

## Digital Competences in the Elderly and University Students: Didactic Interaction from the Use of Social Networks

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**Abstract**—Digital Competences mediate the population of vulnerable Latin American contexts. In these there is the need to expand social communication as a way of learning and self-improvement. This research proposes to determine the effects of transfer of digital competences in two types of interaction: university students-adults, adults-schoolchildren. Therefore, two groups of individuals participate in two experimental phases of didactic transfer through the use of social networks, based on the execution of a Research Seed Project and another Project of Professional Practices of Social Responsibility in vulnerable contexts. We found effectiveness in the transfer of Digital Competences in both cases during more than six months of project execution. We report greater predisposition for the acquisition of information, communication, self-evaluation and access to information in adults. The schoolchildren managed to reinforce their skills to apply Digital Safety and Problem Solving, improving notably in this group. This program is seen as part of the improvement of teaching that every school needs as a means of curricular strengthening, whether they are teachers of advanced age or students of the primary stage. We believe that these skills will open up to the professional world with better visionary prospects for developing countries.

**Keywords**—Digital Competence, Media Learning, Older Adults, Social Networks, Virtual School Learning

## **1 Introduction**

### **1.1 Problems and networks in vulnerable contexts**

The growth in the use of Internet networks in different educational contexts is undeniable. Its consumption is much more prominent in all university entities in developing countries. Therefore, digital illiteracy is reduced by every minute in this population. Although social networks as a means of professional training have been used very little in the elderly population. The report of [1] reveals that more than 60% of the young population consumes many hours to solve academic tasks, more than 30% of the older adult population uses the Internet for different activities. Specifically, in studies related to Peru, [2] reports that approximately 18% of people over 50 years of age from contexts with socio-economic problems, use this medium and technological resources to apply them in communication and socialization media (Pc, Tablets, Mobile Telephony). These figures affect the higher education sector, since many people are developing important digital skills in a mature stage of their lives, therefore, stop taking advantage of the hours of Internet consumption and networks of a population that is increasingly excluded in digital communities it would generate possible unemployment [3-4-5]. To this it should be added that more than 90% of educational institutions in this country have some digital tool or resource [2], which requires great efforts to have trained personnel in educational institutions.

The problem focuses on the non-existence of the use of one of the Internet media such as social networks, which with its benefits, increases the skills to learn in digital media [6], to interact in daily life, as well as to be considered the most basic skill for professional life [7-8-9-10]. This indicates the positioning that these networks have in the adult community, their deep practice, the rigorous assistance in their learning; and its support in vital activities, could allow the transfer of knowledge to other communities that are still developing their digital competences. For this reason, the study tries to answer these questions: (a) Can the transposition of digital competences be generated between a young university community and an adult one in network learning media? (b) What will be the effects of the media teaching of social networks on the digital competences of schoolchildren from vulnerable contexts?

### **1.2 Research objectives**

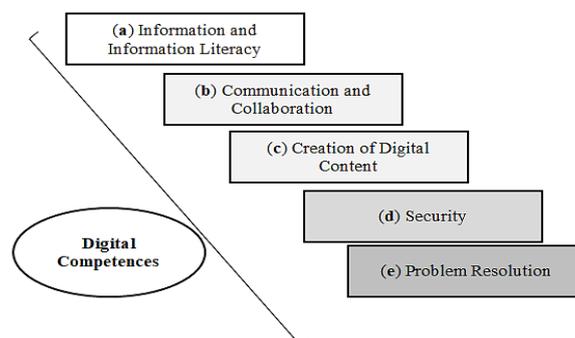
The research proposes:

- Study the provocation of the didactic transposition of digital competences that young university students develop into adult participants of a learning project in social networks.
- Determine the effects of the teaching transferred by a group of adults to another school group in vulnerable contexts.

### 1.3 Literature review

Digital competences are complex conceptual constructions that attempt to define the knowledge and skills to carry out actions in the academic, labor or vital field for social development. In this regard, [11-12-13] they agree to consider these competencies as potentialities of the human being to adapt to the virtual demands that predominate in the coexistence of digital communities. Digital competences are basic and advanced skills for the achievement of human interrelationships, learning and teaching to achieve human communication [13-14-9]. If we add to this concept the benefits of virtual teaching, both in the university environment and in the school context, we can understand digital competences or skills as the primary capacities to respond to the requirements of the curriculum [1-6], in turn, to solve the conjunctural problems of societies, in which the visionary powers of the country's universities and schools are immersed. Therefore, the attitudinal aspect is considered in this set of competences, although some proposals do not consider its inclusion in digital theory.

In Figure 1, the main capacities (dimensions) are observed, which were proposed by [15] for the effective participation of digital communities for educational development. Regarding the capacity (a), it is described as one that allows finding means to search and evaluate different types of evaluation. In competition (b), individuals learn to interact with others effectively, establishing links to strengthen digital citizenship. Regarding dimension (c), it can be understood as the competence to use the Web to find and use information applied to the teaching of academic disciplines.



**Fig. 1.** Digital competences in the connectivist approach.

Dimension (d) is defined as the capacity that allows common users to apply the security criteria of the use of data (information) in or outside of learning environments. Regarding component (e), we can understand it as the ability to recognize the difficulties for teaching and learning, applying tools to support the approach of different virtual learning tasks. We can add that the competences exercised in the digital community were established in the informational education approach, through the theory of connectivity proposed by theorists of communicational connectivism [16]. These theories have been intertwined with others that have followed their postulates [12-15-17], at least to consider them in the current distance education methodology, the ap-

plication of massive distance courses (MOOC), and even in the field of educational gamification. Educational proposals of this nature allow the development of academic performance in educational communities, the acquisition of information [18-19-20-21]; and the development of responsible skills or social sustainability.

Specifically, some studies reveal that social networks strengthen digital skills through the interaction we carry out with others in a context of mutual learning. When the increase in these competencies develops in this way, then, possibly, there is a decrease in neuronal deterioration in adults [5-22-23-24]. This process can improve fluidity in the use of resources. To this, digital inclusion can be generated in environments in which these individuals develop on a daily or professional basis [10-23-24], some of these benefits may be the usefulness of didactic tools for teaching, communication platforms social, specialized teaching platforms; and effective communication in networks.

## **2 Method**

The research has a quantitative approach, we seek the measurement of the Digital Competences variable. Additionally, two study phases were designed with a pre-experimental design to respond to the objectives set based on the Didactic Interaction Based on Social Networks (DISN) project. The DISN program was carried out in two moments of knowledge transfer on the use of social networks: (a) Youth university teachers to adults, (b) Adults to school children. In both processes, control groups were organized for the comparison of the respective scores. The first phase was about a research seedbed project (GAMA) with the aim of developing digital competences in a group of adults. The second phase compared the development of digital competences in a group of schoolchildren, based on an immersion program in social networks through activities of Social Responsibility of Professional Practices in Education.

### **2.1 GAMA seedbed project: Transfer to the elderly**

In the first phase of the research, we made up a sample of 76 participants, all of whom were adults ( $M = 56.5$  years of age;  $SD = 1.21$ ). 56% of the totals were male and 44% female. In total, the sample came from a district of social and economic vulnerability in the capital of Peru. All subjects participated of their own free will in the GAMA University Researchers Seed Project of a private university in Lima, which allowed us to apply a convenience sampling. The project lasted six months with visits made inter-day to a Nursing Home for the Elderly. The individuals fully agreed to participate in the experiment by signing a written informed consent.

### **2.2 Social responsibility project: School transfer**

The second phase required us to integrate 10 adults from the first experimental group ( $M = 51.12$  years;  $SD = 2.32$ ), who participated according to their usual activi-

ties (time, economy, family occupations). All assumed the figure of Associate Professor (AP) as members of a project of Social Responsibility activities corresponding to the course of Terminal Practices for Teaching in Primary Education directed by a private university in Lima (Peru). Regarding the experimental sample of this phase, 125 students between 9 and 12 years of age ( $M = 11.51$ ;  $SD = 1.51$ ), who attended four Educational Institutions, were attended. The Institutions served as a Professional Practice Center for university students, as well as AP.

### 2.3 DISN procedure

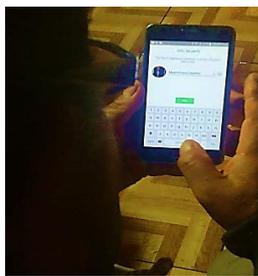
For the execution of the GAMA Seedbed Project, more than 70 learning sessions were applied through the execution of five pedagogical steps: (a) Dynamization, (b) Thematic introduction, (c) Involvement in social networks; (d) Computer utility. In Figure 2, the activities related to pedagogical steps a, b and c are observed, as part of the Seedbed Project carried out with adults.



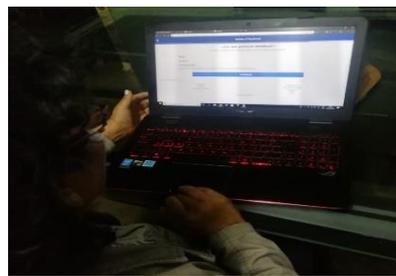
(a)



(b)



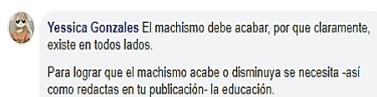
(c)



(d)



(e)



(f)

“Machismo must end because clearly, it exists everywhere. To achieve that machismo ends or diminishes, it is necessary -as well as you write in your publication- education” [Critical schoolboy comment] / [Trad.].

**Fig. 2.** Activities of the Seedbed Project and Internship Project.

Figures d, e and f describe the activities of the Social Responsibility Project linked to the Terminal Practice of Primary Education. This was executed for six months with the execution of more than 90 counseling sessions and personalized teaching by Associate Professors (AP). These were developed to advise the classes of educational informatics, social education and communication. The project developed the processes of: (d) support, (e) communication; and (f) social criticism. The activities were carried out on an interday basis with the participation of the AP and the students, in order to reinforce the subjects in which the young university students developed their terminal practice classes. The AP (adults) used the computer and computer rooms of the schools to carry out each scheduled activity.

It should be noted that we managed the implementation of the projects with the directors of the schools, of which two were privately managed and two were publicly managed. Regarding the evaluations, the Teacher's Digital Competence Questionnaire from [15] and a Checklist on Digital Procedure were used. For the school sample, these instruments were adapted, which we applied in two moments for each phase of experimentation. We execute each of them through pretest and posttest methodological steps. That is, before and after the execution of each project. Finally, the normality distribution of the data was verified using the Kolmogorov-Smirnov test with a 5% error forecast.

### 3 Results and Discussion

#### 3.1 Digital competences in the elderly

Figure 3 describes improvements in the sample of adults, they obtained greater progress in the Digital Procedure, which was significant with more than 30 average points ( $t(74) = -2,451; p < .001$ ), at Difference from Digital Competences, where

more than 100 average points have been reported, although this advance was also significant ( $t(71) = -2,102; p < .001$ ). This is important, since more than 50% of the subjects in the sample have presented scores above the average in the total of Digital Competences; in more than 30% scores above the average were analyzed. These results indicate the effects caused by the DSIN method included in the University Research Seed Project. Social networks have impregnated two types of placebo: (a) reinforcement of digital skills little practiced by the participants, (b) training of totally obsolete capacities in subjects unfamiliar with 4g technology, or other computer environments.

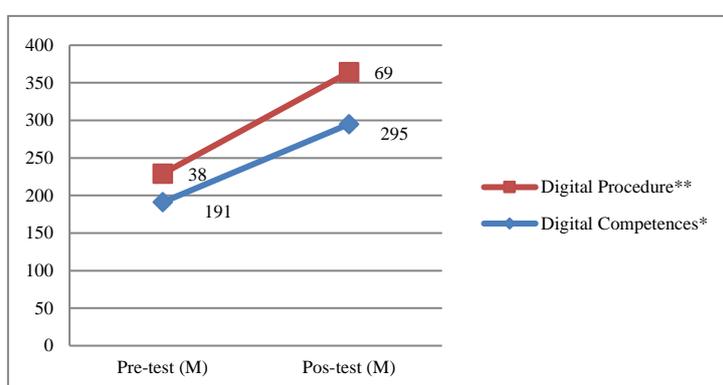


Fig. 3. Average of competence and digital procedure in the group of adults <sup>1</sup>.

These evidences make it possible to clarify that the subjects have developed Digital Competencies thanks to the development of social communication through the use of networks [5-23-24], as fluency was also increased when using technological tools [5-22], as did the young university students in their interaction with adults. The activities of the Semillero Project were based on generating interrelationships between people in digital communities (family or social) to achieve more continuous, powerful relationships that favor memory in people who use these technologies very little in their daily lives.

Table 1 summarizes in a particular way the effects of improvement in particular capacities, being those of Information and Information Literacy ( $t(71) = -1,051; p < .001$ ), Security ( $t(74) = -1,312; p < .001$ ) and Problem Solving ( $t(69) = -1,356; p < .001$ ), although the remaining dimensions also presented significant differences. It is important to emphasize these improvements in digital skills, since the subjects developed them by virtue of the benefits obtained in daily practice, as well as other studies that report that this improvement is made by applying effective communication [12-13-9], This also carries an implicit benefit [6-14-13], which is to improve coexistence among peers.

<sup>1</sup> \*Top Score = 378 / \*\* Top Score = 75.

**Table 1.** Average in the dimensions of digital competence in adults.

Digital Competences	Pre-test (M)	Pos-test (M)
Information and Information Literacy	21,56	33,4
Communication and Collaboration	19,4	22,58
Creation of Digital Content	14,12	18,76
Security	8,56	12,31
Problem Resolution	11,39	16,7
Digital Procedure	Pre-test (M)	Pos-test (M)
Execution of commands	13,1	18,54
Cognitive self-assessment	12,11	21,05
Correction	15,46	17,73
Virtual access	25,6	38,46

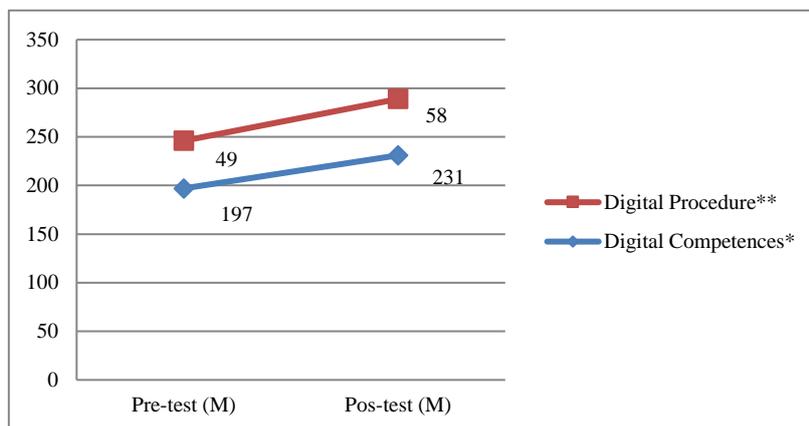
Regarding Digital Procedures, we find significant differences in all indicators. However, the effect on correction has been very low ( $t(68) = -1,012$ ;  $p < .001$ ), which is explained by the fact that the subjects learned to use commands to communicate with others, to prepare later classes in a didactic teaching experience, as well as self-knowledge of their own learning skills in digital environments. It should be noted that it has been difficult for them to use their own errors in virtual interrelationships, or in communication between peers by digital means. This indicates that although it is true, they learn to make their experience with technological resources viable, such as internalization in social networks, they do not usually notice the defects that their own communication generates, thus neglecting described messages, comments, or the use of information graphic that can damage the susceptibility of the people who receive the virtual community.

This can be verified in proposals that argue that the lack of practice of digital competences can reduce the usefulness of the capacities related to human self-evaluation, in a certain sense by presenting little practice in the media that require the use of complex information in the face of a communicational rather than informational conectivism [12-16-17], as well as in the discrimination of implicit social messages, but at the same time, they are important. On the other hand, it is worth noting that the elderly population managed to learn in access to virtual information and in the execution of social interaction commands in networks, which is similar to what was found in research that found improvements in educational formats to distance [18-19- 20], which require the use of personalized attention and tangible resources to achieve communication in groups or digital communities.

### 3.2 Digital competences in the school community

In this second phase, we analyze the effects of DSIN in schoolchildren who participated in a professional practice program in the area of social responsibility, whose executors were the members of the group of older adults. They participated as Associate Professors (AP). In Figure 4 we can see improvements between the beginning and the end of this program, the results of which have been more notable in Digital Competences ( $t(115) = -2,341$ ;  $p < .001$ ). In turn, we also find differences in the Digital

Procedure ( $t(120) = -2,512$ ;  $p < .001$ ). More than 75% of the subjects in this sample had scores higher than the general average in Digital Competences, and more than 85% in Digital Procedure.



**Fig. 4.** Average of competence and digital procedure in the group of schoolchildren<sup>2</sup>.

These evidences describe important results in the way that these subjects execute the functionalities of social networks and 4g technology, but technically, their abilities to develop in digital media have been better. This could be explained because the group of schoolchildren, in general, in the Latin American context, usually present the constant practice of these skills thanks to the search for communication in their own social networks, particularly, from the primary stage (more than nine or ten years old). Therefore, we could assert that older adults (PA) transferred certain teachings that ensured potential within the school group; this transfer has occurred in other studies with differentiated samples, but in contexts other than those of Spanish speech [19-21]. From the analysis of Table 2, it can be pointed out that the students improved Safety ( $t(115) = -2,341$ ;  $p < .001$ ), and Problem Solving ( $t(119) = -2,187$ ;  $p < .001$ ), which may allow us to accept that students learn by improving their possibilities of interrelation, as their work environment will require in the future [10-23-24]. That is, they no longer only seek to learn with the objective of growing academically, rather, they take advantage of learning environments to grow socially.

<sup>2</sup> \*Top Score = 245 / \*\* Top Score = 60.

**Table 2.** Average in the dimensions of digital competence in schoolchildren.

Digital Competences	Pre-test (M)	Pos-test (M)
Information and Information Literacy	23,78	38,43
Communication and Collaboration	21,54	25,6
Creation of Digital Content	19,05	21,09
Security	10,71	13,86
Problem Resolution	12,3	18,97
Digital Procedure	Pre-test (M)	Pos-test (M)
Execution of commands	14,56	19,71
Cognitive self-assessment	13,54	23,04
Correction	17,51	18,51
Virtual access	28,1	41,06

Regarding their Digital Skills, we discovered more notable improvements in the Cognitive self-assessment ( $t(124) = -2,532; p < .001$ ) and in the capacity of Virtual access ( $t(121) = -2,644; p < .001$ ). In this, we appreciate better use of students for learning to enter the use of little-used programs or applications as well as the use of tools that facilitate feedback on their learning and effective communication. These evidences have also been verified in other studies that reveal the parallel improvement of communicational and academic processes through information systems included in the institutional curriculum [6-14-9]. Here we consider that the possibilities of strengthening vulnerable contexts should start from the use of tools and media for both learning and communication of disadvantaged people, since the learning media allow cognitive practice, but the component is often neglected. social in this type of contexts, in which teachers use these means unilaterally, wasting the benefits of social networks and technology as a means of knowledge.

## 4 Conclusion

We conclude that the experience of social networks for adults allowed the development of their Digital Competences, with greater effects on the search for information, interrelationships and the acceptance of access to information on a constant basis, which has served them so much to learn like to socialize virtually with your loved ones or other colleagues. They have also learned to use 4g tools and resources such as the personal computer, in people who had not used them before. The experience of transferring Digital Competences and Procedures was achieved among the young university executors of the GAMA Research Seed Project and the group of older adults from vulnerable contexts.

Regarding the sample of schoolchildren, Digital Competences were significantly reinforced. Their previous experience in the use of digital tools and social networks allowed them to merge well with the Professional Practices Project. The more specific competencies such as Safety and Problem Solving were improved thanks to this program. In this case, the Associated Teacher (older adult) and school interaction was effective within the framework of transferring digital skills as a means of learning and socialization.

## 5 Acknowledgement

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