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10 Facilitators of sense of belonging through Digital Competences: a qualitative study with educational science students

10 Facilitatori del senso di appartenenza attraverso le competenze digitali: uno studio qualitativo con studenti di scienze dell'educazione

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Abstract. This study explores how digital competences (DC) can contribute to fostering the sense of belonging in social groups. It examines the factors that shape belonging *agency*, *trust*, and *social capital*, while considering the potential of digital technologies to promote it and the role of DC in enhancing social inclusion, also in an intersectional perspective. This research uses qualitative methods and peer-research following the last version of the DigComp model developed by European Commission. A total of 108 participants from two universities from the European context were involved. The results identified 10 facilitators of sense of belonging: *common interest*, *learning and engagement*, *voice and empowering*, *communication*, *interculturality*, *leisure activities*, *shared emotions*, *being informed*, *freedom of speech*, and *group values and norms*. The findings highlight the ways in which DC, such as content creation, problem-solving, and communication and collaboration, contribute to fostering a sense of belonging into social groups. Finally, the study points out that digital technologies can be a tool to support the facilitators of belonging rather than being the central focus. The research underscores the importance of considering actions and abilities rather than specific tools in promoting social belonging in the digital era.

Keywords: digital competences, digital technologies, inclusive education, sense of belonging, social inclusion.

Riassunto. Questo studio esplora come le competenze digitali (DC) possano contribuire a promuovere il senso di appartenenza nei gruppi sociali. Esamina i fattori che danno forma all'appartenenza, alla fiducia e al capitale sociale, considerando il potenziale delle tecnologie digitali nel promuoverla e il ruolo delle DC nel migliorare l'inclusione sociale, anche in una prospettiva intersezionale. Questa ricerca si avvale di metodi qualitativi e di ricerca tra pari, seguendo l'ultima versione del modello DigComp sviluppato dalla Commissione europea. I risultati hanno identificato 10 facilitatori del senso di apparte-

nenza: interessi comuni, apprendimento e impegno, voce e potere, comunicazione, interculturalità, attività ricreative, emozioni condivise, essere informati, libertà di parola e valori e norme di gruppo. Infine, lo studio sottolinea che le tecnologie digitali possono essere uno strumento di supporto ai facilitatori dell'appartenenza, piuttosto che esserne il fulcro. La ricerca sottolinea l'importanza di considerare le azioni e le abilità piuttosto che gli strumenti specifici per promuovere l'appartenenza sociale nell'era digitale.

Parole chiave: competenze digitali, tecnologie digitali, didattica inclusiva, senso di appartenenza, inclusione sociale.

1. INTRODUCTION

In societies of the late modernity, characterized by complexity, fragmentation, uncertainty, globalization and rapid change (Bauman, 2000), people faces a lot of tensions and difficulties also on the level of the self-identity (Giddens, 2023), and are confronted with ever-changing inequalities, that sometimes result in situations of social exclusion. Moreover, since 2020, the explosion of pandemic has accentuated these critical situations, highlighting the difficulties of certain categories and social groups, which have worsened their conditions more than others (e.g. women, children, older adults or people with disabilities) (Seifert et al., 2021). In this context, social inclusion becomes an increasingly difficult objective to achieve. Starting from the theoretical framework of social inclusion and intersectionality (Creenshaw, 2017), from the educational research (Riley, 2019) and considering the role of digital technologies, we will try to explain the factors that can foster social inclusion, in particular in social groups. In this reconstruction, the interdisciplinary contribution of social psychology, and of the ecological system theory (Bronfenbrenner, 1987) can be also very useful, as it can help to better frame the topic[1].

Social inclusion is influenced by factors such as age, gender, ethnicity, and various other variables. In this sense, the concept of social exclusion is referred to "a process of declining participation, access, and solidarity" in two levels (Silver & Miller, 2003, p. 159): a) at the societal level, it is referred to the inadequate social cohesion or integration; b) at the individual level, it refers to the incapacity to participate in normatively expected social activities and to build meaningful social relations".

On the other side, inclusion involves the establishment of new pathways to foster interaction among individuals when discriminatory situations act as barriers to achieving their own goals (UNESCO, 2017). The intersectional approach (Creenshaw, 2017) emphasizes how multiple aspects of a person's identity can intersect and lead to different forms of discrimination or privilege in terms of inclusion within a group. Adopting this approach, various variables such as physical attributes, disabilities, religion, culture, age, gender, sexuality, economic status, and nationality can be considered to identify instances of exclusion and vulnerability within a social group from a comprehensive standpoint.

In this context, Riley (2019), studying children and families at risk and vulnerability situations, suggests that cultivating a "sense of belonging" is a crucial factor for enhancing inclusion within a social group. The sense of belonging refers to the motivations and reasons individuals have for being part of a group, accompanied by a sense of satisfaction and pride. Riley (2019) identifies three significant variables that influence an individual's sense of belonging in a group: 1) *Agency*, as the individual's ability to actively engage and make a meaningful difference within the group; 2) *Trust*, it is demonstrated through shared expectations, ethics, and norms within an institution or organization, as well as through interactions between individuals; and 3) *Social capital*, which encompasses the networks, social activities, and positive relationships that facilitate cooperation within and between groups.

Specifically, *agency* is a sociological concept that has a long story, from Smith (1776) to the more recent theories. A good application of this concept is the one proposed by Giddens (1984), that opposes this concept to the social structure, defining agency as the capacity to act in the social structure. A second concept that we can consider in this framework it's *trust*, a classical idea that we can find in social theory (Simmel, 1950). Analyzing sociological literature and referring to Simmel (1950) and Luhmann (1968), we can state that "trust is a social mechanism that derives from the basic fact that humans in society must act under conditions of uncertainty and a lack of knowledge" (Jakobsson & Stiernstedt, 2023, p. 483). Other definitions of *trust* are those of Coleman (1990), who defines trust as a decision to cooperate under uncertainty; while Hardin (2002), defines it as encapsulated interest, and, thus, an expectation: the expectation that the trustee encapsulates the interest of the truster.

[1] The Bronfenbrenner's Systems theory (1987) states that an individual's interactions within a social group directly impact their personal development. This theory underlines how all groups aim to accomplish goals, either formally or informally established. However, some individuals may encounter challenges when interacting with others within the same social group, facing barriers that hinder their goal attainment.

Finally, the third concept that we can consider is social capital. Formulated by Bourdieu (1986), social capital is part of a broader system, which consists in the social obligations that come with social relationships. Social capital refers to the collective resources that are intrinsically "tied to membership in a specific group" (Julien, 2015, p. 364). Therefore, social interactions within social groups facilitate the exchange of social capital, strengthening relationships and social standing.

In addition to the three key concepts considered above, an additional factor to be considered within society and social groups is the pervasive presence of digital technologies, which have become an inherent part of individuals' lives. In the context of Europe or other developed nations, digital technologies contribute, together with other social agencies, to socialization and development of identities, especially for young people and teens (Taddeo & Tirocchi, 2021). In the new mediascape characterized by the protagonism of digital platforms (Van Dijck, Poell, & de Waal, 2018), smartphones, in particular, have emerged as a gateway to a multitude of opportunities (Drusian et al., 2022), and in some cases, constitute a tool that allows even individuals facing vulnerable circumstances and/or with a low socio-economic status to the use of digital technologies (Erta-Majó & Vaquero, 2023; Fernández-Rodrigo et al., 2019), Currently, the debate on digital divide in Europe is not primarily focused on the accessibility of devices and tools, but rather on the way individuals employ them (Fernández Rodrigo, 2016). In this sense, the DigComp model of Digital Competences (European Commission, 2019, p. 10) involves the "confident, critical, and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills, and attitudes". This updated framework synthesis 21 competences in 5 dimensions (Vuorikari et al., 2022): information and data literacy; communication and collaboration; digital content creation; safety; problem solving.

Given the omnipresence of digital technologies in individuals' lives and the imperative to foster inclusive and socio-educational initiatives in response to social exclusion, the central inquiry of this research becomes: How can the sense of belonging among individuals be promoted by leveraging DC to enhance inclusion within a social group?

To address this question, the primary aim of this study is to describe the factors that foster a sense of belonging in social groups, taking into account the potentialities offered by digital technologies. The qualitative research presented in this article is guided by the following key inquiries:

Q1. What are the specific social groups that young individuals feel a sense of belonging to, and how do they perceive this sense of belonging?
Q2. How do the components of Riley's model (2019) manifest and manifest themselves in the context of belonging to these groups?
Q3. To what extent do DC contribute to improving the sense of belonging within social groups?

By examining these fundamental questions, we seek to provide a comprehensive understanding of the factors that contribute to promoting a sense of belonging in social groups, with a particular focus on the role of DC.

2. METHODS

The study has been developed through a qualitative and an interpretative approach following methods of peer-research (Urrea-Monclús et al., 2021). Peer research is an inclusive research approach that involves individuals who have personal knowledge or first-hand experience of the subjects under investigation, actively contributing to the direction of the research (Lushey, 2017). Like other participative methodologies, it seeks a closer relationship with agents of change to transform society through scientific research. Thus, students of educational science were involved and considered researchers at the same level that during different phases of the process.

Research methods are based on peer research production and DC strategies to be included in participatory design (Fernández-Rodrigo et al. 2023; Mateos et al., 2020), The goal of this strategies is to develop products for expressing the perception of the participants about sense of belonging through digital technologies.

2.1 Participants

The study was conducted with the participation of students of the Complutense University of Madrid (UCM, Spain) and the University of Torino (UniTo, Italy) within an Erasmus+ mobility program for teaching in higher education. Both Italy and Spain are countries in the European Union with similar socio-educative needs, due to the high levels of social exclusion, inequalities in education, school absenteeism and school failure (Gaušas et al., 2022; Giancola & Salmieri, 2020).

One hundred and eight students of different degrees and subjects about Educational Science participated in the field study (Table 1): 13.89% were students of 3rd year and 9.27% of 2nd year of Educational Science degree at UniTo; 54.61% were students of 4th year of Pedagogy at UCM; and 22.23% were students of 4th year of Speech

Table 1. Characteristics of the participants.

Group	University	Degree	Subject	Year	Nº of students	% of students
1	Complutense University of Madrid (UCM), Spain	Pedagogy	Direction of educational institutions	4th	59	54.61%
2	Complutense University of Madrid (UCM), Spain	Speech and Language therapy	Inclusive education for children with language and communication disorder	4th	24	22.23%
3	University of Torino (UniTo), Italy	Educational Science	Sociology of the family and gender perspective	3rd	15	13.89%
4	University of Torino (UniTo), Italy	Educational Science	Sociology of digital media	2nd	10	9.27%
Total					108	100%

and Language Therapy degree at UCM, coursing an optative subject about Inclusive Education. Participants in these subjects and degrees have academic knowledge about inclusive education, disabilities, people in social exclusion and vulnerability. They also received, in their courses, some notions about multiculturality, gender perspective, family education, direction of educational institutions and digital media.

Regarding ethical considerations, participants were informed at the beginning of the first research session about the study (research's goal, scientific purpose, participants' rights, and confidentiality of the collected data) and their involvement as peer researcher, the use of their contribution, the recognition of authorship of their productions. The expository parts of the sessions were recorded in audio and with photographs for the review and analysis of the results of the research. The participants digitally accepted the informed consent form in which the aforementioned aspects are listed. All participants were informed about.

2.2 Strategies for data collection and analysis

Five peer-research strategies (Table 2) were used to collect and analyze the data, based methodologically on dimensions of the DC framework (Figure 1) and guiding the participants to think about the "sense of belonging" dimensions of Riley (2019).

2.3 Procedure

The field study was conducted through three workshops. Two of these workshops were carried out in Spain (at UCM, Università Complutense di Madrid) and one in Italy (at UniTo, Università di Torino). The workshops were organized in two sessions of 3 hours split in two parts with a short break between. The sessions were conducted on separate days. Finally, also asynchronous evaluations of the workshops through digital media were carried out. The organizational structure of the sessions followed the strategies for data collection and was distributed as shown in Table 2.

The process of the study was structured following the dimensions of the DigComp model set by the European Commission, et al. (2022). This model serves as a reference in policies and strategies related to digital literacy in Europe and beyond. It is a framework that describes the DC required to actively participate in the digital society. It was created with the aim of providing a common structure that facilitates understanding and assessment of digital skills in different contexts. DigComp (European Commission et al., 2022) defines a set of DC across five key areas:

- *Information and Data Literacy*: Understanding, searching, evaluating, and effectively managing information, as well as using digital tools to collect, organize, and analyze data.
- *Communication and Collaboration:* Using digital technologies to communicate, collaborate, and engage in online networks and communities, as well as sharing resources and knowledge.
- *Digital Content Creation:* Developing skills to create and edit digital content in various formats, such as text, images, audio, and video, using appropriate digital tools.
- *Safety:* Understanding and applying digital safety practices, protecting privacy and personal data, as well as understanding the risks associated with technology use.
- *Problem Solving:* Utilizing digital skills to identify, analyze, and effectively solve problems, applying appropriate digital methods and tools.

The DigComp framework is flexible and can be adapted to different educational and work contexts, allowing for the assessment of individuals' digital competence levels and the design of training programs to enhance these skills. The following paragraphs will illu-

Table 2. Peer-research strategies through digital competences.

Strategy	Goals	Digital Competences	Digital tools
A. Analysis of experiences of inclusion and belonging through multimedia files	· To conduct an analysis of personal multimedia files stored on smartphones pertaining to experiences of inclusion within social groups. ·To conduct a comparative assessment between personal evidence and existing OER frameworks.	1. Information and data literacy: 1.1. Browsing, searching and filtering data, information and digital content; 1.2. Evaluating data, information and digital content.	· Students' smartphone · Multimedia files: photos, videos, social media · OER about frameworks on belonging and inclusion · QR codes to access OER · Projector and screen
B. Co-creation of digital content about belonging	· To disseminate personal experiences, gathered through multimedia files, with others. · To develop a multimedia product that elucidates the characteristics of inclusion and the perception of belonging within a social group.	2. Communication and collaboration: 2.4. Collaborating through digital technologies. 3. Digital content creation: 3.1. Developing digital content; 3.2. Integrating and re-elaborating digital content.	· Creative and multimedia apps · Multimedia files · Smartphones and/or laptop
C. Validation about the multimedia product created	· To share the multimedia product with classmates via Google Drive. · To explain the theoretical connections between the created product and the concept of belonging.	2. Communication and collaboration: 2.1. Interacting through digital technologies; 2.2. Sharing through digital technologies. 4.Safety: 4.2. Protecting personal data and privacy	· Smartphones · QR codes · Google Drive shared folder · Projector and screen
D. Solving a practical case in a Digital Story	· To identify the inclusion requirements of the main subject within the digital story's social context. · To propose digital technology-driven solutions aimed at enhancing the sense of belonging.	2. Communication and collaboration: 2.2. Sharing through digital technologies 5. Problem Solving: 5.2. Identifying needs and technological responses; 5.3. Creatively using digital technologies	· Story written with the support of Chat GPT · Projector and screen · QR codes · Google forms to share solutions
E. Evaluation of the participatory methodology	· To evaluate the methodology employed, considering the technological aspects, pedagogical approaches, and content used.	1. Information and data literacy 2.Communication and collaboration 4.Safety 5.Problem solving	· QR codes · Google forms

strate how the workshop phases reflected the dimensions identified within the DigComp model.

2.3.1 Information and data literacy

The workshop commenced with the participants being introduced to the theoretical framework encompassing the concepts of 1) *sense of belonging* (Riley, 2019); 2) *intersectional approach* (Crenshaw, 2017); and 3) *digital competency* (Joint Research Centre et al., 2013). The participants engaged in a dual process of immersion into the topics. The process consisted on a guided instruction during the initial phase of learning and afterwards an independent exploration, assessment of information, and search of Open Educational Resources (OER) available on the Internet (Rako & Softic, 2020) on the frameworks topics. Hereafter, the participants had to manage their own multimedia files or data of personal experiences and organize them accordingly with the framework concepts. In view of that, the participants evidenced but also shared personal experiences in social groups.

2.3.2 Communication and collaboration

Then, the participants worked in small groups (3 to 6 persons) in face-to-face settings and with collaborative apps (such as Google Docs, Mentimeter, QR Codes, Google Forms, etc.) (Rangel Romero et al., 2021) to communicate and collaborate with the aim to explain their

Table 3. Sessions and strategies.

Session	Part	Strategy
One	I	Analysis of experiences of inclusion and belonging through multimedia files
	II	Co-creation of digital content about belonging
Two	I	Validation about the multimedia product created
	II	Solving a practical case in a Digital Story
Asynchronous		Evaluation of the Seminar

experiences and share resources and knowledge about the concepts of the framework.

2.3.3 Digital content creation

Afterward, the small groups of participants created, edited, and produced digital content through several media and formats using digital technologies (such as short videos, podcasts, digital collages, etcetera). The participants had freedom in choosing the format to better express their ideas and experiences about the different social groups and their relationship with the framework's concepts (Erta-Majo et al., 2022; Runchina et al., 2022). This process ended in oral presentations of several multimedia productions about different social groups also determined by the participants. Such presentations also served as validation of production for the whole group.

2.3.4 Safety

Regarding ethical considerations, participants were informed at the beginning of the first session about the study (research's goal, scientific purpose, participants' rights, and confidentiality of the collected data) and their involvement as peer researcher, the use of their contribution, the recognition of authorship of their productions. The expository parts of the sessions were recorded in audio and with photographs for the review and analysis of the results of the research. The participants digitally accepted the informed consent form in which the aforementioned aspects were listed.

During this process the participants rose considerations about the ethical use of personal multimedia data and ensured that all use of files was ethical. Censuring faces and other personal details if needed. The participants also checked multiple times with the leading researchers to ensure the ethical and reserved use of their productions, information, and data previously to share them.

Figure 1. DigComp Model illustration (Joint Research Centre et al., 2013).

2.3.5 Problem solving

Finally, to close the workshops, the leading researchers used the tools Chat GPT and Dall-E to develop a practical case scenario, which linked the use of digital competency with the sense of belonging to school. The participants were asked to use resources around them, including OER, to propose possible solutions or recommendations for teacher or school professionals in the intent to improve the scenario through digital technologies.

2.4 Data analysis

The data analysis was carried out though qualitative data-driven analysis (Gibbs, 2012) and to this end, the written responses records, audio records of the sessions and the multimedia productions were assessed. For each dimension of Riley's (2019) variables the data from different records and productions were coded. Triangulation was used as a strategy (Aguilar & Barroso, 2015) to write a single interpretation of each variable from the variety of strategies. The principles of credibility and internal validity, reliability, and comprehensibility (Gibbs, 2012) were followed in the interpretation of results. Content analysis was conducted using Riley's model (Riley, 2019) dimensions and analyzing the contributions of the participants inductively to arise an inductive category system (Table 4) from variables. Finally, DC from DigComp

Figure 2. Communication through Mentimeter app.

Model were assessed to established which ones were present per category.

3. RESULTS

The analysis of the results has revealed various factors that contribute to the development of a sense of belonging within social groups, taking into account the possibilities and implications of digital skills. Table 4 illustrates the categories and definitions derived from the collective input of all participants, aligning with Riley's dimensions (2019).

The digital skills outlined in the DigComp framework do not emerge as a distinct category or dimension. This absence of digital skills as a separate category is a result itself. It shows that participants perceive digital technologies primarily as tools that facilitate the various actions encompassed within the resulting categories.

3.1 Common interest

Participants' experiences demonstrate that shared common interests play a significant role in fostering a sense of belonging within a social group and facilitating interactions with others. The concept of agency is promoted as individuals actively engage in pursuing common objectives, academic and professional goals, as well as improving their skills in hobbies and interests.

Participants from Group 1 and Group 2 engaged in identifying various types of social groups based on their personal experiences. The process of group identification was carried out cooperatively within the class, as depicted in Figure 5, where students proposed titles and engaged in a voting process. The initial proposals for social groups were then validated and modified by Groups 3 and 4, resulting in an expanded list of options. Figure 6 illustrates the comprehensive set of social groups established by students studying Educational Science, along with the respective group members. Interestingly, no social group directly linked to digital world or digital competences was identified. For example, no participant proposed a "class WhatsApp group." This finding highlights that digital technologies are inherent in supporting common interests within social groups. Technology does not serve as the central focus of the common interest; rather, it functions as a medium or channel to facilitate the pursuit of shared goals, as expressed by the students:

> *Through the use of social media, you can get in touch with users who share your same passions or life situation. You can learn about communities or events* (Student from Group 3).

Figure 3. Students at the workshop creating the productions.

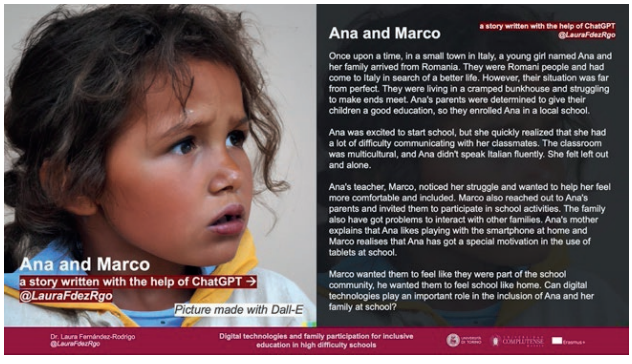

Figure 4. Problem-solving activity with Chat GPT and Dall-E.

Table 4. Categories as sense of belonging facilitators with digital competences.

Dimension	Category	Definition	Digital Competences
Agency	1. Common interest	Common goals, objectives, activities, interests, or hobbies shared among group members.	· All of them transversally
	2. Learning and engagement	Opportunities for acquiring new knowledge and active engagement in virtual or face-to-face environments.	· Information and data literacy · Digital content creation · Problem solving · Communication and collaboration
	3. Voice and empowering	Platforms for expressing opinions and proposing innovative ideas to enhance social group dynamics through various media.	· Communication and collaboration · Digital content creation
Social Capital	4. Communication	Means of interaction with other group members, considering languages and digital tools.	· Communication and collaboration · Problem solving
	5. Interculturality	Exchange of cultural topics and experiences facilitated by digital tools.	· Digital content creation · Communication and collaboration · Problem solving
	6. Shared emotions	Sharing of emotions and feelings through diverse media.	· Digital content creation
	7. Leisure activities	Activities that encourage interactions with individuals outside the original social context, with or without the use of digital technologies.	· Information and data literacy · Communication and collaboration
Trust	8. Being informed	Access to information about social activities through different channels and media.	· Information and data literacy · Communication and collaboration · Digital content creation
	9. Freedom of speech	The freedom to express oneself without fear of judgment, both in digital and non-digital environments.	· Digital content creation · Communication and collaboration · Safety
	10. Group values and norms	Guidelines for promoting harmonious coexistence, taking into consideration moral and ethical principles.	· Safety

Inviting to participate, asking for opinions and ideas regarding the topics addressed, get to know each other to find interesting topics and common interests, to proceed towards a collective goal (Student from Group 4).

3.2 Learning and engagement

The competences of "Content creation", "Problem solving", and "Communication and collaboration" play an important role in fostering the acquisition of new knowledge and promoting greater engagement within social groups. As part of the study, participants were tasked with creating a multimedia product focused on the concept of belonging, requiring them to employ their creative abilities in a collaborative manner. They were able to choose the most suitable digital technologies, such as apps, devices, and other tools, to effectively represent the notion of "belonging." Interestingly, the mobile phone emerged as the most frequently utilized tool, with some students acknowledging it as the easiest means to foster a sense of engagement and accessing to information contributing to "Information and data literacy". As some students stated:

I think it was very useful to better understand the concept of inclusion and sense of belonging and the concept of social technology (Student from Group 3).
I think it engages people (Student from Group 4).
Active moments on the part of us, the students, through forms and activities. Besides, I also enjoyed creating a digital product with my group (Student from Group 3).
Moments of sharing and active participation in the community, meetings, language courses (Student from group 3).
Creating activities/tasks that can be done online, using games and pictures (Student from Group 3).

The students participating in the "job colleagues" group highlighted the significant role of learning and engagement opportunities in fostering a sense of belonging. They recognize the importance of diverse values and the acknowledgement of their individual abilities in promoting this sense of belonging (Figure 7).

3.3. Voice and empowering

During the workshops, students actively utilized various digital tools to express their opinions, perspectives, and innovative ideas. All their contributions were

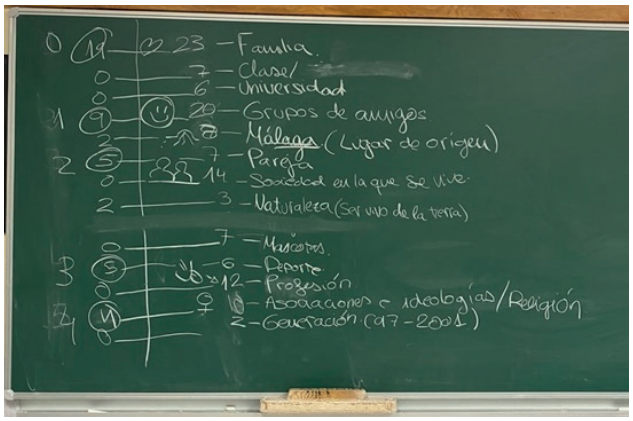

Figure 5. Identifying social groups.

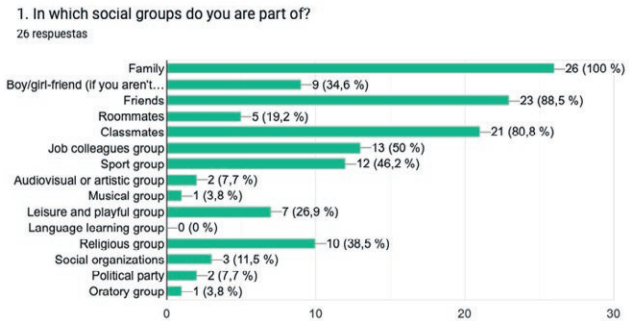

Figure 6. Number of participants for each social group.

carefully considered and incorporated into the proposal of new ideas for the practical case. Notably, students who were affiliated with political parties or other social organizations emphasized this element as a facilitator of agency, enabling them to actively contribute to societal improvement (Figure 8):

> *I found the use of digital competences useful, which proved to be a great contribution to better expressing the different experiences* (Student from Group 3).

Participants explained how the "Communication and Collaboration" and "Digital content creation" skills facilitate interaction with others, sharing personal experiences, digital files, thoughts, and ideas:

> *Nowadays the inclusion of digital technologies is also interesting because it gives us the possibility to express in our own way what we want others to understand and see, and above all express our thoughts with tools that we use every day* (Student from Group 3).

Figure 7. Participants' digital production about job colleagues.

Figure 8. Participants' digital production about political party and social organization.

3.4. Communication

The findings highlight the positive impact of "Communication and collaboration" competences on facilitating communication within social groups. On one hand, the use of digital communication tools offers new opportunities to maintain and expand social networks:

> *Digital technologies are essential not only for personal use but for our daily routine. It is a meaningful mean for inclusion, sharing and creating new social networks* (Student from group 4).

On the other hand, digital technologies present new avenues to "Solve Problems" for inclusion, particularly for individuals with special needs, enabling them to communicate and connect with others. As observed in the practical case activity, communication and collaboration skills can also prove beneficial for individuals

who may not possess proficiency in the language of their new country:

> *The use of smartphones can be useful for communication if families from other countries do not know very well the language of the country they are in now* (Student from group 4).

3.5. Interculturality

Participants expressed how the skills of "Digital content creation" and "Communication and collaboration" have played a significant role in fostering intercultural knowledge within their social groups. As they engaged in the process of developing multimedia productions, they shared videos, photos, and personal experiences from their daily lives. The resulting digital product not only showcased cultural themes but also highlighted the collaborative process within the group, facilitating information sharing, collaborative "Problem solving", and the exploration of cultural interactions among the participants:

> *To show photos of your community, listen to music together, to show them the values and traditions of the culture* (Student from group 4).
> *Provide opportunities (video, games, videogames, flyers, shareable advertising) to get to know other cultures. Making diversity visible to be all equal with the same opportunities* (Student from group 4).

One student emphasized the significance of exchanging cultural experiences and discussing relevant issues within a group. Such interactions serve to enhance their sense of belonging and foster social capital among group members:

> *We could think in organizing cultural activities within the neighborhoods that are able to embrace the culture of belonging and the new customs of the host country* (Student from group 1).

3.6 Leisure activities

Participants underscored the significance of leisure activities to foster a sense of belonging within a social group. Various social groups form around leisure pursuits, such as "family", "classmates", "roommates", or "job colleagues". Sharing hobbies and engaging in leisure activities were seen to contribute significantly to the enhancement of social capital and the cultivation of positive relationships among group members.

Regarding the use of digital tools within this category, the findings were scarce. Only one group acknowledged the potential of digital skills in enabling alternative ways of "Communicating and collaborating" as well as accessing "Information and data literacy". These digital tools can facilitate interactions among group members and facilitate the inclusion of new individuals, thereby expanding social networks and enabling the sharing of interesting activities within the city, neighbourhood, or community:

> *Promoting community spaces outside ordinary/institutional meetings.*

3.7 Shared emotions

During the peer-research strategies, participants showcased the potential of multimedia productions in

Figure 9. Activity to identify common interests and friendships.

Grupo Música

Figure 10. Participants' production about musical groups.

Figure 11. Participants' production about friendship.

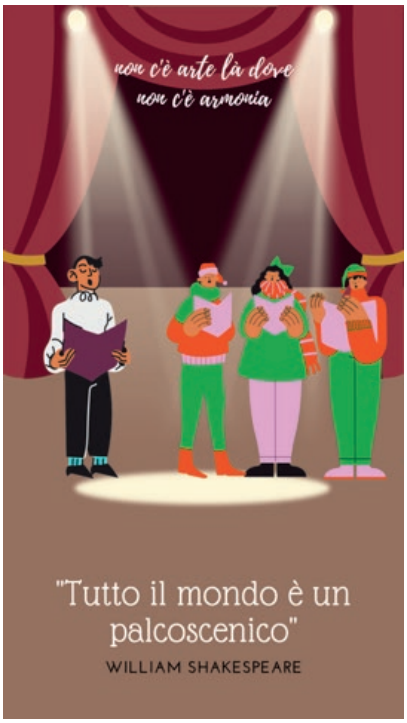

Figure 12. Participants' production about an arts group.

expressing and sharing their emotions, utilizing the competences of "Digital content creation". Engaging in this process not only facilitated a deeper reflection on the inclusion of students but also fostered positive emotions within their social groups, as expressed by some students:

> *I felt happy because it made me think about where I felt belonged and included and made me realize that I feel this in many different social groups* (Student from group 3).
> *I felt positive feelings about belonging to a group* (Student from group 3).

The act of sharing feelings and emotions can serve as facilitators for fostering a sense of belonging within a group. This notion was exemplified by a particular group that conducted a production centred around the theme of friendship:

3.8 Being informed

Trust, as a crucial dimension for facilitating inclusion, is promoted when individuals are adequately informed about matters concerning the group. Participants emphasized that digital tools play a vital role in providing multiple formats to disseminate information through various channels and media, leveraging the competences of "Information and data literacy" and "Communication and collaboration". Furthermore, participants recognized the importance of adapting the format of information to cater to the specific needs of group members, leveraging the capabilities of digital tools and the "Digital content creation" competence. This approach ensures that information is effectively communicated and accessible to all, fostering a greater sense of trust and inclusivity within the group:

> *I think it is also important to use technology to make concepts explained in a theoretical way more specific* (Student from group 2).
> *Creating a place that can be consulted by parents that is always up to date, not only posting "logistic" communications, but perhaps also including webpages on topics that can help parents* (Student from group 3).

3.9 Freedom of speech

The findings emphasize the significance of cultivating an environment of freedom to enhance a sense of belonging. Participants highlighted the importance of having non-judgmental spaces where they could freely express their thoughts and opinions, contributing to the competence "Safety". Additionally, the opportunity to make choices aligned with their interests was recognized as a valuable element in promoting freedom of speech within the group. In this sense, students affiliated with

Figure 13. Participants' production about values and norms.

an arts group particularly emphasized the importance of freedom of speech (Figure 12).

> *Generate an atmosphere of openness to others in a protected and non-judgmental space, so that everyone can express themselves freely* (Student from group 3).
> *I think we had the opportunity to choose the best technology to adapt it to multimedia products* (Student from group 4).

Participants expressed that digital technologies offer them various means to express their thoughts, utilizing their "Communication and collaboration" skills. They felt a sense of freedom in being able to communicate through different digital tools and experience a deeper sense of belonging through their "Digital content creation" skills. As they expressed that this allows them to express each situation or concept in the language that they feel more comfortable doing it. The availability of these digital option empowered participants to express themselves authentically and engage more actively within the group:

> *The thing that struck me the most was the video on the sense of belonging and the group work that we were asked to do, because everyone was able to express their way, their way of thinking and their experience on the sense of belonging* (Student from group 3).

3.10 Values and norms

In social groups, the establishment of values and norms is crucial to define what is considered moral and ethical. Participants who had roommates at home emphasized the significance of having clear norms for coexistence (Figure 13). Additionally, another participant proposed some values aimed at enhancing inclusion within the group:

> *Communicating sincerely, meeting periodically, providing support, empathy, help, cooperation, respect for the story of others* (Student from group 3).

Regarding the inclusion of digital technologies, one participant emphasized the importance of establishing norms that take into account the "Safety" skills. This highlights the significance of promoting safe and responsible use of digital technologies within the social group. By prioritizing safety skills, participants recognize the need to create a secure and supportive environment when engaging with digital tools:

> *I'll share my photos, but without the faces of my friends* (Student from group 2).

4. DISCUSSION AND CONCLUSIONS

This research explores the facilitation of the sense of belonging within social groups through the utilization of digital technologies. The findings reveal a total of 10 facilitators of a sense of belonging through DC, as depicted in Figure 14. Building upon Riley's model (Riley, 2019), which emphasizes trust, agency, and social capital as foundational elements for promoting a sense of belonging, this study provides specific insights into tangible components by considering the actions undertaken to promote DC. Digital competences are defined by

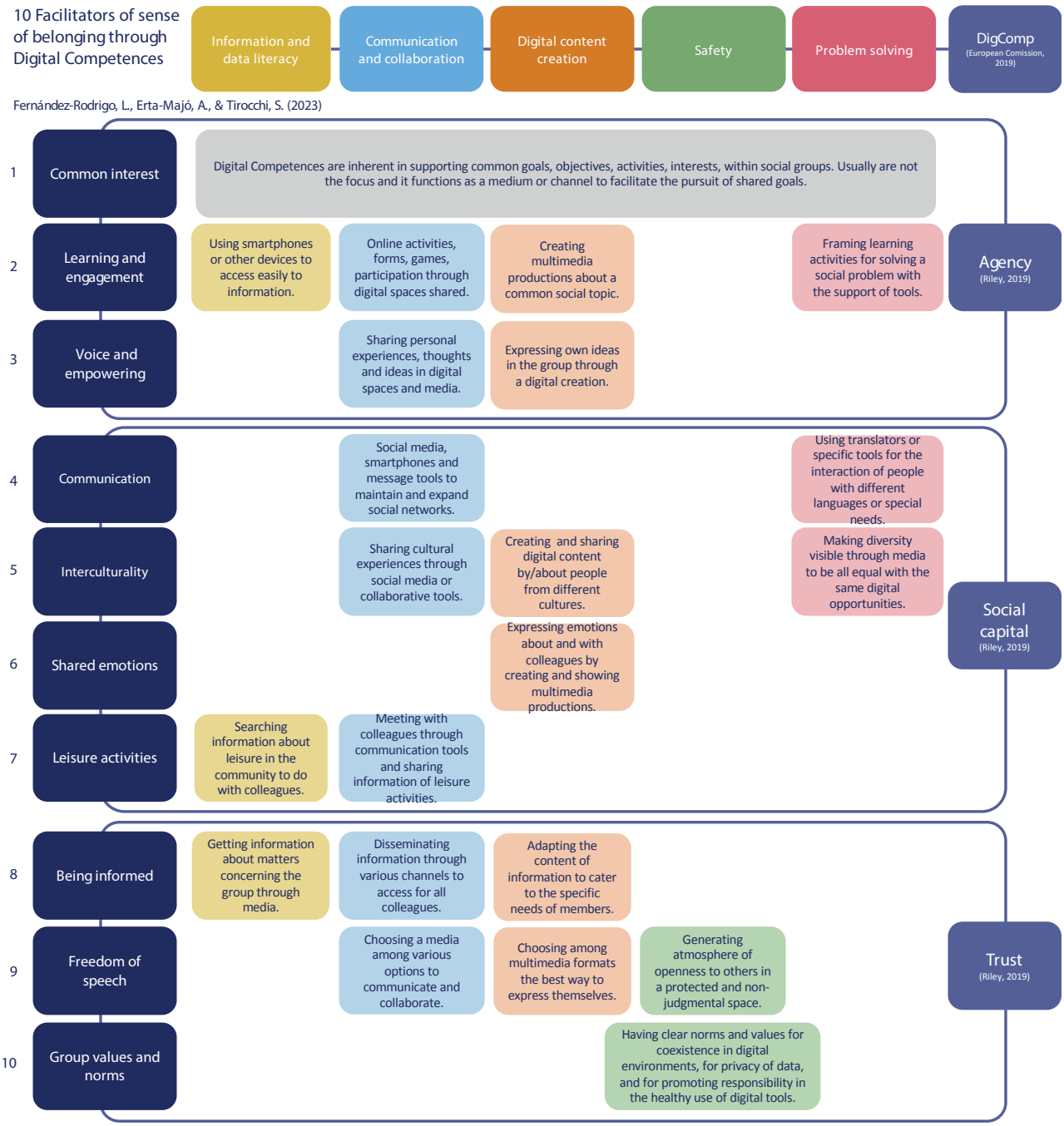

Figure 14. Main results of the study.

the European Commission (2019), as actions individuals should be capable of undertaking with digital technologies in their daily lives.

The results of the study are graphically summarized in Figure 14, which attempts to show actions mediated with digital technologies that facilitate the sense of belonging in social groups, linked to competences. As can be seen, each of the different digital competences contributes to improving one or more factors that influence the inclusion of individuals in the group. The Communication and Collaboration and Digital Content Creation skills are those that provide the most actions to improve inclusion. However, it is also important to promote trust in the group through the Safety skill,

promoting freedom of expression, values and norms in digital spaces.

The participants in this study consisted of university students majoring in education sciences from Spain and Italy. As suggested by López-Meneses et al. (2020), European university students generally possess an upper intermediate level of competence in information and digital literacy, as well as communication and collaboration. However, their competence level is comparatively lower in terms of digital content creation, particularly in creating and disseminating multimedia content using several tools. While this study did not evaluate the DC of the participants directly, the results demonstrate how DC can be promoted through their application as a participatory methodology within a qualitative study.

The utilization of a participatory methodology based on DC not only served to facilitate the acquisition of knowledge among participants but also functioned as a didactic approach (Erta-Majo et al., 2022). This phenomenon is used in other qualitative and participative studies that incorporate digital technologies (Bautista et al., 2023; Swanson & Leader, 2023). Through the implementation of participatory strategies, participants have gained knowledge regarding the concepts of sense of belonging and inclusion while actively engaging with DC. Koehler and Mishra (2009) argue that teaching and learning processes involving digital technologies should be designed with techno-pedagogical strategies given equal importance than the learning content itself.

While a significant portion of existing literature focuses on digital tools that facilitate learning processes (Haleem et al., 2022; Lai & Bower, 2019), the findings of this article demonstrate that emphasis should be placed on the actions and abilities individuals exhibit when using technologies, rather than only on specific devices or tools. The DigComp framework can be viewed not only as a DC goal to be achieved by society but also as a mean to develop other competences. In this sense DC are paramount to improving the sense of belonging within social groups in the current western society.

The development of the 10 facilitators was based on individuals aged between 18 and 30 years old. The social groups identified and analyzed by the participants are representative of their everyday experiences and where they perceive a sense of belonging (Family, Friends, Classmates, etcetera (Figure 6)). However, it is important to acknowledge that this study's limitation lies in its focus on university students' lives. Consequently, future research lines should explore how digital skills can promote a sense of belonging in different life stages or among young individuals in diverse social contexts.

The 10 facilitators showed in Figure 14 can serve as a valuable guide for designing new socio-educational interventions aimed at promoting inclusion and preventing exclusion within various social groups. These facilitators were developed through the integration of multidisciplinary knowledge and theoretical-practical insights, drawing upon the expertise of participants from diverse backgrounds such as digital technologies, sociology, and inclusive education. Prior studies have emphasized the significance of assembling a multidisciplinary team of experts to design innovative socio-educational practices (Fernández-Rodrigo et al., in press).

The facilitators of belonging, when combined with DC, encompass concepts from other frameworks that address social inclusion, such as the intercultural approach (Elias & Mansouri, 2020) and elements of the positive youth development approach (Urrea-Monclús et al., 2023). As intersectionality asserts, future studies could delve deeper into the relationship between DC and inclusion-related concepts, such as the gender perspective or the attention given to individuals with special needs or disabilities.

In addition, the components of Riley's model (2019) manifest themselves in all of the belonging facilitators. Therefore, becoming an important framework to guide sense of belonging also through digital technology. Our finding indicates that digital technologies are not the central focus within social groups since they are inherent in our lives and are used to collectively achieve goals. In conclusion, the sense of belonging among individuals can be promoted through DC to enhance the sense of belonging within social groups, when specific facilitators are taken into account and included in the process.

Aligned with the principles of connectivism (Siemens, 2004) and recognizing the challenges and exclusion situations in a fluid and complex society (Bauman, 2000), technology has the potential to make individuals feel "more connected" with each other by facilitating interactions. Consequently, this study aims to inspire further research on generating inclusive situations in the digital era, also taking into account the evolution of the concept of digital competence in a transmedia reality (Scolari, 2018).

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