



Digital empathy in online education: A comparison study between Portugal and Romania Empatía digital en la educación en línea: Un estudio comparativo entre Portugal y Rumanía

- Dr. Alexandre Duarte. Assistant Professor, Department of Communication Sciences, Nova University Lisbon (Portugal) (alexandreduarte@fcsb.unl.pt) (<https://orcid.org/0000-0002-2665-864X>)
- Dr. Romina Surugiu. Associate Professor, Department of Cultural Anthropology and Communication, University of Bucharest (Romania) (romina.surugiu@fjsc.ro) (<https://orcid.org/0000-0003-2731-2058>)
- Dr. Madalina Moraru. Associate Professor, Department of Cultural Anthropology and Communication, University of Bucharest (Romania) (madalina.moraru@fjsc.ro) (<https://orcid.org/0000-0001-5976-7968>)
- Dr. Valentina Marinescu. Professor, Department of Sociology, University of Bucharest (Romania) (valentina.marinescu@sas.unibuc.ro) (<https://orcid.org/0000-0002-9882-5902>)

ABSTRACT

This study aims to present the extent to which online education influenced the level of empathy displayed by university students. The research relies on a self-evaluated applied survey in two European countries: Portugal and Romania. The participants in this research are 1,085 students enrolled in Communication Studies programs. The purpose of this study is to unfold the connection between gender, exposure to digital technology, empathy level according to the Basic Empathy Scale applied to young adults, and online education self-perception that involves the use of webcams. Empathy can have positive effects on students' satisfaction and increase students' outcomes. The shift from a physical environment to a digital one brought significant challenges that most students and teachers were not ready for. The digital environment influences how empathy is expressed. The present research found evidence of a relationship between exposure to technology usage, emotional contagion, and gender. This suggests that understanding the emotions of others might be inhibited during digital education. Also, the most relevant factor of empathy variation in online education is gender. The findings of the present research may contribute to the design of activities or programs that could foster empathy expression during online education for young adults.

RESUMEN

Este estudio pretende presentar la medida en que la educación en línea influyó en el nivel de empatía de los estudiantes universitarios. Basada en una encuesta aplicada y autoevaluada en Portugal y Rumanía, participaron 1.085 estudiantes matriculados en programas de Ciencias de la Comunicación. El propósito de este estudio es desvelar la conexión entre el género, la exposición a la tecnología digital, el nivel de empatía según la escala BES aplicada a adultos jóvenes y la autopercepción de la educación en línea que implica el uso de cámaras web. La empatía tiene efectos positivos en la satisfacción de los estudiantes y aumenta sus resultados educativos. El cambio del entorno físico al digital trajo importantes desafíos para los que la mayoría de los estudiantes y profesores no estaban preparados. El entorno digital influye en cómo se expresa la empatía. Se han encontrado evidencias de una relación entre el uso de la tecnología, el contagio emocional y el género. Esto sugiere que el factor más relevante de variación de la empatía en la educación en línea es el género y que la comprensión de las emociones de los demás puede inhibirse durante la educación digital. Los hallazgos de la presente investigación pueden contribuir al diseño de actividades o programas que fomenten la expresión de empatía durante la educación en línea para adultos jóvenes.

KEYWORDS | PALABRAS CLAVE

Neuroscience, digital empathy, technology, education, communication, Basic Empathy Scale.
Neurociencia, empatía digital, tecnología, educación, comunicación, Escala de Empatía Básica.

1. Introduction and state of the art

The importance of empathy in an educational context is well documented in academic literature. Empathy increases students' satisfaction, enhances a teacher's ability to relate with students (Taylor, 2002), and has strong positive effects on students' outcomes (Feshbach & Feshbach, 2009), facilitating communication and relation (both between students and teachers, and among students) in the classroom.

Recently, the rapid adoption of digital technologies and, especially, the pandemic, obliged most organizations, including educational institutions, to urgently redesign their work models. According to UNESCO (2020), because of the pandemic, more than 90% of students worldwide (1.5 billion), had their classes suspended or transferred to an online environment, with all teaching undergoing a huge and rapid transformation (Duarte & Riedl, 2022). Technology-mediated learning (TML) facilitates students' interactions, engagement, brainstorming, and problem-solving tactics, being very efficient and indispensable during the pandemic (Joa & Lorenzo, 2021). With the migration of education to the online world, the empathic social filter, usually present in traditional communication, was overlooked. Online communication is often devoid of several of the emotional signals and cues experienced in face-to-face interactions, frequently leading to more impersonal contacts (Terry & Cain, 2016).

In a meta-analysis of studies conducted over 30 years, Konrath et al. (2011) found that past generation students used to have more empathy than current ones, given the change in interpersonal dynamics, a consequence of the rising prominence of technology and social media use as a daily communication tool. As Villarroel and González (2023: 48) stated, the level of interpersonal empathy in online education might progressively increase based on students' interests and area of study. Due to the growth of computer-mediated education, it is of paramount importance to study, understand, and outline strategies to deal and potentiate this new concept of digital empathy, especially in the educational environment.

2. Empathy

According to Batson (2009), the word "empathy" was first coined by Titchener (1909), starting from the psychological state "Einfühlung" referred by Lipps (1903), about imaginatively projecting oneself into another's situation. Half a century later, Rogers (1951: 129) defined it as the concept of the "as if", explaining that empathy enables a better understanding of another person's views and feelings (Carré et al., 2013). Although it is a multidimensional construct, applied to more than a half-dozen phenomenon (Batson, 2009), "empathy denotes a sense of similarity between the feelings one experiences and those expressed by others, without losing sight of whose feelings belong to whom" (Decety & Hodges, 2006: 107).

2.1. From interpersonal empathy to digital empathy

The rapid adoption of social and mobile technologies altered, as many other aspects of contemporary culture, society's communication patterns and, somehow, disrupted the expression of empathy (Terry & Cain, 2016). The authors referred to a new form of empathy, the digital one, that they define as the "traditional empathic characteristics such as concern and caring for others expressed through computer-mediated communication (CMC)" (Terry & Cain, 2016: 1).

If the importance and impact of technology evolve as expected, digital empathy will become an even more critical issue in all aspects of life, including education. When technology meets the online educational space, emotions become mediated. According to Ahmed (2022: 76), one of the most relevant aspects to be discussed here is "how digital tools spatialize bodies and emotions of students and teachers". Consequently, digital empathy arises as a way to connect emotions and pedagogy. Once empathy has a strong correlation with positive educational outcomes and it is a fundamental part of the student-teacher relationship, the technological advances, the increasing digitization of education and the consequent decrease of empathy may be cause for concern.

2.2. Empathy and neuroscience

In 1992, three Italian researchers found that monkeys, when watching them eating, showed the same neural activity. Deepening this insightful incident, they discovered the "mirror neurons" – nerve cells that enable humans to understand other's experiences by undergoing a kind of involuntary "echo" while

observing one another's behavior (Gerdes et al., 2011). This discovery marked the beginning of the empathy research within neurosciences. In 2004, Decety and Jackson (2004) observed specific brain activity related to empathy, being able to identify the neural mechanisms that mediate empathy in the brain.

Although D'Ambrosio et al. (2009) assumed that there is consensus on the two dimensions of empathy (affective and cognitive), Carré et al. (2013) stated that recent neurophysiological studies have allowed researchers to define empathy as underpinned by three components: cognitive empathy, emotional contagion, and emotional disconnection. According to the authors, emotional contagion involves automatic processes that allow immediate evaluation of the emotions' nature: positive or negative, pleasant, or aversive, and involves subcortical structures such as the limbic lobe. The cognitive empathy involves activations of the insular cortex, the ventromedial prefrontal cortex and medial PFC. Finally, emotional disconnection is related to executive functions based on the orbitofrontal cortex, medial and dorsolateral prefrontal cortex, and the anterior cingulate cortex (Carré et al., 2013: 681). Once modern neuroscience reveals the impact of positive emotions on cognitive processes during learning activities, this fact emphasizes the need to develop digital empathy strategies in education (Li et al., 2020: 227).

2.3. Empathy and education

Authenticity and empathy are qualities that routinely appear on an attribute list of a "good" teacher (Bialystok & Kukar, 2018) and there are numerous studies relating empathy with positive findings in prosocial behaviors such as cooperation, sharing, donating, and other altruistic acts (Batson et al., 1981), all relevant in the learning process. The classes transfer to an online environment broke many of the interpersonal connections existing in the physical classroom. As known, traditional face-to-face communication of personal thoughts and attitudes widely differs from the digital one (Terry & Cain, 2016). If learning is basically a social process (Swan & Shea, 2005) and empathy is a central concept in the context of social interactions, it is of utmost importance to understand the interaction between students and professors in online classes where communication is essentially computer-mediated (Lowenthal, 2010).

During the pandemic, some higher education institutions innovated their teaching systems by creating and implementing diverse academic models focusing on positive emotions and social inclusion in a period when many young people may have been experiencing a feeling of alienation. Okoye et al. (2021) mentioned two interesting online educational models: HyFlex+ TEC (a hybrid and innovative program) and MFD+ (a flexible digital model), highlighting the impacts on emotional health of the latter.

The preoccupation with the impact of digital education on students' performance and emotions is not new. In 2000, Garrison et al. (2000), while proposing a conceptual tool for CMC in education, presented the Community of Inquiry (CoI), developing the concept of successful educational experience based on three relevant aspects: cognitive presence, social presence, and teaching presence. This framework contextualises the relationship between education and empathy in the digital environment. The nature of online communication allows individuals to be physically invisible to others (cameras off), which invalidates the crucial non-verbal communications: facial expression and eye contact (Nelson-Jones, 2005), or possible awareness of the person's physical reaction to another person(s). As much of traditional face-to-face communication tends to be non-verbal, without cues like tone of voice or body language, digital interactions lack this essential element of understanding (Terry & Cain, 2016).

Another important issue potentially lost in online education is the emotional contagion, that is developed during the preverbal period and constitutes the first step in the empathic functioning (Carré et al., 2013). Although researchers agree on the positive role of empathy in interpersonal relationships (Stephan & Finlay, 1999), there is evidence that CMC altered interpersonal dynamics (Konrath et al., 2011) and it is currently acknowledged that empathy is influenced by age, gender, and other attributes of the individual, including situational context (Feshbach & Feshbach, 2009). Therefore, we hypothesize:

- H1. Students spending more time in online education display a lower level of empathy.
- H.1.1. Students spending more time in online education display a lower level of cognitive empathy.

- H1.2. Students spending more time in online education display a lower level of emotional contagion.
- H1.3. Students spending more time in online education display a higher level of emotional disconnection.
- H2: The level of empathy varies according to gender in online education.
- H2.1 Female students are more likely to display a higher level of empathy than male students when attending online education.
- H3: Students with low level of empathy are more likely to switch off their camera during online education.
- H4: During online education, students with a high level of empathy are more likely to need the emotional support of their colleagues.

3. Methodology

The research relies on a quantitative approach, conducted in Portugal and Romania between September 29 and November 9, 2022, that consisted in applying a survey to students enrolled in higher education courses specialized in Communication.

This study respects the guidelines of the Research Ethics Commission from the University of Bucharest, the Portuguese law 58/2019 about General Data Protection Regulation, and follows the guidelines and rules imposed by the EU General Data Protection Regulation (April 27, 2016/679).

According to the Digital Economy and Society Index (DESI, 2022) published by the European Commission, that analyzes Human Capital, Connectivity, Integration of Digital Technology, and Digital Public Services of the 28 EU countries, Portugal and Romania display significant differences regarding the access and use of digital technologies. Portugal is very close to the EU average in 3 of the items, but considerably lower in Connectivity, where Romania presents better results than Portugal. Looking at the Integration of Digital Technology in society, Portugal ranks in #12, above EU average, while Romania is the last country. These differences and the similarity in long periods of online classes in both countries justify the research comparison.

3.1. Participants

The main criterion of respondents' selection was the field of study: Communication. The exact number of students enrolled every year in Portugal and Romania in Communication Studies is difficult to determine, since in both countries the only official data refer to the maximum number of places available in those study programs, not to the actual number of enrolled students. Given this limitation, a non-probability sampling technique was applied to obtain a convenient sample (Bryman, 2012; Kalton, 2020), which included 570 Portuguese and 515 Romanian students.

The sample (n=1,085) consisted of volunteers contacted personally via institutional e-mails, social media groups, and with posters with a QR code and a presentation of the research, displayed in visible places on the premises of Communication Departments/faculties in both countries.

All participants were informed about the purpose of the research and were free to withdraw from the survey at any time. The respondents had to meet the following requirements: be enrolled in Communication programs in Portuguese or Romanian universities (at any level); have a fluent level of English (language of the questionnaire); be at least 18 years old, and freely agree to participate in the survey through an expressed informed consent.

Regarding the age distribution, more than 80% of the participants were young adults, 18 to 23 years old, with most respondents aged 18-20. What is predominant in Portugal with 55.26% are Bachelor students aged 18-20 in comparison with 27.72% aged 21-23. In Romania, there is a visible age balance between the first two categories, 46.01% representing the participants aged 21-23, and 41.17% aged 18-20.

In terms of gender (Table 1), young women represent 73.36%. This can be explained by a majority among the students enrolled in both countries in Communication programs, as this field offers many opportunities for women at European level (Ross & Padovani, 2017).

Gender	Portugal		Romania		Total	
	Frequency	%	Frequency	%	Frequency	%
Female	401	70.35%	395	76.70%	796	73.36%
Male	166	29.12%	113	21.94%	279	25.72%
Other	2	0.35%	4	0.78%	6	0.55%
Gender not specified	1	0.18%	3	0.58%	4	0.37%
Total	570	100%	515	100%	1,085	100%

3.2. Data collection procedures and tools

The questionnaire was anonymous and did not collect names, e-mail addresses or geo-locations. Data collection was conducted through a self-administered online questionnaire (Bryman, 2012), by using the link provided by the researchers or by accessing the QR code included in the poster. The questionnaire consisted of four sections: (1) demographic data regarding the age group, country of origin, gender; (2) exposure to the usage of digital technologies (number of hours spent with digital technology) and to online education (the number of semesters with online education); (3) level of empathy (see “infra”); (4) online education self-perception involving the use of webcams and self-evaluated feelings regarding online education (“online education positively impacts my life”, “during online teaching sessions, I find it difficult to interact with my classmates”, “after 2 years of pandemic, students are tired of being nice in online classes”, “after 2 years of pandemic, I feel more disconnected emotionally”).

The third section - measuring empathy - consisted of a 20-item scale entitled Basic Empathy Scale (BES), designed by Jolliffe and Farrington (2006). This scale was tested on British adolescents, and the results were interpreted using two factors: affective and cognitive empathy, which may overlap, but show a degree of differentiation (Jolliffe & Farrington, 2006: 602). In 2013, Carré et al. validated the BES for adults, and proposed a three-factor model of analysis: emotional contagion, emotional disconnection, and cognitive empathy. Emotional contagion is a form of synchronizing one’s own postures and expressions with those of the persons around (Hatfield et al., 1994). Emotional disconnection refers to “a mechanism of disconnection from emotion that protects individuals from excessive emotions” (Carré et al., 2013: 686), whereas cognitive empathy means a manner of immediately detaching oneself from the other’s emotions, so as not to suffer. For Gerdes et al. (2011), the coherence and combination of the 3-factor model of empathy can be justified by neuropsychological processes as well. This section made use of the BES proposed by Jolliffe and Farrington (2006) and led to the interpretation of the results using the 3-factor model of Carré et al. (2013) that excluded one item from BES, but to facilitate comparison between this study and previous similar ones, the mentioned item (4) was kept in this research.

Following both survey designs (Jolliffe & Farrington, 2006; Carré et al., 2013), the participants rated each sentence on a 5-point Likert type scale (-2 Strongly Disagree, -1 Disagree, 0 Neither Agree nor Disagree, 1 Agree, 2 Strongly Agree). To uniformly interpret the results, the Likert scale was re-coded as follows: 1 Strongly Disagree, 2 Disagree, 3 Neither Agree nor Disagree, 4 Agree, 5 Strongly Agree. In the original BES, seven items were reversed (to be empathic the respondent had to disagree with the item), therefore the scale was also reversed in the case of these 7 items to provide a uniform interpretation of the results. Therefore, the minimum level of empathy is expressed by 20 points, and the maximum by 100 points (Carré et al., 2013: 682). The statistical analysis was performed using free softwares: PSpP version 1.6.2; R version 4.1 (R Core Team, 2021); R statistical packages (Fox & Weisberg, 2020; Lenth, 2020); Jamovi Version 2.3.

4. Results

4.1. Digital technology and online education

91.61% of the respondents declared that they spent more than 4h/day using digital devices, and 36.68% spent more than 8 hours daily using computers, tablets, or smartphones. The variation between the two countries is below 3%. For example, 56.32% of the Portuguese students considered they spent between 4 and 8h/day, similar to 53.40% of Romanians. The high exposure to digital technology representing at least 8h/day unfolds similar self-estimated results, i.e., 35.09% in Portugal and 38.4% in Romania.

Regarding participation in online education, there are significant differences: 31.93% of Portuguese participants declared that they attended 2 semesters of online courses, compared to 16.12% of Romanians,

and 9.82% of Portuguese attended 4 online semesters, compared to 32.63% of Romanians. Both Portuguese and Romanian students self-assessed that they had studied 3 online semesters, representing almost the same percentage (29.82% in Portugal and 29.13% in Romania). Despite the pandemic context, 7% of total respondents considered they did not attend online classes, whereas, conversely, 1.57% self-evaluated their online studies as over 5 semesters.

4.2. The level of empathy

The level of empathy - calculated by using the total number of points for the 20-item BES as described “supra” - varies between 43 and 100 points (Table 2).

Table 2. Level of empathy by gender and country of origin

Level of empathy	Portugal					Romania					Total
	Female	Male	Other	Gender not specified	Total Portugal	Female	Male	Other	Gender not specified	Total Romania	
20-30	0	0	0	0	0	0	0	0	0	0	0
31-40	0	0	0	0	0	0	0	0	0	0	0
41-50	2	1	0	0	3	5	2	0	0	7	10
51-60	12	19	0	0	31	26	14	0	0	40	71
61-70	62	63	0	0	125	62	44	0	1	107	232
71-80	157	54	0	0	211	153	40	3	2	198	409
81-90	135	23	2	1	161	107	11	0	0	118	279
91-100	33	6	0	0	39	42	2	1	0	45	84
Total	401	166	2	1	570	395	113	4	3	515	1,085

Most participants (920, i.e., 84.79%) displayed a medium level of empathy between 61 and 90 points. The average level of empathy in Portugal is 76.20 (SD=9.69) and in Romania is 75.51 (SD=10.57).

Regarding gender, women scored higher than men, irrespective of the country of origin. For the total empathy scale women had an average of 77.63 (SD=10.11), and men 70.72 (SD=9.03). The average score of Portuguese women was 78.23 (SD=9.18), and men 71.29 (SD=9.15). In their turn, Romanian women had an average score of 77.04 (SD=10.53), and men 70.16 (SD=8.85).

The data on emotional contagion (the interval is 6-30) displayed no differences between countries, but they show significant differences regarding gender. In Portugal, the average score of emotional contagion (women and men) is 19.97 (SD=4.29), while in Romania it is 19.84 (SD=4.83). In Portugal, women's average score for emotional contagion is 20.91 (SD=3.93), and men's 17.69 (SD=4.26). In Romania, women's average score is 20.57 (SD=4.59), and men's 17.27 (SD=4.81). Women score higher than men in both countries.

The data on emotional disconnection (the interval is 6-30) also displayed no significant differences in terms of country of origin but show differences regarding gender. In Portugal, the average score for emotional disconnection (women and men) is 24.31 (SD=3.98), while in Romania it is 23.17 (SD=4.32). The difference between women and men scores within the same parameters (around 3 points out of 30). In Portugal, women's average score is 24.98 (SD=3.67), and men's is 22.71 (SD=4.24). In Romania, women's average score is 23.89 (SD=3.96), men's 20.68 (SD=4.59).

4.3. The impact of online education on students' lives

Although there is a difference between Portuguese and Romanian students, 63.50% of respondents estimated that online education had a positive influence in their life. 68.42% of the Portuguese participants “strongly agree” and “agree”, compared to 58.06% of the Romanians. Only 7.37% considered that online education did not have a positive impact in their life.

During online classes, 47.85% of the participants believed that they had no difficulties interacting with colleagues. In Romania, 51.85% of the students self-assessed that online education did not make communication with classmates difficult, an opinion similar for 43.86% in Portugal.

4.4. The level of students' interaction by using a web camera

The percentage of participants who “agree” or “strongly agree” with a difficult interaction during online classes is 25.53. The difference between Portuguese and Romanian students who self-evaluated very low interaction with their fellows is less than 2%. Similarly, 19.65% of the Portuguese admitted that the interaction with their classmates during online teaching was difficult, while the Romanians self-evaluated with 16.12%. The total percentage of “neither agree nor disagree” assessment is 28.82%. More than half of the Romanian students did not agree with the difficulty of interaction with classmates, compared to 43.86% of the Portuguese. The difference of 8.99% between the Romanians and the Portuguese students is significant.

75.02% of the respondents participated in online classes with the camera off, without differences between countries. Regarding the attendance with the camera on, there is a difference between countries: 26.66% of Portuguese, compared to 19.41% of Romanians.

4.5. The level of empathy “fatigue”

44.52% of the Portuguese and Romanian participants “strongly agreed” or “agreed” with the idea that it is difficult to be nice in online classes (Table 3). This feeling could be associated with an “empathy fatigue” or empathy blocking. Even so, 15.61% of the Portuguese declared they are still willing to communicate nicely in online classes, while in Romania the percentage is 18.25. Only 10.97% disagreed with the possibility of getting tired of being nice in online classes, after 2 years of the pandemic.

After 2 years of the pandemic, I think students are tired of being nice in an online classroom	Portugal		Romania		Total	
	Frequency	%	Frequency	%	Frequency	%
Strongly agree	101	17.72%	93	18.06%	194	17.88%
Agree	157	27.54%	132	25.63%	289	26.64%
Neither agree nor disagree	172	30.18%	128	24.85%	300	27.65%
Disagree	89	15.61%	94	18.25%	183	16.87%
Strongly disagree	51	8.95%	68	13.20%	119	10.97%
Total	570	100%	515	100%	1085	100%

4.6. Self-assessed emotional disconnection after pandemic

In this research, 41.47% of the respondents self-evaluated as emotionally disconnected (Table 4). The percentage of Romanians stating that they “strongly agree” and “agree” with emotional disconnection after 2 years of the pandemic is 45.44, while among the Portuguese participants it is 37.90. In terms of disagreement and strong disagreement with emotional disconnection, the Portuguese self-assessed with 42.81%, compared to 35.73% of the Romanians. The percentage of Portuguese and Romanian students who neither agree nor disagree with this emotional disconnection is 19.08, well balanced between both countries.

After 2 years of the pandemic, I feel more disconnected emotionally	Portugal		Romania		Total	
	Frequency	%	Frequency	%	Frequency	%
Strongly agree	69	12.11%	102	19.81%	171	15.76%
Agree	147	25.79%	132	25.63%	279	25.71%
Neither agree nor disagree	110	19.30%	97	18.83%	207	19.08%
Disagree	143	25.09%	106	20.58%	249	22.95%
Strongly disagree	101	17.72%	78	15.15%	179	16.50%
Total	570	100%	515	100%	1085	100%

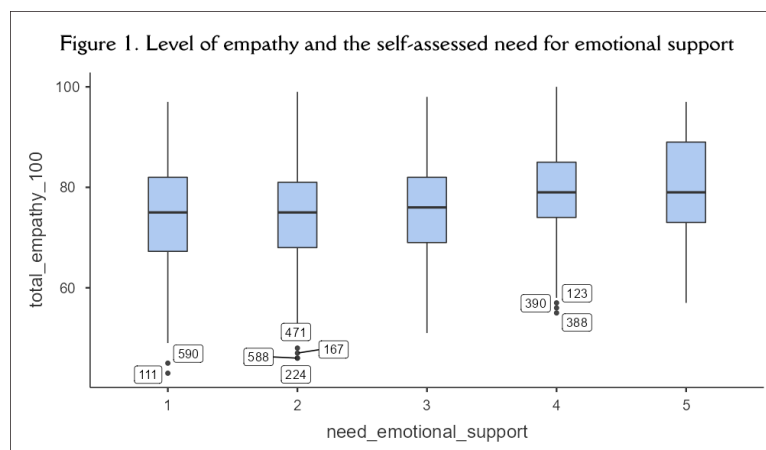
4.7. Gender, empathy, and technology

The results of the data analysis from both countries show that there is a correlation between the level of empathy, and gender (Table 5). A weak correlation can also be observed between the empathy and the hours spent online and number of years in higher education.

Table 5. ANOVA – Level of empathy						
	Sum of Squares	df	Mean Square	F		p
Camera on/off	34.8	2	17.4	0.191		0.826
Gender	9,495.8	2	4,747.9	52.061		<.001
Age group	361.6	3	120.5	1.322		0.266
Number of years in higher education	1,032.3	5	206.5	2.264		0.046
Hours spent online (exposure to digital technology)	832.8	4	208.2	2.283		0.049
Online semesters	294.6	4	73.6	0.807		0.520
Residuals	88,098.0	966	91.2			

The ANOVA test was run to investigate the impact of factors on digital empathy. With a 0.05 level of significance, gender, the number of years in higher education, and the number of hours spent online seem to impact empathy (p -values<0.05). To identify the categories that impact empathy differently, Tukey contrast tests were run, and the conclusions are the following: female empathy is higher than men's (mean difference=7.2); men's empathy is lower than others (mean difference= -11.7) and students with less than 3 years of study in higher education display a lower level of empathy (mean difference= -2.8). Furthermore, the ANOVA tests show that emotional contagion is mainly impacted by exposure to digital technology.

The participants with a higher level of empathy are more likely to need emotional support during online education ($p < .001$) (Figure 1). Tukey contrast tests were run, and the conclusions were that those who most agree with the need for emotional support (4 and 5) have greater empathy (for example, mean difference between 1 and 5 is -5.606, and between 2 and 5 is -5.394).



5. Discussion and conclusions

In the case of Portugal, exposure to digital technology correlates with emotional contagion, camera off/on, the perception of the positive effects of online education, and with the feeling that there was a low interaction with classmates online. There is also a correlation between gender and the feeling that online education brought an “empathy fatigue” (expressed by the tiredness of being nice in online classes). As Hosszu et al. (2022: 10) stated, many pupils experienced a feeling of alienation during the COVID-19 pandemic, possibly seen as an emotional disconnection, since most students attended online classes for more than one semester.

The difference of 7.08% between Portuguese and Romanian students who assessed themselves as emotionally disconnected might be seen as a better adaptation to online learning and other resources for expressing emotions beyond online “walls”, as Portugal displays a better adaptation to digital technologies (DESI, 2022). Also, for Portuguese respondents, the more time spent on online education correlates with a higher level of positive feelings towards online education. In the case of Romania, gender correlates with emotional contagion (measured by BES), but it does not correlate with the self-assessed emotional disconnection. The number of semesters spent in online education negatively correlates with the emotional contagion.

- H1 is partially validated. The level of empathy is not influenced by the number of semesters spent on online education, but a significant correlation is to be found at the level of emotional contagion related to self-assessed exposure to digital technology, where weak correlation values can be observed in the case of Portuguese and Romanian respondents (H1.2). Emotional contagion is of paramount importance as it is an automatic and unconscious process, developed in the early years of life, and it refers to the affective expression of emotions (Carré et al., 2013: 679). Our findings also show that the levels of emotional contagion are correlated to the duration of exposure to digital technology.
- H1.1 (cognitive empathy) and H1.3 (emotional disconnection) are not validated.

The results validate the second hypothesis (H2) regarding the level of empathy depending on gender in online education. This is in line with results from previous studies, which underlines that women express their empathy differently from men, substantiating once more the findings of Jolliffe and Farrington (2006: 602). According to statistical analysis, in both countries, women's average score of empathy is higher than men's during online education.

- H3 is also validated. Students prefer to switch off the camera during online classes (75.02%). Women show a similarly low level of interest as men in attending classes with cameras on. 75.67% of the Romanian females stay behind the "black screen", compared to 70.76% of the Portuguese. The camera on/off variable was added to the tested model and does not seem to have an impact on the level of empathy ($p\text{-value}=0.826$). Previous studies showed that anxiety, intimacy, freedom, and discovering new abilities of multitasking activities may be the reasons for not switching the camera on (Hosszu et al., 2022; Deng et al., 2022).

This phenomenon of camera on/off can be explained by the students' ability to simultaneously communicate with their classmates, most likely on social platforms, such as WhatsApp. This platform is seen as a successful tool of interaction which may be integrated in online education, although researchers observed the decrease of learning engagement when using social media platforms during online classes (Deng et al., 2022: 15).

In this study, almost half of the students self-evaluated as being positively impacted by online education. Also, the level of interaction with colleagues is seen as satisfactory. These results are intriguing in the context of keeping the camera off in online classes. Other studies show that students re-create new identities in an online environment, manipulating webcams differently. While attending online classes, students prefer to have the camera off to express different types of freedom and reconstruct another social space behind it (Hosszu et al., 2022: 9-10). The same authors observed that Romanian students did not like teachers' pressure and control and kept their camera off to preserve their individuality and intimacy. The present study could not find consistent data related to a clear correlation between low level of empathy and the practice of keeping the camera off during online classes. A weak correlation was found when it came to gender, empathy, and having the camera turned off in the case of Romanian male respondents, but this does not substantiate the relationship between lower levels of empathy and participation with cameras on in online education.

- H4, regarding the emotional support needed by students with high level of empathy while attending online classes, is validated. The authors presume that students with high levels of empathy are more socially involved with their relatives, friends, and classmates. As learning is basically a social process (Swan & Shea, 2005), without the physical interaction in the online environment, they may feel the need for social presence. Social presence comprises emotional expression, open communication, and group cohesion, being expressed by emotions, risk-free expression and encouraging collaboration (Garrison et al., 2000: 89). During the pandemic, the Communication Programs in Portugal and Romania were almost exclusively online, with no hybrid activities. The need for emotional support could be justified by this lack of face-to-face connection during long periods of digital education.

In conclusion, the present research found evidence of a relationship between exposure to technology usage, gender, and empathy. The authors argue that understanding others' emotions might be inhibited during digital education. Empathy at its core will never change. However, its means of expression is naturally

evolving as the world and its form of communication become increasingly digital (Terry & Cain, 2016: 3). With the growing technological adoption, the social filters that mediate the student-teacher relationship require a deeper understanding. This study analyzed the construct of empathy in the digital educational environment, based on students' perceptions and opinions. As empathy is proven to be correlated to students' satisfaction and performance (Taylor, 2002; Feshbach & Feshbach, 2009), unpacking the digital trait of this concept is fundamental. Although this study cannot establish the causality, it might be expected that a higher exposure to digital technology usage would negatively influence the level of empathy. A weak variation of empathy levels was observed, and this process is related to the digital environment. According to this research, similar to face-to-face interaction, the most relevant factor of empathy variation in online education is gender. The findings of this research may contribute to the design of activities or programs that could foster empathy expression during online education for young adults.

Several aspects can be developed in future research, such as a comparison with students from other study fields, or an extension to other countries. Furthermore, the relationship between gender and emotional disconnection could be approached in order to refine explanations regarding the gender influence on empathy in the digital environment and online education. In addition, the phenomenon of attending online classes or other educational activities with the web cameras switched off could be investigated in depth using a qualitative research method, like the semi-structured interviews.

Authors' Contribution

Idea, A.D., R.S., M.M.; Literature review (state of the art), A.D.; Methodology, A.D., R.S., M.M.; Data analysis, R.S., M.M., V.M.; Results, R.S., M.M., V.M.; Discussion and conclusions, A.D., R.S., M.M.; Writing (original draft), A.D., R.S., M.M.; Final revisions, A.D., R.S., M.M.; Project design and funding agency, A.D., R.S., M.M.

Funding Agency

This article is funded by national funds through the FCT - Fundação para a Ciência e a Tecnologia within the project UIDB/05021/2020.

References

- Ahmed, A. (2022). Emotions in technology-mediated pedagogical spaces. In A. Ahmed (Ed.), *Exploring Silences in the Field of Computer Assisted Language Learning*. Palgrave Macmillan. https://doi.org/10.1007/978-3-031-06501-9_5
- Batson, C.D. (2009). These things called empathy: Eight related but distinct phenomena. In *The social neuroscience of empathy* (pp. 3-15). MIT Press. <https://doi.org/10.7551/mitpress/9780262012973.003.0002>
- Batson, C.D., Duncan, B.D., Ackerman, P., Buckley, T., & Birch, K. (1981). Is empathic emotion a source of altruistic motivation? *Journal of Personality and Social Psychology*, 40(2). <https://doi.org/10.1037/0022-3514.40.2.290>
- Bialystok, L., & Kukar, P. (2018). <https://doi.org/10.1177/1477878517746647>
- Bryman, A. (2012). *Social research methods*. Oxford University Press. <https://bit.ly/3kynzDt>
- Carré, A., Stefaniak, N., Ambrosio, F., Bensalah, L., & Besche-Richard, C. (2013). The Basic Empathy Scale in adults (BES-A): Factor structure of a revised form. *Psychological Assessment*, 25(3), 679-691. <https://doi.org/10.1037/a0032297>
- D'ambrosio, F., Olivier, M., Didon, D., & Besche, C. (2009). The basic empathy scale: A French validation of a measure of empathy in youth. *Personality and Individual Differences*, 46(2), 160-165. <https://doi.org/10.1016/j.paid.2008.09.020>
- Decety, J., & Hodges, S.D. (2006). The social neuroscience of empathy. In *Bridging Social Psychology* (pp. 103-109). Psychology Press. <https://doi.org/10.4324/9781410616982-21>
- Decety, J., & Jackson, P.L. (2004). The functional architecture of human empathy. *Behavioral and Cognitive Neuroscience Reviews*, 3(2), 71-100. <https://doi.org/10.1177/1534582304267187>
- Deng, L., Zhou, Y., & Hu, Q. (2022). Off-task social media multitasking during class: Determining factors and mediating mechanism. *International Journal of Educational Technology in Higher Education*, 19(14), 1-19. <https://doi.org/10.1186/s41239-022-00321-1>
- Derntl, B., Finkelmeyer, A., Eickhoff, S., Kellermann, T., Falkenberg, D.I., Schneider, F., & Habel, U. (2010). Multidimensional assessment of empathic abilities: Neural correlates and gender differences. *Psychoneuroendocrinology*, 35(1), 67-82. <https://doi.org/10.1016/j.psyneuen.2009.10.006>
- DESI (Ed.) (2022). *Digital economy and society index report*. European Commission. <https://bit.ly/41JhjcH>
- Duarte, A., & Riedl, K. (2022). Perceived learning effectiveness and student satisfaction: Lessons learned from an online multinational intensive program. In *Handbook of Research on Teaching Strategies for Culturally and Linguistically Diverse International Students* (pp. 326-344). IGI Global. <https://doi.org/10.4018/978-1-7998-8921-2>
- Feshbach, N.D., & Feshbach, S. (2009). Empathy and education. In J. Decety, & V. Ickes (Eds.), *The social neuroscience of empathy* (pp. 85-97). MIT Press. <https://doi.org/10.7551/mitpress/9780262012973.003.0008>
- Fox, J., & Weisberg, S. (2020). *Car: Companion to Applied Regression*. [R package]. <https://bit.ly/40adBXV>

- Garrison, D.R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2, 16-22. [https://doi.org/10.1016/S1096-7516\(00](https://doi.org/10.1016/S1096-7516(00)
- Gerdes, K.E., Lietz, C.A., & Segal, E.A. (2011). Measuring empathy in the 21st century: Development of an empathy index rooted in social cognitive neuroscience and social justice. *Social Work Research*, 35(2), 83-93. <https://doi.org/10.1093/swr/35.2.83>
- Gerdes, K.E., Segal, E.A., & Lietz, C.A. (2010). Conceptualising and measuring empathy. *British Journal of Social Work*, 40(7), 2326-2343. <https://doi.org/10.1093/bjsw/bcq048>
- Hatfield, E., Cacioppo, J.T., & Rapson, R.L. (1994). Emotional contagion and empathy. In *Emotional contagion*. Cambridge University Press. <https://doi.org/10.1080/00029157.1997.10403399>
- Hatfield, E., Rapson, R.L., & Le, Y.C.L. (2009). *The social neuroscience of empathy* (pp. 19-30). MIT Press. <https://doi.org/10.7551/mitpress/9780262012973.003.0003>
- Hosszu, A., Rughinis, C., Rughinis, R., & Rosner, D. (2022). Webcams and social interaction during online classes: Identity work, presentation of self, and well-being. *Frontiers in Psychology*, 12, 1-17. <https://doi.org/10.3389/fpsyg.2021.761427>
- Joia, L.A., & Lorenzo, M. (2021). Zoom In, Zoom Out: The Impact of the COVID-19 pandemic in the classroom. *Sustainability*, 13(5), 1-19. <https://doi.org/10.3390/su13052531>
- Jolliffe, D., & Farrington, D.P. (2006). Development and validation of the Basic Empathy Scale. *Journal of Adolescence*, 29(4), 589-611. <https://doi.org/10.1016/j.adolescence.2005.08.010>
- Kalton, G. (2020). *Introduction to survey sampling*. Sage. <https://doi.org/10.4135/9781412984683>
- Konrath, S.H., O'brien, E.H., & Hsing, C. (2011). Changes in dispositional empathy in American college students over time: A meta-analysis. *Personality and Social Psychology Review*, 15(2), 180-198. <https://doi.org/10.1177/1088868310377395>
- Lenth, R. (2020). *Emmeans: Estimated Marginal Means, aka Least-Squares Means*. [R package]. <https://bit.ly/3ZUQVPH>
- Li, L., Gow, A.D.I., & Zhou, J. (2020). The role of positive emotions in education: A neuroscience perspective. *Mind, Brain, and Education*, 14(3), 220-234. <https://doi.org/10.1111/mbe.12244>
- Lowenthal, P.R. (2010). Social presence. In *Social computing: Concepts, methodologies, tools, and applications* (pp. 129-136). IGI Global. <https://doi.org/10.4018/978-1-60566-984-7.ch011>
- Nelson-Jones, R. (2005). *Practical counselling and helping skills. How to use the life skills helping model*. Sage Publications. <https://bit.ly/3ZoEXJz>
- Okoye, K., Rodriguez-Tort, J.A., Escamilla, J., & Hosseini, S. (2021). Technology-mediated teaching and learning process: A conceptual study of educators' response amidst the Covid-19 pandemic. *Education and Information Technology*, 26, 7225-7257. <https://doi.org/10.1007/s10639-021-10527-x>
- R Core Team (Ed.) (2021). *R: A Language and environment for statistical computing. (Version 4.1)*. [Computer software]. <https://cran.r-project.org>
- Rogers, C. (1951). *Client-centered therapy: Its current practice, implications and theory*. Constable.
- Ross, K., & Padovani, C. (2017). *Gender equality and the media*. Routledge. <https://doi.org/10.4324/9781315709024>
- Stephan, W.G., & Finlay, K. (1999). The role of empathy in improving intergroup relations. *Journal of Social Issues*, 55(4), 729-743. <https://doi.org/10.1111/0022-4537.00144>
- Swan, K., & Shea, P. (2005). The development of virtual learning communities. In *Asynchronous Learning Networks* (pp. 239-260). Hampton Press. <https://doi.org/10.4324/9781410611482-19>
- Taylor, C. (2002). Beyond empathy: Confronting homophobia in critical education courses. *Journal of Lesbian Studies*, 6(3-4), 219-234. https://doi.org/10.1300/J155v06n03_18
- Terry, C., & Cain, J. (2016). The emerging issue of digital empathy. *American Journal of Pharmaceutical Education*, 80(4), 1-4. <https://doi.org/10.5688/ajpe80458>
- Titchener, E.B. (1909). *Lectures of the experimental psychology of thought processes*. Cornell University Library.
- UNESCO (Ed.) (2020). *Education: From disruption to recovery*. Unesco. <https://bit.ly/3ZpRHjh>
- Villarroel, V., & González, A. (2023). Students' learning perception in engineering, health and education during emergency remote education in Chile. *International Journal of Educational Methodology*, 9(1), 41-51. <https://doi.org/10.12973/ijem.9.1.41>