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Elderly digital competences: a focus on creating digital materials

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ABSTRACT. This article aims to investigate the digital competences necessary for the elderly to create digital materials as well their potential for improving their quality of life. There have been many technological changes and some elderly people are interested in learning how to make digital materials. The methodology used here was a qualitative field study with an interpretive approach. The target group was elderly people with an average age of 72.4 years old participating in a digital inclusion course at a university and specialists with an average age of 36.8 years old. Two types of instruments were applied for collecting data: online questionnaires and participant observation. Therefore, it was possible to map one general competence called digital authorship and three specific competences: Digital content creation; digital content sharing; and digital security and privacy. This study also identified the need for the elderly to be digitally fluent, or to at least master basic technological knowledge about the authorship tool used as a prerequisite for making digital content .

Keywords: elderly; digital competences; digital materials; digital inclusion.

Competências digitais de idosos: um foco na construção de materiais digitais

RESUMO. O presente artigo objetiva investigar as competências digitais necessárias para a criação de materiais digitais por idosos e suas potencialidades para a melhoria da qualidade de vida. No contexto atual, observa-se, além das mudanças tecnológicas, o interesse de alguns idosos em aprender a construir materiais digitais. A metodologia utilizada nesta pesquisa foi a qualitativa, de campo, com abordagem interpretativa. O público-alvo foram idosos com média de idade de 72,4 anos que participam de um curso de inclusão digital em uma Universidade e especialistas com média de idade de 36,8 anos de idade. No que se refere à coleta de dados, foram aplicados dois tipos de instrumentos: questionários on-line e observação participante. Portanto, foi possível mapear uma competência geral denominada Autoria digital e três específicas: Criação de conteúdo digital; Compartilhamento de conteúdos digitais e, por último, Segurança e privacidade digital. Assim, essa pesquisa identificou como pré-requisito para a construção de conteúdos digitais a necessidade de o idoso ser fluente digitalmente ou, no mínimo, dominar conhecimentos tecnológicos básicos sobre a ferramenta de autoria utilizada.

Palavras-chave: idosos; competências digitais; materiais digitais; inclusão digital.

Habilidades digitales de las personas mayores: un enfoque enlaconstrucción de materialesdigitales

RESUMEN. Este artículo tiene como objetivo investigar las habilidades digital es necesarias para la creación de materiales digitales por parte de las personas mayores y su potencial para mejorar la calidad de vida. Em el contexto actual, además de los cambios tecnológicos, existe elinterés de algunas personas mayoresen aprender a construir materiales digitales. La metodología utilizada en esta investigación fue cualitativa, de campo, con enfoque interpretativo. El público objetivo fueron personas mayores con una edad promedio de 72,4 años que participan em un curso de inclusión digital en una Universidad y especialistas con una edad promedio de 36,8 años. Encuanto a la recolección de datos, se aplicaron dos tipos de instrumentos: cuestionarios en línea y observación participante. Por tanto, fue posible mapear una competencia general denominada Autoría digital y tres específicas: Creación de contenidos digitales; Compartir contenido digital y, finalmente, Seguridad y privacidad digital. Así, esta investigación identificó, como requisito prévio para la construcción de contenidos digitales, la necesidad de que las personas mayores tengan fluidez digital o, al menos, dominar conocimientos tecnológicos básicos sobre la herramienta de autoría utilizada.

Palabras clave: ancianos; habilidades digitales; materiales digitales; inclusión digital.

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Introduction

The number of elderly people has risen significantly in recent years. As the Brazilian Institute of Geography and Statistics (IBGE) study (Paradella, 2018) pointed out, the elderly (defined as those over 60 years of age in this country) will represent 32% of the Brazilian population by 2060. The elderly also have increasing access to digital technologies (DT) such as smartphones, tablets, and computers. Thus, it is possible to recognize a new profile in this increasingly technologically active society. In fact, a portion of elderly people are interested, both in creating and disseminating digital materials such as creating and sharing videos, photographs, as well as emojis[1], text, and audios.

Despite the growth of this public in Brazil, there are no consolidated methodologies or strategies for the elderly to create digital materials. Because they are indeed interested in learning and using digital technologies, it is therefore increasingly relevant to give new meaning to the use of digital technologies in elderly education. Thus, they can build digital competences (DC) to be included and active in today's society. This public therefore needs to build a set of knowledge, skills, and attitudes regarding these digital tools in various contexts such as, in everyday life, virtual communication, and the educational environment. Hence, this research seeks to investigate the digital competences required for the elderly to create digital materials and their potential for improving their quality of life. The following section discusses the elderly's process of making materials and the potential for improving their quality of life.

Construction of digital materials by the elderly

Brazilians grow older in diverse ways. In fact, each elderly person faces and experiences their aging process in a unique and subjective way. When it comes to digital technologies, Machado and Behar (2015, p. 146) point out that "[...] despite many initiatives, there is still a part of this population that does not see the need to use them in their daily lives." Osório and Pinto (2007) understand that part of the elderly population seeks to adapt to changes while remaining active and autonomous in their aging process. Thus, Antunes (2015) affirms that active aging is a process that aims to improve the quality and increase healthy life expectancy.

Candido (2015) points out that active aging for the elderly has motivated them to accompany the evolution of DT through educational courses, in order to learn about these digital tools and insert themselves in current society. According to Doll and Machado (2013), the ability to use digital technologies gives the elderly the feeling of active participation in contemporary society, influencing their self-esteem and life satisfaction.

In the educational context, the elderly's creation of digital materials (DM)[2] is relevant, contributing both to the understanding of the aging process itself as well as lifelong learning. Thus, Oliveira (2013, p. 82) states "[...] education, besides being a right for the elderly, represents the possibility of conceptual changes in relation to aging and old age". Thus, Slodkowski, Machado, and Behar (2017), state that authorial creation can in fact improve the students' sense of self-worth and self-esteem, especially, for the elderly public.

In 2009 the European Union (EU)[3] highlighted eight essential skills for lifelong learning in a knowledge-based society. They are: 1. Communication in one's mother tongue: referring to the ability to express and interpret concepts, thoughts, feelings, in oral and written modalities; 2. Communication in a foreign language: in addition to competence 1, it includes two further skills of mediation, i.e. summarizing, paraphrasing, interpreting, or translating, and also intercultural understanding; 3. Mathematical, scientific, and technological competence: related to numeracy, understanding of the natural world, and the ability to apply knowledge and technology to identified human needs (in the fields of medicine, transport, and communication); 4. Digital competence: addresses the safe and critical use of information and communication technologies in the work environment, leisure, and also in communication; 5. Learning to

[1] *Emoji:* according to the on-line dictionary (https://www.significados.com.br/emoji/), an *emoji* is a pictogram, that is, an image that conveys the idea of a complete word or phrase. According to Paiva (2016), the pictograms that have emerged in the digital world, are called emojis, and are popular, especially, in communication on social networks and through instant messages.

[2] This study understands the following terms as synonymous, "digital materials" (DM), "digital resources," and "digital content". It thus supports Branco's (2017) understanding of digital materials as any content produced through digital technological resources or using digital authorship tools such as, for example, *PowerPoint* presentations, sites, applications, conceptual maps, videos, comic books, among others.

[3] Lifelong learning: essential competences (2016).

learn: refers to the ability to manage one's own learning, both individually and in groups; 6. Social and Civic competences: covers the ability to effectively participate in social and work life, as well as engage in active and democratic civic participation; 7. Sense of initiative and entrepreneurial spirit: describes the ability to turn ideas into action through creativity, and to plan and manage projects; 8.Cultural sensitivity and expression: involves the creative appreciation of ideas, experiences, and emotions through various media, such as art, music, and literature.

This document is relevant to the field of lifelong learning and to competence-based education. In fact, they are both crucial for the educational context, but this research focuses specifically on digital competences. In the report "Education: a treasure to be discovered" for UNESCO, Delors (2010) proposed four pillars for lifelong learning for the 21st century. These pillars are: 'learning to learn', 'learning to do', 'learning to be' and 'learning to live together', it is also used the word 'learning' to replace 'knowing' making it possible to establish a relationship with the elements of Knowledge, Skills and Attitudes (KSA). This vision of education goes beyond what is currently practiced, since, "[...] it requires opening the possibilities of education to all, with several objectives: to offer a second or third chance; to respond to the thirst for knowledge, beauty or self-improvement [...]" (Delors, 2010, p. 32). Thus, there is no inherent age for learning, because it is a continuous process that occurs throughout life. This strengthens Freire's (2004) view on teaching. He argues that it is not about transferring knowledge, but, above all, about creating possibilities for it to be constructed. Associated with this Freirean conception, Machado and Behar (2015) define education as a continuous process that occurs throughout life. Patrício and Osório (2013, p. 3613) also state that lifelong learning "[...] has become a necessity for all citizens, in order to adapt to the constant changes in the working, globalized, technological, and digital world [...]".

Thus, the process of authorial creation of digital materials by the elderly is understood as involving the construction of digital competences through the mobilization of a set of knowledge, skills, and attitudes regarding a new situation, as will be addressed in the following section.

Digital Competences and the elderly public

The construction of digital competences is increasingly necessary for subjects to be able to insert themselves in the current technological context. Digital competences can be defined as "[...] the safe, critical, and creative use of Information and Communication Technologies to achieve broader goals related to employment, education, work, leisure, inclusion, and participation in society" (Patrício & Osório, 2017, p. 3).

Among the various theoretical references present in the literature, Behar (2013), Machado (2019), Machado, Grande, Behar and Luna (2016) and Patrício and Osório (2017) were chosen because they support the theoretical view regarding digital competences and digital inclusion of the elderly. It is worth noting that the older audience can learn to master a range of knowledge, skills, and attitudes regarding digital tools to create authorial productions. In addition, Machado and Behar (2015) have shown the digital competences the elderly require, highlighting the importance of using a didactic approach that meets the physiological, psychological, and cognitive needs of this particular audience. Thus, the authors point out that the use of DT enables the active insertion of the elderly in today's society (Machado & Behar, 2015).

Based on these approaches, DC focused on the elderly can be elaborated. In this study, this is defined as the ability to mobilize different knowledge, skills, and attitudes to use digital technologies in the different problem situations that may arise in the daily lives of the elderly, in a critical, creative, safe, and authorial way (Slodkowski, 2019).

In order to explain the relevance of DC for the elderly public, Patrício and Osório (2017, p. 10) state that ''[i]t is one of the essential competences, and, therefore, indispensable for the digital inclusion of the aging population, improving their quality of life, fully integrating them, and making them active participants in society.'' Patrício and Osório (2017) in fact understand DC as literacy skills for the 21st century. Hence, Machado and Behar (2015) believe that DT can potentially increase active participation in virtual teaching and learning processes. Machado and Behar (2015) further illustrate three essential digital competences specifically for seniors developed in digital inclusion courses:

1. Functional Digital Literacy: is a basic contemporary competence because it refers to the initial notions to use DT. Therefore, this concept is equivalent to the need to functionally master the technologies as well as reading and writing, in order to access digital and virtual knowledge (Coll, Illera, 2010 apud Machado et al., 2016). Moreover, Critical Digital Literacy and Digital Fluency competences are built upon it (see Figure 1);

2. Critical Digital Literacy: this competence covers the social practices linked to literacy. Here DT are used as a way to search for and disseminate information. Therefore, this competence is related to research, evaluation, critical reflection on the information available on the Internet, as well as the use of digital tools (Machado et al., 2016);

3. Digital Fluency: is related to the use of the DT, when the subject feels that they are a digitally active/participant in technological evolution. Moreover, being fluent enables the creation of digital content/materials. Therefore, this competence is closely related to both the concept of functional digital literacy and critical digital literacy. The subject is digitally fluent only if they can go beyond the act of knowing how to search for a text, read, write, save, and send a document through digital technologies. Thus, they must have the ability to be critical in relation to the use of DT in order to use different digital tools together (Machado et al., 2016).

However, Machado (2019) points out that "functional literacy" and "critical literacy" are not synonymous with DC, given that this concept is complex and encompasses a set of elements (KSA) that are mobilized when faced with an unusual situation. Therefore, there are three groups within DC: Functional Digital Literacy, Critical Digital Literacy, and Digital Fluency which, in turn, are made up of other specific competences.

Silva (2018) argues that these three groups of DC are distinct, but interconnected processes that portray the experience as well as the practice of the subjects regarding the use of the DT: Functional Digital Literacy, Critical Digital Literacy, and Digital Fluency.

The creation of digital materials is intimately related to the Digital Fluency competence, since it makes it possible to understand if the subject is feeling digitally active enough both to use and create materials, as shown in Figure 1. In addition, the different levels of proficiency of the elderly participants in the research should be considered.

Competence	Digital Fluency Competence
Description	It is associated with the use of digital technologies to create of digital content/materials. Therefore, consolidated practices are necessary for Functional Digital Literacy and Critical Digital Literacy. Being digitally fluent makes it possible for the subject to feel digitally active, that is, a participant in technological evolution.
Knowledge	Theoretical/technological about the tool used to create the content/digital material.
Skills	Move, search, select, organize, plan, and create digital content/materials.
Attitudes	Take the initiative to look for innovations, keep up to date, be critical both in terms of the use of digital tools/technologies and in the sharing of digital content/material.

Figure 1. Description of the Digital Fluency Competence and KSA.
Source: Prepared by the authors based on Behar (2013), Silva (2018), and Machado (2019).

Based on the construction of these DCs, older people can create digital materials which, in turn, contribute to the development of their autonomy and promote a more active aging process (Kachar, 2010). Hence, in order to identify the digital competences necessary for the process of the elderly to make DM, this study's methodology will be addressed below.

Methodology

The methodology used here was a qualitative field study with an interpretive approach. Qualitative research allows for the empowerment of subjects by sharing their experiences and stories (Creswell, 2014). Therefore, this approach was chosen to research the technological experiences of the elderly. Moreover, in

order to address the ethical issues of the research, participants were given an Informed Consent Form (ICF) in order to formalize the research and, above all, to let them choose if they wanted to participate in this study. Privacy was emphasized. The information provided by the elderly and specialists, as well as their identities were kept confidential. This research was part of the "Gerontechnology: constructing pedagogical models for Distance Learning' project, approved by the Education Department of the Federal University of Rio Grande do Sul's ethics committee, number is 35750.

This study was conducted through hybrid workshops in a course offered by the Digital Inclusion Unit (Unidade de Inclusão Digital in Portuguese, UNIDI) of the Federal University of Rio Grande do Sul in the first semester of 2019. The classes were attended by seniors who were 60 years of age or older, with access to technological resources. In addition, 26 specialists in the area of digital technologies and educational competences also participated. These experts were between the ages of 31 and 54.

To determine the participants in the study, questionnaires were sent to 18 of the elderly students in the course mentioned above, 17 of whom responded. As for the experts, 30 questionnaires were sent, 26 responses were received. The professionals' contact details were researched online and those whose research was focused on competences, digital competences, digital inclusion of the elderly, digital materials, or gerontology were selected.

The qualitative data analyzed used an interpretative approach that, according to Flick (2009, p. 37), "[...] addresses the analysis of concrete cases in their local and temporal peculiarities, starting from the expressions and activities of people in their local contexts."

Therefore, it is relevant to know the target group of the study and, above all, the inclusion criteria for participation in this research. The subjects were divided into two groups: the elderly and specialists. The elderly had to meet the following criteria to participate in the research:

a) Be 60 years of age or older (the definition of elderly based on the Brazilian Elderly Statute);

b) Be literate;

c) Have basic computer knowledge;

d) Have access to a computer and/or mobile device such as a smartphone or tablet with Internet access;

e) Be interested in learning about using DT and creating digital materials;

f) Answer the questionnaire that was sent online;

g) Sign the ICF.

The criteria for the experts to participate in the research were:

(a) have an interest in or conduct research about competences, digital competences, digital inclusion of the elderly, digital materials, or gerontology;

b) Answer the questionnaire that was sent online;

c) Have an interest and/or work with the elderly public.

This study was conducted in five steps, as illustrated in Figure 2.

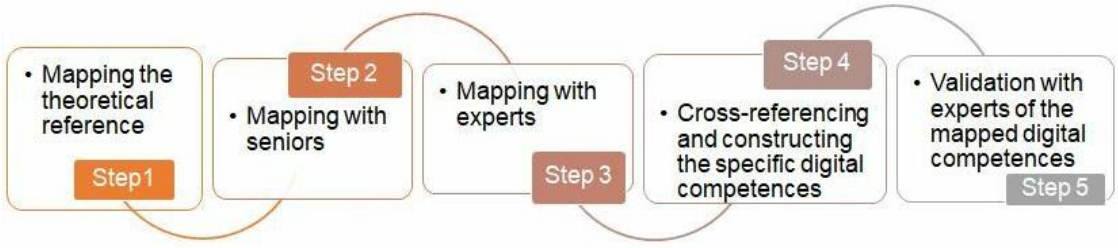

Figure 2. Stages for developing the methodology.
Source: Created by the authors (2020).

Each of these methodological steps are presented in more detail below:

Step 1 - Mapping the theoretical reference: The theoretical survey was conducted using two search engines: Google Scholar and Science Direct. The following keywords were used: "elderly" AND "digital technologies." This made it possible to analyze articles containing definitions of the elderly profile of people who use DT and related to digital competences. This search aimed to verify if there was in fact previous research in the area as well as to contribute to steps 2 and 4 of this study. The exclusion criteria were: studies where the elderly were not the target group of the study; publications before 2015; publications that were not related to this area of research. A total of 2 publications were found in Science Direct,

though neither were chosen because they did not contemplate the focus of the study. Yet, 1,200 research studies were found in Lume and 4 were selected (Candido, 2015; Machado & Behar, 2015; Machado, 2019; Silva, 2018). From these results, it was possible to map both general and specific competences.

Step 2 - Mapping with seniors: This step was to develop and apply a questionnaire with seniors who participated in a UNIDI course, in which they created digital materials. This instrument was used after these subjects engaged in the creation process, and the questions referred to their experiences of creating digital materials and to the digital competences that they deem necessary. Hence, the target group of the research participated by answering a questionnaire[4] with open-ended essay questions where they pointed out the knowledge, skills, and attitudes they thought elderly people needed to create digital materials both on mobile devices and computers. Thus, online questionnaires were sent to 18 elderly people. This data made it possible to organize a new table with the respective KSA for each of the specific competences.

Step 3 - Mapping with experts: In this step, the goal was to develop and apply a questionnaire with experts about the digital competences needed for the process of the elderly creating DM. The experts answered a questionnaire with open-ended essay questions. The researcher sent the online questionnaire[5] to 30 participants. It was then possible to organize a new chart with the respective KSA for each of the three specific competences.

Step 4 - Cross-referencing and constructing the specific digital competences: This step was to analyze the data from the two target groups of the research. Thus, it was possible to analyze the data from the two previous steps (Steps 2 and 3). A definition was then presented for each of these specific competences and the information highlighted by both the elderly and the experts regarding the KSA of each of the two groups.

Step 5 - Validation with experts of the mapped digital competences: This step aimed to validate the specific competences and their respective knowledge, skills, and attitudes with the participation of experts. Thus, another questionnaire[6] was applied, presenting the definitions of the mapped competences and tables with the respective KSA organized by the researcher (Step 4). This instrument included both multiple choice and open-ended essay questions. Two types of questionnaires were used. The first was an open-ended questionnaire with essay questions. The second was semi-open-ended, containing a combination of open-ended questions as well as multiple choice questions with objective alternatives, previously established by the researcher. In addition, in Step 1, which refers to the construction of the theoretical framework, we carried out participant observation during the classes that were conducted with the elderly students. This method was chosen because, according to Michel (2015, p. 91), it is characterized as "[...] a form, created beforehand, consisting of an ordered series of questions that should be answered in writing, and preferably without the presence of the interviewer." Thus, it allows the participants to answer according to their availability, time, and place. Moreover, observation, according to Yin (2016), allows data to be collected about social interactions, actions, and scenes in the environment. It is therefore characterized as qualitative, since it is not a mere contemplation to "[...] sit and see the world and bring notes" (Sampieri, 2006, p. 383). According to this author it implies "[...] going deep into social situations and maintaining an active role, as well as ongoing reflection, and being attentive to the details of facts, events, and interactions" (Sampieri, 2006, p. 383). Qualitative data were investigated through content analysis, as indicated by Moraes (1999). It is worth noting that this author understands content analysis as a personal interpretation by the researcher regarding their particular understanding of the data (Moraes, 1999).

Data analysis and discussion

This research enabled the mapping of the digital competences and the respective sets of KSA necessary for the elderly to create digital materials. It was divided into two major steps.

The first was a preliminary mapping of the Digital Authorship competence. Based on the first data analysis, this competence was identified as part of the Digital Fluency group (Behar, 2013), corresponding to the outcome of step 1 of the methodology. Similar to Behar (2013), Pinho (2011, p. 9) explains that the Digital Fluency competence is "[...] for the appropriate, creative, autonomous, and authorial use of technology [...]" focused on education with effective digital inclusion of citizens.

To deepen the understanding of the Digital Authorship competence, it was necessary to learn about the experiences the elderly research participants had when creating digital materials. Some characteristics were

[4] The questionnaire that was sent to the elderly participants is available at: https://forms.gle/TmboFGrV2n6n96bf6

[5] The questionnaire for the specialists is available at: https://forms.gle/1FUED325H7PgBqSv6

[6] The validation questionnaire with specialists is available at: https://forms.gle/ZZgQ3GGqi5magESaA

perceived based on this data, such as their preferences regarding the DT used in this process, their motivation, and the types of resources produced. It is worth highlighting that the elderly's motivation for creating new digital content was related to their willingness to learn how to use DT, overcome challenges, keep up with digital evolution, have new learning, and to develop new skills.

Therefore, the use of DT, focused on experiences that provide digital authorship, may allow "[...] the elderly to feel that their opinions and suggestions are valued. The digital resources can develop their ability to imagine, memorize, and use communication strategies, thus demanding different competences than those used in everyday life" (Behar, Machado, Ribeiro, & Ebeling, 2010, p. 99).

The instruments utilized for data collection were two online questionnaires that were answered by 17 elderly people and 12 experts, which can be accessed at the addresses provided in the footnotes in the methodology section. In the first, the elderly answered 15 questions. Question 5 is of particular interest: "Did the digital material turn out the way you imagined? Tell us about the experience and your difficulties." This question allowed for the understanding of the seniors' learning experience, as well as the difficulties they faced. Their answers reflected general satisfaction with the process and they also noted their fear of "losing" the digital material as a challenge.

In the second questionnaire, the experts answered 13 questions. Of note was question 12: "For you, what is the relevance of digital competences for the elderly to create digital materials?" Here, the specialists pointed out the relevance of competences, which also help to resolve problems in daily life. From this data, it was possible to identify three specific digital competences: Creation, Dissemination, and Evaluation. These were then cataloged with their respective KSA, corresponding to steps 2 and 3 in the methodology.

In the second step, the Digital Authorship competence and the three specific competences in this group were validated. To do so, an online questionnaire was applied with 14 specialists who evaluated the preliminary mapping. It was therefore possible to critically analyze it, based on this new data, as well as validate the general and specific competences. Finally, in addition to the definitions of Digital Authorship and the three specific competences, a new nomenclature was identified: Digital Content Creation, Digital Content Sharing, and Digital Security and Privacy. These were also assigned their respective KSA corresponding to steps 4 and 5 of the methodology.

Hence, it was possible to identify the need for the elderly to be digitally fluent, or at least master basic technological knowledge about the authoring tool used as a prerequisite for the creation of digital content, as shown in Figure 3. This was mapped based on the responses of the research subjects.

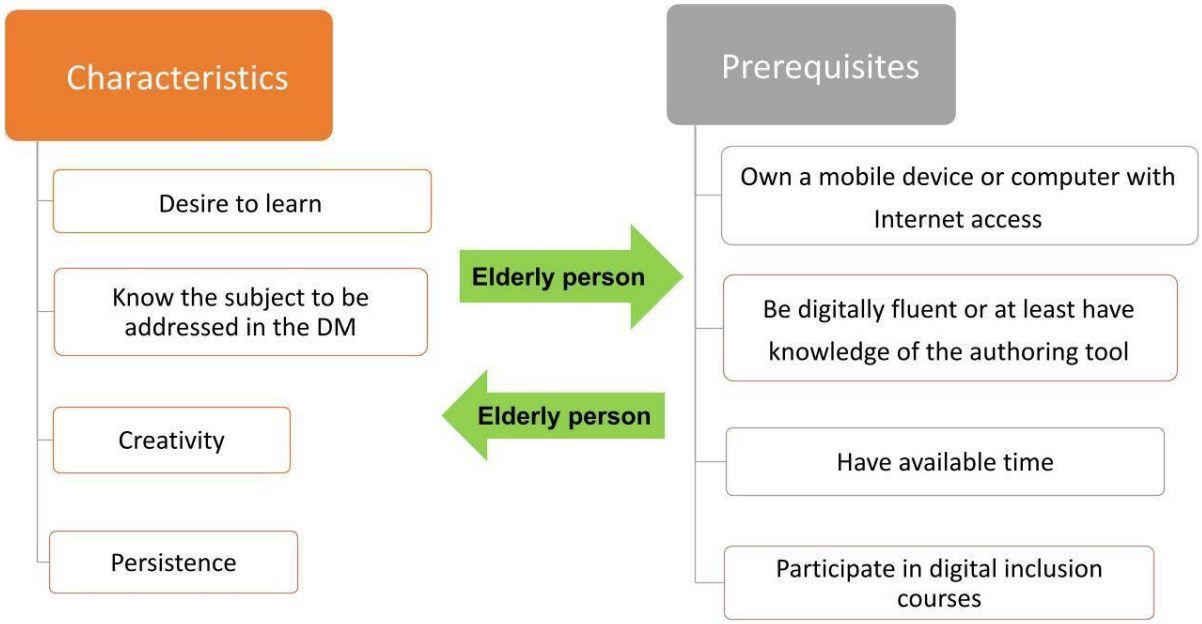

Figure 3. Profile of the elderly to create digital materials.
Source: Created by the authors (2020).

In fact, Grande (2016) discusses the elderly's general motivation for learning about the DT. Highlighting that they are mainly interested in increasing contact with family, entertainment, as well as shopping and travel.

Turning toward the specific profile of the elderly participants in this research study, the majority were female (88.2%) and only 11.8% male. They also emphasized their desire to learn about DT as a relevant factor. Moreover, in terms of their level of formal education, 6% of the students had not finished elementary school, 6% had an incomplete high school education, 35% had completed high school, 23% had a complete college education, 12% had an incomplete college education, and 18% had completed graduate studies. Thus, there was a specific elderly profile. They had an average age of 72.4 years, were middle class, and had diverse levels of education.

The characteristics, i.e. a set of elements that an elderly person must develop to create digital materials and the respective prerequisites, are identified in this study. It should be noted that the general Digital Authorship competence is a group composed of three specific related competences. Thus, in addition to the creation of the material, other elements must be considered, such as digital security as illustrated in Figure 4. To create digital materials autonomously, the elderly must mobilize different knowledge, skills, and attitudes associated with the creation, dissemination, and evaluation of the digital security of the DM.

Figure 4. Final mapping of the Digital Authorship competence and its specific competences.
Source: Created by the authors (2020).

It is therefore possible to note that when digital technologies are linked to education, new ways of learning are configured. According to Perrenoud (2000, p. 125), "[...] technologies spectacularly transform not only our ways of communicating, but also of working, deciding, and thinking [...]" and even make new needs emerge.

Therefore, Figure 5[7] presents the conceptual definition of the Digital Authorship competence, as well as the respective KSA of the three specific digital competences validated by the experts. Thus it is a way to illustrate and organize the study's final mapping.

Based on the framework presented in Figure 5, it is possible to reflect on what it means to be a digitally competent subject. Silva and Behar (2019) warn that merely possessing and/or accessing digital tools does not ensure that the subject is digitally competent. Above all, the mobilization of the KSA in a given digital context enables the creation and/or improvement of each of the DC possible. However, it is pertinent to highlight that the process of building competences is constant and emcompasses lifelong learning. In fact, Schneider (2014, p. 74) argues that the construction of competences does not occur in a vacuum[...] where the competences are created and finalized. On the contrary, it is necessary to see it as a pleasurable process one wants to be part of, otherwise, it does not happen." Thus, the digital authoring potential of the elderly in developing digital materials is a part of a lifelong learning process. There is always time to learn and to actively contribute to society. Now, the final considerations of this study are presented below.

[7] Chart 1, the complete map is available at: https://www.lume.ufrgs.br/handle/10183/199170.

Digital Authorship and its specific competences for the elderly's creation of digital materials Digital Authorship is a group of digital competences that refer to the ability to use digital technologies autonomously and critically in order to create digital materials. Moreover, it includes three specific competences: Creation of Digital Content, Sharing Digital Content, and Digital Security and Privacy.	
Specific Competences	**KSA (knowledge, skills and attitudes)**
Creation of digital content This digital competence is related to authorial construction, that is, planning and developing digital materials.	***Knowledge:*** -Know the subject/theme to be covered in the digital material; -Know the target audience the digital content is being made for; -Plan of the steps (make a script) to create the digital material; ***Skills:*** -Know how to use the program where the digital material will be built (Word, PowerPoint, Photoshop etc.) -Make material pertinent to the context; -Analyze and evaluate the potential and limitations of the authoring tools used to create the digital material; ***Attitudes:*** -Be interested in learning about authoring tools and DT; -Be determined, persistent, and creative; -Have the autonomy to produce digital materials on different devices according to the needs.
Sharing digital content This digital competence refers to the dissemination and/or sharing of digital material created by seniors in libraries, websites, and social networks.	***Knowledge:*** -Know ways to export/share a media (photos, videos, music) both on mobile devices and a computer; -Know the ethical and legal principles of posting and sharing information on the Internet with respect to the authorship of digital materials; -Know platforms, social networks, and libraries where digital materials can be made available. ***Skills:*** -Share the materials on different devices; -Share the digital materials on social networks, safeguarding the security of personal information; -Identify the icons for sharing digital materials on both mobile devices and computers; ***Attitudes:*** -Have the autonomy and motivation to disseminate the digital materials that are made; -Have the confidence to interact and share materials on mobile devices or on a computer; -Consider the ethical and legal principles of posting and sharing information on the Internet, specifically regarding the authorship of digital materials.
Digital security and privacy This digital competence is associated with the assessment of security and privacy regarding personal data, it is necessary to insert them in the digital material to be disseminated on the Internet.	***Knowledge:*** -Know the online security and privacy features to preserve one's personal data; -Know the legal aspects and risks of acting online. ***Skills:*** -Use online security and privacy features to preserve one's personal data; -Assess the most appropriate place (library, Virtual Learning Environment, digital social networks) to disseminate the digital material; -Evaluate one's own online security when disseminating the digital material; ***Attitudes:*** -Be critical when analyzing the exposure of personal data in digital materials.

Figura 5. Digital Authorship Competence and specific competences validated by specialists.
Source: Created by the authors (2020).

Final considerations

In the current context, the growth of the elderly population and their interest in using digital technologies in their daily lives is notable. Thus, there is a need to investigate the process of digital inclusion of this elderly public, which is interested in learning, especially about the creation of digital materials. The process of using the DT is directly related to the creation of digital competences, which makes it pertinent to carry out further studies on this topic.

This research made it possible to verify that for digital inclusion to occur in a meaningful way, it is necessary to go beyond the use of these digital technologies exclusively for entertainment and searching for information. Thus, a set of knowledge, skills, and attitudes must be mobilized when facing situations with DT. It is also necessary to map digital competences, as well as plan and apply pedagogical strategies that enable the construction of KSA for the elderly in an increasingly connected world. Thus, this research identified the need for seniors to be digitally fluent, or at least, master basic technological knowledge about the authoring tool[8] that will be used as a prerequisite for the creation of digital content.

This study points to a possible path for the digital inclusion of the elderly through the creation of the Digital Authorship competence. As they engage in activities to learn how to use digital technologies and show interest in authoring materials, the elderly feel more empowered, valued, and digitally participative. Furthermore, by building the digital competences of Digital Authorship, seniors can engage in society in a safer, more critical, creative, and active way.

Highlighted in the difficulties encountered in the research were the scarcity of publications focused on the creation of digital materials by the elderly and their relationship with digital competences in the educational context. There is a need for future work to investigate the transversal competences of digital authorship and also to analyze the levels of proficiency of the specific DC in the elderly's creation of digital materials.

Therefore, in the field of education, making digital authorship resources for the elderly can help both in the understanding of the aging process itself as well as lifelong learning. Hence, digital inclusion courses are an interesting way to foster the application of authorship tools for seniors to make digital content, especially, to develop strategies that enable the creation of the digital authorship competence.

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[8] he authoring tool used in this UNIDI course was Weebly. It is a free and intuitive resource, being possible to use both on mobile devices and on a computer. It is available at: https://www.weebly.com/br. The digital materials (DM) built by the elderly are available for access at: http://unidibr.weebly.com/.

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