

# ¿Lo saben todo? Innovaciones educativas orientadas a promover competencias digitales en universitarios

## Do they know everything? Educational innovations aimed at promoting digital skills in university students

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### Palabras clave

Innovación educativa,  
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### RESUMEN

Las competencias digitales son vitales para participar en la sociedad actual. Circula socialmente la representación de los jóvenes como competentes en el aspecto digital porque desde pequeños operan de manera habilidosa distintos dispositivos tecnológicos. Sin embargo, estudios recientes han mostrado que las competencias digitales de esta generación son dispares y no son extensivas a todos los ámbitos. Estos argumentos dieron sustento a la innovación educativa que describimos en este artículo, cuyo objetivo se orientó a promover el uso de una herramienta (Google Drive) y el ensayo de una habilidad (escritura y edición colaborativa en línea) que no suele ser de las más desarrolladas entre los jóvenes. Participaron 151 estudiantes universitarios de diferentes áreas disciplinarias, a quienes les planteamos resolver una tarea académica en grupos, pero con la mediación de un documento compartido en Google Drive, en el que debían avanzar y editar la respuesta en forma colaborativa. Luego de la tarea, administramos un cuestionario, cuyas respuestas analizamos en este artículo. Los resultados más destacados mostraron que tan solo 5% de los participantes tenía experiencias previas y, por tanto, alguna habilidad para escribir y editar de manera colaborativa un documento compartido en la nube. Más aún, 85% valora de modo positivo la herramienta para futuras implementaciones en otros contextos después de haber experimentado y conocido su uso a partir de la innovación propuesta.

### ABSTRACT

*Digital skills are vital to participate in today's society. It is thought that young people are digitally competent because they skillfully operate different technological devices. However, recent studies have shown that the digital competences of this generation are disparate and do not extend to all areas. Such arguments gave support to the educational innovation that is described in this article, whose objective was oriented, precisely, to promote the use of a tool (Google Drive) and the essay of a skill (writing and online collaborative editing) that is not usually of the most developed among young people. 151 university students from different disciplinary areas participated. They were asked to solve an academic task in groups, but with the mediation of a shared document in Google Drive, where they had to advance and collaboratively edit the answer. After the task a questionnaire was administered, whose answers are analyzed in this article. The most outstanding results showed that only 5% of the participants had previous experiences to collaboratively write and edit a shared document in the cloud. Furthermore, 85% positively valued the tool for future implementations in other contexts, after having experienced and known its use from the proposed innovation.*

### Keywords

Educational innovation,  
ICT, digital skills, higher  
education

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## INTRODUCTION

Work, education, leisure, inclusion and participation in society, communication, among others, are areas that are becoming increasingly digitized. Consequently, digital competences - understood as a set of skills and knowledge related to information management, communication, content creation, citizen security and problem solving, among others (Zempoalteca Durán and Barragán, 2017) - are vital to participate in society and in today's economy.

A myth is circulating in our society about children and young people "knowing everything" about technology and, thus are digitally competent, but is it true? Do they master all the digital skills necessary to perform in any environment? Previous studies have been conducted in this regard and they show that, in effect, millinials [1] are skilled and they can function easily in certain areas or contexts and in specific activities, among others (Bennett & Maton, 2010; Castillejo, Torres and Lagunes, 2016; Morduchowicz, 2013; Scolari, 2018).

In fact, they are good at playing video games quickly, chatting quickly, learning the use of technological devices by trial and error - without fearing trial or error (Libedinsky, 2013) -, use social networks for leisure purposes and socialization, or use and decipher meanings from symbols other than words, such as emoticons. However, they may not be as good at creating contents or collaborating and communicating effectively asynchronously (Bennett & Maton, 2010, Bennett, Maton & Kervin, 2008, Chiecher, Vicario and Paoloni, 2016, 2017, Chiecher, Melgar and Paoloni, 2017; Gisbert and Esteve, 2011). In the context described above, we formulated the hypothesis that designing and implementing educational innovations aiming at fostering the development of digital competences can improve students' performance in those technological skills that, presumably, are not too developed.

We are guided by the objective of influencing the learning of digital skills and competences that will be required in the students' future professional performance. To do so, we avail ourselves of the generation of spaces within the university education that contribute to their development, testing and implementation. More specifically, the innovation we describe consists of involving students in solving academic tasks to which they must respond in groups of three or four members. However, instead of meeting in person - as they usually do when asked to work in groups -, they must work collaboratively toward the response by means of virtual contexts.

In the following sections we will refer to the potential of educational innovations, as well as the reasons that support the proposal of an innovation in this field focused on the use of technologies and virtual contexts in the university.

## EDUCATIONAL INNOVATIONS IN THE UNIVERSITY

The term *innovation*, in general, has good press; no one would disagree in considering that the new, generates at least some intrigue. However, not everything novel, by itself, yields the expected results. Libedinsky (2014) points out that this term has three lexical components: *in-nova-tion*. *In* is not used as a negation of a reality, but on the contrary, as a possibility to incorporate, introduce something new to a pre-existing reality; *nova* means doing again, changing; and *tion* implies activity or process, result or effect, and also internalized or consummated reality. Innovating is not inventing; it is to give a new meaning to a creation in a particular social space. Innovating is always an action contextualized in a space, group, institution or context, and involves analyzing the characteristics and qualities of a new practice, as well as its implementation in one or more social spaces and opportunities.

The term *innovation* is often related to other concepts that should be clarified, such as *reform*, *change* and *improvement*. To reform something means to modify it with the purpose of improving. In education, when we think about reforms, we point out to actions that tend to modify the system or structure on a large scale; the reform by itself does not guarantee educational improvement. Any reform implies some change, understood as alterations or variations at different levels of the system, institution or classroom, of different states or previous practices. Innovating implies changes in the most internal, timely and specific educational processes, referring to beliefs, materials, teaching methods (Camargo, 2001).

Innovation implies modifications and changes in specific contexts that could allow educational improvements. Improvements imply evaluative judgments when comparing results with previous states, based on the achievement of educational goals. Not all innovation means improvements; it is necessary to assess them according to the desirable changes and with certain objectives. Innovations are linked to the students' learning processes and the teachers' professional development; the image of the teacher is linked to that of the researcher, who is present in the proposals of innovation, beliefs and language. All these elements constitute means to study the classrooms social life (García, 2003).

Thinking about educational innovations implies considering a set of ideas, processes and strategies that require a degree of systematization and aiming at generating changes in the educational practices that have been carried out (Juarez, 2011). Innovation in education implies understanding the practices and changes, through which, we want to materialize as processes. Innovation has specific objectives aiming at modifying conceptions, skills, knowledge and attitudes. A single one-time activity is not enough; in the innovative process, the life in the classrooms, the institutions and the teachers' actions are revised. The ultimate goal of innovation is to alter the current reality by changing conceptions and

attitudes, methods and interventions, improving and transforming teaching and learning processes.

Educational innovation is a topic of interest at all levels of the education system, including university. Proof of this is the call for the presentation of research and innovation projects [2] for the improvement of undergraduate teaching which, since 2004, has been valid in our local context: the Río Cuarto National University. This call defines five priority areas for the presentation of projects and four transversal axes to all areas; among them, the use of technologies in education. This is in line with the innovation that we describe and present in this paper. We will understand in the next section the reasons why we consider an educational innovation that encourages the use of ICTs and virtual environments in academic situations important.

#### WHY AN EDUCATIONAL INNOVATION WITH ICTs

As we mentioned at the beginning of this paper, digital competences – are fundamentally linked with the use of computers to obtain, assess, store, produce, present and exchange information, and communicate and participate on collaboration networks through the Internet- and are among the eight key competences, essential and necessary in the 21<sup>st</sup> century. It is so because people need them for self-realization and development, as well as for active citizenship, social inclusion and employment.

Ferro, Martínez and Otero (2009) point out that educational innovations with ICTs allow generating ruptures of space and time barriers in teaching-learning activities, open and flexible training processes, better communication processes among those participating in learning proposals, personalized teaching and quick access to information. They sometimes promote the interest and motivation of students, in addition to supporting complementary learning activities.

The results of the research conducted in different contexts are consistent with the fact that young people are skilled and digitally competent, but not in all areas or with all the tools provided by ICTs (Bennett & Maton, 2010, Bennett *et al.*, 2008; Chiecher, Vicario and Paoloni, 2016, 2017; Chiecher *et al.*, 2017; Gisbert and Esteve, 2011). Recent data collected from young people entering the engineering field of studies at the Río Cuarto National University show that most of them come from households with a high presence of screens (among them: tablets, cell phones, smart TV and notebooks), almost all with access to the Internet at home. They are technological owners, because all of them have had their own cell phone since they were eleven or twelve, or even earlier. They spend a lot of the time "connected", they even sleep with the cell phone within reach.

However, less than 30% of the time in which these young people are connected, is used for academic or school work; i.e., they use ICTs mainly

to communicate, entertain and socialize, but to a much lesser extent, for academic activities or to carry out group work. They report uneven digital skills; in fact, among the least developed are those of creating a website, entering a virtual classroom, attending a forum, editing collaboratively a shared document or creating a video (Chiecher, 2018).

Hence, the profile of students in our context is consistent with that reported by studies carried out in other areas (e.g., Morduchowicz, 2013, Bennett & Maton, 2010, Arias, Torres and Yáñez, 2014) and this justifies an educational innovation as the one we propose. In fact, the innovation that we present in this paper is linked to promoting the use of a tool (documents shared in Google Drive) and the essay on a skill (writing and collaborative online editing) which is not usually the most developed among the youngsters. In the next section we share the methodological aspects of the study.

## METHODOLOGY

The research design responds to the methodology known as design studies or programmatic interventions (Rinaudo and Donolo, 2010). They are cyclical and iterative studies in which research and intervention cycles are linked. In this case, we designed and implemented a didactic intervention – more precisely, an academic task - and accompanied said intervention with a process of evaluative research aimed at monitoring the participants' assessment regarding their experiences and the lessons learned.

Educational innovation was implemented in four subjects belonging to three degree programs with students from different areas and ages. The participants were students of Psycho-pedagogy, Physical Education and Engineering of a public university of Argentina. Some were advanced students, 3<sup>rd</sup> and 5<sup>th</sup> year, while others were freshmen. We did not observe, however, substantial differences in the performance of the groups in regard to the proposal.

In all cases, we asked the students to solve an academic task related to the contents of the subject they were studying. That task had to be solved in groups, whose interactions, communications and advances took place in documents shared in Google Drive. Next, we will refer to the characteristics of the proposed tasks.

### *Description of the tasks proposed*

The instructions for the tasks to be solved varied according to the subject in which they were applied. The Table presents a brief description of the tasks developed with each of the participating groups.

**Table.** Tasks developed with each group of students

	Number of participants	Task requirement
Educational psychometry	39	Draft a document on the history of psychometry
Test theory and technique	52	Draft a document on the history of psychological tests
Pedagogy	38	Write a synthesis or comparative chart of different pedagogical models
Preliminary engineering workshop	22	Formulate an encounter problem and suggest a solution

Source: Self development.

Although different in terms of the content addressed, the criteria for the design and formulation of the tasks remained stable and uniform. In all cases, before presenting the task, the instructions specified the procedural aspects to follow: form groups of three to five members; create an account in Gmail – in case the students did not have one; and watch an explanatory video about the use of shared documents in Google Drive [3].

We asked all students to collaboratively prepare and present a document in Word format, even though, as we said previously, with a specific content depending on the subject. The answer had to be raised in groups and by means of a shared document in Google Drive [4] that each member could access and edit at any time and from anywhere. We also specify in the instructions the task deadlines, delivery modality and assessment criteria.

### *Participating Subjects*

As we anticipated, four groups of students participated, namely: 52 students of the Test Theory and Technique course of the 3<sup>rd</sup> year of the degree in Psycho-pedagogy; 39 students of Educational Psychometry of the 5<sup>th</sup> year of the degree in Psycho-pedagogy; 38 students of Pedagogy, of the 1<sup>st</sup> year of the degree in Physical Education; and 22 students of a preliminary workshop to enter Engineering.. It worked with 151 university students in all, 120 women and 31 men, aged between 17 and 23.

### *Data Collection Instrument*

At the end of the task execution period, we distributed a questionnaire among the students in order to recover their assessment on the group work experience mediated by Google Drive. For the purposes of this research, we focused on the analysis on the subjects' responses to three questions:

- Did you know Google Drive?
- If you answered “yes”. In what occasion did you use it?
- What is your assessment after using it?

We conducted quantitative analyzes for the dichotomous response item (first question) and qualitative for the open response items (second and third question). In this case, we built categories based on the answers offered by the subjects.

## RESULTS

In this section we present the analysis of the data collected as a result of the administration of the aforementioned questionnaire. We will refer to the knowledge and previous uses of Google Drive by this group of students, as well as their assessment of the tool after having used it for the proposed task.

### *Prior Knowledge of Google Drive*

“Did you know Google Drive?” was one of the questions included in the questionnaire. With closed response alternatives (yes or no), 52% of the students (N = 79) answered "yes", while 48% (N = 72) said they did not know the tool previously (See Graph 1).



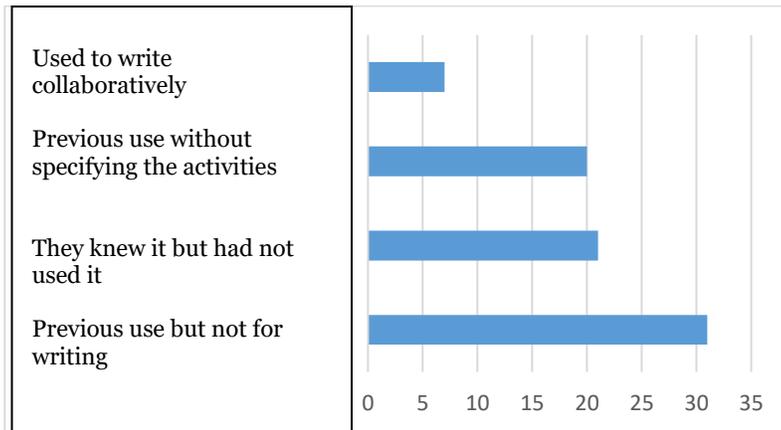
**Graph 1.** Did you know Google Drive?  
Source: Self development.

The fact that almost half of the students (48%) did not have any knowledge of the Google Drive tool and of its functionalities before using in the context of experience, leads us to think that the objective of the didactic intervention - including in the learning of digital skills and competences - was somewhat covered.

Even though the information about the fact that almost half of the students did not know the tool speaks for itself; it is interesting to deepen the analysis within the group that said having previous knowledge of the tool because, as we will see in the next section, although they knew of its existence, very few had had previous collaborative writing experiences with this tool.

### *Previous uses of Google Drive*

The 79 subjects who responded affirmatively to the previous consultation: "Did you know Google Drive?" should mention the occasions in which they used the tool. The answers were grouped in the categories shown in Graph 2.



**Graph 2.** Previous uses of Google Drive.  
Source: Self development.

- Subjects who knew Google Drive and had used it previously, but not to write collaboratively.

31 subjects reported having used the tool previously, but differently from the collaborative writing this task proposed. Here are some illustrative answers of this category:

Example 1. I had used it to store documents, files in general, personal files. This way I have everything saved in the network, and in case of loss or failure of my computer I do not lose my work or personal files.

Example 2. I only used it to receive some files from some professors for a research grant. However, I do not know how to share files with a group or work the way we did, I had never done so.

Example 3. To save some files, but I never used it to share work.

- Subjects who knew Google Drive, but had not used it

21 subjects said knowing the tool existed but had not used it before. Next, are some illustrative answers to this category:

Example 1. I knew it but never used it.

Example 2. I did not use it. I had it as an application on my cell phone and I erased it because I did not what it was.

Example 3. I never used it. I only knew what it was because it was on my cell phone and I also saw it on computers.

Example 4. I had not used it before but I knew it existed.

- Subjects who knew Google Drive and used it previously, but did not specify for what activities

20 subjects claimed having made previous uses of the tool in high school or in the framework of a particular subject, but did not specify if they used it to write in collaboration. Here are some illustrative answers of this category:

Example 1. In high school since I had a guidance course in computer sciences Example 2. In the Computer Sciences course.

- Subjects who knew Google Drive and had used it previously to write collaboratively:

Only seven subjects mentioned having used the tool previously with their working group to write an academic document in collaboration. Here are some illustrative answers of this category:

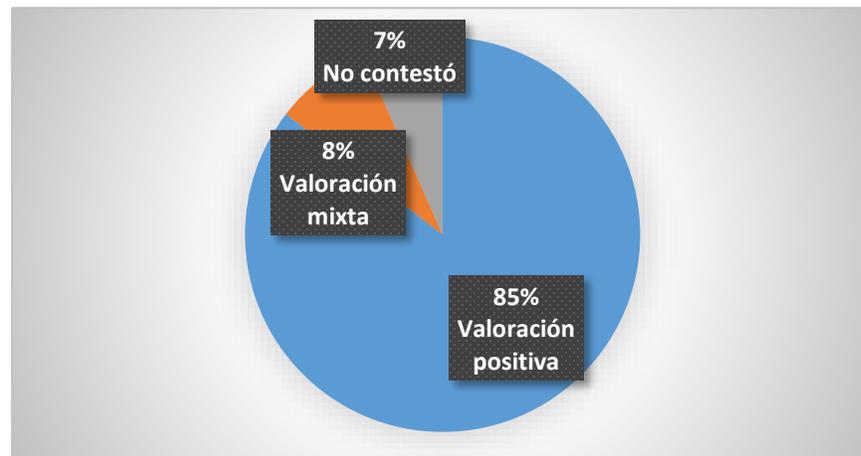
Example 1. We used it with the same group for an assignment on developmental psychology but we did so on our own will.

Example 2. I have used it with my classmates to work in group or share our work (we did this several times from Google Drive), summaries and papers.

In short, of the 79 subjects, seven only explicitly recognized a prior online collaborative writing experience mediated by the Google Drive tool. Within the group of 20 subjects who did not specify what previous experiences they had with the tool, there may be another case, but we do not know with certainty. The truth is that there are few students who knew the tool and had used it in a collaborative writing activity. In the next section we will see assessment made of the tool after the development of the task that required their use.

### *Assessment of Google Drive after the collaborative writing experience*

"What assessment can you make after using Google Drive?" This was another of the items included in the questionnaire (See Graph 3).



**Graph 3.** Assessment of Google Drive.  
Source: Personal development.

In response to the question, 129 (of 151) participants expressed positive feedback about the Google Drive tool and its potential to write collaboratively online. Utility, comfort, flexibility, simplicity, efficiency and practicality were characteristics attributed to the work mediated by the tool. Here are some illustrative answers of the students' opinions:

Example 1. I found it useful, since nowadays we handle technology, but we may not know everything about it, and this was something more positive than everything that can be done with technological resources, which one does not know about and when these occasions arise, one says "we do not know how to use it at all", and this way I found it super useful and I would have loved to use it in high school or with previous assignments.

Example 2. It is very practical to share information or perform group work at a distance when the group cannot gather.

Example 3. It is a tool that I will keep in mind from now on for the next assignments given the benefits it gives us, such as, for example, that we can work from the cell phone, technology that we use all the time and that we can make the most of in academic matters in addition to personal ones.

A small group of 12 subjects (out of 151) included both positive and negative aspects in their assessment:

Example 1. It is a very useful tool, but it is difficult to adapt.

Example 2. It is a good tool to work at a distance, but I do not think I can get used to it. I prefer assignments in person, I feel more organized and safe.

Lastly, 10 (out of 151) subjects did not answer the question while none expressed completely negative views about the tool used.

## DISCUSSION

The results of the study allowed us to answer the primary question of this paper: "They do not know everything". In fact, the young people themselves recognize that their knowledge and skills for the management of certain technological tools are limited in some areas (a student said: "We currently handle technology, but perhaps we do not know everything about it").

The data obtained and presented in the previous section "speak" for themselves and in a forceful way. Almost half of the group (48%) was unaware of the existence and uses of Google Drive, while only 5% of the 151 students who participated in the innovation implemented had previous experiences of collaborative writing of documents shared through Google Drive. Paradoxically, once they tried and knew the tool, they appreciated its value for other academic situations. Similar results were obtained in previous studies of our team in which students were involved in activities that required visiting virtual museums or the use of social networks for academic purposes (Chiecher, 2014, Melgar, Chiecher, Elisondo and Donolo, 2017; Vicar, Chiecher and Paoloni, 2017).

In general, the university students who participated in different studies gave positive assessment of innovations that allow them to learn new or alternative uses of the tools they already know and often use for other purposes. Results from other studies are similar to those that indicated that the skills of young people with technologies do not necessarily extend to all activities and contexts. In fact, the most frequent uses that young people make of technologies are limited to the field of leisure, entertainment and social relations and they seldomly used them to solve academic aspects, create content, edit collaboratively, etc. (Bennett & Maton, 2010, Chiecher, Vicario and Paoloni, 2016). So much so that the current trend seems to be to characterize young people as "digital learners", in an attempt to question the older notion, coined by Prensky at the beginning of the century, of "digital natives" (Bullen & Morgan, 2011; Gallardo et al., 2016). We believe that perhaps young people today are both at the same time: "native", because they are born in a technologized world and, from an early age, they are exposed to and in contact with digital technology, they are even technological owners (Morduchowicz, 2013). However, they are also "apprentices" because, even though, through their fluid interactions with technologies they develop skills to operate them, but they do not know everything (Chiecher et al., 2017).

It is paradoxical that those who often think that young people "know everything" about technology are adults or "digital immigrants," who are astonished at how even children skillfully operate different devices, and feel disadvantaged in that regard. Perhaps this conception, socially rooted, also tinges the actions of many teachers at different levels of the educational system; they know that students who live in contact with the screens (cell phones, tablets, smart TV, computers) come to their classrooms and are aware that they must propose a teaching that involves technologies (Chiecher and Lorenzati, 2017). However, the reason that guides many teachers in including technologies in teaching may not have to do with the conviction that they can teach new uses and tools (and that the youngsters develop new skills and abilities with technologies), but rather they wish to motivate students by using a resource they find attractive and that they believe they master in all senses (even with more expertise than the teachers themselves).

## CONCLUSIONS

The results of this study ratify the need to include technologies in academic contexts and make the most of their potential. If the world is technologized, education should not be left out. If we are educating youngsters of a generation for which the screens are protagonists, these should not be left out of the academic fields. At this point, "information literacy" comes to play an important role, since the mission of educators is not limited to literacy in a specific discipline; it also involves the literacy of digital learners in digital competences (worth the redundancy), competences of the 21<sup>st</sup> century, which will be necessary for them to perform in any professional field.

Educational innovations with ICTs in the university context also make sense from the perspective of information literacy that creates opportunities to access multiple resources that can contribute as tools for future professional performance. Virtual museums, Google Drive, Facebook, WhatsApp and its academic uses constitute possibilities for students and future professionals. Educational innovations with ICTs could expand the limits to learn and know, generate strategies to think critically and multiply spaces of curiosity.

For future research, it would be interesting to adopt a follow-up perspective that would allow us to know if students continue using the proposed tools (e.g., the collaborative edition of documents in Google Drive) in other contexts, subjects and even in their professional performances after graduating.



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