628	192	< .001	0.184	0.613
	Moderate problematic use of internet	106	3.30	0.797					

Note. 95% CI: 95% confidence interval for the difference between group means.

With regard to parent-child communication, H2b was also confirmed: significant differences were found between students who have moderate problematic use of internet and students who do not have problematic use of

internet at the level of the total score of the parent COMPA-AE-version scale $t(172) = 2.055$, $p = .041$, more specifically it is found that students who report moderate problematic use of internet show lower parent-child communication ($M = 3.06$, $SD = 0.782$) than students who do not report any problematic use of internet ($M = 3.32$, $SD = 0.902$). There are also statistically significant differences at the level of the emotional support and affect expression dimension of the COMPA-AE-father, $t(174) = 2.378$, $p = .019$, that is, students who make moderate problematic use of internet perceive less emotional support and affect expression in relation to the father ($M = 3.15$, $SD = 0.962$) compared to students who do not make any problematic use of internet ($M = 3.50$, $SD = 1.019$). There is also a statistically significant difference at the level of the negative communicational pattern dimension in relation to the father, $t(174) = 2.924$, $p = .004$, more specifically, students who have moderate problematic use of internet show a higher negative communicational pattern in relation to the father ($M = 3.73$, $SD = 0.782$) than students who do not make any problematic use of internet ($M = 3.95$, $SD = 0.648$).

With regard to the COMPA-AE-mother scale, there is a statistically significant difference in the overall result, $t(191) = 2.100$, $p = .037$, that is, students who make moderate problematic use of internet show lower parent-child communication towards the mother ($M = 3.73$, $SD = 0.782$) than students who do not have any problematic use of internet ($M = 3.95$, $SD = 0.648$). There is also a statistically significant difference in the emotional support and affect expression dimension, $t(188) = 2.776$, $p = .006$, more specifically, students who make moderate problematic use of internet perceive lower emotional support and affect expression in relation to the mother ($M = 3.92$, $SD = 0.980$) than students who do not have any problematic use of internet ($M = 4.26$, $SD = 0.706$). Furthermore, students who make a moderate problematic use of internet were found to have a higher negative communicational pattern towards the mother, $t(192) = 3.628$, $p < .001$, $M = 3.30$, $SD = 0.797$, than students who do not have any problematic use of internet ($M = 3.70$, $SD = 0.716$). The results can be seen in more detail in Table 2.

Compare College Students With and Without the Perception that ICT has Been Harmful to Their Academic Performance in Terms of Preference for Online Social Interaction, Mood Regulation, Negative Outcomes and Deficient Self-Regulation (GPIUS-2 Scale Dimensions; Objective 3, H3)

Statistically significant differences were found in the total score of the GPIUS-2 scale, $t(194) = 4.002$, $p < .001$, namely, students who considered that ICTs were harmful to their academic performance presented maladaptive behaviors related to general internet use ($M = 3.08$, $SD = 1.108$) than students who did not consider that ICTs were harmful to their academic performance ($M = 2.48$, $SD = 0.926$). Therefore, H3 was partially confirmed, as no significant differences were observed in the dimension of preference for online social interaction.

Table 3. *T-student for the GPIUS-2 Scale as a Function of Students' Perception of Whether the Use of ICT Have Been Prejudicial to Their Academic Performance.*

								95% CI	
		n	*M*	*SD*	*t*	*df*	*p*	Lower	Upper
Total GPIUS-2	ICT prejudicial	66	3.08	1.108	4.002	194	< .001	0.303	0.895
	ICT non-prejudicial	130	2.48	0.926					
Preference for online social interaction	ICT prejudicial	66	2.66	1.423	0.778	198	.438	−0.252	0.580
	ICT non-prejudicial	134	2.49	1.392					
Mood regulation	ICT prejudicial	66	4.20	1.675	2.402	198	.017	0.103	1.052
	ICT non-prejudicial	134	3.62	1.560					
Negative outcomes	ICT prejudicial	66	3.08	1.396	4.369	194	< .001	0.433	1.146
	ICT non-prejudicial	130	2.29	1.081					
Deficient self-regulation	ICT prejudicial	66	2.39	1.302	3.528	100	.001	−0.278	0.992
	ICT non-prejudicial	134	1.75	0.951					

Note. 95% CI: 95% confidence interval for the difference between group means.

Specifically, it was found that students who considered that the ICTs were harmful to their academic performance had a greater need for mood regulation via the internet, $t(198) = 2.402$, $p = .017$, $M = 4.20$, $SD = 1.675$, than students who do not consider that the ICTs were harmful to their academic performance ($M = 3.62$, $SD = 1.560$). Also it was found that students who considered that ICTs were harmful to their academic performance had higher negative outcomes (e.g., *My internet use created problems in my life*, *I missed appointments or social activities because of my*

internet use), $t(194) = 4.369$, $p < .001$, $M = 3.08$, $SD = 1.396$, than students who did not consider that ICTs were harmful to their academic performance ($M = 2.29$, $SD = 1.081$). Finally, there are significant differences in the deficient self-regulation, $t(100) = 3.528$, $p = .001$, that is, individuals who consider ICTs to have been harmful to their academic performance show greater deficient self-regulation of internet use ($M = 2.39$, $SD = 1.302$) compared to individuals who do not consider ICT to have been harmful to their academic performance ($M = 1.75$, $SD = 0.951$).

Discussion

The present study aimed to describe the use of ICT in the academic context, as well as to analyze differences between groups considering the problematic use of the internet, perceived academic performance and parent-child communication.

Two of the three hypotheses posed for the present study were confirmed, while one was partially confirmed. These findings highlight the dual role of digital connectivity in the lives of young people: on the one hand, it fulfills a crucial developmental need for connection and interaction, but on the other, it poses risks to academic performance. Generally, the results of the present study suggest that: (a) students who make problematic use of the internet show lower attention/concentration in class and have a higher perception that ICT use is harmful to their academic performance compared to young people who do not make any problematic use of the internet; (b) students who make moderate problematic use of the internet are expected to report experiencing poorer parent-child communication than those who do not report problematic internet use, both in relation to their mother and father; and (c) students who considered ICT to have been harmful to their academic performance had more problematic use of the internet than students who did not consider ICT to have been harmful to their academic performance.

Specifically, when describing the use that college students have of ICT, it was found that 50% to 75% of the time students use them for academic purposes in the classroom context and 25% to 50% of the time for non-academic purposes (in the classroom context). When asked about which ICT is most used for both academic and non-academic purposes, the mobile phone was the most commonly mentioned, for both purposes, but it should be noted that for non-academic purposes the percentage of mobile phone use is higher compared to the use for academic purposes, consistent with the findings of Simbrón Espejo et al. (2022). This result is congruent with Pontes and Patrão (2014) who refer that the mobile phone is a more popular gadget among young people, as it is practical for surfing the internet and keeping in touch with peers. Additionally, the Pew Research Center (2024) reports that individuals aged 18 to 29 are the most frequent users of smartphones. In the present study, students report using ICT (for non-academic purposes) in the classroom context mainly to access social networks. According to Arnett (2014, 2018), the interactions that occur through the content shared on social networks enable young people to assert their identity, pass on information about who they are and how they want to be seen by others, and also to share opinions. Similarly, Rouvinen et al. (2021) in their scoping review, found that youth use online platforms to facilitate social connections. The exchange of messages is the second most mentioned purpose in the present study and, again, Arnett (2014) mentions that text messages occupy an important place in the daily life of this generation because they allow constant connection to the people they consider to be most important to them. Similarly, chat-based communication ranks as the third most common motivation among participants, echoing Subrahmanyam and colleagues' (2008) findings that emerging adults use the internet, especially social networks, to connect with friends and family.

Given the above, one of the main results of the present study suggests that the use of ICT for non-academic purposes in the classroom context is motivated, above all, by the young person's need to establish contact/connection with the outside, whether through social networks or by exchanging written messages. The existence of ICTs, particularly the mobile phone, facilitates the breaking down of boundaries and limits between the learning space and the leisure space. These results are in line with those obtained by Pontes and Patrão (2014), who found that young people tend to resort to applications of a social nature that allow them to (1) access social networks and search for general information, (2) email services and (3) chat rooms.

An alarming result of the present study concerns the fact that about half of the sample shows indicators of moderate problematic use of internet. Some studies (Mosley et al., 2021; Sotero et al., 2019; Tokunaga, 2014) suggest that problematic use of the internet by college students tends to translate into difficulties in family relationships, friendships and academic and/or professional responsibilities. In fact, in the present study there were statistically significant differences between students with moderate problematic use of the internet and

students with no indicators of problematic use of the internet considering some variables related to the use of ICT in an academic context. It was found that students who make problematic use of the internet present lower attention/concentration in class compared to students who do not make any problematic use of the internet; it was also found that students who make problematic use of the internet have a higher perception that the use of ICT is harmful to their academic performance compared to those who do not show indicators of problematic use of the internet. These results thus corroborate several studies that suggest that the overuse of technological internet access devices in a classroom context interferes with academic performance (Carcelén et al., 2019; Díaz-López et al., 2021; Tokunaga, 2014; Uğur & Koç, 2015). It was also expected that students who report moderate problematic use of the internet would show significant differences in their self-reported "use of ICT for academic purposes" and "use of ICT for non-academic purposes" compared to those who do not. The present study did not reveal these differences, a finding that aligns with the literature's suggestion that ICT can have both positive and negative effects on students' learning (Carcelén et al., 2019; Corbeil & Valdes-Corbeil, 2007; Rouvinen et al., 2021; Yunita et.al., 2018). It is important to mention that students who consider that the use of mobile phones has negative repercussions on their academic performance, forces themselves to devote more time to study outside the school context (Carcelén et.al., 2019). This could be one of the reasons why statistically significant differences did not emerge.

When comparing the parent-child communication of students with moderate problematic use of the internet and students who did not report these indicators, it was found that the first group exhibits lower parent-child communication, both in relation to the father and mother, compared to the second group. When analyzing these differences in more detail, it was found that students who report a moderate problematic use of the internet show lower emotional support/affect expression in relation to their father and mother and greater negative communicational patterns with both parental figures. The literature (Parra et al., 2015) demonstrates that the relationship between parents and adult children undergo changes in order to allow the appropriate adaptations to individual and family challenges. Parent-child communication tends to shift from a hierarchical (vertical) structure to a more egalitarian (horizontal) one (García-Mendoza et al., 2024; Portugal, et al., 2019), as power in the parent-child relationship becomes more equally distributed. Although this change is considered normative, some studies highlight that problematic internet use not only interferes with academic performance but also disrupts family (Barrie et al., 2019; Tokunaga, 2014; Uğur & Koç, 2015). One possible explanation for the findings in the present study is offered by Carone et al. (2023). Their research highlights that maladaptive parenting practices, such as maternal helicopter parenting, can indirectly contribute to problematic internet use in emerging adults. This relationship is mediated by defensive functioning, as young people may turn to problematic internet use as a coping mechanism to manage the stress caused by intrusive or overprotective parental behaviors. These insights could shed light on why, in the present study, students with moderate problematic internet use reported lower levels of affectionate and more conflictual communication with both parental figures. While these results cannot be definitively attributed to such dynamics, it remains plausible that intrusive or controlling parenting styles play a role in shaping the observed patterns of problematic internet use and challenges in parent-child communication. Nonetheless, further research is needed to better explore and clarify the connection between parenting practices and problematic internet use in emerging adulthood.

When analyzing the dimensions of the GPIUS-2 scale according to students' perception of whether ICT use had been harmful to their academic performance, it was found that those students who considered ICT to have been harmful to their performance showed greater problematic use of the internet than those who did not consider ICTs to have been harmful to their performance. More specifically, it was verified that those who considered that ICTs were harmful to their academic performance present (a) higher need for mood regulation (motivation to use the internet as a mood regulator), (b) higher scores on the negative outcomes dimension (obsessive thought patterns involving internet use) and (c) greater deficient self-regulation (failure to self-monitor internet use), compared to college students who do not consider that ICT were harmful to their academic performance. These results are in line with the data from Uğur and Koç's (2015) study, in which it was found that higher education students are aware of the disadvantages of using ICT in the classroom context, as they promote distraction and constrain academic performance. This result partially confirmed H3, as there was no evidence that college students who perceive ICTs as harmful to their performance prefer online contact over face-to-face interaction (as suggested by Caplan's model) when compared to the other group of students. It is important to note that the number of participants in our study who reported severe problematic internet use was quite small, and as a result, this group was not included in the mean comparison. The presence of moderate problematic internet use (with percentages in line with Benzi et al., 2023) may indicate that some aspects of problematic use are still evident. While concerning, this suggests that the majority of our sample remains at an intermediate level, which may signal

the potential for a more critical relationship with ICT. According to a Pew Research Center (2024) survey, smartphone dependency among young people aged 18 to 29 increased by 9% between 2013 and 2024. These findings highlight the need for further studies to investigate the evolving impact of ICT on emerging adults.

Despite the above-mentioned contributions, the present study has some limitations, namely: (a) it was chosen to analyze the subjective perception of students' academic performance rather than the calculation of the course average, given that the latter option does not appear to be a real and accurate portrait of the student's ability (Oliveira & Santos, 2006); (b) data collection was conducted in two ways: paper and pencil format and online format, which may have given rise to variations in response depending on the format; and (c) some socio-demographic variables do not have a homogeneous distribution, such as gender (more female than male individuals participated in the study), which implied that no gender comparisons could be made.

Considering both the limitations identified and the study's findings, it is suggested to future research: (a) deepen the results presented in this paper (e.g., analyze moderation effects between variables); (b) also analyze parents' and teachers' perspectives on the use of ICT and its relationship with academic performance; (c) use a scale that assesses the addiction and cross the data, because in this study only problematic use of the internet was analyzed. It would be interesting to study, also, if students who make a problematic use of internet have some kind of addiction problem and relate this aspect with the academic performance and the parent-child communication; and (d) conduct new research using the course average obtained by the students as a variable.

In conclusion, this study aimed to provide an empirical contribution on the understanding of ICT use and its relationship with problematic use of the internet, parent-child communication and academic performance. Although the present study was conducted with a non-representative sample of emerging adults, its results offer several implications for young people, particularly college students, who are navigating a transitional phase of balancing academic responsibilities with personal and social demands. Emerging adulthood is a developmental phase where individuals navigate key transitions, including academic responsibilities, social connections, and the exploration of personal identity. The findings from this study highlight the significant role that ICT, particularly mobile phones, play in this phase. The study demonstrates that students reporting problematic internet use in academic settings also report lower attention and concentration in class, along with a more negative perception of their academic performance. This suggests that emerging adults, especially those in higher education, may benefit from developing strategies to balance their use of ICT to prevent detrimental effects on their academic success. Furthermore, our results indicate that the use of ICT for non-academic purposes, such as social networking and messaging, is particularly prevalent among emerging adults and can interfere with academic engagement. By understanding the patterns of ICT use and their potential negative consequences, emerging adults can make more informed decisions about managing their digital lives, ultimately enhancing both their academic performance and personal relationships. For instance, emerging adults who recognize the impact of ICT on their academic life may be more motivated to reduce distractions in the classroom and engage in healthier communication with family members. In addition, the study sheds light on the importance of parent-child communication during this developmental phase, showing that problematic internet use is linked to poorer communication with parents. This finding underscores the need for emerging adults to cultivate supportive and open relationships with their parents, as these connections can buffer the negative effects of problematic internet use and help them navigate academic and personal challenges more effectively.

The results of this study may be useful for emerging young adults, as well as for college professors, parents and educational policies. For college professors, the findings suggest several ways to adapt their approach to ICT use in the classroom. Given that the use of mobile phones for non-academic purposes is prevalent among students, one potential recommendation is for professors to implement more structured guidelines around mobile phone use during class. For example, professors could encourage the use of mobile phones as learning tools, such as for accessing online resources, collaborating on class-related tasks, or participating in interactive activities. This would harness the positive potential of ICT, while minimizing distractions. Alternatively, professors may consider setting clear expectations and guidelines for mobile phone use, establishing designated times for students to check or use their phones, so as to avoid disruption during critical parts of the lecture. Encouraging students to reflect on how their mobile phone use impacts their attention and academic performance could also be valuable in fostering self-regulation.

Furthermore, the findings have implications for parents, particularly in supporting healthy ICT use and promoting positive family dynamics. As students with problematic internet use reported poorer parent-child communication, it may help for parents to engage in open conversations about the impact of technology on their child's academic

and personal life. Parents can model healthy technology habits, set boundaries around screen time, and encourage face-to-face interactions. This balanced approach could improve both academic outcomes and family relationships by promoting healthier communication and technology use.

Finally, regarding educational policies, the findings underscore the need for institutions to establish clear policies on ICT use in the classroom, emphasizing both the benefits and potential risks of ICT. Educational policies should strike a balance between encouraging technological engagement for learning and mitigating distractions that may harm academic performance. For instance, institutions could provide guidelines for faculty on integrating ICT in ways that enhance learning outcomes, such as by utilizing educational apps, interactive platforms, or collaborative tools. Additionally, promoting digital literacy and responsible ICT use could be an integral part of the curriculum, ensuring that students develop a healthy relationship with technology both in and out of the classroom.

Conflict of Interest

The authors have no conflicts of interest to declare.

Use Of AI Services

The authors declare they have used AI services, specifically ChatGPT, for grammar correction and minor style refinements. They carefully reviewed all suggestions from this service to ensure the original meaning and factual accuracy were preserved.

Authors' Contribution

Alda Portugal: conceptualization, methodology, writing—original draft (introduction, methodology, results), writing—review & editing (response to reviewers). **Carina Almada**: writing—original draft (introduction, methodology, results), methodology. **Luciana Sotero**: writing—original draft (discussion), writing—review & editing. **Ana Paula Relvas**: conceptualization, writing—review & editing (revisions based on editorial and peer review feedback, in collaboration with the first author).

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