# Mapping Competences of Distance Education Students

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*Abstract*— **This article aims to present a mapping of the competences needed by students of Distance Education. The study establishes a relationship between competences and students of distance education, highlighting knowledge, competences and attitudes linked to this mode of learning. The qualitative-quantitative approach employed presents an explorative and unique case study. As part of the study, a Learning Object was developed and subsequently validated through an extension course. The course was one of the strategies used to map competences and was complimented by interviews and questionnaires. Analysis consisted of an evaluation of the data and a description of the competences. The final competence map was organised using a twelve-part diagram presenting the following competences: digital fluency, autonomy, organization, planning, time management, communication, reflection, virtual presence, self-evaluation, self-motivation, flexibility, and teamwork.**

***Keywords - Distance Education; Competences; Distance Education students***

## I. INTRODUCTION

The advance that Distance Education has made in the Brazilian context in recent years is undeniable. One of the key factors in this phenomenon is the development of technology, in particular Information and Communication Technology (ICT). The introduction of ICT in education has meant a reduction in distances, which in turn has favoured Distance Education and thus new opportunities for creating, storing and transmitting data.

Technology has generated a profound social change whereby, increasingly, the generation born and living in this new age of technology, develops new ways of acting, thinking, learning and being [1][2]. All of these transformations have had a huge impact on education, modifying learning environments and the resources used for teaching and molding the profile of the students themselves. These peculiarities of Distance Education require those being taught to demonstrate unique knowledge, abilities and attitudes, which can be identified as specific competences. Thus, both the teacher and student of Distance Education must possess knowledge of technology and its potential [3]. In the Brazilian education system, Distance Education was regulated in law in 1996 through the so called *Lei de Diretrizes e Bases da Educação National* (LDB) nº 9.394 [4]. In 2005, with the updating of the LDB, Distance Education was defined as: "[...] a type of education whose pedagogical didactic is characterized by the use of information and communication technology where students are found in diverse places or times."

In 2007, the Brazilian Education Ministry (MEC) released guiding principles of the process of Distance Education in tertiary education systems, with the intention of informing the evaluation, organization, supervision and wider role of this mode of education. With this in mind, Distance Education can be seen as having significant potential to democratize and elevate the standard and quality of Education in Brazil.

Students, the focus of this study, possess characteristics in transformation, most apparent in the way they behave and act through technology [5]. There exists a broad spectrum of individuals who have had different experiences and relations with ICT, while not all Distance Education students will have a natural affinity with the use of technological resources [6]. For students to drive their learning, it is necessary to understand what competences, knowledge and attitudes are needed to undertake study in Distance Education, as opposed to in traditional classroom learning. Paloff and Pratt, state that "[...] with the freedom and flexibility of the on-line environment comes responsibility" [7]. In other words, the student becomes responsible for his individual study plan as Distance Education course planning is more open and flexible regarding the distribution of reading hours, assignments and other activities. In classroom learning, these considerations are strongly guided by the classes attended and by direct engagement with the teacher.

It is in this context that discussion surrounding the basic skills essential for students in Distance Education is set. Sections II and III of this article contain a brief bibliographic revision, focusing on themes relating to competences, their elements and students of distance education. Following this, the research itself is presented in Section IV, while Section V covers the conclusions of the study.

## II. COMPETENCES

The term competence initially originated in the business world, where it denotes someone capable of completing certain activities efficiently. Etymologically, competence shares its Latin roots with competition, both words coming from the Indo-European expression pot (pet), meaning to put oneself against and compete, to find oneself at the same point, to be adequate, to bring together circumstances. There is, therefore, a relation to the professional world in which there is the need for competitiveness. As such, people are not resources, which the organization consumes, uses and which

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produce costs, but rather they constitute a competitive factor in the same way as do the market and technology [8].

Being professional, competitive and competent is linked to those most capable and efficient - those who achieve the most in professional terms. Competence is knowing how to act responsibly and to be recognized by others. It implies knowing how to mobilize, integrate and transfer knowledge, resources and skills in a given professional context [9]. For Fleury and Fleury it is an underlying characteristic of someone who is related to a higher performance in the realization of a task or in a specific situation. The job market is based on a process of preparation for operational roles and functions. Thus, those that have greater formal education achieve management positions or higher hierarchical levels [10].

From an educational perspective Gaspar [11] states that the concept of competence arises from studies carried out in Canada, Switzerland and Belgium at the start of the 1990s, where actions go beyond knowledge, aptitude or ability. Competence is understood as the mobilization of these resources depending on personal experience, one's psychological, cognitive and affective background and the situation in which the individual is placed.

Even today, there exists a great deal of uncertainty about the nature of competences and how they are being applied in education, as at times they have different meanings and show contradictions. For Perrenoud [12] competence is the aptitude to effectively confront a range of situations, mobilizing the conscience more and more quickly and creatively. For Zabala and Arnau [13] present the concept of competence that is adopted in this study as being the capacity or ability to carry out tasks or act in a range of situations in an effective way in a given context. It is necessary to mobilize attitudes, abilities and knowledge at the same time and in an interrelated way.

In Brazil, the concept focused on education was incorporated in 1996 through the *Lei de Diretrizes e Bases (LDB)* nº 9.394 [4], which states that the curriculum of secondary schools should be aimed at the development of competences for citizenship.

The CNE/CEB 16/99 report, which deals with curricular directives for professional education, presents curricular reform in a professional way. Here, the concept of competence is understood as "[...] the capacity to articulate, mobilize and put into action values, knowledge and skills necessary for the efficient and effective development of the required activities in a given working environment." [14].

In 2001, the CNE/CP 9/2001 report surrounding teacher training, has the development of competences as its central focus. The report states that: "It is not enough for a professional to possess knowledge about their job. It is fundamental that they know how to summon this knowledge and transform it into action." [15].

The Brazilian national secondary school examination known as ENEM (*Exame Nacional do Ensino Médio*), administered by the Brazilian Ministry of Education (MEC) since 1998 is applied with the aim of evaluating the performance of students. This evaluation is based on five competences: 1 - Mastering languages; 2 - Understanding phenomena; 3 - Problem solving; 4 - Constructing arguments; 5 - Elaborating proposals.

There is an exaggerated use of the term competence, which can lead to incorrect use and confusion. It is therefore necessary to be able to truly understand the changes and new perspectives brought by the concept of competence in education.

As such, with the aim of contextualizing and using the term coherently in education, one must understand the context of the competence. This is particularly salient given that, naturally, the great challenge in education remains the association of competences with the final performance of the student. In education, one must consider the entire process of development and mobilization of competences and not only the result.

With these different definitions of competences in mind, it is possible to see commonalities such as:

- The behaviour of students in new and complex situations;
- The mobilization of resources, depending on the willingness or not of the student to solve problems, i.e., with specific attitudes and intention;
- The command of the procedures in the action being carried out;
- The action must be inter-related as it depends on the gathering of resources or command of the student, not only in terms of knowledge but also in experience and attitude etc.;
- The resources are, therefore, composed of three fundamental elements: knowledge, ability and attitudes.

The analysis of these points forms the concept of competence, as it is necessary to understand the composing elements: knowledge, abilities and attitudes. It is thus not sufficient to merely understand what a competence is but also to understand the wider process, beginning with its elements as described below.

## III. ELEMENTS

The elements of competences correspond to the joining of the elements that an individual has at their disposal. "[...] competences presuppose the existence of resources [...]. No resource belongs exclusively to a competence in that it can be mobilized by others." [16]

The majority of our resources can be used or reused in different contexts, i.e., they are at the service of a range of different intentions. The dynamic character of competences relates to the elements, which modify or transform them according to socio-cultural changes. Thus, it is important to understand each element and their characteristics.

### *A. Knowledge*

Knowledge is constructed through contact with one's environment and is not synonymous with information or wisdom. This study understands knowledge in terms of Piaget's constructivist vision [17]: "[...] the essential point of our theory is that knowledge is the result of interactions between the subject and the object, which is richer than what

objects can supply by themselves." This perspective holds that the construction of knowledge is attained through the interaction between the student (subject) and the environment (object) and its structures. As such, the acquisition of knowledge depends on both the cognitive structures of the student and their relation with the object. The construction of the subject's knowledge of the object is therefore achieved through construction and reconstruction in constant spiral movement.

### B. Ability

Ability is the element of competence which demonstrates what the student knows and can learn. It is related to the application of knowledge, can be constructed through practice and can suffer alterations according to the socio-cultural and cognitive context of the student.

The concept of ability also has different perspectives. Perreound [16] states that "[...] in general, an ability is not as broad as a competence, that is why it is understood by many authors to be one of the elements of competence." Thus different abilities form one or more competences, i.e., they are used in different situations. In this way, abilities are both those which present mental/cognitive processes and those which present motor and technical processes. Indeed, different abilities form one or more competences in that they are used in different situations [16].

### C. Attitude

Attitudes determine how individuals position themselves in relation to others and to wider circumstances. They also serve to evaluate feelings, behaviour and choices. A number of studies have exhaustively demonstrated that attitudes are behind behaviour. An attitude is a state of readiness organised by experience which exercises a guiding and dynamic influence over the responses of an individual *vis-a-vìs* given objects or situations. Thus, attitude can be understood as the motivation behind an action.

Following an understanding of the link between competences and their elements, it is necessary to understand the characteristics of distance learning students.

## IV. The Distance Learning Student

The range of changes generated by technology have had a significant impact on education, modifying learning spaces, educational environments and teaching resources, as well as the profile of the student arriving at school. As such, distance education has also been reorganized to include technology and has redefined its structure.

The profile of the student has also changed, given the nature of the moment of transition and the fact that not all are born and raised in contact with technology. Pozo and Monereo [6] call this phenomenon the *digital divide*, as, just as there exist young people who remain distant from ICT, there also exist those in the older generation who have had close contact with the latest technology from the outset and whose current modes of working, communicating and thinking are guided by computer systems. Thus, there is a great diversity of students with different profiles, tastes, knowledge, background and ideas [6].

According to the Quality References for Higher Distance Education (*Referenciais de Qualidade para Educação Superior a Distância*) [18], the student is the centre of the educational process. When distance education first emerged, all attention was focused on the teacher and technological resources while the student was marginalized. Today the student is regarded as the centre and focus of on-line learning [19].

The course, materials and structure are created with the virtual student in mind. Paloff and Pratt [7] present the following as necessary resources for students: connection with technology; training and support on the use of course technology; access to services, such as those found on the university campus; support services and feedback and evaluations.

The virtual student cannot always adapt to this mode of education. In addition to personal issues, experience in using technology can also influence and present difficulties for students. [3]

Prensky [1] describes the relationship that people have with technology by characterizing two types of people: Digital Natives and Digital Migrants. These terms distinguish those who came into contact late with digital technology, migrating from technology based on conventional texts, from those that have been raised with these technologies as their "natural" environment of development. The profile of distance learning students dealt with in this study is largely that of the digital migrant, previously used to printed linear and statistical texts.

In Brazil, data from the 2008 Higher Education Survey published by the Brazilian National Institute of Studies and Research (Inep) show that there were 115 institutions with 647 undergraduate distance courses, a total of 727.961 students enrolled and 70.068 graduates of these courses.

Research released in 2010 by the Brazilian internet regulator CGI (*Comitê Gestor da Internet no Brasil*) shows that more than seven million Brazilians have already taken distance courses using the internet. This study excludes those who have completed courses using other technological means such as video and radio.

This suggests that the number of distance education students and distance courses has risen rapidly. Thus, it is important to attract students, present the innovations and opportunities of distance education and identify the necessary skills in this process. In this way, it will be possible to anticipate and reduce future conflicts and problem situations, increasing motivation – so essential in the process of teaching and learning. The focus of this study is on adult learners undergoing post-graduate study in a distance learning format.

The following section discusses the methodology used in this study to carry out the mapping process.

## V. Delineating The Mapping

This research was carried out over a two year period in which time, during the first year, a Learning Object was constructed. This Learning Object was called CompMap –

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Competence Mapping of Distance Education students (*Mapeamento de Competências dos alunos da EAD*). The main function of the object was to act as a digital resource with a content specially developed for the mapping of competences and with a focus on Distance Education students. The content and activities of the Learning Object were developed with a focus on the mapping of competences and the Object was employed with post-graduate students in an extension course; the intention being to map the competences of these students.

During the second year, the process of data collection was completed using Questionnaires, an Extension Course and Interviews. The Questionnaire was given to distance learning students, teachers and tutors and was developed in an on-line form using Google Docs. Through this source, it was possible to obtain information on the profile of the distance education students and their skills, tying in with relevant studies and literature. In total, 17 tutors, 2 teachers and 7 students who participated in the extension course responded to the questionnaire The extension course was given to post-graduate distance learning students who were doing teacher training. The theme of the course was distance learning competences and consisted of 40 hours, over 7 weeks with 3 traditional face-to-face classes (at the start, middle and end of the course) and 4 distance classes. The extension course used the UFRGS AVA Moodle tool as well as the OA CompMap. During this time, participating students completed activities aimed at mapping their competences. In order to obtain the final mapping, comparisons were made between competences noted in relevant academic literature, the answers given by teachers and tutors and the result of the mapping carried out during the course. Finally at the end of the course, some of the participating tutors and students were interviewed. The interviews were performed with students who participated in the extension course, and with tutors who did not answer the initial questionnaire. A total of five tutors and three students were interviewed for more than 30 minutes each and the interviews were transcribed.

## VI. COMPETENCE MAPPING

Mapping was carried out using an analysis of two categories created from the data collected. The categories were: 1. Distance Education students and 2. Competences of Distance Education students. Mapping in the former category was noteworthy in demonstrating issues with technology, time management and communication. Moreover, adults enrolled in this class work 40 to 60 hours a week. It was noted that, just as students in the classroom require competences which allow them to act like students, distance education students also require skills to face their difficulties and discover the opportunities presented by technology. The quotes below were taken from responses to the questionnaire and reveal some of the principal characteristics of the of the profile of the students.

> "For a distance learning student … who works from 40 to 60 hours is difficult to take traditional classes," said a student 4.
> "People who work for 40 hours don't have the time to go to a University. It is much more comfortable to study at home," a student 5 commented.

Today's distance learning students were formed through the traditional classroom model throughout their learning process. As adults, they are not very familiar with technology and have trouble feeling responsible for their own learning. Moreover, for a long time they had only been content reproducers rather than producers. This is illustrated in the following quotes from students:

> "The distance education student depends on a physical professor, has some difficulty to interpret the tasks proposed, as well as to be able to use the Virtual Learning Environment well," student 1 stated.
> "My biggest challenge as a distance learner was the lack of physical contact, the exchange of looks, facial expressions, and other non-verbal communication that just does not happen in distance learning," student 2 said.

It is therefore necessary for students to construct new identities – that of a virtual student. In order to do so, one must remodel what has already been elaborated in the face-to-face classroom environment. This process is not only a cause or product of interaction but must be a constant transformation.

In order to develop a new identity, three fundamental points are necessary. The first is strategic action: time management, ways of communicating, disposition and motivation. The second is an understanding of the characteristics of the group and of the tasks, objectives and wider context of the course. The third is the technological conditions available to the student, such as reliable Internet connection, the use of tools and familiarity with technology, shown in "Fig. 1".

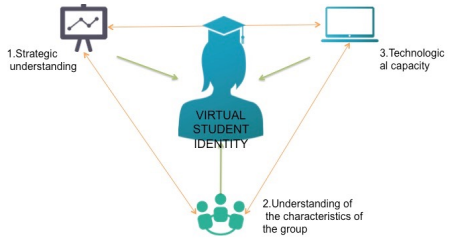


Figure 1. Representation of the Identity of the Virtual Student

To begin with, students can take their real world experiences to the virtual world along with the understanding of strategies, characteristics and technology. Students can also start to create a type of hybrid or blended learning [20].

This convergence of real world and virtual experiences will unlock the students' style and behaviour in each

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situation, be it face to face or virtual. It can be concluded that the profile of distance education students is composed of three interlinked contexts/dimensions, those being: social/family related, professional and academic. Technology is transversal and permeates all other contexts owing to its daily presence in the life of the student. However, technology is not a resource with which this student is familiar, being a context under construction and which, owing to experiences and time, will go through transformations with different results for each student.

Having raised and organized the profile, it was possible to present and list the competences of these students. This is the subject of the next section.

## VII. COMPETENCES OF DISTANCE LEARNING STUDENTS

Basic competences of students of distance education were identified through analyzed data. These competences derive from an initial mapping of the relevant literature, which was subsequently compared with the data obtained from students taking the course and statements given by teachers and tutors. From this, text extracts were taken in which the research subjects indicated the competences that a distance learning student should have. The extracts below are the tutors' opinions about the students.

> "The competences required are: Autonomy, discipline, reflective reading, suitable production of writing, proper reference of other's texts,," said tutor 1.
> "The student has to be autonomous, be able to manage his time, have basic knowledge of computing, know the virtual environment that he will use," tutor 3 said.
> "[...] the student should have knowledge about computer tools and computing itself, and be autonomous," stated tutor 7.
> "The student must be organized and disciplined, and should seek a theoretical base from the classes' suggested readings.," tutor 20 said.

The following extracts reveal the students and tutors answers about the competences the students had during the course.

> "I think that the group I classified as knowing more about technology had technological competences but no communicative competences. Yet, the other group had more difficulties with technological issues. Both groups lacked good time management strategies," tutor 4 stated.
> "There are cases in which students didn't have any of this competence [technological]. In this case, the focus has to be to invested in the student's digital literacy, which I think is a very important," tutor 5 said.
> "I believe I have the main competences, though due to the everyday rush, I end up falling behind on my homework/readings," student 1 stated.

The mapping itself, shown in "Fig. 2", demonstrates the organization of the twelve competences listed in this study together with the profile of these students. While many other competences of course exist, the students in this study showed little familiarity with distance learning, thus generating a list of basic competences.

The results obtained show that there exists a gradual transition, beginning with competences of digital fluency and ending with team work. This analysis, based on levels of difficulty, was made possible via the statements made by statements as well as by activities undertaken on the course.

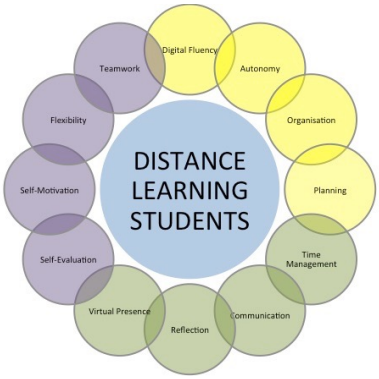


Figure 2. Twelve Competences of the Distance Learning student

The full competence mapping, and their elements (Knowledge, Abilities and Attitudes), will be presented below.

### A. *Digital Fluency*

Digital Fluency is linked to the use of technology whereby the student feels an active participant in advances in digital technology. Fluency makes possible not only the use of technology but also the creation of content and materials. Knowledge: Theoretical and technological knowledge of the tools. Abilities: The ability to use, search for, select and produce. Attitudes: Having the initiative to seek innovations and keep up to speed with technological advances at all times.

### B. *Autonomy*

For Piaget, autonomy is being governed by oneself. It is the opposite of heteronomy which is where one individual is governed by another. Knowledge: Knowledge of social and cultural norms, moral values and ethics. Abilities: The ability to analyse and interpret data and situations, making complex choices, anticipating situations, selecting, systemising, relating and interpreting data and information and making decisions. Attitudes: Having self-control and being responsible, self-critical, proactive, committed and ethical.

### C. *Organization*

Organization is related to the ordering and structuring of activities, materials and groups. Knowledge: Having self-knowledge, being able to plan and being aware of deadlines. Abilities: Creating strategies, systemising, ordering and

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classifying. Attitudes: Being engaged, involved and proactive, taking decisions and being persistent.

*D. Planning*

Planning is based on the establishment of priorities, goals and objectives. In education, planning is also having the necessary conditions to create learning situations and apply learning strategies. Knowledge: Knowledge of types of planning, context, opportunities, weaknesses and audience (if applicable). Abilities: Systemising, evaluating and analysing. Attitudes: Being proactive, objective and methodical.

*E. Time management*

Time management is necessary in fulfilling diary commitments, organizing and managing activities and fulfilling priorities, goals and objectives. Knowledge: Knowledge of deadlines, methods of organization and self-knowledge. Abilities: Using time efficiently, establishing limits, deadlines and priorities, ordering actions and identifying objectives. Attitudes: Being proactive, objective and focused.

*F. Communication*

Communication is founded in the clarity and objectivity of oral, gestural and written expression. Knowledge: Linguistic knowledge, understanding rules of behaviour, forms of communication and different audiences. Abilities: The ability to write clearly, objectively and coherently, to interpret messages received, and knowing how to use one's voice, articulate words and use appropriate language. Attitudes: Being expressive, empathetic, cautious and articulate.

*G. Reflection*

Reflection is based on being able to reflect on and critically analyse situations, activities and ways of behaving. Knowledge: Knowing the object in question and its different aspects. Abilities: This consists of analysing and interpreting data/facts and situations. Attitudes: Being proactive, critical and reflective and having self-control and the ability to self-teach.

*H. Virtual presence*

Virtual Presence is the concept of being present in the virtual environment through interaction with classmates and the carrying out of activities. Knowledge: Knowledge of the virtual environment and its tools, forms of communication and deadlines. Abilities: Using virtual environment tools efficiently for communication and the sending of activities. Attitudes: Being proactive, analytical, having insight and being willing to participate.

*I. Self Evalaution*

Self-evaluation is having knowledge about one's own learning processes and thus being able to colaborate in or evaluate the activities proposed. Knowledge: Knowing one's learning needs, one's learning processes and the ways of evaluating. Abilities: Being able to analyse the learning process, systemise activities, mediate and take into consideration one's individual characteristics. Attitudes: Having self-control, being critical, being up to date with developments and being receptive.

*J. Self-motivation*

Self motivation is establishing the conditions to be able to maintain motivation amongst peers and with oneself and being a facilitator in the process. It is being able to be receptive to the difficulties being faced by others and encouraging peers to continue and conclude an activity, being active and participating. Likewise, it is being able to deal with one's own difficulties. Knowledge: Self-knowledge, knowledge about others and about motivational mechanisms. Abilities: Insight and ability to criticise, analyse and face obstacles. Attitudes: Having self-esteem and self-confidence, being open, engaged, participative, receptive, empathetic, open to exchanges and being able to put oneself in the place of others.

*K. Flexibility*

Flexibility is being able to deal with a range of needs, examining and interpreting the opportunities presented by actions as well as by changes of opinion and attitude. Knowledge: Knowledge of interpersonal relations, knowing how to deal with socio-cultural differences. Abilities: Being able to identify situations, analyse possible solutions and mold situations. Attitudes: Being ethical and responsible and knowing how to change one's posture.

*L. Teamwork*

Teamwork relates to intra and interpersonal relations which allow individuals to effectively express and communicate their feelings, desires, opinions and expectations. Teamwork also requires interpersonal conduct and dexterity to interact with others in a socially acceptable way so as to bring benefits to participants in moments of interaction. These elements can also be complimented by an affective perspective as the complexity of social relations also demand the capacity to notice and make distinctions in mood, intentions, motivations and in the feelings of others. Knowledge: Knowledge of types of teams and the parts which compose a team. Abilities: Adapting intra and interpersonal actions, creating strategies and articulating communication with others. Identifying the profile and needs of the team in which one is placed, knowing how to work in a fair environment, articulating conflicts, negotating, communicating, collaborating, cooperating, being able to adapt to new situations and deal with different situations. Attitudes: Being concerned to reach team objectives, being flexible and open to criticisms and suggestions, knowing how to listen to others and being collaborative and cooperative.

## VIII. CONCLUSIONS

The focus of this study was to relate studies of distance education competences with the aim of identifying

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competences, which may be able to help students in the learning process. The final objective was to map these competences and their elements. By analyzing the student of this education method, the necessity for new educational opportunities was apparent. The competences relate to these opportunities seeking, via the input of students and their trainers, to uncover solutions, which can provide action and change, above all, in the challenges faced by students who begin their education in the distance education format.

In this context, it is more necessary than ever for students to have adequate skills to manage their own learning, aiming to learn through autonomy.

Distance courses demand a great deal of organisation and flexibility on the part of the student. Thus, understanding the competences and elements that can facilitate the learning process for students would appear essential for those participating in this process.

It is therefore believed that the results of this study can bring about reflections relating to best practice in distance education as well as to new ways of teaching and learning.

A continuation of this research will therefore map the digital competences of these students, focusing on technological questions, so as development of these competences at the beginning of distance learning course.

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