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APPROPRIATION AND USE OF DIGITAL TECHNOLOGIES IN UNIVERSITY ENTRANTS. A CASE STUDY

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Abstract: The appropriation of digital technologies by students is a key process for their academic and professional success. In this context, they generally face a period of adaptation to new digital tools and environments that are fundamental in their training. Initially, many of them arrive with basic knowledge in the use of computers, internet and common applications, but lack experience in specific tools of the field, such as programming languages, databases and project management software. The process of technological appropriation also involves the development of soft skills, such as problem solving, critical thinking and the ability to work in teams. A self-administered questionnaire with closed questions was designed for the data collection, which was applied through the institutional platform to first year students of the Bachelor's Degree in Information Systems of the Faculty of Exact and Natural Sciences and Surveying of the Universidad Nacional del Nordeste (Argentina) during the year 2024. The results allow identifying and describing their conditions of access to technologies for study, to then address the uses and perceptions of technologies as resources for academic performance. The work concludes that students are able to operate various digital technologies in their daily lives, although they require assistance, advice or tutorial activity for the development of soft skills to ensure an effective and efficient use in the learning process.

Keywords digital technologies, higher education, digital environments.

APPROPRIATION OF DIGITAL TECHNOLOGIES IN THE EDUCATIONAL ENVIRONMENT

The appropriation of technologies is a process in which students not only adopt the available technological tools, but also adapt and personalize them to meet their own learning needs and social contexts. This implies a reinterpretation and resignification of technologies according to their experiences, interests and academic objectives.

"The appropriation of information and communication technologies by communities is characterized by a process where ICTs are re-signified and adapted to local social and cultural practices" (Castells, 2000). In this sense, Bossolasco et al. (2020) state that: "*ICT appropriation refers to the capacity of users to use technologies according to their needs, with relevant contents in relation to their values, traditions and culture*".

In the educational field, technologies are "*enablers of forms of appropriation of knowledge that allow us to transcend their use as tools and to understand that there is a relationship of mutual implication when technologies are introduced in the classroom*" (Lion, 2006, p. 86).

Technologies are not only used as they were thought and designed by their creators, but in the process of use, there is a transformation of them and also of the subjects that use them. It is enough to recall situations in which "*platforms originally designed for socialization, such as Facebook and WhatsApp,* have been *transformed into educational tools, creating study groups and sharing academic resources. This phenomenon shows how students adapt existing technologies for purposes that transcend their initial use*" (Selwyn, 2012).

Castañeda and Adell (2013) also mention similar situations, such as *"the use of note-taking applications such as OneNote or Notion has been adapted to include not only class*

notes, but also personal planning and project management". Another example is the use of *smartphones* to take pictures of a presentation or a whiteboard during a class instead of taking notes on their paper block, in other words, they employ technologies in their study routines and practices.

These cases also show that students not only use the technologies provided by the university, but also use or reuse others, "*modifying them to meet their learning objectives in ways that the designers of the original technologies had not envisioned*" (Selwyn, 2011).

The tension between two perspectives on students and the use of technologies is considered necessary. On the one hand, the denomination of "digital natives" created by Prensky at the beginning of the 21st century, according to which those born after the 1980s have a fluent and natural handling of technologies. And, on the other hand, the difficulties they present when using technologies in the educational environment (Taboada and Álvarez, 2021).

In line with what UNESCO (2018) expresses.

> Digital skills are defined as a spectrum of skills that facilitate the use of digital devices, communication applications and networks to access and better manage information. These skills enable the creation and exchange of digital content, communication and collaboration, as well as problem solving for effective and creative development in life, work and social activities in general. In general, basic digital skills, i.e. the fundamental functional skills for the basic use of digital devices and online applications, as well as the conventional skills of reading, writing and arithmetic, are considered to be an essential part of the new range of literacy skills in the digital age.

In recent years, the educational use of artificial intelligences applied by teachers and students has burst in, thus raising new questions, possibilities and challenges for educational institutions (Coicaud, 2019),

In this context, the *Observatory of Technologies applied to Education of FACENA - UNNE (Argentina)* is interested in knowing about the appropriations and uses that students make of digital tools in their study practices (Lion, 2023).

METHODOLOGY

The information was collected through a self-administered survey with closed questions through the virtual classroom of the subject, on the university's institutional platform. This decision is based on a criterion of validity and reliability, since it ensures that those who respond are indeed students of the subject and, furthermore, that they do so only once.

Out of a total of 500 initial registrants, 360 responded to the survey within the established deadline. The instrument is made up of closed questions and, to a lesser extent, open questions.

RESULTS

First of all, some data are presented to build a profile of the participants, and then we delve into the uses and perceptions of technologies as affordable resources for educational situations.

DEMOGRAPHIC PROFILE OF STUDENTS:

In terms of age range, 50.6% are between 20 and 29 years old and 43.9% are younger than 20 years old. 76.4% entered the career this year, 15.8% in 2023, and the rest in previous years. Most of them come from the province of Corrientes (93%), where the physical location of the course is located, secondly, from the province of Chaco (6%) and the remaining number is similarly distributed among residents of the provinces of Formosa and Misiones.

72.5% of the students do not currently work and 33.3% have never worked. Of those who have work experience, only 7.2% did so in some activity related to the field of information technology.

Age range	V.A.	%
Less than 20	158	43,9
Between 20 and 29	182	50,6
Between 30 and 39	15	4,2
Between 40 and 49	3	0,8
More than 50	2	0,6

Table 1: Distribution according to age

ACCESSIBILITY TO TECHNOLOGIES

In order to know the conditions of accessibility to ICTs, two questions were investigated: 1) the devices to which they have access and 2) the conditions of Internet connectivity. It is understood that both variables, combined, are access indicators (Bossolasco, 2020).

With regard to access to ICTs, 89% have cell phones for personal use and 1% share them with other members of their family. At this point, it is important to note that this device is very limited for the development of academic activities in a computer science career.

Regarding the availability of computer equipment itself, 59% mentioned having a laptop or notebook for individual use, while 18% do so jointly with others; and 42% stated that they have a desktop computer for personal use and 14% share the equipment.

In terms of connectivity, 98.1% have an Internet connection at home or at work. A total of 86.1% have a WiFi connection, 44.4% access via cell phone line, and 31.9% via cable modem. Those who do not have connectivity at home (2%) said that they connect using third-party devices or public institutions.

Access to computing devices	V.A.	%
Computer for personal use	151	42
Shared use computer	51	14
Laptop for personal use	211	59
Laptop for shared use	65	18
Cell phone for personal use	320	89
Shared-use cell phone	5	1

Table 2: Access to computing devices

Connection type	V.A.	%
Wifi connection	310	86,1
Mobile line (4G)	160	44,4
Cable modem connection	115	31,9
Another	1	0,3
None	2	0,6

Table 3: Type of internet connection

USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES APPLIED TO THE EDUCATIONAL FIELD

When asked about the use of information and communication technology, the vast majority of respondents reported using it for entertainment (88.6%), education (86.4%), communication (77.8%), and information search (75%). To a lesser degree, they report using it for programming (58.6%), financial activities (48.9%), work activities (42.5%) and administrative activities (40.3%). It is worth mentioning that only 15.3% use technology to produce their own content.

What do you use ICT for?	V.A.	%
Entertainment (games, movies, streaming, music)	319	88,6
Education / learning (courses, tutorials, seminars)	311	86,4
Communication (social networks, e-mail, messaging, videoconferencing).	280	77,8
Search for information	270	75,0
Programming	211	58,6
Financial activities (e-wallets, payments, home banking)	176	48,9
Work (word processors, spreadsheets, applications, etc.)	153	42,5
Administrative activities (paperwork).	145	40,3
Production of own content	55	15,3
Other	29	8,1

Table 4: Uses of ICT

Regarding the technologies used to study, students ranked the word processor *MS* Word (91%) in first place, followed by *Google Drive* (74%), the presentation application *MS Power Point* (60%) and the spreadsheet *MS Excel* (39%). They also say they use the design tool *Canva* (30%), *Adobe Acrobat* (20%), which allows them to view, share and edit PDF files. To a lesser extent, they mention the use of *Notion* to create documents, calendars, reminders, to-do lists, among other things (5%) and *Trello* (4%) which allows teams to manage any type of project and workflow, as well as to monitor tasks. It is worth mentioning that each of these tools allows different levels of use, an aspect that in this instance was not consulted.

Figure 1: Use of ICT tools prior to entering university

What tools or applications do you use to study?	V.A.	%
MS Word	329	91
Google Drive	267	74
MS Power Point	215	60
MS Excel	140	39
Canva	109	30
Adobe Acrobat	71	20
Other	38	11
Notion	19	5
Trello	13	4

Table 5: Technologies used for learning

Along the same lines, they were asked whether they already used these tools before entering university. Almost half of the responses indicate that they used only some of them 46%, 31% used most of them, while 19% used all of them and only 4% did not use any of them. Figure 1 shows this distribution.
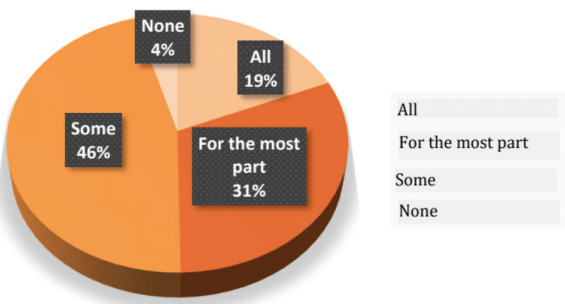
When asked about the use of artificial intelligence to carry out their academic situations, they mentioned *ChatGPT* (66.4%), *Meta* (25.3%), *Gemini* (13.1%), *Bing* (8.6%), all of the generative AI type, in first order. On the other hand, 14.4% say they use other tools and 27.2% say they do not use this type of application.

AI to study	V.A.	%
ChatGPT	239	66,4
IA Goal	91	25,3
Another	52	14,4
Gemini	47	13,1
Bing	31	8,6
Does not use	98	27,2

Table 6: AI tools used for academic situations

53.6% say they did not use artificial intelligence applications prior to university entry, while 31% say they applied some and 15.4% used most.

Students were also asked about the challenges they encounter when searching for and selecting information for academic assignments: 57% responded that they have difficulty finding relevant information, 50% attribute it to problems in organizing and managing the information found, 29% attribute it to limited access to specific journals or books, 22% acknowledge having little familiarity with technological tools, and 12% mention problems with access to Internet connection.

What do you think are the biggest challenges in using technological tools to access information and literature?	V.A.	%
Difficulty in finding relevant information.	205	57
Difficulty in organizing and managing the information found.	179	50
Limited access to specific journals or books.	103	29
Lack of familiarity with the tools.	81	23
Internet connection access problems	43	12
Other	48	13

Table 7: Challenges in the use of technologies for access to information for learning

A specific aspect of academic work is the mechanisms for identifying the reliability and relevance of information obtained on the web. To this end, 73% indicated that they check the source and reputation of the author, 56% consult professors and colleagues at the university, 41% mention checking the citation and references of the text, while for 28%, the date of publication is a relevant piece of information.

How do you evaluate the reliability of information found online for your academic papers?	V.A.	%
Checking the source and reputation of the author	263	73
Consulting your teachers or colleagues	200	56
Verifying the citation and references	148	41
Checking the date of publication	102	28
None	17	5

Table 8: Mechanisms to elucidate the reliability of online information

Regarding the search sites for study material, 70% say they obtain it from the virtual classrooms (material provided by the teaching teams on the Moodle platform), 65% say they use search engines, 49% do so on university library websites. To a lesser extent, 12% use the E-Libro repository (virtual library service that provides digital books or chapters of books from different publishers and which are accessed from the University through the Moodle platform). Eleven percent mention using elec-

tronic services of the university library and, in equal percentage, online scientific journals and publications, while 8% say they use institutional repositories and 7% indicate using academic journal platforms (such as Redalyc or Scielo).

What kind of sites do you use to access study material?	V.A.	%
Bibliography uploaded by the chairs to Moodle	253	70
Online search engines (Google Scholar, etc.)	235	65
University library websites	177	49
e-Book Platform	42	12
Library e-services (Library Network, e-library, etc.)	40	11
Online scientific journals and publications	39	11
Institutional repositories	28	8
Academic journal platforms (e.g. Redalyc)	25	7

Table 9: Type of sites used to obtain study material

The availability of technological devices leads to ask about students' preferences for reading academic texts. In this regard, 62% state that they find it comfortable to study both in digital texts and in printed format, 25% say they prefer reading in traditional printed format (paper) and 13% prioritize reading in digital format (screens).

Regarding the assessment of the contribution of technologies to their academic performance, 66% said that they are essential and 34% indicated that they are partially favorable, as they help to solve some issues.

In this regard, 48% considered themselves to be moderately expert, 38% considered themselves to be scarcely expert, 12% recognized that they were inexperienced and only 3% identified themselves as very expert.
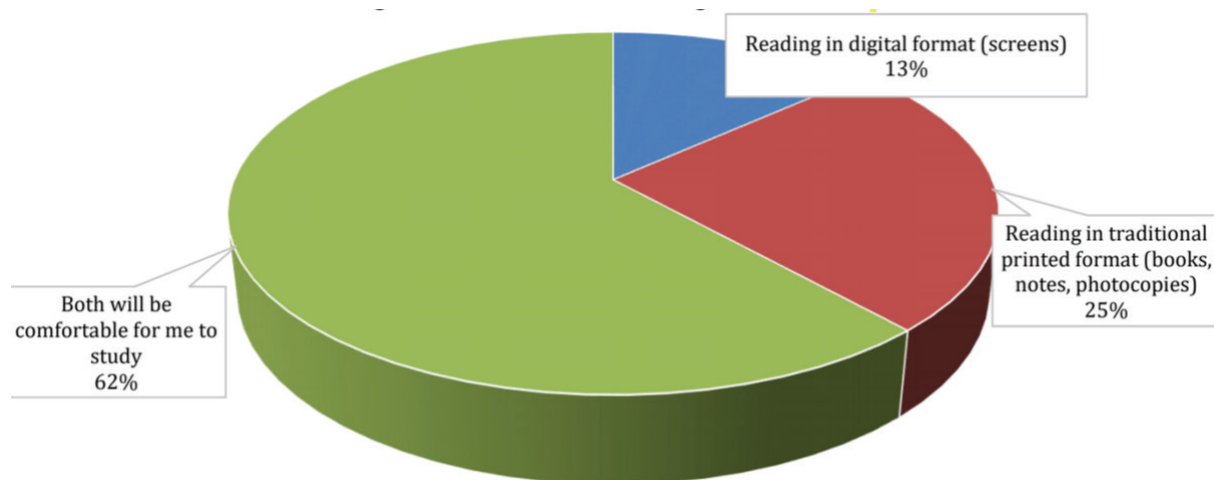
Figure 2 -Preferences for reading academic texts

CONCLUSIONS

The early link between students and technologies often leads to the assumption that they have the digital skills/competences to use them successfully in the educational environment. Also, as stated in the introduction to this paper, it is necessary to consider that students not only use the technologies provided by educational institutions, but also by their socio-cultural environment.

Thus, institutions need to know exactly how students use technology in order to be able to make decisions aimed at strengthening their capacities for better academic performance.

Along these lines, the results presented in the previous section allow us to conclude that the students perceive themselves as moderately expert users of digital technologies. This is reinforced by the number and variety of software and applications used. Some of them correspond to basic office automation tools, such as word processors, tools for making presentations and spreadsheets, as well as others that allow collaborative activities in synchronous or asynchronous mode.

A particular aspect that merits further study is the use of generative artificial intelligences to carry out learning activities.

On this occasion, the level of expertise with which these technologies operate has not been measured. It also emerges from the results that numerous tools were incorporated into their routines upon entering university (Coicaud, 2019),

Students have also been consulted about the challenges they encounter when selecting content for their studies through web searches. In particular, it is interesting to consider that the difficulties are centered on aspects related to digital competencies in the search and selection of information for the realization of their academic activities.

According to UNESCO (2018), if people are to succeed in a hyper-connected society, "*digital skills must also go hand in hand with strong literacy and numeracy skills, critical and innovative thinking, solutions to complex problems, the ability to collaborate, and social-emotional skills*".

Thus, from the results obtained, it is concluded that students are able to operate various digital technologies in their daily lives and perform appropriation processes in the educational environment, although they require assistance, advice or tutorial activity for the development of soft skills for an effective and efficient use in the learning processes.

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