Papers on Social Representations
Volume 32, Issue 1, pages 2.1-2.28 (2023)
Peer Reviewed Online Journal
ISSN 1021-5573

[http://psr.iscte-iul.pt/index.php/PSR/index]

More than a Common Place: A Social Representations Approach to the Internet

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This study aimed to investigate the commonsense knowledge about the Internet and its relationship with social groupings from the perspective of social representations theory. We surveyed 1013 participants (students, teachers, and guardians) from three schools, using the ranked association technique, the General Internet Attitudes Scale, and the Web-Use Skill Measure Index. We conducted a correspondence analysis on the data. Results showed that the representation of the Internet is associated with different social groupings, being organized along a media-message axis and a personal-social axis. While students, participants with lower education levels and participants with positive attitudes toward the Internet have a personal media usage representation, teachers and participants with higher education levels showed a greater focus on the social message. This study is significant because it shows that the Internet – as a social object – is not consensual. This suggests a connection between the social representations of the Internet and social identity that future research should explore to better understand and bridge the digital divide.

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Keywords: internet, social representations, attitudes, digital literacy

Since ARPANET (Leiner et al., 2009), the Internet has been technologically and psychologically construed (Mantovani, 2001) as an information, communication, and cultural system. To use McLuhan's (1964) terminology, as a medium, the Internet is a system that accumulates and distributes representations about the world; as a message, it is an object of social discussion, one about which people talk and struggle to understand. The medium evolves at a fast pace, but we know little about the ever-changing common sense of the Internet, at least from a social representations point of view (Moreira et al., 2021).

Considering that the original goal of the theory of social representations was to understand the appropriation of scientific and technical novelties by social groups (Moscovici, 1976), information and communication technologies (ICTs) are an ideal object of study: they are problematic, because they have many facets and pros and cons; context-dependent, because they are often embedded in history and socio-cultural environments; and socially relevant, because the current hegemonic forms of sociability require people to use and understand them (Sarrica, 2010). These qualities might apply to the Internet, especially when referring to new generations and the Web.

The relationship between the Internet and children or young people is debated in newspapers. Its uses and meanings vary according to cultural background, and people are continuously pressed to position themselves regarding new developments (e.g., 5G, new social media platforms). Formal education is undergoing a process of digitization as well (Høydal & Haldar, 2021), and students have more access and spend more time online (Organization for Economic Co-operation and Development, 2021), although important pockets of digital exclusion persist. Literature about the experiences with online learning during the COVID-19 pandemic reported concerns, challenges and opportunities related, for example, to grading (e.g., Nilsberth et al., 2021), wellbeing (e.g., Acosta et al., 2021), and parental support (e.g., Yang et al., 2022). From a social representations perspective, it seems that a lack of information about how school communities represent the Internet affects educational policies and their efficacy, and different visions of the Internet coexist in an often conflictual way.

While issues such as the digital divide, skills or effects of use are relevant when addressing the representation of the Internet in educational contexts, it is also important to focus on schools as communities. Considering schools as communities opens up the possibility of studying collective representations, in Harré's (1984) sense. From this perspective, representations are

truly social because each member of a group makes a different contribution to the representation. The representation is not possessed by a single individual but is a space in-between the individual and the social. Therefore, it becomes critical to include groups in research that are more than an aggregate of individuals with similar characteristics but are a collective of persons that establish some sort of relationship among themselves (Harré & Moghaddam, 2015).

Following these considerations, it is urgent to fill in the knowledge gaps with a consistent line of studies that may inform us about the common sense of the Internet. This study is one step in that direction. Considering that representations define the symbolic field of communicational exchange and contribute to establishing group boundaries (Doise, 2003), representations that appear to be consensual within one group (e.g., young people, educators, etc.) must be charted and compared with representations constructed by other groups. In this study, we aimed to identify the communication field of the social representations of the Internet and explore its relationship with sociodemographic and psychosocial variables.

This study is situated in the Portuguese educational context. According to the results of TALIS (Organization for Economic Co-operation and Development, 2019), Portugal is above the Organization for Economic Co-operation and Development (OECD) average in the percentage of principals (55%) reporting a shortage or inadequacy of digital technology for instruction. Portugal is below the OECD average in the percentage of teachers who received formal education in teaching with ICT, felt well prepared or very well prepared to use ICT for teaching, and received training in recent professional development. They score above average on allowing students to frequently or always use ICT for projects or classwork. Finally, in the last decade, the number of computers with access to the Internet in schools decreased considerably, to less than half in 2019 (246,015) (Pordata, 2020).

As for Internet access, Portugal is still below the European average (Observatório para as Competências Digitais, 2020). The percentage of households with access to the Internet grew from 62.3% (61.3% broadband connection) in 2013 to 84.5% (81.7% broadband connection) in 2020 (Pordata, 2021), but Internet usage within the last three months before the survey for individuals aged 16 to 74 was 78%, while 18% have never used the Internet (Eurostat, 2021b). According to Eurostat (2021a), Internet access on the move (away from home and work) was 63% in 2019.

In the next sections, we first review studies of social representations in this domain and suggest that the education arena may be an informative one; second, we describe the methodological approach, a survey of three school communities combining numeric and verbal

data; next we present the results of our correspondence analysis; finally, in the discussion, we explore the significance of the results for communication sciences.

SOCIAL REPRESENTATIONS OF THE INTERNET

Social representations theory is a theory of knowledge and common sense, first proposed by Moscovici (1976). Doise (2003) defined social representations as the organizing tenets of the symbolic relations among social actors […] being at the same time a field of symbolic exchange and a representation of that field (p. 248). Social representations are a form of knowledge socially construed and shared, that has practical objectives and contributes to the construction of a reality shared by a social group (Jodelet, 2003, p. 53).

Social representations theory is suitable to understand how people make sense of the world, scientific theories, and technological innovations, providing a good perspective from which to examine how the ICTs are being understood and experienced. In particular, the double nature of the Internet—as both container and content—makes it a worthy object of study from a social representations point of view. The Internet is a medium for representations to circulate and an object of representations that circulate in society.

In a seminal work, Moscovici (1976) proposed that two main processes are used to construct social representations: anchoring and objectification (Arruda, 2015). Through anchoring, social groups compare and integrate new objects into previous knowledge: research on ICTs showed that laptops, for example, are compared to tools or toys, helping to understand and establish the uses people have for them (Hakkarainen, 2012; Rasi & O'Neil, 2014). Through objectification, social groups transform abstract concepts or ideas into more concrete or less abstract images. People might associate a phenomenon with social groups or public figures, who, therefore, personify a phenomenon; they might produce or associate images that become emblematic of a phenomenon; and finally, they may assign an ontological reality to ideas and thoughts transforming them into real things. For example, at least in the eyes of older generations, youth personify the addiction to mobile phones (Ahn & Jung, 2014).

Although several studies address ICTs using the social representations approach, studies that explicitly address the representations of the Internet are as scarce as they are urgently needed because the medium evolves at a fast pace. For example, the new turn toward the Internet of Things will have implications for fields such as marketing (Nguyen & Simkin, 2017) and education (Hwang et al., 2017), besides its paradigmatic role in shaping our understanding of literacies (Leu et al., 2017).

A systematic review of the literature found 12 relevant papers over a period of nearly 20 years (2002–2020) falling into five categories (Moreira et al., 2021): quality of life (Capozza et al., 2003; Contarello & Sarrica, 2007); changes in the representation (Sales-Wuillemin & Morlot, 2008; Salesses, 2005a, 2005b); aging (Castro et al., 2020; Hakkarainen, 2012; Rasi & O'Neil, 2014); mobile culture (Fortunati & Contarello, 2002); and education (Karsenti & Kouawo, 2015; Mamede-Neves & Ribeiro, 2008).

Overall, these studies confirm that the representation of the Internet is not homogeneous or simple. The representations vary across groups (Capozza et al., 2003; Castro et al., 2020), over time (Sales-Wuillemin & Morlot, 2008), and across contexts (Rasi & O'Neil, 2014). In its early stages of diffusion, the representation of the Internet was more abstract (prosthesis of knowledge) than that of the mobile phone (communication prosthesis of the human body), and was rooted in the representation of the telephone (Fortunati & Contarello, 2002).

Capozza et al. (2003) used the laddering technique to reveal that the opportunities provided by the Internet (e.g., to communicate rapidly) were considered a means to make life better, and thus understood as a hierarchically superior goal. According to Contarello and Sarrica (2007), as early as in the first decade of the twenty-first century, the contribution of the Internet to well-being that comes from opportunities for greater social participation were counterbalanced by a feeling of uncertainty. The authors used a free association task to unveil a complex symbolic field, organized by inwards and outwards perspectives, space and time, function and experience. Participants with less familiarity and lower rates of Internet usage provided the most powerful metaphors, which opposed the Internet as a room of one's own to its representation as a window open to the world.

Further evidence suggests that the organization of the social representation of the Internet seems to be associated with attitudes and knowledge. However, while more favorable attitudes toward the Internet are associated with more structured representations (Salesses, 2005a), the relationship between knowledge and structure is not straightforward (Salesses, 2005b), in that intermediate-level users with somewhat less practice presented more structured representations than did users with higher practice.

In a longitudinal study with three independent groups of Internet users, Sales-Wuillemin and Morlot (2008) produced three prototypical analyses that showed changes in the representation over time (2001 to 2005). Computer and communication were stable elements of the core of the representation, but the meaning of the latter seemed to move from asynchronous to synchronous communication; technical aspects seemed to be important in

2001, high bandwidth access became relevant in 2003; and search engines and viruses were referred to in 2005.

Suggestive results come from studies with elderly participants. First, in line with Contarello and Sarrica (2007), powerful metaphors for the Internet are found among elderly non-users (Hakkarainen, 2012; Rasi & O'Neil, 2014). Second, they provide evidence of dichotomous thinking that opposes pairs of categories (e.g., tool versus thing, risky versus non-risky; free versus dependent) that offered a symbolically loaded and negative discourse on the Internet and its importance as an identity marker. Access and perceived usage seem to be relevant for elderly people's representation of the Internet with feelings of exclusion, normality or addiction (Castro et al. 2020; Ferreira & Alves, 2011).

Two studies focused on educational settings. Mamede-Neves and Ribeiro (2008) surveyed almost 1000 university students and reported that the Internet marked their identity, and provided fast and boundless search and communication opportunities, though the benefits depended on usage. Karsenti and Kouawo (2015) showed that high school students in Niger represented the Internet as means of communication, connection and entertainment, supporting the integration of the Internet into schools, but not as a way of replacing teachers.

Overall, these studies revealed the symbolically loaded meanings of the Internet as a means of communication and prosthesis of knowledge, which impact on identity and intergroup relations, and justify the selected measures of our methods.

AN EDUCATIONAL SETTING

Literature on the use of digital media in education is often characterized by underlying, unjustified assumptions, which are not evidence-based (Hew & Cheung, 2013), by adult-framed perspectives about the transformative power of digital technologies (Hughes & Read, 2018), and monitoring reports that often convey implicit ideological perspectives on what should be the role of the digital media in education. The anchoring of digital media to youth became prevalent in the media and spread through society. Examples are the popular book by Tapscott (1997) introducing the notion of the 'Net Generation' or the programmatic article on digital natives by Prensky (2001), which still echo in literature today (e.g., Dias & Brito, 2021). Such authors described a generation of digitally immersed, passionate, and savvy Internet users, without solid evidence to support their claims (Bennett et al., 2008; Evans & Robertson, 2020). The fact, however, is that "available data suggest that digital inequalities are not a generational thing and will persist into the future" (International Telecommunication Union, 2018, p. 3).

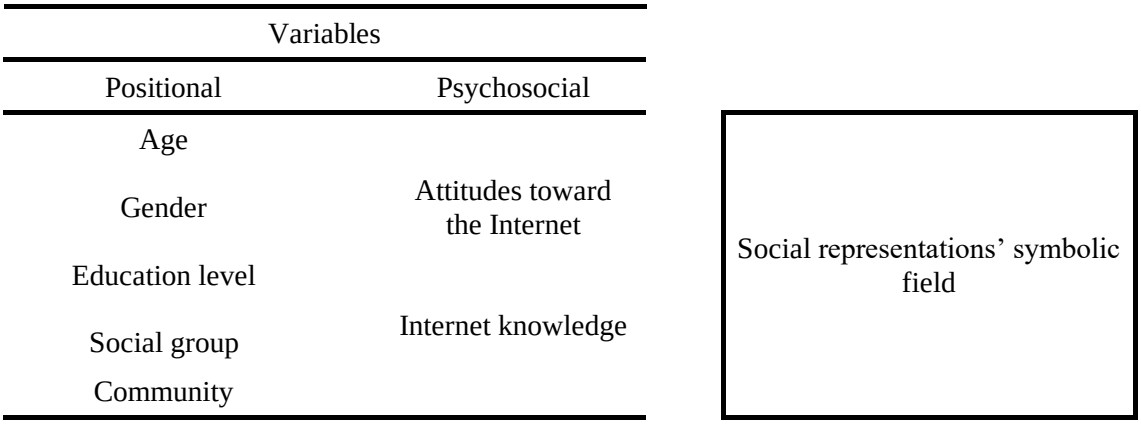
Beckman et al. (2019) showed that there is a link between the cultural capital acquired by students at home and students' technological skills, knowledge, and experience; and that, despite significant investment, school experience with technology is essentially prescriptive and rudimentary rather than transformative.

As already stated, education settings may be informative for the study of the social representations of the Internet, both as a medium and as content. Different social groups interact within schools and across their boundaries and communicate about and through the Internet. Following Duveen's seminal studies (Duveen, 1993), the study of an educational setting from a social representations perspective entails understanding the emergence of a shared vocabulary, the presence of shared systems of knowledge elaborated by students, teachers and staff, and the positioning of the members of these communities within the representational space.

It becomes clear that it is necessary to study the representations of the Internet circulating in educational settings. We aim to draw on previous research to explore the relationship between the symbolic field of the representation of the internet and positional (age, gender, education level, social group, and community) and psychosocial variables (attitudes, knowledge) expressing social groupings, as illustrated in Figure 1. Accordingly, the main objective of this study was to explore the relationship of the symbolic field of the Internet with positional and psychosocial variables expressing social groupings.

Figure 1

Variables Selected for the Study



Note: In Figure 1, we list the positional and psychosocial variables that were projected onto the representations' symbolic field.

MATERIALS AND METHODS

Context

This study was implemented in three public (government-funded) schools, named, for research purposes, α, β, and γ. They were selected because they were located in different socio-economic contexts and the research team had a previous professional relationship with the principals, which might increase the likelihood of participation.

Participants

The participants in this study were 428 students of the 8th year and 11th year, 191 teachers, and 394 guardians (*N* = 1013). Table 1 summarizes their socio-demographic characteristics.

Table 1

Sociodemographic Characteristics of the Participants

	Students		Teachers		Guardians		Full sample	
	n	%	*n*	%	*n*	%	*n*	%
Schools								
α	370	86	66	35	347	88	783	77
β	58	14	43	23	47	12	148	15
γ	0	0	82	43	0	0	82	8
Sex								
Female	247	58	150	79	323	82	720	71
Male	181	42	40	21	65	17	286	28
Age								
[13-14]	183	44	0	0	0	0	183	18
[15-18]	237	56	0	0	0	0	237	24
[30-34]	0	0	1	1	9	2	10	1
[35-44]	0	0	42	22	186	48	228	23
[45-54]	0	0	80	42	172	45	252	25
[55-65]	0	0	67	35	18	5	85	9
Highest educational level								
Up to 9th year	187	44	0	0	176	45	363	36
Up to 12th year	241	56	0	0	120	31	361	36
Bachelor or degree	0	0	146	76	80	20	226	22
Masters	0	0	40	21	6	2	46	5
PhD	0	0	2	1	0	0	2	0.2

Note: This table presents the sociodemographic characteristics (school, sex, age, educational level) of the participants (students, teachers, guardians and full sample).

Most participants were Portuguese (99.6%), from school α (77.3%), and female (71.1%). The sample included students from the 8th year (aged up to 14 years old) (44%) and those from the

11th year (aged over 15 years). Most teachers had a tenured position (75.9%), were older, and had higher educational levels than guardians, with a significant proportion teaching in school γ (42.9%). Most teachers and guardians had children of their own (95.9%). Finally, participants from school γ consisted exclusively of teachers.

Measures

The questionnaire was structured in different sections and aimed at collecting verbal and numeric data. Besides the sociodemographic questions and the ranked association questions, the questionnaire included other original and adapted scales and items that are not reported in this paper.

Ranked association questions

Participants were given a set of nine stimuli (Internet, computer, mobile phone, students, teachers, guardians/educators, my generation, school, and home) and were asked to express five or more words or ideas that they associated with each one; they were then asked to rank them by order of importance. In this work, we report only the results for the term 'Internet', which are of primary interest for our purposes.

General Internet Attitudes Scale

We used the Portuguese version of the General Internet Attitude Scale (GIAS) (Joyce & Kirakowski, 2015; Moreira et al., 2022) to measure attitudes toward the Internet. The GIAS consists of 21 items assessing Internet attitudes with a Likert-type summated ratings scale with five response options ('Strongly disagree' to 'Strongly agree'), scored from 1 to 5. Scores include total attitude score and scores on each of the four subscales (Internet Affect, Internet Exhilaration, Social Benefit of the Internet, and Internet Detriment).

A principal factor analysis (PFA) with direct oblimin rotation was conducted on the 21 items of the GIAS. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy indicated that the sample size was meritorious (Kaiser, 1974) (KMO = .86). Bartlett's Test of Sphericity was statistically significant, $\chi 2(210) = 4856.34$, $p < .001$). A solution of four factors was forced in the analysis, as in the original version. Supporting our option, we found four factors with eigenvalues higher than 1, explaining in combination 38.36% of the variance, corroborated by

the scree plot's analysis, and Horn's Parallel Analysis. In general, results supported the four-factor solution of the English original, with satisfactory internal consistency (α = .80). The process of adapting the scale to the Portuguese context is described elsewhere (Moreira et al., 2022).

The Web-Use Skill Measure Index

The Web-Use Skill Measure Index was first developed by Hargittai (2005), having afterward been revised in the course of additional research (Hargittai & Hsieh, 2012; Hargittai et al., 2018). Hargittai and Hsieh (2012) organized 27 items in three levels of understanding: low, medium, and high. For example, items such as bookmarks or advanced search are easily understood by many (high-level understanding); items such as spyware or firewall are understood by fewer people (medium-level understanding), whereas items such as malware or phishing are understood by few (low-level understanding). Because we expected significant variability in the sample, we chose to organize the short index with six items to use in populations with lower levels of online knowledge. Following the suggestion of Hargittai and Hsieh (2012), we selected half of the items from the high-level understanding (i.e., advanced search, favorites, and pdf), two from the medium-level understanding (i.e., spyware and wiki) and only one from the low-level understanding (i.e., phishing). Each item is measured through a five-point scale, ranging from 1 (no understanding) to 5 (full understanding).

A principal component analysis (PCA) was conducted on the six items of the Web-Use Skill Index. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy indicated that the sample size was between middling and meritorious (Kaiser, 1974) (KMO = .80). The Bartlett's Test of Sphericity was statistically significant, $\chi 2(15) = 2127.29$, $p < .001$, supporting the claim that correlations between items were large enough to conduct a PCA. Also, the analysis of the correlation matrix showed many values above .30 and none above .80. One factor with Eigenvalue higher than 1 was extracted, explaining 53.90% of the variance. The scree plot analysis corroborated the unidimensional solution. The loadings of items varied from .77 for favorites and .64 for wiki. The value of internal consistency for the standardized items was satisfactory (α = .83). Based on this result, a composite variable was created using the mean of all items.

Procedure

Authorization to apply the questionnaire in a school context was granted by the Portuguese Ministry of Education and the Rectorate of the University of Porto. We contacted school principals and obtained their collaboration to participate in the study. The questionnaires were delivered in the schools together with informed consent forms. Guardians signed the informed consent on their own behalf and on behalf of their children. Informed consent was also collected from teachers. Students answered the questionnaire during a class in school, under the supervision of their teachers. Teachers and guardians answered the questionnaire without supervision.

Construction of dictionaries

The answers to the free association questions were submitted to different, complementary data analysis techniques – prototypical, similarity, and textual correspondence analyses – which require the construction of dictionaries. After inserting the participants' answers ipsis verbis into an Excel 2016 spreadsheet, we thoroughly inspected the database, deleting the few duplicate answers between and from participants. First, we explored each unmodified lexical corpus, determining the number of occurrences, distinct words, and the number of single-occurrence words. The threshold for themes to be included for analysis was themes reported by at least around 2% of the participants, in line with the recommendation of Bécue-Bertaut (2018) to situate the threshold between 1% and 2%. Table 2 summarizes how the corpus for analysis was reduced in three phases: original corpora, after categorization, and with a threshold of 20 mentions or more.

Table 2

Phases of Organization of the Corpus of Analysis

	Count
Original corpus	
No. of participants	1013
No. of occurrences (N)	5494
No. of distinct words (Types) (T)	730
No. of single-occurrences (Hapax legomenon) (H)	397
Diversity index (T/N)	.13
Rarity index (H/T)	.54
After categorization	
No. of occurrences (N)	4531
No. of distinct categories (Types) (T)	199
No. of single-occurrences (H)	62
Diversity index (T/N)	.04
Rarity index (H/T)	.31

With threshold of 20 occurrences	
No. of occurrences (N)	3923
No. of distinct themes (Types) (T)	40
Diversity index (T/N)	.01

Note: This table presents the phases of organization of the corpus of analysis from the original corpus to the final corpus with a threshold of 20 occurrences.

Textual correspondence analysis

Correspondence analysis is a technique long applied in social representations research (Deschamps, 2003). Correspondence analysis was conducted using Dtm-Vic software on the reduced corpus. In the next section, all themes with 20 or more occurrences are shown in Figure 2; while in the text we refer only to the themes with significant contributions on one or both factors. Dtm-Vic performs the correspondence analysis, named VISURECA, on the subject by lemma matrix, allowing the positioning of one or more illustrative variables in the Cartesian space, i.e., projecting them as points on the plan after the field has been generated.

The considered variables were the following: sex, social group, school, attitudes toward the internet, and Internet literacy. The statistical significance of the positioning of illustrative variables is given by test-values. A test-value equal or greater than 2.00 means that there is a 95% probability that the positioning is not due to chance (Lebart et al., 1995). Accordingly, we present and discuss illustrative values with test-value equal or greater than |2|.

RESULTS

Attitudes toward the Internet

Participants showed favorable attitudes toward the Internet. Students (M = 3.70, SD = 0.51) scored higher than the other two social groups, and teachers (M = 3.58, SD = 0.48) scored higher than guardians (M = 3.42, SD = 0.55). A One-Way Analysis of Variance showed that differences were significant, *Welch's* $F(2, 523.773) = 28.606$, $p < .001$. Games-Howell post hoc tests identified statistically significant differences between each of the three groups ($p < 0.05$) (Table 3).

Table 3

Games-Howell Post Hoc Test for Differences Between Groups in the General Internet Attitudes Scale

Comparison pairs	Mean difference	Standard error	*p*
Students – Teachers	0.11	0.04	.025
Students – Guardians	0.28	0.04	<.001
Guardians –Teachers	-0.17	0.04	.001

Note: This table presents Games-Howell Post Hoc Test for differences between groups in the General Internet Attitudes Scale.

To perform the textual correspondence analysis, answers regarding attitudes were divided into approximate quarters, using quartiles as cut-off scores (3.23, 3.59, 3.94). In Table 4, we observe that 60% of students, 55.5% of teachers and 40% of guardians are placed in Quarter 3 and Quarter 4.

Table 4

Distribution of Participants by the General Internet Attitudes Scale Quarters

Social group	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Students	85 (19.9%)	81 (19.0%)	127 (29.7%)	134 (31.4%)
Teachers	44 (23.3%)	40 (21.2%)	67 (35.4%)	38 (20.1%)
Guardians	144 (36.6%)	92 (23.4%)	102 (26.0%)	55 (14.0%)

Note: This table presents the distribution of participants by the General Internet Attitudes Scale Quarters.

The Web-Use Skill Measure Index

The perceived web-use skill was middling. Teachers reported higher levels of web-use skills (M = 3.22, SD = 0.94), closely followed by students (M = 3.10, SD = 0.87); and guardians reported the lowest level (M = 2.53, SD = 1.16). Differences were significant between groups, *Welch's* $F(2, 508.434) = 38.877$, $p < .001$. Games-Howell post hoc tests showed that differences were only significant between guardians and the other two groups ($p < .001$) (Table 5).

Table 5

Games-Howell Post Hoc Test for Differences Between Groups in the Web-Use Skill Measure Index

Comparison pairs	Mean difference	Standard error	*p*
Students – Teachers	0.116	0.08	.318
Students – Guardians	0.569	0.07	<.001

Guardians –Teachers	-0.684	0.09	<.001

Note: This table presents Games-Howell Post Hoc Test for differences between groups in the Web-Use Measure Index.

To perform the textual correspondence analysis, web-use skills were also divided into approximate quarters, using quartiles as cut-off scores (2.18, 2.90, 3.65). In Table 6, we observe that 51.8% of teachers, 48.6% of students and 28.6% of guardians are placed in quarters three and four.

Table 6

Distribution of Participants by Web-Use Skill Measure Index Quarters

Social group	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Students	76 (17.9%)	142 (33.5%)	104 (24.5%)	102 (24.1%)
Teachers	26 (13.6%)	66 (34.6%)	43 (22.5%)	56 (29.3%)
Guardians	161 (41.5%)	116 (29.9%)	48 (12.4%)	63 (16.2%)

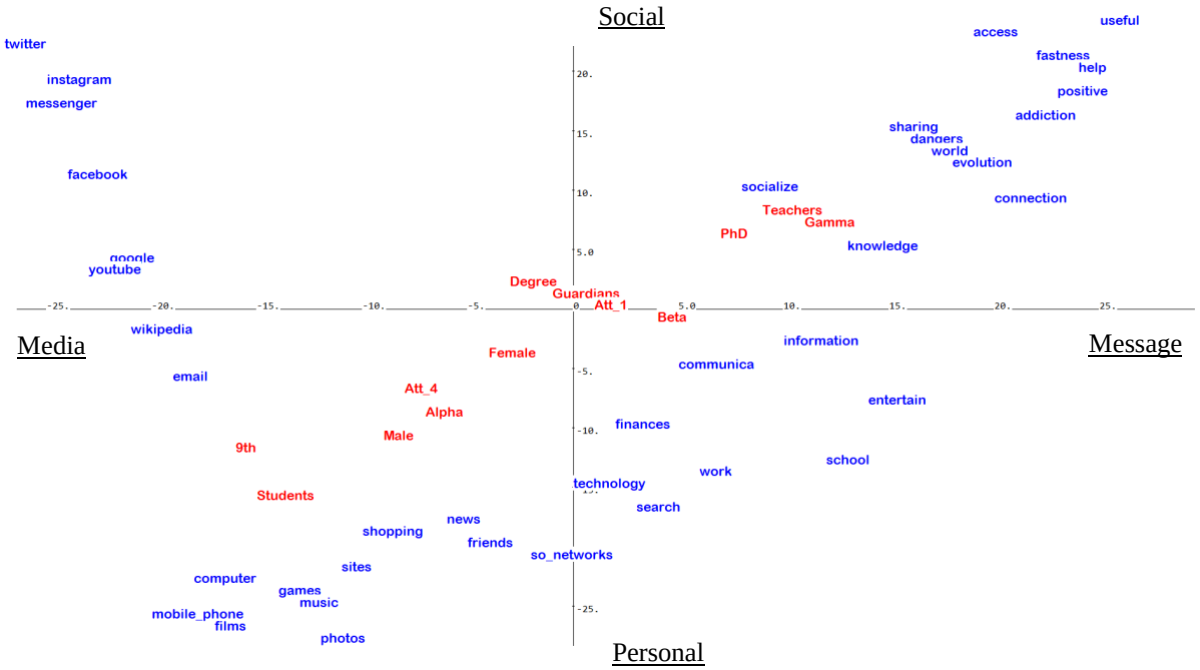
Note: This table presents the distribution of participants by Web-Use Skill Measure Index quarters.

The Symbolic Field of the Internet

To investigate the symbolic field of the Internet, a correspondence analysis was performed. The first two factors explained 11.71% of the variance (Figure 2). The pattern of the plot is consistent with a horseshoe effect, which occurs when a bidimensional plan is better described as a simplex, an opposition between single dimensions, and in its extreme forms is an artifact of the correspondence analysis (Greenacre, 2006, p. 183). Therefore, our interpretation of the plot, namely of the vertical axis, will pay attention to the test-values of the illustrative variables (Table 7).

Figure 2

Correspondence Analysis of the Internet with Illustrative Variables



Note: We constructed Figure 2 based on the first (horizontal axis) and second (vertical axis) factors extracted in the correspondence analysis with a threshold of ≥ 20 occurrences and with illustrative variables with test-value ≥ |2| with coordinates transformed into ranks. Signs of factor 1 (x) have been reversed. The labels of the axes were added by the authors as part of the interpretation of the data.

Based on the contributions ≥ |2| of the themes (Table 7), the horizontal axis seems to oppose media (i.e., Instagram, Facebook, YouTube, Twitter, Google, and Messenger,) to message (i.e., information, dangers, entertain[ment], useful, communication, and knowledge). As for the vertical axis, although the interpretation is not straightforward, it may express a tension between a Personal (i.e., games, films, social networks, search, computer, music, mobile phone, and photos) and a Social pole (i.e., Instagram, dangers, Twitter, useful, access, speed, help, positive, addiction, world, and Facebook).

Considering the significant test-values of the illustrative variables (Table 8), we observe that in Factor, 1 the media pole is associated with students, school α, participants with year 9 qualification, male participants, favorable attitudes and the message pole with high education levels (Masters or Ph.D.), teachers, schools γ and β, female participants, and unfavorable attitudes. We also observe that the personal pole of factor 2 (vertical axis) is associated with students, school α, male participants, and participants with year 9 qualification; the social pole is associated with high education levels (Masters or Ph.D.), teachers, schools γ, guardians, participants with a degree, female participants, and unfavorable attitudes.

Table 7

Coordinates and Contributions of the Themes to the Correspondence Analysis of the Internet

Theme	Coordinates		Absolute contributions	
	Factor 1	Factor 2	Factor 1	Factor 2
access	-.92	1.6	.7	3.1
addiction	-0.96	0.99	1.9	2.8
communication	-0.49	0.03	2.3	0
computer	0.45	-0.87	0.4	2.1
connection	-0.93	0.64	1	0.7
dangers	-0.76	0.91	3.1	6.4
email	0.46	-0.01	0.8	0
entertain	-0.63	-0.05	3	0
evolution	-0.87	0.82	0.9	1.2
facebook	1.52	0.71	12.2	3.8
fastness	-1	1.36	1.4	3.5
films	0.35	-1.03	0.7	8
finances	-0.16	-0.1	0	0
friends	0.04	-0.57	0	0.9
games	0.27	-0.87	0.6	8.5
google	1.08	0.28	8.5	0.8
help	-1.13	1.34	1.9	3.8
information	-0.55	0.06	4.9	0.1
instagram	2.04	1.23	15	7.7
knowledge	-0.63	0.34	2.2	0.9
messenger	2.15	1.07	4.1	1.4
mobile phone	0.59	-1.01	0.5	2.1
music	0.25	-0.93	0.2	4.1
news	0.06	-0.38	0	1.1
photos	0.18	-1.1	0.1	2.9
positive	-1.11	1.11	1.9	2.6
school	-0.59	-0.14	0.8	0.1
search	-0.17	-0.33	0.4	2.4
sharing	-0.75	0.92	0.7	1.5
shopping	0.16	-0.47	0.1	0.7
sites	0.17	-0.68	0.1	1.4
social networks	-0.08	-0.61	0.1	7.8
socialize	-0.52	0.71	0.4	1
technology	-0.11	-0.21	0	0.1
twitter	2.17	1.42	10	6.1
useful	-1.3	1.72	2.4	6
wikipedia	1.07	0.09	1	0
work	-0.49	-0.17	1.2	0.2
world	-0.86	0.86	2.5	3.5
youtube	1.34	0.27	12.1	0.7

Note: This table presents the coordinates and contributions of the themes to the Correspondence Analysis of the Internet.

The combination of the axes results in different areas within the semantic field of the representation. Following the horseshoe, Media-Social characterize the upper left quadrant, then contents grouped in the bottom left refer to a Media-Personal usage, including specific

activities and media; terms related to Message-Personal are present in the lower right quadrant and an area around Message-Social emerges in the upper right quadrant.

If the Media-Social and Message-Personal areas do not seem to be associated with any groups, places, or attitudes, the case is quite different for the other two quadrants. The Media-Personal area is associated with students, participants with the year 9 qualification, male participants, school α, and positive attitude toward the Internet. Teachers, guardians, β and γ schools, participants with higher qualification, and negative attitudes toward the Internet are instead positioned in the Message-Social area of the representational field. Internet literacy does not seem to be associated with any quadrant, and female participants are located close to the intersection of the axes.

Table 8

Coordinates and Test-Values of the Illustrative Variables in the Correspondence Analysis of the Internet

Illustrative variable		Coordinates		Test-values	
		Factor 1	Factor 2	Factor 1	Factor 2
School	α	.12	-.06	6.7	-3.3
	β	-.29	.10	-3.8	1.2
	γ	-.58	.36	-5.4	3.4
Social group	Students	.31	-.26	8.6	-7.1
	Teachers	-.55	.37	-8.3	5.7
	Guardians	-.08	.11	-2.0	2.7
Gender	Female	-.05	.05	-2.6	2.2
	Male	.14	-.11	2.8	-2.2
Education	6th	.06	-.05	.5	-.5
	9th	.33	-.12	5.8	-2.2
	12th	.07	-.08	.6	-.7
	Degree	-.07	.22	-.8	2.6
	Ph.D.	-.49	.35	-8.4	6.0
Attitudes	Quarter 1	-.13	.11	-2.4	2.0
	Quarter 2	-.06	.01	-1.0	.2
	Quarter 3	.06	-.07	1.2	-1.4
	Quarter 4	.13	-.05	2.2	-.8
Web-use skills	Quarter 1	.10	-.01	1.7	-.2
	Quarter 2	.01	-.02	.2	-.5
	Quarter 3	-.06	.06	-1.0	1.0
	Quarter 4	-.06	.02	-1.1	.4

Note: This table presents the coordinates and test-values of the illustrative variables in the correspondence analysis of the Internet.

DISCUSSION

In this study, we explored the relationship between the symbolic field of the social representation of the Internet circulating in educational settings and positional and psychosocial variables expressing social groupings. We surveyed 1013 students, guardians and teachers from three Portuguese publicly-funded schools, eliciting their representations and assessing their attitudes and knowledge about the Internet.

The Internet has changed over a period of roughly 20 years and poses new challenges (Nguyen & Simkin, 2017; Hwang et al., 2017; Leu et al., 2017). It has become more affordable, popular, and accessible on the move via mobile devices. It therefore seems reasonable to expect that the symbolic field of the representation has changed as well. We are aware that previous research on social representations of the Internet do not authorize direct comparison, because different contexts, samples and methodological options have been used. However, we observe that some themes which were already present in the early studies, continue to emerge, confirming that social representations preserve a certain degree of stability in coping with novelties. However, we should also observe and discuss fundamental changes toward the distinctiveness of the field that comes with more complex relationships between attitudes, knowledge, and social groupings.

Media and Message, Personal and Social: The Facets of the Internet

The symbolic field of the Internet, and the association with variables expressing social groupings drawn in this study, are informative and suggestive. The pattern observed in Figure 2 is consistent with a horseshoe effect (Greenacre, 2006) which could suggest an artifact of the correspondence analysis and a possible limitation of our study. However, the meaningful positioning of the themes and the significant positioning of the examined variables encourage us to interpret both axes, rather than think of the field as unidimensional.

The main axis that organizes the semantic field of the associations evoked by the Internet reflects the double nature of any media: media and message (McLuhan, 1964). The Internet seems to unfold into a myriad of media (e.g., Facebook or Google), which work as objectifications that make the Internet less abstract and more visually accessible and simple (e.g., the iconic power of Google webpage stripped of almost all content as opposed to other search engines). It is around media that some social groups (e.g., students) seem to build their representation of the Internet. If we consider middling levels of web-use skills as a proxy for

knowledge or literacy, we cannot claim these users understand the specificity of each media, as the digital natives narrative supposes they do (for a critical debate of digital natives, see Bennett et al., 2008; Evans & Robertson, 2020). Meaningfully, most of these media are social networks, even if the label *social networks* seems to be used with a different function. We should note that social networks are only associated with the personal pole of the vertical axis. While Facebook works as an objectification of the Internet and its social networks, the label *social networks* serves as a one-fits-all concept, an anchor for all other social platforms. Albeit the computer or email are still present in the representational field, they seem to be less significant in organizing the field than during the Internet's earlier stages of diffusion (Sales-Wuillemin & Morlot, 2008).

The interpretation of the y-axis is not straightforward. We interpreted it as an opposition between personal and social facets of the Internet, which resonates with the inwards versus outwards perspectives identified in a different Internet era described by Contarello and Sarrica (2007). Despite being less abstract, less utopic and more concrete, the Internet is still represented as a prosthesis of knowledge (Fortunati & Contarello, 2002). However, the changes in the medium are reflected in its contents: the development of social media, social networks, and entertainment distribution have become more visible: music, films, photos and all the personal usages to which we have become accustomed emerge in the representation shared in particular by students, males and participants with positive attitudes, that is the gendered prototype of technology consumers.

Emerging, Complex Patterns within the Semantic Field

The relationship between the semantic field and attitudes is complex when compared to previous studies. Capozza et al. (2003) suggested that the social representation of the Internet was consensual in the group that they analyzed, which was one with positive attitudes. Our results showed that positives attitudes are related with digital culture which can be related to amusement, social relations and having up-to-date information. However, whereas Salesses (2005a) associated favorable attitudes with more structured representations, we can see here that more extreme attitudes are placed in different quadrants of the semantic field, both rich and complex but different.

Comparing our results with the symbolic field obtained by Contarello and Sarrica (2007), we see that what we entitled Message-Social may correspond to what those authors called Communication. What substantially changed in the representation is the addition of

social media as an evident objectification of the Internet and the increasing complexity of digital culture. The Media-Personal usage represented by email, surfing, computers, friends, or images in Contarello and Sarrica (2007) became indeed more complex and richer (music, games, films and mobile phone).

The Media-Personal area can be understood as descriptive of digital culture (Gere, 2008), is compatible with the idea of a room of one's own, proposed by Contarello and Sarrica (2007); and is expressed by students, adults with the year 9 qualification, males, and those with positive attitudes toward the Internet. Positive attitudes, therefore, come with a cultural experience of the Internet rather than from an instrumental experience, ruled by work or searching activities. Perhaps in McLuhan's (1964) terms, changes brought about by the contents of the media translated into positive access but also increased the perceived risk of addiction and dangers. It is interesting to observe that, for students, the Internet has more to do with individual usage, while for teachers, the societal aspect is more evident.

We can also observe that the pattern of the educational level does not quite follow that of attitudes; while school qualification and attitudes vary along the medium-message axis, only school qualification varies along the Personal-Social axis. Participants with low education levels have a self-centered or hedonistic attitude that does not romanticize the Internet but regards it as a gateway to access digital culture, echoing a room of one's own in Contarello and Sarrica (2007). On the other hand, participants with higher education levels (which include around one quarter of teachers and a few guardians) have a critical view associated with the message rather than with the medium. Interestingly, we see that illustrative variables expressing natural groups about which it is reasonable to assume they share aspects of identity (i.e., school and social group) are more strongly associated with the axes and push us in a fascinating direction of studying the interaction effects of crossed identities (Deschamps & Doise, 1978) or at least between identity and school culture (Duveen, 1993).

Looking at what is absent from the picture, it is worth noting that there are no metaphors for the Internet in our semantic field, which could be expected from participants with low levels of knowledge or practice (Contarello & Sarrica, 2007; Hakkarainen, 2012; Rasi & O'Neil, 2014). In our study, the perceived level of web-use skills is not associated with any of the axes, contrary to Salesses (2005b) findings with the reported level of experience. One should keep in mind that the measure we used is different and that the Web-Use Skills Index has proved to correlate well with effective web knowledge (Hargittai, 2005).

However, critical to our analysis, it seems that, in general, participants had middling levels of reported web-use skills. As reported in the literature, teachers admit they lack training

to work with ICT. Our study shows they have a critical view on the usage of the Internet but do not possess the knowledge to address the technical challenges of the medium. This interpretation is consistent with the shortage or inadequacy of digital technology for instruction reported by Portuguese principals (Organization for Economic Co-operation and Development, 2019). On the other hand, students, who are often portrayed as digital natives, and guardians with lower education levels, do not possess the means to develop a critical view. They dive into a medium they do not quite understand, regarding it as a gateway to pleasant, engaging activities, which are not transformative per se. Attitudes thus regain their social meaning to build individual points of view in articulation with other elements (Sammut, 2015). In the case of the Internet, attitudes are better understood in relation to web-use skills and the symbolic field of the representation.

Although the semantic field reflects most of the recent developments in terms of communication, it is worth noting that it omits important features and debates that are shaping the Internet. Whereas Sales-Wuillemin and Morlot (2008) reported that ADSL entered the Internet lexicon, our semantic field leaves out more recent critical changes such as 5G technology. One may think that ADSL represented a significant change in the quality of the experience whereas the impact of 3G and 4G are minor in comparison.

Contrary to the findings of Hakkarainen (2012), our results consistently show that social thinking about the Internet cannot be explained by dichotomous thinking. Although negative attributions exist, they are placed in the Message-Social quadrant together with positive ones. An anchoring to addiction and dangers can be found here; however, in line with Ahn and Jung (2014), it is probable that teachers – a social group clearly situated in the Message-Social quadrant – associate addiction and danger to youngsters rather than to themselves.

CONCLUSIONS

Interpersonal communication is impossible without a minimum common ground: social representations comprise this communicational field that allows dialogue and discussion (Doise, 2003). The symbolic field of the social representations of the Internet seems to be polarized and clearly associated with social groups and social groupings. While students seem to navigate the media with favorable attitudes, guardians and teachers seem to have a more critical view about the Internet with less favorable attitudes. Given that knowledge of the Internet is middling, there is a literacy challenge ahead. We should keep in mind that the Internet experience is not transformative per se. Contra Chen (2015), we suggest that Mathew's effect

is stronger than the technologically-driven transformational power. With access conditioned by mobile phones, commercially driven data access packages, and poor Internet experiences in schools, some students are excluded from digital opportunities.

The results of the current study are exploratory and cannot be generalized. The pattern described is consistent with a horseshoe effect (Greenacre, 2006) which could suggest an artifact of the correspondence analysis and a possible limitation of our study. Themes such as online pornography and dating are not reported by the participants, clearly due to the sensibility of these issues. These topics are difficult to grasp with the qualitative and quantitative methods used here and especially in a school setting.

Put together, results may suggest that the Internet has entered a new stage of diffusion; it is no longer necessary to explain the Internet with recourse to metaphors outside the semantic field; Google and Instagram are now sufficient objectifications to visualize the Internet. The representational field seems to show a polarization between those that navigate digital culture and those who have developed a critical view about the medium, but this polarization cannot be understood be dichotomous thinking.

Our study showed that the relationship between attitudes as point of view and the semantic field is better understood when considering social groups and knowledge. Future studies should deepen ties between the social representation of the Internet and social identity, paying special attention to crossed identity interaction effects as they may bring new insights to understand and bridge the digital divide.

ACKNOWLEDGMENTS

The researchers express their gratitude to Liam Benison who kindly proofread the manuscript and to Ludovic Lebart for his assistance in the interpretation of the DTM-VIC outputs. This research was supported by FCT - Fundação para a Ciência e a Tecnologia, I.P., as a research grant to the first author (PD/BD/114152/2015) and under the projects UIDB/04097/2020, UIDB/00081/2020 and LA/P/0056/2020.

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