

Article

Digital literacy challenges in higher education: Information literacy in the face of misinformation

<http://dx.doi.org/10.11645/20.1.817>

José G. Casas-Puente

Professor, Universidad Autónoma de Nuevo León, Mexico. Email: jose.casasp@uanl.edu.mx.
ORCID: <https://orcid.org/0000-0002-9800-5891>.

Abstract

This study focuses on Mexican university students and their perceptions about their information literacy (IL) related practices as they face the persistent challenge of digital disinformation. The analysis highlights deficiencies in essential critical information competencies and the lack of pedagogical action within higher education with respect to the integration of IL into the curriculum. Following a qualitative approach, the research collected feedback from students who participated in a short instructional intervention. All the findings point to a strong tendency to draw on 'digital intuition' as opposed to a defined set of criteria and limited tools to corroborate information. The results argue that IL is essential for informed and responsible actions and should be integrated horizontally in all components of the curriculum. In the context of digital disinformation, the paper concludes with suggestions for using sustainable methods to teach IL in the form of IL integration into educational programmes.

Keywords

critical thinking; digital literacy; disinformation; higher education; information literacy; undergraduate students

1. Introduction

Concerns around manipulated, distorted, or misleading information abound on the internet, including in antivaccine literature and resources on other topics concerning public health, education, and other public interest topics (Larson, 2018). Inaccuracy is the norm in environments where algorithms prioritise virality over truth, where uncritical users frequently circulate baseless or misleading information online. Also common are half-truths and other contextual distortions (Lewandowsky et al., 2017; Vosoughi et al., 2018).

This [Open Access](#) work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#), allowing others to share and adapt this content, even commercially, so long as the work is properly cited and applies the same license. Copyright for the article content resides with the authors, and copyright for the publication layout resides with the Chartered Institute of Library and Information Professionals, Information Literacy Group.

Issues around Information Literacy (IL) encompass the acquisition of certain defined competencies, including searching and referencing, and broader higher-order critical thinking skills (Bamgbose et al., 2024). Still, despite increasing demand, these literacies remain poorly and infrequently integrated into Mexican higher education curricula, which to this day is not seen as including these literacies in academic education (Bernard, 2024; Uribe-Tirado & Machin-Mastromatteo, 2024).

There are questions around how students at the university level analyse and assess the information to which they are routinely exposed and whether they have the skills to manage environments where misinformation is presented as bona fide content.

Consequently, this study encompasses two phases. In the first phase, the students analyse their reflections as future professionals on their perceptions and habits regarding their relationships with online information, and the second phase involved a short intervention.

For this purpose, university students were asked to analyse their encounters with digital information and how they manage the flow of information they receive within and outside the university, both in scholarly and non-scholarly contexts. A short educational intervention was then put into place to see if their abilities and perspectives could be further developed.

The multi-method approach adopted in this study was grounded in a previously validated instrument developed in a Spanish-speaking context, which incorporates several open-ended items to allow students to articulate their perceptions with a degree of autonomy.

According to discussions within the field of IL, the present work would expand recent understanding of this concept, which has been transformed into something that goes beyond a simple collection of technical skills towards a mostly social practice. Authors such as Lloyd (2024) and UNESCO (2024), point out that IL has been acquiring a socio-cultural value, as well as an institutional value, and this requires an instructional design that seeks functional approaches, so, based on the context of higher education in Latin America, this article aims to address the global gap on how IL can develop a critical civic engagement of a higher order in contexts immersed in information disorder.

2. Theoretical and contextual framework

2.1 Information literacy

The modern era has seen a change from developing IL skills as optional to an absolute necessity. The pandemic has resulted in an almost exponential growth in the information available online, including information of dubious veracity. In the digital environment, informational disorders are magnified, highlighting false information, rumours, fake news and erroneous information. It is because of this situation that the ability to search, evaluate and use information correctly and ethically must be mastered by all members of society, including students, teachers and members of society (Echeverría & Rodríguez Cano, 2023).

To reinforce the conceptual basis of this work, it is necessary to establish the way in which the definition of IL is presented in this work. This concept will be addressed as the combination of cognitive, evaluative, ethical and socio-technical skills necessary to locate, evaluate, interpret, communicate and use information in complex digital environments. The above definition is

obtained from the Media and Information Literacy framework established by UNESCO (2024), which establishes that IL represents a civic and democratic competence, which gives it a value far beyond technical purism. In the same way, Lloyd (2024) establishes that IL is an entire socio-cultural practice that is in the field of specific information landscapes, shaped by institutional norms, communities, and lived experiences. For the purposes of this study, IL is operationalised according to the UNESCO (2024) Media and Information Literacy framework, which positions IL as a civic, ethical, and socio-technical competence that extends beyond technical skills.

2.2 Misinformation and disinformation

In fact, this article outlines the most significant distinctions between misinformation — false or misleading content shared without harmful intent — and disinformation, which refers to deliberately fabricated or manipulated information aimed at deceiving audiences. These constructs require academic solutions and, therefore, must be solved through non-interchangeable pedagogical strategies, and recent studies on the phenomenon of information disorder confirm this (Washington, 2023). It is useful to understand in detail how these and other forms of information disorder should be addressed, as they are increasingly present in digitised environments that are subject to limited regulation. Addressing them requires greater analytical precision, rather than relying primarily on emotionally driven responses or affective engagement (Faix & Fyn, 2020).

Concerns regarding the digital spread of false or distorted content available on the internet have documented their permanence and reach in numerous sectors, including health care, education, and civic affairs, so collaboration between teachers, decision-makers, and representatives of the communications industries must be intensified. But major obstacles remain. Misguided and deceptive information continues to circulate at speeds that far exceed containment measures, while digital literacy within the population remains uneven, requiring strategic and, more importantly, long-term actions (Keselman, 2022; Washington, 2023).

Although misinformation might appear to be a recent problem, its roots go far back. Ríos-Gordillo (2023) describes how Marc Bloch and Carlo Ginzburg believed that rumour is a social mechanism that is constructed in situations of anxiety and fear. During the First World War, for example, isolated and anxious soldiers communicated and shared accounts of events that were distorted and imagined. This is akin to the modern context where rumour and speculation spread in social media.

The historical emergence of misinformation as a social phenomenon as outlined by Bloch and Ginzburg is a digital pattern of circulating false information, emotional stories, and fabrications at lightning speed. However, today's information ecosystem lacks control, and amplification is systematic and large in scale. In public health, political communication, and education, research has shown how these dynamics increase information disorder and erosion of trust and build gaps, especially in young adults, when encountering and interacting with information online (Keselman, 2022; Morejón Llamas, 2020; Ríos-Gordillo, 2023). Therefore, higher education institutions should implement strategies to enhance students' competencies and skills related to IL and engage in classroom activities that prepare future professionals to go beyond simple functional searches by incorporating contextual and structural awareness, biases, and ethical decision-making (Wineburg & McGrew, 2017).

2.3 Information literacy interventions

IL emerges as a receptive educational construct in these contexts. Instructing students to acquire critical and ethical skills in the use of information should be a protective mechanism against information disorders in the academic and social spheres. Some studies have tried to highlight the positive impacts of strengthening IL as a means of mitigating disinformation, especially during periods of global crisis such as Covid-19 (Rudra et al., 2025).

Other studies indicate that some short and structured interventions have been implemented in IL that have reported measurable improvements in the evaluation of students' sources, credibility assessment, and resistance to misleading content, indicating that brief pedagogical actions can generate significant advances (Guess et al., 2020).

On the other hand, the literature consulted points out the importance of brief interventions focused on promoting IL as effective in reducing the harmful effects of information. Studies that have originated in various contexts indicate the importance of the role of teaching in IL to strengthen students' capacity to verify sources, value content, and resist manipulative narratives in digital environments (Noain-Sánchez, 2020; Osadola et al., 2024; Rajasekhar et al., 2021).

The consulted works indicate that IL should be treated as a fundamental challenge and not as a simple transversal competence. The reviewed data bring to light a heterogeneous variety of tangible improvements in credibility assessment, news verification practices, and digital ethical behaviours when IL is integrated into university curricula. It is reported that students frequently fall into the "trap" of overconfidence regarding their assessment competencies while resorting to formats related to heuristic or intuitive practices, superficial indicators, or prior exposure to a given source, instead of carrying out an exhaustive verification process (Osadola et al., 2024; Rajasekhar et al., 2021).

2.4 Latin American context

The Latin American region is a broad context that represents complexity in terms of IL development, since it is where elements such as structural inequalities, fragmented institutional initiatives, and platform-orientated information environments synergise. All of these conditions highlight the exposure of young people to emotionally manipulative content and algorithms that intensify responses, which makes it a highly critical context to study in terms of the IL competencies and skills needed to combat disinformation in higher education and various sectors.

The above patterns amply reinforce the concerns expressed in the literature about the susceptibility of young people to emotionally manipulative or algorithm-driven content. The Latin American context, by its nature requires strong instruction in IL and that the initiative comes from an institutional level because this remains inconsistent or non-existent. This study responds to a notable gap in the literature by examining IL practices within a Latin American higher educational context, where empirical work on misinformation-related IL competencies remains limited and where socio-technical inequalities intensify the challenges documented in international research (Kops, 2025; Noguera-Vivo & Grandío-Pérez, 2024).

It is within this theoretical framework that IL is also understood as being disciplinary and situated. IL is believed to not develop linearly throughout different educational environments.

Instead, IL develops through the forms of evidence, argumentation, and epistemic norms that disciplinary fields emphasise. For instance, the humanities foster IL by promoting interpretation, citation, and critical reading, even though they may not explicitly state this practice. In contrast, students in engineering, as well as those in health sciences, interact with information in more problem-solving and technically precise ways. This enables us to understand some of the patterns of disparity that are noticed in comparative IL studies and strengthens the argument that IL instruction is context dependent rather than being generic workshops and training that are often siloed (Lloyd, 2024; UNESCO, 2024).

The growth of the digital world and digital technologies brings in more IL challenges beyond the already established IL frameworks. IL challenges from 'algorithmic bias', 'virality', and 'opacity of recommender systems' fuel what some scholars are calling 'algorithmic vulnerability', wherein users are, paradoxically, trapped in automated processes that filter-in only the most emotionally charged or contentious messages (Noble, 2018).

To make the most of automated processes, users need IL competencies that extend beyond source analysis to 'mind the gap' of source engagement. The most recent studies relevant to IL espouse the necessity for users to be able to discern the construction of digital systems to manipulate visibility of and emotionality toward information. This is particularly salient in Latin America, where political communication systems, socio-economic inequalities, and digital gaps collide with and polarise patterns of misinformation (Morejón Llamas, 2020; Ríos-Gordillo, 2023).

2.5 IL HUMASS

IL-HUMASS, unfamiliar in non-Spanish-speaking contexts, is a validated self-assessment instrument designed to measure university students' perceived IL competencies across key dimensions related to information use in academic contexts. The instrument comprises four fundamental dimensions — searching, evaluation, processing and communication (Pinto, 2010). It's important to mention that this instrument has been widely used in Spanish-speaking university students' contexts, making it particularly appropriate for analysing IL competencies in Latin American settings. These dimensions portray transversal IL competencies, all while offering institutions the opportunity to delimit and define their gaps and needs for instruction. While IL-HUMASS has numerous categories under each dimension, it does not operate under 6 macro dimensions; hence, this study concentrates on the particularly relevant categories that engage in evaluating the credibility, ethical use of information, and responsible participation in digital spaces. This focus is paramount to gauging student ability to address misinformation and disinformation challenges.

The selection of these categories is consistent with the analytical focus of this study, as they directly correspond to the cognitive and socio-technical skills required to identify misinformation, evaluate credibility, and resist digitally amplified manipulative narratives. This current study expands upon this area of research by assessing not only the students' self-perceptions and self-evaluations but also the tangible outcomes of a brief IL intervention. The integration of qualitative and quantitative measures deepens the engagement with the question of how universities can construct culturally responsive and scalable methods to counter information disorder (Guess et al., 2020).

Recent studies show that university students operate in information environments marked by speed, overload and algorithmic distortion, where misinformation and disinformation circulate with ease. In this context, IL is understood as the set of abilities needed to locate, evaluate and use information ethically across academic and everyday settings. Prior research across different regions consistently reports gaps in students' credibility assessment skills, especially when interpreting digital sources. The IL-HUMASS framework, with its four validated dimensions, provides a structured basis for analysing these challenges. This study builds on that tradition by examining how students understand credibility and by exploring whether brief, targeted instruction can strengthen their critical information practices.

2.6 Summary

Considering all these facets, the primary thesis that underpins this study is that IL needs to be viewed as an evolving, adaptive, and responsive literacy that boasts an ability to integrate cognitive and socio-technical understandings alike. In this light, the current study aims to provide a constructive, theoretical and practical value diagnostic of current IL practices of university students and to provide an evidence-based case for the inclusion and integration of IL as a key component of higher education curricula, particularly for those regions that are living through crises of complex, shifting information disorders (Cinelli et al., 2021; Wardle & Derakhshan, 2017).

Beyond the formal contribution, this paper offers evidence that IL challenges among university students are not limited to access to information but are mainly related to assessment, verification, and ethical engagement in digital environments. The findings of the diagnostic phase expose the glaring gaps in students' ability to critically assess the credibility of information, while the intervention phase demonstrates that even short, scalable didactic actions produce some measurable improvements in these competencies. This reinforces the need to deepen the fundamental approaches to IL and, with it, propose new pedagogical models that are integrated, contextualised and responsive to the contemporary dynamics of information disorder.

It should be noted that some research continues to recapitulate the urgency of addressing IL in university institutions as a mostly fundamental competency, mainly in the face of the growing use of digitally saturated contexts where misinformation and disinformation abound (van der Linden, 2024). This research strengthens ongoing international debates by offering evidence from the context of the Latin American public university, underscoring the relevance of IL not only as a set of technical skills but also as a critical educational priority aligned with democratic participation, informed decision-making, and the promotion of critical thinking.

3. Methodological Design

This study adopted a mixed-methods design structured in two sequential phases. Study one was a diagnostic phase to identify students' perceived IL practices when managing digital information (academic and non-academic). Study two was a short academic intervention designed to explore whether targeted pedagogical actions produce measurable changes in key IL competencies related to misinformation.

The study did not employ the full 26 item IL-HUMASS questionnaire. Instead, and consistent with the aims of analysing students' preparedness to face mis- and disinformation, we selected

a subset of categories from the original four IL-HUMASS dimensions (information searching, information evaluation, information processing, and information communication/dissemination). The categories selected were those most directly related to credibility assessment and critical information use: evaluation of information quality, recognition of authorship, identification of updated sources, knowledge of scientific information types, use of formal and informal sources, use of search tools, and ethical and responsible use of information. A pilot test was also developed with students to check the clarity of the instrument. The suggestions received were incorporated through micro adjustments that improved some questions. The final version of the instrument was distributed electronically to more than 500 students from different disciplines, allowing them to analyse how they evaluate the information they receive digitally.

The participants in Study one came from a heterogeneity of academic programmes such as medicine, communication, agronomy, graphic design, business, law, among others. Participation was voluntary, recruitment was carried out through institutional emails, publications on social networks and invitations shared directly by the course instructors. Participation was entirely optional, and no incentives were provided. 503 students participated and completed the instrument adapted from the IL-HUMASS. The study was carried out at a large public university in northeastern Mexico, which has an enrolment of more than 100,000 students and is located about 200 km from the border with the United States. This university provides a diverse student population and an environment that provides opportunities for the review of IL practices in an environment saturated with information and digital data available to all.

For the instructional intervention in Study two, a focal group of 42 first-year undergraduate students enrolled in the common core of the Communication degree programme at the same public university. participated in a pretest and post-test activity. Selection was based on course enrolment and voluntary participation. Participants completed a modified version of the IL-HUMASS questionnaire immediately before and after the instructional intervention to examine potential changes in self-assessed IL competencies. The intervention allowed for a focused analysis of the effects of brief, targeted instruction. Anonymised data for both phases are available upon reasonable request. Although IL-HUMASS comprises four validated dimensions, this study focused on the categories most directly related to students' ability to identify, evaluate, and critically and responsibly use information.

Each phase is described below in terms of its design, participants, instruments, and analytical procedures.

3.1 Study one: Methodological overview

Approach and design: The first phase of the study adopted a multi-source approach (predominantly quantitative), combining self-reported questionnaire data with qualitative reflections and group discussions. The aim of this phase was to describe students' everyday experiences, perceptions, and challenges when engaging with digital information. Students were asked to respond to several reflective questions and participate in group discussions where some of the key questions focused on the habits, beliefs, and criteria students employed when assessing media and information content.

Participants: The participants were students in the university general education courses from a range of disciplines. Students' reflections were the basis for identifying some of the dominant themes and some of the issues within their digital practices.

Data collection and analysis: The open-ended written reflections and the notes from the discussions were subject to analysis using thematic coding, which made it possible to identify the conceptual categories, and these subsequently guided the design for the next phase of the study. This phase was intended to establish a descriptive baseline rather than to conduct inferential comparisons. This qualitative component was exploratory and intended to contextualise questionnaire data rather than to generate theory.

3.1 Study two: Methodological overview

Design and procedure: Upon implementation of the second phase, a brief, structured pedagogical intervention focused on a particular group. A pretest and post-test design was used to analyse differences in students' competencies before and after the intervention. The integration of the principles of IL in digital contexts offered the students focused practical exercises, short presentations, and explorations of digital resources. The educational intervention consists of three components: a concise presentation on information and media literacy, a guided evaluation of both fabricated and authentic news, and a practical exercise where students used lateral reading strategies to evaluate sources through gamification on the Educaplay platform.

Participants and scope: The group consisted of students who, at that moment, had not yet received formal IL instruction. Designed for easy replicability in different educational settings, the short-term intervention was approximately 90 minutes in length.

Instruments and Measurement: Data collection was performed using self-assessment instruments on competencies that centred around the information search, evaluation, and ethical use and engagement of digital news. The differences in the pretest and most recent post-test scores were analysed using descriptive statistics. Given the exploratory nature of the intervention and the size of the focal group, inferential statistics were not applied. The intervention was explicitly aligned with the evaluated competencies, ensuring coherence between instructional content and assessment (see Appendix A).

4. Results

The development of this study consisted of several sequential steps, which were all interrelated, and which in each case built on what had been accomplished in previous work. The first of these steps consisted of undertaking a qualitative, exploratory study to capture students' experiences as fully as possible.

Because of the use of reflective prompts and guided group discussion, the researcher was able to document in some detail students' information habits, the beliefs they held, and cognitive assessment practices they used in determining the credibility of information available on the internet. In addition to the IL-HUMASS instrument, reflective prompts embedded in the adapted IL-HUMASS items and brief guided group discussions were used to contextualise students' responses. This combination offered a more nuanced understanding of students' information habits, underlying beliefs, and assessment practices related to credibility.

In Study two of this work, a brief educational intervention was designed and implemented by the researcher to ascertain whether, and in what way, targeted small-scale actions might yield

positive and measurable results in central media and IL competencies. The impact of this intervention was explored using a pretest and post-test design on one group of students, and the results were in turn analysed quantitatively. Further details of the intervention are provided in Appendix A.

While each of the two parts of the study can be considered on their own, taken together they provide a fuller understanding of the two frames of reference. The first relates to the initial position students adopt in the agency they exercise when working on digital material. The second is the positive responsiveness that can follow purposefully designed and implemented educational interventions.

Finally, it is important to mention that all reported scores in tables 1–4 are based on students' self-assessed perceptions using a 0–10 scale, where lower values (0) indicate lower perceived competence and higher values (10) indicate higher perceived competence in the corresponding IL dimension.

4.1 Study one: Exploring students' perspectives on IL

The responses indicate that in the IL section students seem to have some understanding of search strategies, as evidenced by the average of 6.19. As shown in Table 1, students reported moderate levels of competence in several foundational IL areas but displayed notable weaknesses in advanced search techniques and evaluative practices.

When it comes to more advanced techniques though, such as the use of quotation marks and Boolean operators, they scored considerably lower, at 4.19. This may suggest that students have not been taught these methods. It should, however, be acknowledged that high scores in the validation of quality and sufficiency of information suggest that students, even though they use sources of low academic value, could evaluate the information they consume.

Table 1: IL competencies among university students (Study one)

Category	Perception (0–10)
Print media use	4.91
Use of reliable websites	6.41
Consultation of informal sources	7.38
Use of search tools	4.32
Evaluation of information	6.24
Recognition of authorship	6.66
Use of updated information	6.26
Outlining and organizing ideas	6.94
Ethical use of the sources	5.55
Use of alternative media	7.21

Source: Obtained by the author through an electronic survey.

All results reported in Tables 1 and 2 derive from the modified IL-HUMASS questionnaire administered in Study one. Table 2 summarises the complementary digital information

competencies reported by students, providing further insight into their habits of news consumption, verification, and participation in institutional initiatives.

Table 2: Complementary digital information skills among university students (Study one)

Category	Perception (0–10)
Digital news consumption	6.67
Diversity of news sources	6.68
Awareness of media responsibility	7.70
Sharing of unverified content	4.03
Participation in institutional information initiatives	3.69

Source: Obtained by the author through an electronic survey of 503 university students.

With regards to IL, it appears that respondents are regular consumers of digital news with an average of 6.67. They access diverse sources (6.68) and acknowledge the importance of media responsibility (7.70). Nevertheless, their propensity to share information without verification is significant (4.03), suggesting a lack of critical verification before dissemination. Additionally, a low average (3.69) was recorded concerning participation in initiatives that involved information. This indicates that there is a need for training programmes that deal with the evaluation of information and the responsible sharing of information.

These results show that many students can master the more basic aspects such as recognising a need for information and organising it for academic purposes. However, concerning more advanced aspects such as the academic search engines, advanced filters, and Boolean tools, the results significantly dropped which indicates a considerable gap. Furthermore, the very limited number of students reporting the use of library services and the consultation of librarians indicates a lack of awareness of how these services can aid the learning process. Therefore, this emphasises the need to improve the IL competencies framework within the institutional policies of the universities. These are critical observations about the small number of students who approach librarians or utilise library services considering the predominance and ease of access to unreliable sources. The anecdotal evidence points to students being unaware of the librarians' effective work and how resources can positively impact their learning, or they do not perceive librarians as collaborators in their educational journey. This illustrates how guidance concerning these competencies is functioning at the university.

Overall, the descriptive results expressed in Tables 1 and 2 show a fragmented development of information and digital literacy dispositions among students. While fundamental behaviours — such as regular consumption of digital news and basic source recognition — show moderate and relatively consistent self-reported scores, on the other hand, more advanced evaluation skills in evaluation, ethics, and institutions remain considerably lower. These lower results are directly related to the results of the verification of sources, participation in institutional information initiatives, and advanced search strategies that point to gaps that go beyond the functional use of information. These patterns are from Study one's participants' perceptions, which should be interpreted as descriptive indicators and not as inferential comparisons. Thus, qualitative reflections also indicate that many participants in the study indicate a lack of formal instruction in complementary digital information skills, so it can be inferred that they prefer

practices derived from experience or intuitive practices of scepticism developed through personal exposure instead of structured training.

We have identified both strengths and weaknesses related to the results obtained. A considerable number of students seem to commonly employ self-taught techniques and rely on the Internet as their only resource, while they lack the tools to evaluate their effectiveness. There is a probability that these situations will continue due to the lack of relevant support from the higher education institution. This data serves as a basis for the development of informed decisions and the formulation of specific efforts to improve students' readiness for a more complex information ecosystem. In summary, Study one illustrates that, although learners demonstrate moderate familiarity with common digital practices, they appear to lack real training in information assessment, ethical aspects, and establishing strategies necessary for informed engagement related to digital information ecosystems. These findings have impacted the design of Study two, which sought to determine whether a brief and scalable instructional intervention could produce some measurable improvements in these areas.

4.2 Study two: Measuring the impact of a brief awareness strategy

In the context of IL and to assess the impact of a short-term awareness strategy, pretest and post-test design was used. IL skills improved significantly in several key areas as evidenced by the results: the use of search tools improved from 3.11 to 5.02, the evaluation of information increased from 4.01 to 6.44, and the recognition of authorship increased from 4.24 to 6.87. A summary of the focal group's performance in core IL competencies before and after the intervention is presented in Table 3, illustrating the areas in which the brief instructional activity generated measurable improvements. Taken together, these improvements confirm that even brief instructional interventions can generate measurable gains in core IL competencies, particularly those related to evaluative and critical judgement.

Table 3: IL competencies before and after the intervention (Study two)

Category	Pretest	Post-test
Print media use	4.02	2.17
Use of reliable websites	5.48	6.70
Consultation of informal sources	6.14	4.18
Use of search tools	3.11	5.02
Evaluation of information	4.01	6.44
Recognition of authorship	4.24	6.87
Use of updated information	6.15	6.29
Outlining and organizing ideas	5.12	6.86
Ethical use of the sources	4.48	6.45
Use of alternative media	3.94	4.67

Source: Obtained by the author from an educational intervention with a focal group.

Significant progress was observed in complementary digital information competencies. Participants showed a more critical approach to consuming digital news, consulted a wider range of sources, and became more aware of media accountability. Notably, their tendency to

share fake news decreased substantially. Table 4 shows a comparison of pretest and post-test results and presents the corresponding changes in complementary digital information skills, offering a comparative view of students' news consumption habits, verification tendencies, and engagement with institutional initiatives.

Table 4: Complementary digital information skills before and after intervention (Study two)

Category	Pretest	Post-test
Digital news consumption	4.15	6.21
Diversity of news sources	4.76	6.10
Awareness of media responsibility	6.11	6.90
Sharing of unverified content	4.33	2.11
Participation in institutional information initiatives	2.15	3.19

Source: Obtained by the author from an educational intervention with a focal group.

The scope of the educational intervention is reflected in the data, an approach aimed at the visual and contextual aspects useful in the digital environments that students handle, a promising first step towards strengthened IL skills. It is important to emphasise that this study is made up of a couple of integrative phases that aim to broaden the understanding of students' IL-related competencies and skills in digital environments.

The first section involved students who indicated that they had a limited ability to evaluate sources of information, in addition to identifying biases and reviewing the implications of the information they consume and that they could disseminate. While the second section indicated that the action of evaluating the sources used, as well as the ethical use and critical consumption of digital information, could be relevant skills that are developed mainly through targeted interventions. In addition, it is relevant to mention that, when analysing the results from a holistic perspective, these findings could infer the need to intentionally incorporate training in these literacies in university curricula, and this would have the possibility of sustainably increasing the number of digital citizens.

Finally, the combined evidence from both phases suggests that students do not acquire IL-related skills spontaneously or develop them in a heterogeneous manner. On the one hand, Study one revealed clear deficiency in evaluative, ethical, and strategic practices, while Study two indicated that, even with brief interventions, measurable improvements could be triggered in these same areas. These results, which complement the study, would greatly reinforce the tangible need for a planned and sustained integration of IL into academic plans. Taken together, the data collected not only indicate the existing gaps in IT assessment and ethical skills but also show the potential of short, scalable interventions to address them. This data aligns with and extends previous research, which is discussed below.

5. Discussion

The collected data highlights situations that warrant global discussion regarding the importance of IL in combating disinformation and other information disorders affecting society, particularly in higher education contexts where students frequently engage with a complex digital

environment. Students' express confidence in their perceived IL competencies, but this trust does not correlate with using broad evaluation practices or practical verification strategies. This finding aligns with the consulted literature, which indicates that young adults have not developed the skills necessary for assessing credibility and often resort to a heuristic or instinctive approach in their evaluations of information (Osadola et al., 2024; Rajasekhar et al., 2021).

5.1 Alignment and contradictions with previous research

Some gaps identified in Study one, especially in credibility assessments, source verification, and the interpretation of digital content, are connected to research that shows that teaching IL in Latin America is not comprehensive. In this area, IL education is frequently restricted, disjointed, or merely superficially incorporated into the formal curriculum (Morejón Llamas, 2020; Noain-Sánchez, 2020). Students often say they can tell if information is true or not. This phenomenon has been noted in the fields of public health and education, where misinformation is widespread. The study participants indicate a moderate to high degree of self-efficacy in information management (Keselman et al., 2022; Washington, 2023).

Therefore, it is important to mention the impact of disciplinary affiliations, as the gaps identified between students from humanities or social sciences and those from STEM or health disciplines align with Lloyd's definition of IL in terms of situated practice (2024), which should be contextualised within the epistemic and evidence paradigms of specific disciplines. This view reinforces arguments in the literature suggesting that the generic IL workshops offered as part of the curriculum are not engaging with students in their practices on information management, especially in the management of digital data that is much more complex.

5.2 Information overload and algorithmic vulnerability

As has been pointed out, students' engagement in poor credibility-assessment practices and the gaps in the process of evaluating information and the credibility of what is published in digitised environments are, in a way, the result of the information disorder that currently reigns. As indicated in the theoretical framework, disinformation and misinformation are detected in digital environments that glorify, amplify and polarise content related to emotion and the senses. The reported errors (gaps) in the evaluation of sources and the dependence on basic and superficial indicators of credibility are, in part, the result of aspects identified in other studies, such as algorithmic bias, virality of disinformation, and limited editorial control of the media, among others (Ríos-Gordillo, 2023; Echeverría & Rodríguez Cano, 2023).

However, given the variety of disorders detected and the multiple dysfunctions associated with information disorder, it should be noted that these issues support the claim that the development of IL must go beyond the basic technical skills of searching for and interacting with information, especially in rapidly developing digital environments. The participants' lack of socio-technical awareness further reinforces the need for IL, which encompasses critical and civic literacy (UNESCO, 2024). It is for this reason that this work aims to extend existing literature by illustrating the case where students show functional competencies but lack the socio-technical competencies that make them victims of misinformation. Students appear to evaluate information cognitively, although this does not translate into socio-technical awareness.

5.3 Contribution of the Intervention

The results of Study two indicate that even minor instructional interventions can lead to notable improvements in students' evaluations of information sources and in identifying disinformation. It should be noted that this study only focused on the immediate effects after the intervention, so the consistency of these in the medium or long term cannot be inferred, which could be reviewed in future research. This supports the results of other international case studies that demonstrate the impact of instructional interventions on IL that are contextualised, explicit and practice-based, improving students' abilities to detect manipulative and erroneous information (Noain-Sánchez, 2020; Osadola et al., 2024).

The results of the 90-minute intervention also suggest that the improvements within the IL and humanities (IL-HUMASS) categories indicate that structured IL activities can compensate for the observed absence of systematic IL education in higher education. Nevertheless, the competencies did show uneven improvements. In the digital verification area, credibility gained recognition, while weaker improvements occurred in ethical information use, synthesis, and communication. This suggests that while targeted skill development may be achieved in the short term, deeper IL dispositions that scholars suggest are necessary to navigate in a digitally mediated world (Lloyd, 2024) remain difficult to develop in the long term.

5.4 Adding value and implications

This research makes the following contribution to the literature:

1. Evidence within a Latin American context where misinformation is predominant and the context of IL instruction is scarce.
2. A context-sensitive explanation of IL competencies demonstrating the considerable difference a discipline makes in the way information is understood and acted upon by students.
3. Identification of specific IL-HUMASS factors related to misinformation, particularly the inability to assess information credibility, the lack of verification, and unawareness of digital manipulation.

Higher education institutions may consider the need to include IL programmes as central and transversal to the curriculum, and not as an auxiliary or secondary support function, since IL competence is fundamental according to the findings detected in this study. The results at the same time indicate that IL competence should encompass the socio-technical dimensions of informational disorder, including curation algorithms, digital bias, and platform dynamics, with the aim of ensuring more efficient readiness for current and future digital environments. Finally, this article expands on the contexts proposed in the literature by providing empirical evidence of a focused environment in Latin American countries where IL instruction is unequal so that misinformation interacts with structural gaps.

6. Recommendations

To build on these findings, the following recommendations are organised into two sections: the practical implications for higher education institutions; and future research avenues to further explore the integrations of IL in digital environments.

6.1 Practical implications

The gap that emerges from the wide availability of digital information and its effective use continues to be a problem that must be addressed, and this is extremely relevant since it indicates the urgent need to integrate IL throughout the curriculum. Rather than instructing, as is the case in most academic programmes in IL in a transversal way and in some independent subjects, they should instead be framed as explicit constructed competencies within each discipline. Therefore, the fundamental stages of any training should incorporate instruction focused on cultivating critical questions and responsibly employing the information detected.

Promoting a highly impactful and adaptable Massive Open Online Course (MOOC) on digital and IL skills could be a positive step, because it could reduce existing inequalities and provide an option of access to people marginalised from formal education. On the other hand, higher education institutions should continue to promote this type of action, employing attractive formats to promote the culture of critical reflective practice on controversial health, policy, and education issues to maintain advocacy within the community.

Educators and library staff are not exempt since they must promote and participate in a change in the new pedagogy and provide students with tools that allow them to take the step from passive consumers of information to empowered and informed critical thinkers.

6.2 Future Lines of Research

This research leaves new avenues open, for example, in studies that examine learners as cases in research on information-seeking behaviours. Attention should be paid to the intersection of digital algorithms that capture students' socio-political information in a closed retrieval system. More broadly, structured proximal environments that shape students' digital habits should be examined.

Most importantly, future work should encompass assessing the impact of MOOCs and media campaigns on IL skills, both traditional and online, as well as media and digital literacy skills. Evaluating these interventions within the framework of a research agenda would help to streamline these silos and justify the consolidation of their components into official organisational frameworks.

7. Conclusion

The challenge represented by the need to validate information has become increasingly complex, and this is with the lack of restrictions in the face of massive amounts of information lacking appropriate filters. The collected data shows that university students have basic skills to navigate in an environment with an excessive load of information; therefore, a defined strategy is required, with the objective of students obtaining skills aimed at better decision-making.

Although students have developed elements of IL, this research shows that they have not fully integrated them into their academic practices. This is a case of a lack of the fundamental skills to navigate the internet, let alone master the art of 'Googling'. We must appreciate that the tendency to rely too much on results 'at the top of the page' without questioning the source,

purpose, context, and impact of that information is the source of concern. The tendency to passively internalise available information, combined with the tendency to amplify exclusionary information and unquestioned fictions, is potentially dangerous.

This analysis aimed to go beyond the diagnostic perspective, as well as to stimulate the promotion of and focus on particular early actions: the incorporation of both literacies in the curricula; the development of flexible and responsive programmes; the creation of outreach initiatives in the language and lived experiences of students; and above all, the joint efforts with libraries and library staff, who must also be reimagined as fully supportive of the initiative.

Although this article has provided valuable insight, it also has some limitations. The short-term educational intervention (approximately 90 minutes) and the sample focused on a single institutional setting, which would prevent a generalisation of the results. Therefore, future research to be carried out in the medium term should extend the duration of educational interventions and should also include various profiles to assess external validity. However, these limitations do not undermine the validity of the findings, as they demonstrate the potential of scalable strategies to incorporate IL into the curricula of Latin American universities.

Providing students with strong IL and digital literacy skills is not an easy task; it takes time, intention, and a genuine commitment on the part of universities to produce students who are reflective, self-confident, and able to relate to the world around them. Not only do they support academic and professional development, but they also help students move through digital spaces with greater clarity and critical awareness. Strengthening IL is ultimately a way to prepare citizens to carefully weigh evidence, recognise misleading narratives, and participate with purpose and responsibility in public and democratic life.

Declarations

Ethics approval

Ethical approval was not considered necessary in alignment with Universidad Autónoma de Nuevo León's guidance on the conduct of ethical research.

Funding

Not applicable.

AI-generated content

AI-assisted language tools were used for grammar, style, and phrasing support. All intellectual content, analysis, interpretation, and conclusions are the author's own.

Acknowledgements

The author thanks the participating students for their reflective contributions.

References

- Bamgbose, A. A., Ibrahim, H. M., & Musa, S. (2024). [Information literacy and learning in the emerging digital landscape: A theoretical review](#). *Library Philosophy and Practice*, 8125.
- Bernard, S. (2024). [Investigating curriculum-integrated information literacy](#). *The Journal of Academic Librarianship*, 50(1), 102839.
- Bloch, M. (1992). *The historian's craft* (P. Putnam, Trans.). Manchester University Press. (Original work published 1949).
- Cinelli, M., Morales, G. D. F., Galeazzi, A., Quattrociocchi, W., & Starnini, M. (2021). [The echo chamber effect on social media](#). *PNAS*, 118(9).
- Echeverría, M., & Rodríguez Cano, C. A. (2023). [Does digital literacy foster disbelief in fake news? Efficacy of attitudes and strategies against disinformation in Mexico](#). *Revista de Comunicación*, 22(2), pp.79–95.
- Faix, A., & Fyn, A. (2020). [Framing fake news: Misinformation and the ACRL framework](#). *Portal*, 20(3), 495–508.
- Ginzburg, C. (2013). *The cheese and the worms: The cosmos of a sixteenth-century miller*. Johns Hopkins University Press. (Original work published 1976).
- Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). [A digital media literacy intervention increases discernment between mainstream and false news in the United States and India](#). *PNAS*, 117(27), 15536–15545.
- Keselman, A., Smith, C. A. & Wilson A. J. (Eds.). (2022). *Combating online health misinformation*. Rowman & Littlefield Publishers.
- Kops, M. (2025). *Young people and false information: A scoping review of young people's responses to false information, the factors that influence these responses, the consequences of this type of information, and interventions*. Television & New Media.
- Larson, H. J. (2018). [The biggest pandemic risk? Viral misinformation](#). *Nature*, 562(7727), 309.
- Lewandowsky, S., Ecker, U. K. H., & Cook, J. (2017). [Beyond misinformation: Understanding and coping with the "post-truth" era](#). *Journal of Applied Research in Memory and Cognition*, 6(4), 353–369.
- Lloyd, A. (2024). [Chasing information literacy into the wild: Questions for the Anthropocene epoch](#). *Journal of Information Literacy*, 18(1), 21–30.
- Morejón Llamas, N. (2020). [Desinformación y alfabetización mediática desde las instituciones: Los decálogos contra las fake news / Disinformation and media literacy from the institutions: The decalogues against fake news](#). *Revista Internacional de Relaciones Públicas*, 10(20), 111–134.

- Noain-Sánchez, A. (2020). Collaborative journalism versus disinformation: An approach to fact-checking projects in Mexico, Argentina, Colombia, Brazil, and Spain. In D. Ramírez-Plascencia, B. Carvalho-Gurgel, & A. Plaw (Eds.), *The politics of technology in Latin America: Digital media, daily life and public engagement* (Vol. 2) (pp. 194–211). Routledge.
- Noble, S. U. (2018). *Algorithms of oppression: How search engines reinforce racism*. NYU Press.
- Noguera-Vivo, J. M., & Grandío-Pérez, M. M. (2024). [Enhancing algorithmic literacy: Experimental study on communication students' awareness of algorithm-driven news](#). *Anàlisi: Quaderns de Comunicació i Cultura*, 71, 37–53.
- Osadola, O., Amuta, E., Somefun, C., Somefun, T., Ongbali, S., & Mene, J. (2024). [Deciphering disinformation: Strategies for identifying and addressing fake news in today's information landscape](#). *2024 International Conference on Science, Engineering and Business for Driving Sustainable Development Goals (SEB4SDG)*, Omu-Aran, Nigeria, 2024, 1–7.
- Pinto, M. (2010). [Design of the IL-HUMASS survey on information literacy in higher education: A self-assessment approach](#). *Journal of Information Science*, 36(1), 86–103.
- Rajasekhar, S., Makesh, D., & Jaishree, S. (2021). [Assessing media literacy levels among audience in seeking and processing health information during the COVID-19 pandemic](#). *Media Watch*, 12(1), 93–108.
- Ríos-Gordillo, C. (2023). [Pandemia, rumores, noticias falsas. Hacia un desciframiento de la infodemia en México](#). *Secuencia*, 117.
- Rudra, K., Ganguly, N., Mifsud Bonnici, J., Müller-Budack, E., & Manuvie, R. (2025). [Disinformation and misinformation in the age of Generative AI](#). *Proceedings of the Eighteenth ACM International Conference on Web Search and Data Mining, Germany*, 1122–1123.
- UNESCO (2024). [Alfabetización Mediática e Informacional](#). UNESCO.
- Uribe-Tirado, A., & Machin-Mastromatteo, J. D. (2024). [Past, present and future of information literacy in Latin America](#). *Journal of Information Literacy*, 18(2), 6–36.
- van der Linden, S. (2024). [Chapter one - Countering misinformation through psychological inoculation](#). In B. Gawronski (Ed.), *Advances in experimental social psychology* (Vol. 69) (pp. 1–58). Elsevier.
- Vosoughi, S., Roy, D., & Aral, S. (2018). [The spread of true and false news online](#). *Science*, 359(6380), 1146–1151.
- Wardle, C., & Derakhshan, H. (2017). Information disorder: Toward an interdisciplinary framework for research and policymaking. Council of Europe.

Washington, J. (2023). [Combating misinformation and fake news: The potential of AI and media literacy education](#). *SSRN Electronic Journal*.

Wineburg, S., & McGrew, S. (2017). [Lateral reading and the nature of expertise: Reading less and learning more when evaluating digital information](#). *Teachers College Record: The Voice of Scholarship in Education*, 121(11), 1–40.

Appendix A

Overview of the instructional intervention

The instructional intervention implemented in Study two was designed as a brief, low-cost, and easily replicable activity aimed at strengthening students' awareness of information and media literacy principles, with particular emphasis on source evaluation, verification practices, and responsible information sharing in digital environments.

The brief intervention was carried out in a single broadcast of about ninety minutes, which consisted of three revised components. First, the students participated in a concise presentation that broadly showed some key concepts related to IL and media IL, and this included indicators of credibility, disinformation and misinformation, as well as some implications related to the ethical use of digital information. Subsequently, a source evaluation activity was carried out as a guide in which participants examined both fabricated and authentic news, discussing clues related to authorship, source, bias and reliability. Finally, the students participated in a practical exercise applying lateral reading strategies through a gamified activity hosted on the Educaplay platform, which required them to confirm sources and evaluate information in multiple digital environments. This was presented in a brief intervention in a holistic way with aspects related to IL and was well received by students.

To assess potential changes associated with the intervention, participants completed a modified version of the IL-HUMASS self-assessment questionnaire immediately before and after the session. This pretest and post-test design focused on competencies related to information evaluation, verification practices, and ethical information use. The intervention was not intended to provide exhaustive training, but rather to explore whether a short and scalable instructional strategy could produce measurable shifts in students' self-perceived IL competencies.

Instrument and assessment design

Both the pretest and the post-test used the same self-assessment tool. The modified IL-HUMASS questionnaire had 29 questions that aimed to measure how students perceived their ability to find and use information. Items 1–26 are from the original IL-HUMASS framework. Three more items were added about the use of AI tools, the ethical issues of using AI, and what students think they need to learn in today's higher education settings. The tool focuses on skills related to accessing, evaluating, processing, communicating, and using information in an ethical way.

Aligning the intervention with the evaluated competencies

The instructional intervention was meticulously designed to align with the competencies assessed by the modified IL-HUMASS instrument. The initial session addressed fundamental concepts about the discernment of information as truthful, false, or unethical. The guided evaluation task focused on abilities such as assessing source reliability, identifying authorship, and evaluating source credibility. The lateral reading exercise, derived from a game-like activity on the Educaplay platform, emphasised verification and cross-checking procedures in digital contexts. These components were designed to facilitate short-term reflective engagement with the skills evaluated by the pretest and post-test evaluation.