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Visibility of Scientific Production and Digital Identity of Researchers through Digital Technologies

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Abstract: The research process does not end with the publication of the results; on the contrary, it has to continue even further, when results are disseminated and scientific disclosure on the Web begins. The purpose of this article is to promote visibility of the scientific production and digital identity of the faculty and researchers at the Universidad Técnica del Norte (Ibarra-Ecuador). By implementing a quantitative documentary, descriptive, and quasi-experimental comparative approach, it was possible to determine the importance of scientific visibility, the most suitable digital platforms for this task (ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (WoS), Author ID (Scopus), Sciprofiles, Mendeley, Facebook, Twitter, LinkedIn and Impactstory), and the level of knowledge that professors have of these platforms. With the results, a pilot training-course was planned and implemented for researchers and university professors of the Faculty of Education Science and Technology, with the purpose of registering their author profiles and incorporating their scientific production onto the platforms with the greatest impact and visibility. The results from the two stages (pre-test and post-test) of the pilot course show a significant difference regarding the creation and management of the research profiles; therefore, this strategy puts forward an alternative way to make research and digital/identity visible in the academic, scientific and social community.

Keywords: scientific visibility; digital identity; scientific production; digital technologies; researcher profile; author profile; academic social-networks; scientific disclosure

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1. Introduction

The visibility of the academic-scientific production and digital identity of researchers in the knowledge society implies transforming the professional practices of publishing and disseminating their findings. Beyond the research process, the way in which the results are published and disseminated will make a difference to the impact of scientific development. Taking the basic definition of the dictionary as a starting point, visibility is defined as the "quality of being visible", and "something that can be seen" [1]. In the scientific field, visibility is understood as the presence of the researcher on the Web: the recognition, the positioning, and citations that the author receives for conducting research in the scientific community.

Scientific production is a substantial function of research. The publication of knowledge in scientific articles, books, book chapters, doctoral theses, repositories, and magazines, among others, constitute the main source of scientific dissemination [2,3], and it is becoming more and more important within the professional curriculum. The number and quality of scientific productions determines the research level and faculty categorization within Higher Education Institutions (HEIs) [2]; however, there are a large number of investigations with concrete results that go unnoticed, whether because they have not been disclosed, their format is analogous, or simply because they stay unread in some university library [4].

Traditional media, magazines, reports, congresses, conferences, among others, have allowed scientific dissemination in the recent past. The slow process of publication and the

high cost have made it difficult to access scientific information [5]. Currently, the use of digital platforms is immersed in the production of scientific knowledge, the methodological design of research, data collection, analysis and processing of information, dissemination, and the evaluation of its results [6]. Sharing research and academic-scientific resources through virtual platforms, blogs, web pages and social networks, among other web spaces, has become an easier task with digital technologies.

Digital technologies are those that allow researchers to investigate, learn, innovate, create, co-create, publish, share, and actively participate on the web. They have opened up the possibility for improving visibility and the communication of knowledge through social interaction, the dissemination of content, the conversion of scientific journals from printed format to digital format, and the publication of research in open access (OA) [7].

There is a higher probability that researchers with more experience in research publish their work in open access [3,8]. The main reasons for this choice are publication visibility, impact [7–9], and the increased number of citations and readers they may have [8]. For some researchers, publishing in OA is not an easy task, due to the high cost of publication [3,8,9], copyright respect [10,11], and editorial/magazine quality [12]. Nowadays, due to the positioning of open access, researchers must assume a more proactive and digitally literate role to disclose, spread and disseminate their scientific production through digital technologies.

Personal branding or researchers' digital identity maintains a direct relationship with the visibility of scientific production. For Fernández-Marcial and González-Solar, digital identity is "the result of the conscious effort made by the researcher to be identified and recognized in a digital context, distinguishing himself from the group of researchers through standardization, with the use of identifiers, and the dissemination of research results in networks and platforms of a diverse nature" [13] p. 657. The difference will be more important for those who, in addition to being identified, manage their visibility and digital identity towards greater academic and scientific recognition.

Higher Education Institutions (HEIs) must establish some strategies that make scientific production more visible and configure researchers' digital identity as a personal brand [14]. This will help identify the researcher in the scientific and academic digital ecosystem, make university affiliation visible, and contribute to the evaluation of institutional rankings such as Scimago.

In the last two decades, scientific production has become a priority in Latin America and in other regions of the world. It represents one of the emerging economies that focuses on the development of science, technology, and innovation [15]. According to the Scimago Journal Rank (SJR), in 2021, Ecuador was ranked number 7 in Latin America for its scientific production, surpassed only by Brazil, Mexico, Chile, Colombia, Argentina and Peru. Of the 5980 documents published, 80.51% have been cited; however, 23.34% of this stratum are self-citations.

The interest of researchers in visualizing scientific production through various web strategies is evident in the mainstream Scopus and Web of Science (WoS) literature. Such strategies include the standardization of the researchers' signature, which allows the management of their digital identity on the network, to be identified and recognized in the scientific digital-context [14,16], the creation and management of professional profiles through digital technologies through ORCID, Google Scholar, ResearcherID (WoS), Author ID (scopus) [14,16,17], the participation in academic social-networks (ASNs), Mendeley, Academia.edu and ResearchGate.net [5,14,16,17], the incorporation of institutional repositories [14,18], and the communication of science in open access [8–12,19,20].

Although the creation and configuration of research profiles and participation in ASNs are strategies that enhance the visibility and digital identity of the researcher, time and effort are needed for its management and constant updating. For Mandiá-Rubal et al. [16], researchers with a higher number of publications are more proactive in ASNs and have a higher h-index. The researcher must be aware of the benefits offered by digital technologies and ASNs when disclosing their research results. It is necessary to modify their

sociocultural and technological practices, based on openness and connectivity, for greater recognition [21] and contribution to the development of a society open to science.

The increase in research activity at Universidad Técnica del Norte (UTN) is reflected in the number of publications attached to the institution. One of the problems detected in UTN, though, is that, despite the fact that technology is immersed in daily life and mainly in the scientific community, some researchers are unaware of the digital technologies with the greatest impact, which limits the visibility of their academic-scientific profile and, therefore, the dissemination of their scientific production is not oriented towards universal knowledge.

Of approximately 600 faculty members, 133 have already created their research profile on one of the digital technology platforms (Google Academic); however, of this segment, 31 professors do not have at least one citation in their scientific production. Therefore, the purpose of this research is focused on identifying the knowledge that the research faculty have of these digital technologies, to make their scientific production and digital identity more visible and, based on the results, design a pilot training-proposal that allows the strengthening of their visibility on the Web.

2. Materials and Methods

This research is based on a quantitative documentary, descriptive, and quasi-experimental comparative approach. The three phases of this research are described below.

2.1. Phase 1—Literature Review

The bibliographic review was conducted in UTN's Virtual Library with the databases Web of Science and Scopus. The importance of scientific-production visibility and the digital identity of researchers was characterized and established, as well as the most suitable digital technologies for this purpose (See Table 1).

Table 1. Digital technologies for scientific-production visibility and publication.

Technologies/Author Profile	Description	Metric Dimension	Impact Metric	Account	URL
Iralis	Standardization system for scientific authors' signatures.	Not applicable	Not applicable	Free	Accessed on 14 October 2022. https://www.iralis.org
ORCID (Open Researcher and Contribution ID)	It provides a unique and permanent identifier for each researcher.	Not applicable	Not applicable	Free	Accessed on 14 October 2022. https://orcid.org/
Google Scholar	The researcher or author knows the citations they receive for their scientific production.	Citation metrics	h [1] index i10 [2] index	Free	Accessed on 14 October 2022. https://scholar.google.com
ResearchGate		Citation metrics Research-interest metric Research-reading metric Metric by recommendation Metric by mentions (Twitter)	h [1] index h index (excluding self-citations)	Free	Accessed on 14 October 2022. https://www.researchgate.net
Academia.edu	Social network for researchers.			Free/payment	Accessed on 14 October 2022. https://www.academia.edu/
Author ID (Scopus)	Author identification and profile integrated into Elsevier's Scopus database.	Citation metrics Metric by the number of publications in Scopus	h [1] index	Payment	Accessed on 14 October 2022. https://www.scopus.com
ResearcherID (Wos)	Author identification and profile integrated into Web of Science database.	Citation metrics Metric by the number of publications in WoS Peer-reviewed metrics Publisher Verification Metric Author Impact (Beamplot)	h [1] index	Free	Accessed on 14 October 2022. https://clarivate.com/products/scientific-and-academic-research/research-discovery-and-workflow-solutions/researcher-profiles/

Table 1. *Cont.*

Technologies/Author Profile	Description	Metric Dimension	Impact Metric	Account	URL
Mendeley	Academic social network associated with ScienceDirect or Scopus.	Citation metrics Metric by the number of readings Integrated metrics in Plumx metrics (quotes, captures, mentions, social networks)	h [1] index	Free	Accessed on 14 October 2022. https://mendeley.com
SciProfiles	Social network for researchers and academics integrated into the open access publisher MDPI (Multidisciplinary Digital Publishing Institute).	Altmetrics by followers, sponsorships, comments, and recommendations	Not applicable	Free	Accessed on 14 October 2022. https://sciprofiles.com
Twitter	Academic social network to increase the visibility and impact of the author.	Altmetrics based on the following actions: interactions, reactions, likes, shares, and research posts	Not applicable	Free	Accessed on 14 October 2022. https://twitter.com
Facebook	Social network to increase the visibility and impact of the author.	Altmetrics based on the following actions: interactions, reactions, likes, shares, and tweets from the research	Not applicable	Free	Accessed on 14 October 2022. https://www.facebook.com
PlumX Metric		Metric by the number of bookmarks Metric by number of times it has been bookmarked (Slideshare, SoundCloud, Youtube) Metric by the number of followers (GitHub) Metric per repository fork (GitHub) Metric by the number of people who have added research to their library (CiteULike, Goodreads, Mendeley, Social Science Research Network (SSRN)) Metric by the number of subscribers (Vimeo, YouTube) Metric by the number of times a citation has been exported in a bibliographic manager or the number of times a citation, abstract and full document have been downloaded (Social Science Research Network (SSRN)) Metric by watchers (Github)	Not applicable	Free	Accessed on 14 October 2022. https://plumanalytics.com/
ImpactStory	It allows the measurement of the research impact by the author profile.	Metric by the number of times a document has been downloaded or shared Metric by dataset, software, slides, and other research products (Figshare, Github, Slideshare, Google Scholar citations, ORCID, Twitter)	Not applicable	Free	Accessed on 14 October 2022. https://profiles.impactstory.org

[1] h index: metric at the author level that measures the productivity and impact of the publication citations. [2] i10 index: metric that indicates the number of works that an author has written and those that have received at least ten citations.

2.2. Phase 2—Research Design

The population was made up of 635 professors from UTN. A random-sampling technique permitted us to obtain a sample of 302 professors, with a 95% of confidence and a 4% margin of error. Table 2 presents the sample distribution of UTN professors per each academic unit.

Table 2. Sample distribution of UTN professors.

Academic Unit	Frequency (f)	%
FACAE [1]	69	22.85%
FCCSS	57	18.87%
FECYT	85	28.15%
FICA	56	18.54%
FICAYA	21	6.95%
FP	14	4.64%
Total	302	100%

[1] FACAE, Faculty of Administrative and Economic Sciences; FCCSS, Faculty of Health Sciences; FECYT, Faculty of Education Science and Technology; FICA, Faculty of Engineering in Applied Sciences; FICAYA, Faculty of Engineering in Agricultural and Environmental Sciences, and FP, Faculty of Postgraduate Studies.

Based on the literature review (phase 1), the information from authors specializing in the visibility of scientific production and the digital identity of researchers [4,7,14,17,18,20–22] was considered to build the research instrument in ad hoc form, with 36 questions grouped into three sections: informative data, academic data, academic-scientific digital visibility, and digital identity. The purpose of this instrument was to identify the knowledge that UTN researchers have concerning the management of their scientific-production visibility and their digital identity, through the use of digital technologies.

The survey was validated by five experts in scientific research. The evaluation focused on the writing style and syntax of each question, as well as the coherence and relevance of the content in relation to the objective proposed. The validation combined or eliminated some items, resulting in an instrument of 27 questions. To obtain the reliability of the questionnaire, a pilot test was applied, and later the internal consistency was verified through Cronbach's alpha, whose coefficient reached the value of 0.9123; that is, the reliability of the instrument was very high, so it was applied through "Forms", a Microsoft 365 application. For the inferential and descriptive analysis, the statistical package SPSS v22.0 was used.

This study was approved by the Ethics Committee of the University Center for Scientific and Technological Research (CUICYT) at Universidad Técnica del Norte (N° 0000000691). This work was carried out in accordance with the guidelines of the university code of ethics (UTN, 2012). The researchers who voluntarily participated in this study signed a written informed consent to guarantee the confidentiality and anonymity of the participants. The same instrument was used for both the pretest and the post-test. The link can be found in the Data Availability Statement section.

2.3. Phase 3—Development and Application

With the results from phase 2, a pilot teacher-training proposal was developed, with the intention of promoting scientific-production visibility and digital-identity at Universidad Técnica del Norte (Ibarra-Ecuador) using digital technologies of great impact. Table 3 presents the course planning in Spanish, divided into three phases: introduction, development and closing, with a duration of 40 h (12 h in-person and 28 h for autonomous work). Before the course, participants were asked to gather all their academic and scientific production (articles, books, book chapters, undergraduate and postgraduate theses, among others), and to keep the institutional-email active.

Before accessing the course certification and validation by UTN, participants were asked to create their research profiles and upload all their publications onto the platforms ORCID, Google Scholar, ResearchGate, Scopus, ResearcherID (Wos), Mendeley, Impactstory and Sciprofiles. For this pilot test, professors from the Faculty of Education Science and Technology were requested to collaborate and take part in the survey (pre-test). The same instrument was used at the pre-test stage and at the post-test period. The results were compared using the SPSS software.

Table 3. Teacher-training pilot-course planning.

Course Stages	Objectives	Content	Resources (R)/Strategy (S)	Estimated Time in Hours
Introduction	Identify new information on digital-ecosystems and its importance in academic-scientific visibility.	Participants' welcome. Course objectives. Analysis of the diagnosis results. Course-development insights. Introduction What is the visibility of academic and scientific production? How to improve the academic-scientific impact. Digital identity (researcher profile). Signature standardization through registration in Iralis. UTN Institutional affiliation. How to create and manage a profile in ORCID, Google Scholar, ResearchGate, Scopus, ResearcherID (Wos), Mendeley, Impactstory and Sciprofiles. How to record academic-scientific production in the institutional teaching portfolio. How to register as a researcher in Senescyt-Ecuador. Signature configuration in the institutional email.	R: Computer, Internet connection, multimedia material S: Q and A	1 synchronous
Development	Use research and publication technologies to make scientific-academic production visible through the researcher profile.		R: Computer, Internet connection, multimedia material available on and accessed on 14 October 2022. https://osf.io/2hwga/ and https://www.symbaloo.com/mix/visibilidadinvestigativa S: Brainstorming, Q and A	10 synchronous 28 autonomous
Closing	Understand the benefits of digital technologies for researchers and their scientific production.	Synthesis and recommendations to make scientific production and digital identity visible. Post-test survey. Thanking and closing.	S: Q and A	1 synchronous

3. Results

The results are presented, based on the methodology described. First, the general results from the diagnosis in the sample (302 professors) are described, then the comparative results between the pre- test and post-test at the Faculty of Education Science and Technology (FECYT) are also described.

3.1. General Diagnostic Results (Pre-Test)

A total of 84.11% of UTN researchers do not have enough knowledge regarding an author's signature normalization; only 15.89% have their signature normalized. It should be noted that 78% have had at least one scientific publication during the last five years; of this stratum, the highest scientific production is recorded in Latindex, with 16%, followed by 14% in book chapters. The percentage of publications indexed to Scopus is similar to the scientific production of indexed books, conferences, and presentations (12%). Articles indexed in Scielo account for 7%, closely followed by the 6% that represents Web of Science (WoS) publications.

Regarding the creation of professional profiles using the digital technology platforms ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (Wos), Author ID (Scopus), Sciprofile and Medeley, it is evident that most UTN researchers have neither created

their profile nor published their scientific production on these platforms. It can be observed that when creating author profiles, ORCID is the most used (60%), followed by Google Scholar (38%), ResearchGate (35%) and Mendeley (35%). The other platforms (Academia, ResearcherID (WoS), Author ID (Scopus), Sciprofile) have percentages less than 28% (see Figure 1).

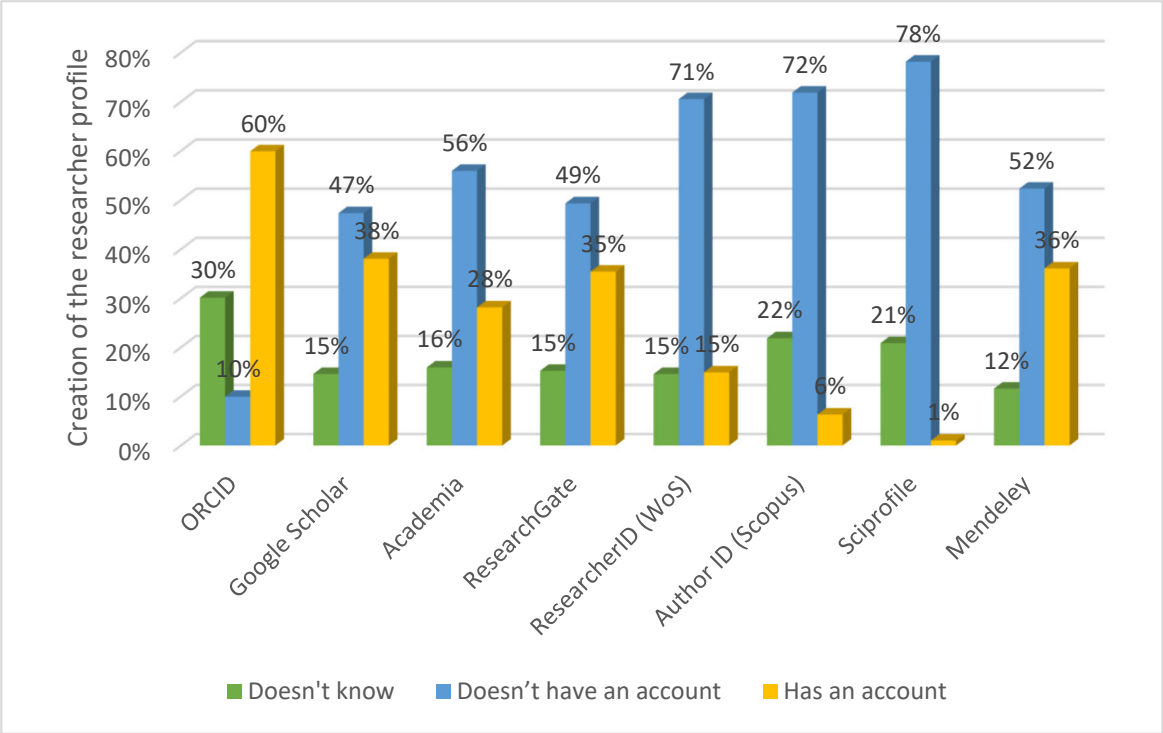

Figure 1. Creation of the researcher profile on digital platforms.

On the other hand, when research professors are asked about the frequency with which they manage their academic-scientific profile, the results show that most of them do not take any action to manage it. This inactivity fluctuates from 30% in ORCID to a 67% in Sciprofile (see Figure 2); therefore, the diagnosis makes evident the lack of dissemination and visibility of scientific production using digital technologies for publishing.

Knowledge of academic social networks (ASNs) such as Facebook, Twitter, LinkedIn and ImpactStory is low (Figure 3). The lack of knowledge of research professors about ASNs ranges from 9% for LinkedIn to 21% for Impactstory. A total of 53% of the participants do not have an account or profile on LinkedIn, followed by Facebook (73%), Twitter (77%) and Impactstory (78%). Figure 3 shows that 38% of the researchers have a LinkedIn account, followed by Facebook (16%), Twitter (13%) and Impactstory (1%). On the latter, only three people have an account to measure the impact of their research.

Figure 4 reveals that the frequency of profile management on academic social networks (Facebook, Twitter, LinkedIn and Impactstory) is limited. Inactivity fluctuates from 46% on LinkedIn to 68% on Twitter. The percentages of moderate management of ASNs range from 2% for Impactstory to 12% for LinkedIn, with the latter being the one that researchers use the most.

The average value that professors assign to their knowledge of scientific-production visibility and digital identity is 1.99, on a scale of 1 to 5. Mostly, 98% of those surveyed expressed the need to receive a training course on the subject in in-person modality (62.34%).

These results show the need to create a training course to help research professors create and manage their author profiles on each of these digital platforms, which will contribute to scientific-production visibility and both personal and institutional digital-identity.

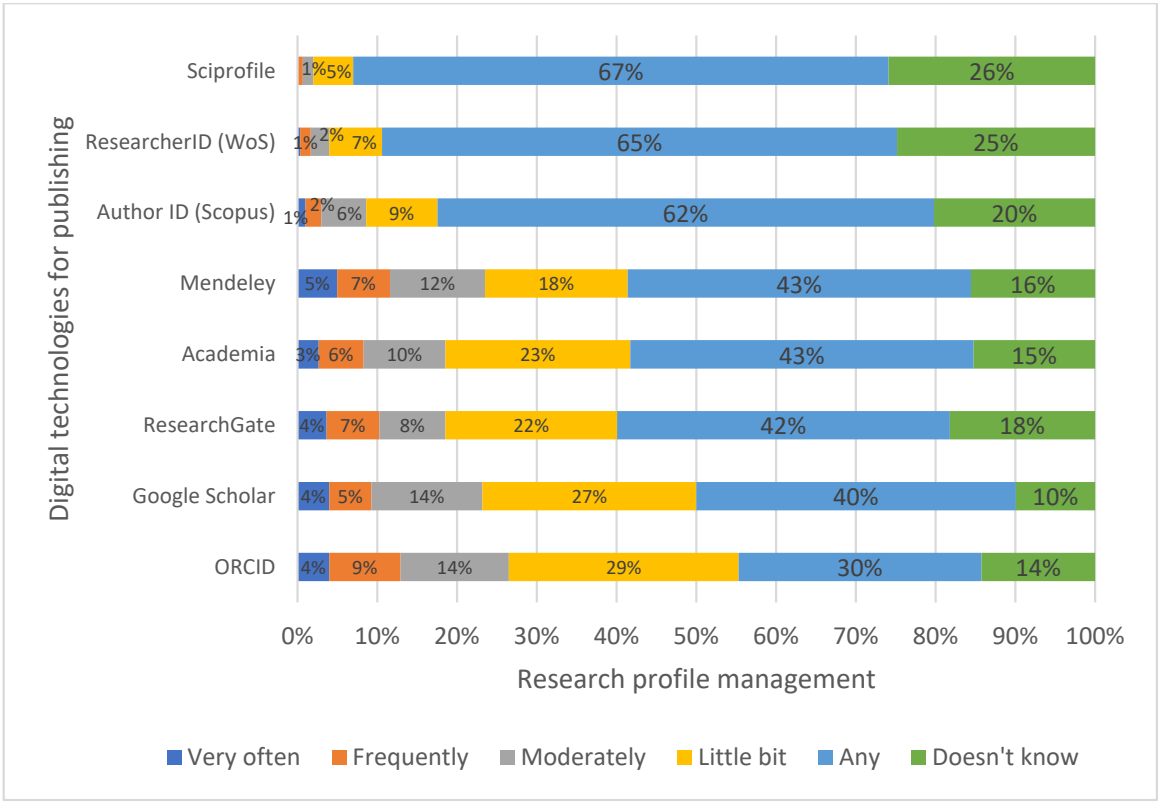

Figure 2. Researcher-profile management on digital-publishing platforms.

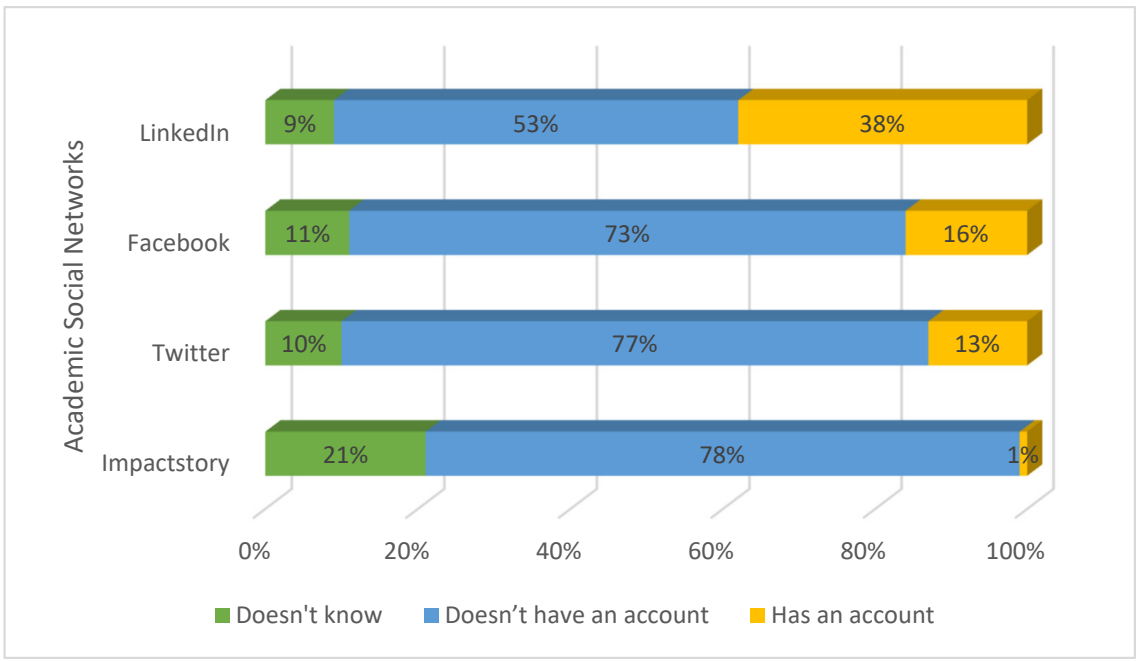

Figure 3. Researcher profile on Academic Social Networks.

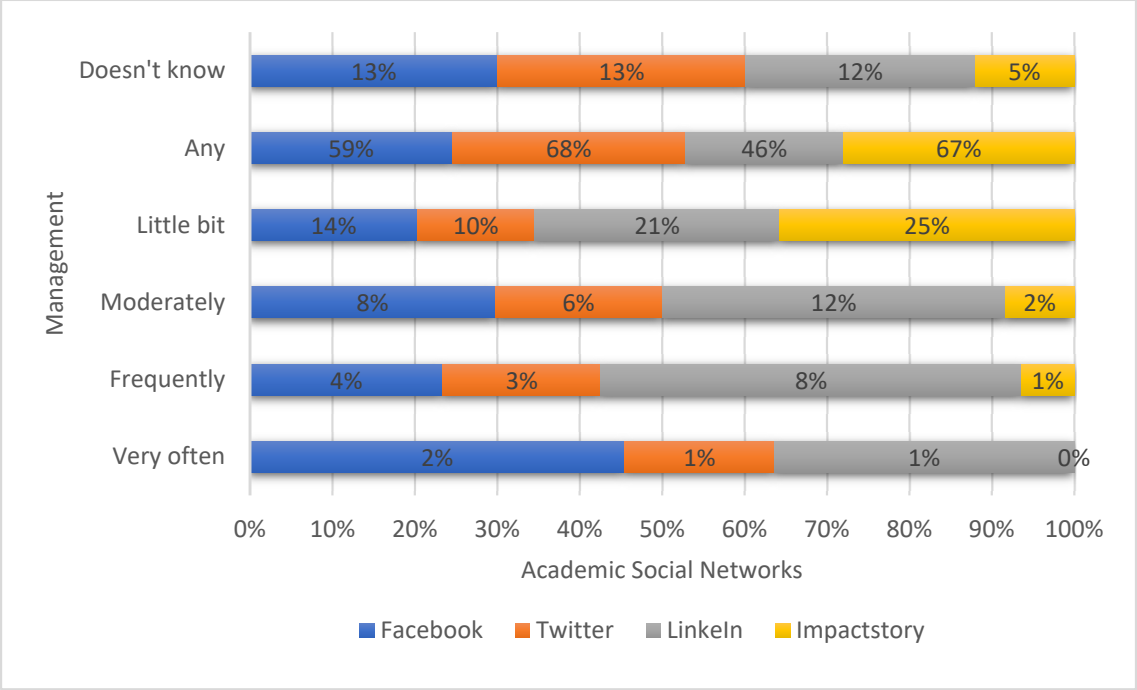

Figure 4. Researcher-profile management on Academic Social Networks.

3.2. Pre-Test and Post-Test Comparative Results at FECYT

Before the pilot course on digital technologies for scientific-production visibility and digital identity, 57.65% of the professors at the Faculty of Education Science and Technology affirmed that they did not have their signature normalized, 17.65% did not know about the subject, and only 24.70% had a signature. Table 4 shows the positive results obtained after the training course, with 89.41% now having their author signature.

Table 4. Pre-test and post-test author-signature normalization.

	Pre-Test	Post-Test
Not created	57.65%	10.59%
Doesn't Know	17.65%	0.00%
Created	24.70%	89.41%

Before the training course, 72.94% stated that they had not created their researcher profile on any of the digital platforms such as ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (WoS), Author ID (Scopus), Sciprofiles, Mendeley, Facebook, Twitter, LinkedIn and Impactstory; only 12.94% had had their researcher profile already created. Table 5 presents the results obtained after implementing the pilot course at FECYT: a positive change is observed in professors who have ventured into research and publication technologies, with 47.68% creating their author profile. There is a minority of 1.16% which represents a participant who affirms no knowledge of digital platforms to create a researcher profile.

Table 5. Pre-test and post-test researcher-profile creation.

	Pre-Test	Post-Test
Not created	72.94%	51.16%
Doesn't Know	14.12%	1.16%
Created	12.94%	47.68%

In order to know if this change in the use of digital technologies for scientific-production visibility and researcher identity is significant, a comparative analysis was conducted for the two moments (pre-tests and post-tests) of the course.

The data does not come from a normal distribution; therefore, the non-parametric Mann–Whitney U test is used (see Table 6), with the following hypotheses:

Table 6. Mann–Whitney U.

	Mean	Median
Pre	2.0461	2.0800
Post	2.4256	2.4200
Total	2.2370	2.3300

H_0: There is no significant difference in the value of the medians.

H_1: There is a significant difference in the value of the medians.

As the *p* value is < 0.05, the null hypothesis is rejected, and the research hypothesis is accepted. There is a significant difference in the value of the medians. With a median value of 2.08 for the pre-test (before the training course) and a median value of 2.42 for the post-test (after it), it can be concluded that the difference is significant (see Figure 5) and the change was positive with respect to researcher-profile creation on digital platforms.

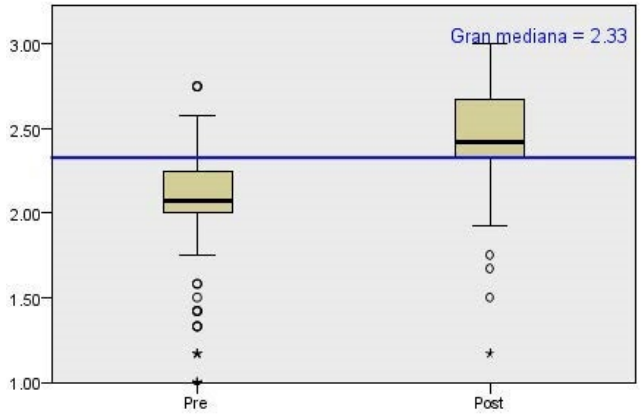

Figure 5. Median test for independent samples.

Regarding the management of a research-academic profile, the data do not come from a normal distribution. For the comparative analysis, the non-parametric Mann–Whitney U statistical test was used, with the following hypotheses: H_0: There is no significant difference in the value of the medians and H_1: There is a significant difference in the value of the medians. (See Table 7.)

Table 7. Non-parametric Mann–Whitney U test.

	Mean	Median
Pre-	1.5151	1.3300
Post-	2.0271	1.8700
Total	1.7726	1.5300

As the *p* value is < 0.05, the null hypothesis is rejected, and the research hypothesis is accepted, which reaffirms that there is a significant difference in the value of the medians. With a median value of 1.33 for the pre-test (before the training course) and a median value of 1.87 for the post-test (after it), it can be concluded that the difference is significant (see Figure 6). The change was positive with respect to academic- and research-profile management.

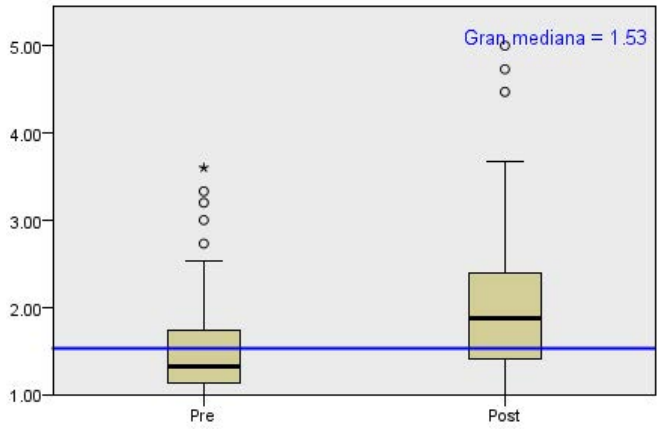

Figure 6. Median test for independent samples.

At the end of the training course, a survey with two open questions helped to collect relevant information on planning, methodology, structure, resources, time, and other indicators, to improve the final structure and future versions of the course. Table 8 summarizes the feedback received.

Table 8. Feedback received from the course participants.

Question	Condensed Responses
What is your perception of the course?	It helped me improve my digital identity and make my scientific-academic publications more visible. The course was useful personally and professionally, the contents taught were current and fit our current needs. The course generated creativity and innovation in research. A training program is the best strategy to learn and be at the forefront when using digital technologies. The course was very clear and encouraged us to incorporate research into everyday activities
What would you suggest to improve the course?	Increase synchronous class time and reduce autonomous work hours. Time is a limitation, the course should be longer to address practical aspects. Perform regular evaluations during the course on digital platforms and creation of author profiles. Plan the course with smaller groups in order to make learning more meaningful.

4. Discussion

The visibility of the scientific production and digital identity of research professors is both an individual and institutional responsibility. The uniformity of author signature and institutional affiliation in research are key elements to achieve recognition and academic-scientific positioning based on scientific production. The results achieved in this study are partially similar to the findings of Fernández-Marcial and González-Solar [13], since they establish the integration of the researcher profile in the ORCID, ResearchID (WoS) and Author ID (Scopus) identifiers; nevertheless, this study highlights the importance of creating and managing profiles on twelve digital platforms: ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (Wos), Author ID (Scopus), Sciprofile, Medeley, LinkedIn, Twitter, Facebook and Impactstory.

Another result that coincides with Tena et al. [23] is the ignorance and poor use of digital technologies that professors have when visualizing and managing scientific production and digital identity among their peers and within a scientific community. Participation, interaction, and collaboration of researchers in the scientific field through

digital technologies facilitate the search for information and the dissemination of results, resulting in greater visibility and impact for the author; these are aspects that contribute to visibility and institutional prestige.

This study reveals the importance of technology in research and the need to train research professors in how to create and manage their profiles through the normalization of the scientific signature to avoid ambiguities, the possession of a single digital-identity, and the management of profiles through the digital technologies that have the greatest impact and visibility (a subject presented in this study). The results achieved in this research ratify the findings of Rodríguez [4], García-Peñalvo [14] and Rodríguez-Fernández et al. [24], who state that teacher training on scientific-production visibility and digital identity through digital technologies contributes to the consolidation of the image and prestige of both the researchers and the institution they represent. The more public profiles the researchers have, the greater their visibility and impact are; these are statistics that will be reflected in the number of citations and readings they will receive for their research.

Of the eight digital platforms (ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (Wos), Author ID (Scopus), Sciprofile and Medeley), which are classified within the category to create researcher profiles and make scientific-production visible, it was found that, on average, 27.37% of UTN research-professors use these platforms. These results are similar to those of Corchuelo [25], who confirms that researchers do not have an account on these platforms; therefore, the presence of UTN researchers on academic networks and academic social networks (ASNs) with the greatest impact and visibility is low, and they do not have the digital culture to share the knowledge they produce, despite the fact that the widespread use of these platforms has been addressed by other authors such as Deng et al. [26] and D'Alessandro et al. [27]. These studies, similarly to the results of this research, corroborate that digital technologies are platforms that allow academic and scientific self-promotion, providing researchers with the opportunity to be found on the Web through their positioning and participation in networks of researchers with communal interests.

On the other hand, ORCID was found to be one of the best known and most-used platforms by research professors in this study, a finding that confirms the results of Fernández-Ramos and Barrionuevo [18] and Fernández-Marcial and González-Solar [13], but contrary to Uribe-Tirado et al. [28], who highlight the use of ResearchGate. ORCID has been considered in recent years as the main identifier for researchers; the author's identification code is required more frequently in research projects and in the publication of articles in indexed journals, in order to avoid ambiguities and thus uniquely identify the author [29]. It is necessary to consider that, by using ORCID, it is possible to link with other platforms such as Academia, ResearcherID (WoS), Author ID (Scopus), Mendeley and Sciprofiles.

The results also show that the platforms in this order: Google Scholar, Mendely, ResearchGate, Academia, ResearcherID (WoS), Author ID (Scopus), and Sciprofile, have less presence of use among the research professors in this study. This does not mean that they are less important; on the contrary, ignorance of these platforms limits the visibility and impact of researchers and the institution to which they belong. According to [25,27], these platforms promote research, show the scientific impact through the citation rate, and allow professors to improve their research networking.

Another result analyzed in this study is the minimal presence of UTN research professors on the ResearcherID (WoS) and Author ID (Scopus) platforms, which is different from the results obtained by Fernández-Marcial and González-Solar [13], where university researchers have a greater presence. Despite the importance of JCR and SJR for research careers, the data presented on profile creation in these databases is related to the low percentage of publication on them.

Presence on ASNs is minimal, despite the fact that a greater presence here could potentially promote research and increase the number of citations. Participants in this study show a preference for LinkedIn (38%), followed by Facebook and Twitter, a result similar to that of Uribe-Tirado [28] and partially in line with that of Corchuelo [25], since LinkedIn

is the platform with the highest registry, followed by YouTube and Twitter. In this sense, LinkedIn is the most significant social network for dissemination and visibility.

The results obtained from comparing the pre-test and post-test stages show that teacher training on scientific-production visibility and digital identity creates a positive relationship for reciprocity and individual and institutional commitment. Researcher-profile registration and management on the platforms described in the course planning is very important. The subject must be studied in greater depth, from a bibliometric approach, to continue taking advantage of the digital technologies that are presented in this work; by doing this, it could be possible to achieve greater dissemination, diffusion and popularization of science, as well as greater visibility and scientific and social impact.

5. Conclusions

Higher education institutions are committed to taking actions to facilitate access to information, to consolidate the creation of science, and to manage and make scientific-production visible, in order to achieve greater visibility and institutional prestige.

In an attempt to improve the visibility of the scientific production and digital identity of UTN researchers, it was necessary to implement, as a strategy, a training course on digital technologies with the greatest impact in the academic, scientific and social fields: ORCID, Google Scholar, Academia, ResearchGate, ResearcherID (WoS), Author ID (Scopus), Sciprofiles, Mendeley, Facebook, Twitter, LinkedIn and Impactstory.

The results of this study showed that planning and implementing a pilot course as a strategy to make science production and digital-identity visible was a positive action. A combination of theory and practice allowed professors to register their researcher profiles and integrate their scientific production. What was previously seen as something limited, regarding the visibility of the author, is now visible in the institutional and international scientific-community; therefore, it is confirmed and ratified that implementing a training course on this subject becomes a potential strategy that can be replicated in other academic units within the Universidad Técnica del Norte.

This study can serve as a point of reference for other higher education institutions to formulate training strategies that guide the good practices of digital technologies and support the generation of new institutional policies to improve scientific-production visibility and the digital identity of researchers and institutions in the scientific and social community.

6. Limitations and Future Lines of Research

Although the description of the results achieved in this study allows us to have a diagnostic vision on the use of digital technologies for the publication of the scientific production and digital identity of a group of researchers from the Universidad Técnica del Norte, it is not possible to generalize or extrapolate the results. To determine the relevance of the use of the platforms, it would be advisable to conduct research in other contexts, similar to this one.

From this study, various lines of research could be derived, such as the application of training proposals to other scenarios or at educational levels, establishing the relationships between demographic variables and researchers in the use of digital platforms, and comparing digital-publication platforms in relation to the number of citations that the researcher receives in a given time, to establish the effectiveness of scientific visibility. Likewise, it would be of great interest to analyze and verify whether the creation of author profiles on most of the platforms reviewed in this study correspond to greater visibility and affect the impact of the researcher. In the qualitative field, researchers' motivations and limitations when using digital-publication platforms could be also studied.

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