ISSN 1678-765X doi 10.20396/rdbci.v23i00.8678475/en


Research Article

RDBCI
Revista Digital de Biblioteconomia e Ciência da Informação
Digital Journal of Library and Information Science

# Information literacy needs of university students

Ueliton Araújo Trindade[1] Maria Aldecy Rodrigues de Lima[2]
Ana Flávia de Lima Rocha[2]

ABSTRACT

Introduction: This article investigated the information profile of higher education students, focusing on their information needs and the impact of information literacy. Objective: The objective was to identify how these needs can be met to develop effective literacy strategies. Methodology: The research was conducted with Agroecology and Physics students from a technical and higher education institution in Acre through anonymous questionnaires that collected data on their research practices and use of information sources. Results: The results show that, although many students are familiar with search tools such as Google Scholar, there is a significant lack of knowledge about specialized databases and citation standards, which compromises the quality of research. Most students are not familiar with the critical evaluation of sources, essential skills in the contemporary information environment. Conclusion: The study concludes that there is an urgent need to integrate information literacy into academic curricula. Training and workshops are recommended to enable students to locate, evaluate, and use information critically and ethically. Differences between courses highlight the importance of approaches tailored to the specific needs of each area of study. Investing in information literacy is crucial to preparing students for academic and professional challenges, promoting a research culture that values quality and ethics.

KEYWORDS

Information literacy. Teaching. Research. Information needs. Sources of information.

Correspondence from authors

[1] Instituto Federal do Acre
Rio Branco, AC - Brazil
ueliton.trindade@gmail.com

[2] Universidade Federal do Acre
Cruzeiro do Sul, AC - Brazil
maria.lima@ufac.br

[3] Instituto Federal do Acre
Cruzeiro do Sul, AC - Brazil
ana.rocha@ifac.edu.br

# As necessidades de letramento informacional com estudantes universitários

RESUMO

Introdução: O artigo investigou o perfil informacional de estudantes de cursos superiores, com foco em suas necessidades informacionais e o impacto do letramento informacional. Objetivo: O objetivo foi identificar como essas necessidades podem ser atendidas para desenvolver estratégias eficazes de letramento. Metodologia: a pesquisa foi realizada com alunos de Agroecologia e Física de uma instituição de ensino técnico e superior no Acre, por meio de questionários anônimos que coletaram dados sobre suas práticas de pesquisa e uso de fontes de informação. Resultados: os resultados mostram que, embora muitos alunos conheçam ferramentas de busca como o Google Acadêmico, há um desconhecimento significativo sobre bases de dados especializadas e normas de citação, o que compromete a qualidade das pesquisas. A maioria dos alunos não está familiarizada com a avaliação crítica de fontes, habilidades essenciais no ambiente informacional contemporâneo. Conclusão: no estudo conclui que há uma necessidade

urgente de integrar o letramento informacional nos currículos acadêmicos. Treinamentos e oficinas são recomendados para capacitar os alunos a localizar, avaliar e usar informações de maneira crítica e ética. Diferenças entre os cursos destacam a importância de abordagens adaptadas às necessidades específicas de cada área de estudo. Investir no letramento informacional é crucial para preparar estudantes para desafios acadêmicos e profissionais, promovendo uma cultura de pesquisa que valoriza qualidade e ética.

PALAVRAS-CHAVE

Competência informacional. Ensino. Pesquisa. Necessidade informacional. Fontes de informação.

## CRediT

- Acknowledgments: Not applicable.
- Funding: Not applicable.
- Conflicts of interest: The authors certify that they have no commercial or associative interests that represent a conflict of interest in relation to the manuscript.
- Ethical approval: The study was submitted to the Research Ethics Committee (REC) with CAAE: 69708623.5.0000.5010, which approved the research under Opinion No. 6.470.803. All stages followed the REC's ethical guidelines, including informed consent and data confidentiality.
- Availability of data and material: Not applicable.
- Contributions of authors: Conceptualization: TRINDADE, A. U.; Formal analysis: TRINDADE, A. U.; Research: TRINDADE, A. U.; Methodology: TRINDADE, A. U.; Visualization: TRINDADE, A. U.; Writing – original draft: TRINDADE, A. U., LIMA, M. A. R. F, ROCHA, A. F. L.; Writing – review & editing: LIMA, M. A. R. F, ROCHA, A. F. L.
- Image: Taken from the Lattes Platform.
- Translation: S. Iacovacci Tranlation Service

JITA: BH. Information needs and information requirements analysis

ODS: 17 - Partnerships and means of implementation




Article submitted to the similarity system

Submitted: 26/11/2024 – Accepted: 08/05/2025 – Published on: 18/06/2025

Editor: Gildenir Carolino Santos

## 1 INTRODUCTION

The concepts of literacy and literacy skills are widely recognized, even by those with no formal education. When people talk about being literate, they usually associate it with reading and writing skills. However, the concept of 'information literacy' is less well understood, even among education professionals. In today's information-rich age, those involved in information management, including librarians, face increasingly complex challenges.

With its roots in interaction with the printed world over the centuries, librarianship has adapted to organize and facilitate access to information in the digital environment. This evolution is fundamental, as the growing need to understand the vast informational universe requires individuals to acquire the skills needed to use information autonomously and critically. In this context, information literacy emerges as an essential educational approach, equipping students with the necessary skills to navigate the complexities of contemporary information (Campello, 2009a).

Information literacy is a significant advancement in librarianship, transforming librarians from mere providers of information to facilitators of learning. Through guidance services, librarians help users understand the structure of the information environment and utilize available sources. This shift in focus underscores the importance of developing information literacy skills.

However, it has been observed that teaching research skills is often limited to entry into higher education, which may be insufficient. In the "information age," where data retrieval is instantaneous, it is crucial for students to learn how to discern the source and quality of the content they consume. Many students enter higher education without the necessary research skills, a problem that could be mitigated by placing a greater emphasis on research initiation in basic education (Lorenzetti & Delizoicov, 2001; Sasseron & Carvalho, 2011).



In this scenario, the research aimed to identify the information needs and profiles of students in two higher education courses. The goal was to develop effective information literacy strategies by understanding their needs and profiles. The guiding question was: What are the information needs of higher education students, and how can information literacy contribute to meeting those needs? This study is relevant because it raises awareness and guides students to become critical and efficient researchers who can seek and use information that meets their academic demands.

A professional librarian who has conducted training and mini-courses focused on standardizing scientific research and information sources since 2018 conducted the research on the information profile of students. These activities target students who enter higher education to pursue their first degree after completing high school. Throughout his professional career, the librarian has had the opportunity to closely follow these students' academic paths, from the beginning of their scientific research to the completion of their courses. This careful observation provided a deeper understanding of the challenges students face, highlighting their lack of knowledge about conducting effective and appropriate research, which is directly related to information literacy.

A lack of research and academic writing skills compromises the quality of work produced and affects students' ability to think critically and analytically. Scientific research requires the collection of information and the ability to critically evaluate it. This includes discerning reliable from unreliable sources and correctly applying citation and referencing standards. These are fundamental aspects of information literacy.

Through research into information needs and literacy, combined with workshops, mini-courses, and training, the goal is to teach students to not only locate information, but also question it critically. This learning process enriches the quality of academic work and develops

essential life skills, such as critical thinking, rigorous reasoning, and clear and thoughtful expression.

Teaching and guidance from elementary school onwards is one of the key points for training critical and assertive researchers. Scientific literacy, with an emphasis on information literacy, is an important component of civic education, as it promotes the acquisition of scientific knowledge by students (Araújo, Chesini, & Rocha Filho, 2014). Therefore, investing in research that explores students' information profiles and needs is essential to promoting quality education and preparing students to face the challenges of scientific research. This will enable them to become critical and informed citizens who are fully equipped with information literacy.

## 2 INFORMATION NEEDS AND BEHAVIOR

Information needs and information behaviors are interrelated concepts that describe how people seek, access, evaluate, and use information to meet their needs and achieve their goals. Below, we provide a more detailed exploration of these concepts based on the work of Martínez-Silveira and Oddone (2007).

Information need refers to the perception that one needs information to achieve a goal or solve a problem. This need can emerge in various contexts, ranging from everyday situations, such as searching for recipes, to academic and professional endeavors, such as conducting research for projects. Motivations behind these needs may include curiosity, learning, and problem solving, which highlights the importance of information literacy in empowering individuals to meet these demands. Information behavior encompasses the actions an individual takes to satisfy their information needs. This process involves searching for, obtaining, evaluating, using, and sharing information. It is influenced by factors such as the availability of resources, research skills, personal preferences, and the nature of the information need.



Research into information behavior has its roots in the 1948 Royal Society conference. Over the years, this field has produced a vast number of articles and reports on information needs and information-seeking behavior. However, one constant criticism is the lack of building on previous research, which prevents the formation of a cumulative body of theory and empirical findings. Wilson (1999) identifies three main reasons for this: the adoption of inappropriate quantitative methods, ignorance of related work in other fields, and the late emergence of general models of information behavior.

Maslow's theory (1943) is presented in his article entitled “A Theory of Human Motivation” to support the subjective nature of need. Maslow proposes that human needs are organized into a hierarchy where basic needs such as physiological and safety needs must be met before higher needs such as love, esteem, and self-actualization can manifest. Maslow emphasizes the importance of self-actualization, a state of fulfillment and harmony with the world. He argues that society hinders the achievement of this state by prioritizing scarcity and competition. Thus, Maslow's work offers an inspiring perspective on human potential and the search for a meaningful life.

According to Maslow, the satisfaction of needs allows new needs to emerge, and a satisfied need ceases to be an active motivator. Basic needs are often unconscious, but still significantly influence behavior. Maslow argues that human needs are organized into a hierarchy, where satisfying a more basic need allows higher needs to emerge. This concept is relevant to information literacy because it suggests that, as people meet their basic information needs, they can seek more complex and specialized information.

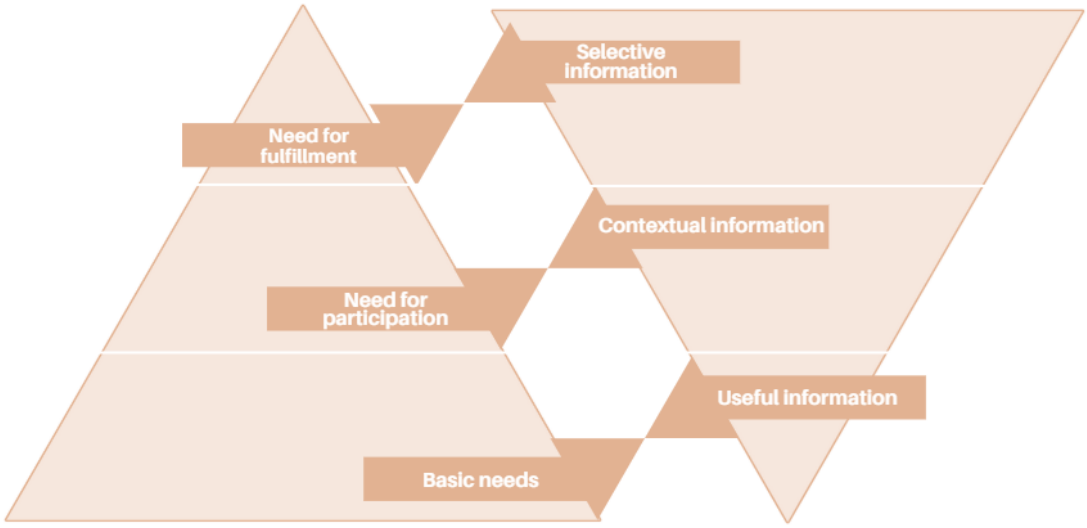
Barreto (1994) adapted Maslow's (1943) concept of the hierarchy of needs to explain the demand for and supply of information. According to this adaptation, information should be structured and distributed according to the needs of different social levels. Barreto discusses the temporal relationship between the accumulation of information and its assimilation by

individuals. He emphasizes that large volumes of information can compromise the everyday experience of knowledge.

The demand for information is observed to vary according to the stage at which individuals find themselves in the pyramid of needs. Barreto (1994) suggests that demand is more intense and diverse at the upper levels of the pyramid, and that the required quality of information increases as one moves up the pyramid. Those searching for self-actualization require more complex and specialized information. Although the base of the pyramid has a larger number of individuals, they have a more basic and uniform demand for information. As one moves up the pyramid, the number of individuals decreases, but the demand becomes more specific and qualitative.

Information stocks must be organized to meet demands at different levels. Barreto (1994) proposes an inverted pyramid structure for information stocks (Figure 1), where the base contains a large amount of basic, general-purpose information accessible to a wide audience. The intermediate level consists of smaller stocks of more specialized information intended for groups with common interests and needs. The top level contains highly specialized and restricted information, accessible only to an elite group with high cognitive skills and resources.

Figure 1. Demand and supply of information.




Source: Prepared by the authors, adapted from Barreto (1994).

Barreto (1994) discusses the temporal relationship between the accumulation of information and its assimilation by individuals, addressing a crucial aspect of contemporary information dynamics. The author describes the accumulation of information as a continuous, linear process. As time progresses, more information is collected, stored, and organized in databases, libraries, archives, and so on. The amount of accumulated information grows exponentially, creating large data repositories driven by the need for novelty, quality, and comprehensiveness of information.

The demand for and stock of information reveal the complexity of balancing supply with individuals' varied needs. Barreto highlights the importance of distribution strategies that consider recipients' cognitive and contextual competencies, as well as the need for infrastructures that promote the effective assimilation of knowledge. Ultimately, the democratization of information must empower individuals to transform it into meaningful and liberating knowledge, aligning itself with the greater goal of information literacy.

## *2.1 The importance of information literacy*

Information literacy involves more than just accessing information. It encompasses the essential skills of identifying when information is needed and the ability to locate, evaluate, and use that information appropriately. In other words, information literacy involves knowing how and where to find the knowledge you need (Campello, 2009a).

Historically, librarians have played a central role as intermediaries between users and the information they seek. However, this dynamic has changed as users have become more autonomous in identifying and accessing the information they need. At the same time, the explosion of electronic information resources, such as full-text databases, institutional repositories, and digital libraries, presents an additional challenge for librarians (Garcia & Silva, 2005).

The question that arises is whether users still need reference services in digital libraries, and how these services can be improved to meet evolving demands. This question is particularly relevant in the current context where online information is widely available, and users have access to various resources. Thus, information professionals must adapt to technological changes and user needs while maintaining their role in facilitating access to information (Garcia & Silva, 2005).

Camillo (2022) presented another perspective on the need for information reference services in his master's thesis. He highlights the possible exclusion of professors and students due to a lack of access to adequate technology training, which results from educators' resistance to using technological tools. This situation creates barriers between professors and students who are proficient in technology, generating inequalities. Camillo (2022) also notes that some professors lack the skills to harness students' potential in relation to information and communication technologies (ICTs). This can lead to students being excluded, causing them to lose interest in classes and resort to harmful online practices. Camillo (2022) argues for addressing these issues with transparency and sincerity to demystify the use of digital technologies in schools, promote inclusion, and foster closer relationships between students and teachers.



The journey to information literacy begins with recognizing the need for information. It is a moment of awareness when an individual identifies a gap in their knowledge or understanding. Whether for decision-making, academic projects, or satisfying personal curiosity, recognizing that one does not know something is the crucial first step. This recognition enables the formulation of relevant questions and guides the subsequent process of searching for and evaluating information (Campello, 2009a).

Finding information is only part of the challenge; critical evaluation is equally essential. Given the proliferation of misinformation and “fake news,” it is critical to discern the quality, relevance, and reliability of sources. When evaluating information, one must consider its origin, the purpose of its publication, possible biases, timeliness, and the accuracy of the data presented. It is also crucial to cross-check information from multiple sources to gain a broader and more balanced understanding of a topic or issue (Pires, 2012).

In summary, information literacy is like a compass in the sea of information that characterizes the modern world. It empowers individuals to navigate this landscape with confidence and discernment and contributes to the development of a more informed, critical, and democratic society. As we move further into the digital age, cultivating and improving these skills will be vital for every citizen.

After locating and evaluating information, the next step is to use it effectively and ethically. This means integrating the information in a way that meets the original need, whether through writing, presenting, or making decisions. Additionally, ethical use requires respecting copyright, citing sources appropriately, and avoiding plagiarism. The recognition, location, evaluation, and use of information form the basis of information literacy (Brandão, Santos, & Borges, 2020).

The advent of social media and sharing platforms has exponentially increased the speed and scope with which information circulates. Concurrently, there has been an alarming rise in fake news. Often deliberately created to mislead, fake news serves political, economic, or social agendas. In other cases, it stems from misinterpretation or a lack of verification. Due to its sensationalist nature, fake news spreads quickly, causing confusion and fear. In some cases, it has real and harmful consequences for people's lives (Martínez-Silveira & Oddone, 2007).

Mello (2020) discusses how disinformation spreads through media resources, such as buying engagements and using automated mass messaging. One of the central topics of the author's book is how domestic and foreign companies illegally purchase mass messaging packages on WhatsApp to benefit candidates during election season. Mello emphasizes the illegality of these practices and argues that society is transitioning from the "Information Age" to the "Disinformation Age," where false narratives influence social relations beyond the digital realm.

In a world where information is abundant but not always accurate. Therefore, information literacy becomes an essential defense against misinformation. The ability to discern, evaluate, and verify information is not just a skill but a civic necessity for ensuring an informed society that can resist the influence of fake news.

## 3 METHODOLOGY

The research was conducted in accordance with ethical principles to ensure the integrity and well-being of the participants. All participants were informed of the study's objectives, procedures, risks, and benefits. Participation was voluntary, and participants had the right to withdraw at any time without penalty. The study was submitted to the Research Ethics Committee (REC) under CAAE: 69708623.5.0000.5010, and the committee approved the research under Opinion No. 6.470.803. All stages adhered to the REC's ethical guidelines, including informed consent and data confidentiality.



Data collection took place in the city of Cruzeiro do Sul, Acre. Initially, we considered collecting data from all high school students in the city. However, due to the difficulty of reaching such a large population, we decided to focus on a technical and higher education institution: the Federal Institute of Acre, located in the Juruá Valley region. We conducted the research with 11 undergraduates from the agroecology program and seven students from the physics program who were preparing their final coursework.

To achieve the study's main objective, we used a 20-question closed-response questionnaire to obtain more accurate answers on the topic addressed. The questionnaire was administered anonymously and collected only demographic data, such as gender, age, municipality of residence, and whether students lived in an urban or rural area. According to Cervo and Bervian (2002, p. 48), this impersonal approach gives respondents greater confidence and allows for the collection of more accurate information.

The responses were quantitatively processed and analyzed using statistical methods to identify patterns and trends in research practices and information sources used by students. This analysis aimed to understand how these practices are reflected in students' academic transcripts, thereby contributing to a deeper understanding of their information profile in relation to the use of information sources. This approach enabled the formulation of recommendations to enhance information literacy and improve the effectiveness of research practices among students.

## 4 RESULTS AND DISCUSSION

The study involved 18 students: 11 from the agroecology technology program and seven from the physics degree program. The gender distribution was balanced, with nine women and nine men. Thirteen of the participants are between 19 and 25 years old, two are between 26 and 30 years old, and three are over 30 years old. Geographically, 14 students live in Cruzeiro do Sul, which is approximately 38 km from the Federal Institute, and four live in Mâncio Lima. Eleven students live in urban areas, seven live in rural areas, and only one student does not have internet access at home.

Of the 18 students questioned about their knowledge of information sources, 13 were familiar with the concept and 5 were not. The majority (72%) demonstrates a good level of information literacy. However, the lack of familiarity among 28% of the students is an academic challenge, especially since nearly half of the students in the agroecology program do not understand what information sources are.

It is important to investigate the reasons for this lack of knowledge, which may include a lack of emphasis in the curriculum or differences in available resources. Learning opportunities exist not only through training and workshops, but also by encouraging knowledge exchange among students. Students familiar with information sources can help their peers, promoting a collaborative environment.

Additionally, librarians must understand the characteristics and evaluation methods of information sources to select the most appropriate ones. Training should extend beyond recognizing sources to include critical evaluation. After the questionnaire, students were asked to indicate a source of information; Google was the most frequently mentioned. While Google is a useful search engine, it is essential that students learn to evaluate the credibility of the information they find. Google is a tertiary source that directs users to other sources, which are not always academically reliable.



Students also mentioned the internet as a reference. It is essential to be able to discern between reliable and unreliable sources, as the internet is more of a mechanism than a source of information itself. YouTube, a user-generated content platform, offers a wide range of videos, but the accuracy and verification of the information are not guaranteed. Therefore, it is crucial to teach students to identify videos from authoritative educational sources.

Although considered reliable sources, newspapers and television can be influenced by editorial bias. Although mentioned less frequently by students, scientific journals are highly reliable due to the peer review process, which lends credibility to academic research. Students should learn to identify reputable journals and distinguish the type of research they publish.

Although rarely cited, books offer in-depth information and are generally reliable, though they can quickly become outdated. When using books as sources, relevance and timeliness should be considered.

In short, each type of source has its advantages and limitations. Information literacy involves critically evaluating sources by considering their context, purpose, target audience, authority, and credibility, not just finding information. Educators must teach students to not only locate information but also think critically about sources and their content. Campello, Cendón, and Kremer (2000) point out that technological advances offer advantages beyond the possibilities of print and present opportunities and challenges regarding information available on the internet, which poses challenges to the traditional publishing model.

All the students who were interviewed said that they knew what fake news was. This indicates a high level of awareness about the subject. However, only 14 out of 18 students could describe fake news, defining it as false, distorted, manipulated, or invented information that has the potential to spread misinformation and negatively influence society.

Regarding identifying reliable information, eight of the eleven students in the agroecology course (72.7%) said they knew how to do so, while three students (27.3%) said

they did not. In the physics course, only two of the seven students (28.6%) said they knew how to identify reliable information, while five (71.4%) said they did not. These results demonstrate a significant difference between the two courses: the majority of agroecology students feel capable, while the majority of physics students do not.

While most students claim to know how to identify reliable information, the effectiveness of these skills is questionable. Simply stating that one knows how to identify reliability does not guarantee that students actually have the necessary skills. Some students may have a superficial understanding or excessive confidence, which can result in errors in practice.

The results emphasized the importance of promoting critical thinking, which involves more than just evaluating sources. It also includes analyzing arguments, recognizing biases, and making informed decisions. Considerable work is needed to improve students' information literacy and ability to identify reliable information. Silva (2019b) emphasizes that education should focus on developing skills that enable students to question, investigate, and validate information. This prepares them to be critical consumers in an environment saturated with misinformation.

Of the 18 students who were asked how they identify the reliability of information, only 11 responded. Many students emphasized the importance of evaluating the source, considering it an indicator of reliability. However, not all sources are equally valid. Other students mentioned checking information from multiple sources as an effective strategy, though this method is time-consuming and can perpetuate misinformation.

Additionally, some students evaluated the author's background, which is important but not always practical. One student mentioned checking for the padlock in the address bar (HTTPS), which protects privacy but does not directly indicate reliability. The popularity of information was also mentioned, but it does not guarantee truthfulness. Checking fact-checking channels, such as "Fato ou Fake," was cited as a solid practice.



One student admitted to not always checking the reliability of information, citing lack of time as a challenge. While students' strategies demonstrate an awareness of the importance of evaluating information, they also reveal the complexity of the process. However, most students do not seem to fully understand the evaluation criteria, especially the concept of authority, which is fundamental to academic research and informed decision-making. Authority refers to the credibility and expertise of the author or source and is essential for determining the quality of information.

Of the 18 students who responded, eight said they knew what databases were, while 10 said they did not. In the agroecology course, six of the eleven students were familiar with databases, while five were not. Among the seven students in the physics course, only two said they knew what databases were, while five did not have this knowledge.

Agroecology students are more likely to claim familiarity with databases than Physics students, possibly due to the nature of their discipline and the more frequent use of databases in their research. Databases are fundamental to academic research because they provide access to scientific information, articles, and experimental data. Lack of familiarity with these tools can put students disadvantaged in their studies and future careers.

These foundations are essential for the dissemination of scientific literature, and in library science and other fields, the development of information literacy is vital to prepare students for their future careers. This literacy involves the skills and knowledge necessary for the effective use of information sources. User education is crucial to ensure that students learn to navigate and use these tools, avoiding academic disadvantages. Therefore, databases are more than repositories of information; they are pillars of the educational process, promoting the construction of meaning from acquired and shared knowledge, as highlighted by Campello, Cendón, and Kremer (2000) and by Campello (2003; 2009b).

When asked to name a database, students' responses revealed a mixed understanding

and, in some cases, misconceptions about what actually constitutes a database. For example, one student mentioned “UOL,” confusing it with a database, when in fact it is an internet service provider. Another response associated databases with specific documents, such as laws, which demonstrates a limited view, since a database is an organized system for storing and managing information from various sources.

Two students cited Google, which, although it is a search engine that indexes information, is not a database in the traditional sense. One response about “card data” referred to personal information, and two responses that mentioned where information is stored showed a general understanding of storage but did not identify a specific database.

These responses show that although students believe they know about databases, the concept confuses them. A database is an organized structure that allows for the efficient storage, management, and retrieval of information. It is composed of tables and records. This underscores the importance of a more comprehensive information literacy education that provides clear concepts about databases and their significance, helping students to better utilize research resources in academic and professional contexts.

When asked about their research format, all students said they only used digital/virtual formats. While this preference reflects the convenience and accessibility of online resources, it also raises concerns about the need to develop critical skills in source evaluation, research ethics, and cybersecurity.

Regarding sources of information, all 18 students considered books, whether physical or digital, to be relevant. They highlighted the importance of the depth and authority that books offer. Most students (15) mentioned the internet and Google, although these references are generic, since the internet hosts various sources and Google functions as a search engine.

Fourteen students cited libraries as important sources, highlighting their significant role in academic research. Eleven students mentioned academic journals, recognizing the importance of peer-reviewed articles for up-to-date research. Eleven students also cited videos, reflecting the popularity of video platforms as accessible educational resources.



Additionally, 12 students emphasized the importance of interacting with people, such as professors and colleagues, in the learning process. Five students mentioned movies as a useful source for illustrating concepts, and eight students cited cell phones as a tool for accessing information. However, it is important to note that cell phones are access devices, not sources of information.

These data reveal how students seek and value different resources for their studies. This underscores the need for an educational approach that promotes a critical understanding of the sources used.

Campello, Cendón, and Kremer's (2000) work, "Information Sources for Researchers and Professionals," offers a comprehensive view of the diversity and evolution of information sources, reflecting trends observed among higher education students. By emphasizing the enduring importance of books, the dependability of libraries, and the swift availability of the internet, the study underscores the necessity of critical thinking skills to navigate the vast sea of available information. The value placed on academic journals and interpersonal interactions as sources of high-quality information reaffirms the fundamental roles of scientific communication and collaborative learning. In an increasingly digital world, this work serves as an essential guide to understanding and effectively utilizing the multiple sources of knowledge available.

In summary, higher education students draw on various information sources in their studies, reflecting the diversity of resources available in the digital age. Students must develop the ability to discern reliable sources from less reliable ones to derive maximum benefit from these sources in their academic studies and future professional lives.

Students in the agroecology and physics courses showed varied preferences when seeking sources of information. All 18 respondents used Google, highlighting its convenience

and accessibility. However, this also underscores the need to critically evaluate the information found, a concern Santaella (2004) discusses in the context of digital literacy.

Only one student reported using specialized databases, which is concerning because these databases offer reliable and specific academic information. This is concerning because these databases offer reliable, specific academic information. Campello, Cendón, and Kremer (2000) emphasize the importance of raising awareness about these tools, as they provide the accuracy and relevance often lacking in general internet searches.

Five students mentioned using books from the campus library, and four mentioned using the virtual library, indicating that they still value these resources. However, it would be useful to understand what materials the students are looking for, as well as their awareness of all the available resources. Silva (2019a) highlights the need for strategic planning in university libraries.

Compared to Google, the use of social networks, such as WhatsApp, Instagram, and Facebook, to search for information is low. While these platforms can be useful for communication, they are not considered reliable sources of academic information. Recuero (2009) discusses the importance of distinguishing between the personal and academic uses of these networks.

Clearly, students need to be more aware of information sources because many are unaware of the best practices for finding reliable academic information. Therefore, educational institutions should offer guidance and training on evaluating and selecting sources to benefit their academic and professional training activities.

Additionally, research on students' knowledge of scientific journals revealed that only four of the eighteen respondents were somewhat familiar with the concept, and only three were able to cite an example. This lack of knowledge is concerning because journals are fundamental to disseminating academic research. Campello, Cendón, and Kremer (2000) emphasize the importance of integrating knowledge about journals into the academic curriculum to promote robust information literacy.



Students' lack of understanding of scientific journals may also influence their ability to conduct quality research. Therefore, educational measures are needed to increase students' familiarity with reliable research sources. Students' use of general information websites indicates a variety of sources, which presents opportunities and challenges regarding academic rigor and information reliability.

Data on students' use of information sources reveals a significant pattern. Google Scholar is the most widely used database, with 11 students indicating its use due to its accessibility, variety of available academic articles, and user-friendly interface. SciELO is the second most popular database, used by nine students. It is known for its collection of scientific journals from Latin American countries and attracts students seeking region-specific resources. Only two students reported using Periódicos Capes, which may be due to less familiarity or accessibility.

Additionally, two students reported unfamiliarity with databases, suggesting an information literacy gap. The use of Brasil Escola and UOL by one student each suggests a reliance on general information sources that are less specialized. Notably, none of the students reported using BDTD (Brazilian Digital Library of Theses and Dissertations), suggesting either a lack of awareness of this resource or its perceived irrelevance.

The preference for Google Scholar reflects students' tendency to use broad, easy-to-navigate platforms. Using SciELO and Periódicos Capes demonstrates an interest in regional and specific resources. However, the low usage of these databases and the lack of knowledge about others highlight the need to improve students' information literacy.

Eight students said they learned about these databases through their professors, highlighting the crucial role of educators in introducing academic resources. Another eight

students said they discovered the databases through friends, highlighting the importance of social networks among students, though the quality of recommendations may vary. Additionally, seven students reported finding the databases independently, demonstrating their ability to autonomously search for academic resources. Finally, two students said they were unaware of the databases. This is concerning because these students may be disadvantaged compared to their peers who have access to academic resources.

These results underscore the importance of promoting awareness of and developing skills in using academic databases. This ensures that all students have access to the resources necessary for their academic success. Educational institutions must identify and support students who lack knowledge of these tools.

According to Campello (2009a), cognitive development is influenced by the social environment and personal experiences. Social interactions are fundamental to learning because they provide a context in which people construct meaning. Additionally, knowledge is shaped by individual experiences, wherein personal hypotheses help interpret and understand the world. In this sense, guided research suggests creating an environment that balances social collaboration with space for meaningful individual learning.

Data reveal that higher education students learn about databases in various ways. Professors play a significant role in introducing students to these resources, and friends and self-discovery are common sources of knowledge. However, it is crucial to address the identified knowledge gap among students to ensure equal access to the necessary academic research tools.

In addition to databases, a questionnaire was administered to assess students' knowledge of information search tools and techniques. The data analysis showed limited knowledge: only four students reported knowing how to use quotation marks for exact searches, and only one student mentioned the "file type" operator, which restricts searches to specific file types. Furthermore, none of the students demonstrated knowledge of Boolean operators (AND, OR, and NOT) or the use of the asterisk (*), both of which are essential for refining search queries.



Thirteen out of eighteen students stated that they were unfamiliar with the mentioned search tools and techniques, indicating a significant gap in their research skills. This lack of knowledge may hinder their ability to find relevant, reliable information for academic purposes.

After all, unfamiliarity with these tools and techniques can negatively impact students' academic research productivity. Therefore, it is crucial for educational institutions to incorporate training or workshops on information search skills into their curricula to help students become competent and independent researchers. Dias (2008) emphasizes the importance of understanding search engines and their advanced tools, and the necessity of carefully analyzing sources to ensure the credibility of the information collected. Developing these skills is crucial to improving the ability to find relevant and reliable information.

In addition to locating reliable and relevant information, students must know how to use and present this information in academic papers, including references and supporting evidence. To evaluate students' understanding of Brazilian Regulatory Standards (BRS) for citations and references, the BRS 10520 and BRS 6023 standards were examined.

The data revealed limited knowledge of these standards: only one student was familiar with BRS 10520, and three were familiar with BRS 6023. Most students reported not knowing either standard, which is concerning as lack of familiarity can result in formatting problems and improper citation, increasing the risk of plagiarism. Additionally, seven students stated that they did not remember whether they knew the standards, suggesting uncertain familiarity.

Most students are unfamiliar with the BRS 10520 and BRS 6023 standards, which can result in subpar academic work. Proper documentation of sources and academic integrity require the correct use of these standards. To promote integrity in research and improve academic training, educational institutions should consider incorporating training on the use of

these standards into academic activities through information literacy.

The final question of the questionnaire addressed the physical and digital media that students in the Agroecology and Physics courses use for their information searches. Students were asked to rate the usability of different tools using the following indicators: "I don't use it," "I use it very little," "I use it regularly," and "I use it frequently."

The data showed that seven students do not use social networks for research, while four use them frequently, indicating divided preferences. Most students (14) do not use scientific journals, which may reflect a lack of access or interest; only one student uses them regularly, and two use them infrequently.

Google Scholar was the most popular tool, with 13 students regularly or frequently due to its ease of access to academic articles. Additionally, 11 students frequently use search engines such as Google, Yahoo, or Bing due to their availability and versatility.

Eleven students reported not using the campus virtual library, indicating a lack of knowledge or a preference for other tools. Nine students use the physical library, although 12 report rarely using it. Computers are commonly used for research, with 14 students using them, while cell phones are also widely used, with 14 students using them frequently. This highlights the importance of mobile devices, though there are concerns about distractions.

These data on students' preferences for tools and resources for their information searches highlight the need to discuss the advantages and disadvantages of each. Each research tool and medium has its place in academia, and the choice depends on students' individual goals and preferences. Students should be guided in using these tools effectively and critically, verifying the reliability of sources and selecting the most appropriate ones for their academic needs. Additionally, institutions may consider promoting access to high-quality academic resources to improve their students' research skills.

## 5 CONCLUSION



A study of higher education students' information profiles revealed significant gaps in their information literacy. This highlights the need for more effective educational strategies to empower students in their research practices. Although many students are familiar with common search tools like Google Scholar, the findings indicate substantial ignorance regarding specialized databases and scientific journals, which are crucial for rigorous academic research.

The lack of knowledge about citation and referencing standards, such as BRS 10520 and BRS 6023, reflects an urgent need for interventions that promote academic integrity and ethical information use. These standards are essential for correctly presenting academic work and avoiding plagiarism.

Information literacy is therefore an essential tool for filling these gaps. Through training and workshops, students can learn to locate, critically evaluate, and ethically and efficiently use information. Promoting critical evaluation skills, recognizing reliable sources, and appropriately using data are key components in forming informed citizens and competent researchers.

Additionally, the research revealed differences in the use of information resources between agroecology and physics courses, highlighting the need for personalized approaches to teaching information literacy.

Investing in information literacy is essential for preparing students to face the challenges of academia and the job market. It promotes a research culture that values quality, ethics, and efficiency. This study emphasizes the importance of adopting measures that consistently and comprehensively integrate information literacy into higher education

institutions' curricula, ensuring that students are well equipped to navigate the complex contemporary information landscape.

Strengthening information literacy among higher education students and effectively including it in the school curriculum requires adopting a structured, integrated approach. First, specific information literacy modules should be mandatory and tailored to each discipline's needs. This requires an interdisciplinary approach in which information literacy is considered a crosscutting component, interacting with other disciplines to promote research and critical thinking skills in various academic contexts.

In addition, ongoing training for professors is crucial. Training programs should be offered to enable professors to integrate information literacy into their teaching practices and effectively use technological and informational resources. The development of didactic materials and teaching resources can support this process by helping professors facilitate interactive and engaging learning.

It is essential for students to have access to regular workshops and seminars. These events should cover research techniques, the critical evaluation of sources, and proper citation and referencing standards, such as BRS 10520 and BRS 6023. Practical sessions are equally important, as they allow students to explore academic databases, use advanced search tools, and apply their skills to realistic research projects.

Developing resources and tools also plays a vital role. Libraries, both digital and physical, should strengthen their role as centers of support for information literacy. This ensures access to reliable databases and promotes the use of these services among students. Additionally, accessible online guides and tutorials can instruct students on using research tools and critically evaluating sources.

Ongoing assessment mechanisms must be implemented to monitor students' progress in information literacy and use feedback to tailor programs to their needs. Self-assessment should be encouraged to allow students to reflect on their information use skills and areas for improvement.



Finally, collaboration between professors, librarians, and information specialists is essential. Strategic partnerships establish a collaborative environment that values information literacy as an integral part of the educational experience. These actions aim to create a solid foundation for students to develop critical information literacy skills and prepare them for the academic and professional challenges of the 21st century. Effectively integrating information literacy into the school curriculum contributes significantly to developing informed and engaged citizens.

## REFERENCES

ARAÚJO, I. S. C.; CHESINI, T. S.; ROCHA FILHO, J. B. Alfabetização científica: concepções de educadores. **Contexto & Educação**, Unijuí, Ano 29, n. 94, p. 4-24, set./dez., 2014. Available at: https://l1nq.com/6We2N. Access on: 14 dez. 2023.

BARRETO, A. A. A questão da informação. **São Paulo em Perspectiva**, São Paulo, v. 8, n. 4, p. 3-8, out./dez., 1994. Available at: https://acesse.one/V9Huc. Access on: 14 jul. 2024.

BRANDÃO, G. S; SANTOS, J. O.; BORGE, J. Comportamento infocomunicacional: um diagnóstico entre estudantes para a promoção de competências infocomunicacionais. **Informação e Informação**, Londrina, v. 25, n. 4, p. 670-696, out./dez., 2020. Available at: https://brapci.inf.br/index.php/res/v/152209. Access on: 11 fev. 2023.

CAMILLO, M. R. S. **Letramento digital no ensino médio**: alunos nativos digitais da geração Z. 2022. 167f. Dissertação (Mestrado em Ensino de Humanidades e Linguagens) – Universidade Federal do Acre, Cruzeiro do Sul, 2022.

CAMPELLO, B. S. **Letramento informacional**: função educativa do bibliotecário na escola. Belo Horizonte: Autêntica, 2009a. (Coleção Biblioteca Escolar).

CAMPELLO, B. S. **Letramento informacional no Brasil**: práticas educativas de bibliotecários em escolas de ensino básico. 2009. 209 f. Tese (Doutorado em Ciência da Informação) – Escola de Ciência da Informação, Universidade Federal de Minas Gerais, Belo Horizonte, 2009b.

CAMPELLO, B. S. O movimento da competência informacional: uma perspectiva para o letramento informacional. **Ciência da Informação**, Brasília, v. 32, n. 3, p. 28-37, set./dez., 2003. Available at: https://encr.pw/QDzgA. Access on: 22 jul. 2024.

CAMPELLO, B. S.; CENDÓN, B. V.; KREMER, J. M. F**ontes de informação para pesquisadores e profissionais**. Belo Horizonte: UFMG, 2000.

CERVO, A. L.; BERVIAN, P. A. **Metodologia científica**. 5. ed. São Paulo: Prentice Hall, 2002.

DIAS, M. M. K.; PIRES, D. **Usos e usuários da informação**. São Carlos: EdUFSCar, 2004.

GARCIA, R. M.; SILVA, H. C. O comportamento do usuário final na recuperação temática da informação: um estudo com pós-graduandos da Unesp de Marília, **DataGramaZero**: Revista de Ciência da Informação, Rio de Janeiro, v. 6, n. 3, 2005, Available at: http://hdl.handle.net/20.500.11959/brapci/5722. Access on: 11 fev. 2023.

LORENZETTI, L.; DELIZOICOV, D. Alfabetização científica no contexto das séries iniciais. **Ensaio – Pesquisa em Educação em Ciências**, Belo Horizonte, v. 3, n. 1, p. 45-61, jan./jun., 2001. Available at: https://l1nq.com/OwWh7. Access on: 14 dez. 2023.

MARTÍNEZ-SILVEIRA, M.; ODDONE, N. Necessidades e comportamento informacional: conceituação e modelos. **Ciência da Informação**, Brasília, v. 36, n. 1, p. 118-127, maio/ago., 2007. Available at: https://revista.ibict.br/ciinf/article/view/1182.
Access on: 11 fev. 2023.

MASLOW, A. H. A theory of human motivation. **Psychological Review**, Washington, v. 50, n. 4, p. 370-396, 1943. DOI: https://doi.org/10.1037/h0054346

MELLO, P. C. **A máquina do ódio**: notas de uma repórter sobre fake News e a violência digital. São Paulo: Companhia das Letras, 2020.

PIRES, E. A. N. Comportamento informacional e processo de busca da informação: bases fundamentais para pesquisa científica. **Revista ACB**: Biblioteconomia em Santa Catarina, Florianópolis, v. 17, n.2, p. 288-307, jul./dez., 2012. Available at: https://revista.acbsc.org.br/racb/article/view/845. Access on: 1 set. 2023.

RECUERO, R. **Redes sociais na internet**. Porto Alegre: Sulina, 2009. (Coleção Cibercultura).

SANTAELLA, L. **Navegar no ciberespaço**: o perfil cognitivo do leitor imersivo. São Paulo: Paulus, 2004.

SASSERON, L. H.; CARVALHO, A. M. P. Alfabetização científica: uma revisão bibliográfica. **Investigações em Ensino de Ciências**, Porto Alegre, v. 16, n. 1, p. 59-77, 2011. Available at: https://l1nq.com/ehECw. Access on: 14 dez. 2023.

SILVA, A. B. O. A. **Bibliotecas universitárias e sua importância no ensino superior**: análise a partir da construção do Plano de Desenvolvimento Institucional 2019-2023 da Universidade Federal da Paraíba. 2019. 171 f. Dissertação (Mestrado em Gestão nas Organizações Aprendentes) – Universidade Federal da Paraíba, João Pessoa, 2019.

SILVA, D. D. **Desinformação e fake news na ciência da informação**: representações da produção científica na BRAPCI. 2019. 58 f. Trabalho de Conclusão de Curso (Graduação em Gestão da Informação) – Universidade Federal de Pernambuco, Recife, 2019.

WILSON, T. D. Models in information behaviour research. **Journal of Documentation**, Boras, v. 55, n. 3, p. 249-270, 1999. Available at: https://l1nq.com/b3H2j. Access on: 22 abr. 2024.