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Artificial Intelligence Literacy in Higher Education: A Reflective Analysis of Training Needs and Student

Literacidad en Inteligencia Artificial en la Educación Superior: Un Análisis Reflexivo sobre Necesidades Formativas y Percepciones Estudiantiles

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ABSTRACT
Drawing from a historical perspective on the integration of technology into academic life, this article reflects on the school's unavoidable responsibility in the media and technological education of students. Using a qualitative approach, it argues that just as traditional media literacy was once crucial, it is now imperative to integrate artificial intelligence (AI) literacy as an essential component of the curriculum. To explore this educational need, a diagnostic study was conducted with 392 university students through a survey measuring their perceptions on AI literacy, from its utility to its ethical implications. Data analysis, using descriptive statistics, reveals that students identify a high utility for AI, primarily in instrumental tasks such as writing texts and searching for information. However, they report a scarce integration of these tools into their formal learning processes and a limited understanding of their fundamentals and scope. This dissonance between functional use and lack of academic integration underscores a significant gap, highlighting the urgent need for higher education institutions to assume a proactive role in developing critical competencies in artificial intelligence.

RESUMEN
Partiendo de una retrospectiva histórica sobre la incorporación de la tecnología a la vida escolar, este artículo expone una reflexión sobre la ineludible responsabilidad de la escuela en la formación mediática y tecnológica de los estudiantes. Desde un enfoque cualitativo, se argumenta que, como en su momento fue crucial alfabetizar en medios tradicionales, es imperativo integrar la literacidad en inteligencia artificial (IA) como un componente esencial del currículo. Para explorar esta necesidad formativa, se realizó un estudio diagnóstico con 392 alumnos de diversas universidades, aplicando una encuesta para medir sus percepciones en las dimensiones de la literacidad en IA, desde de su utilidad hasta sus implicaciones éticas. El análisis de datos, mediante estadística descriptiva, revela que los estudiantes universitarios identifican una alta utilidad de la IA principalmente en tareas instrumentales, como la redacción de textos y la búsqueda de información. Sin embargo, reportan una escasa integración de estas herramientas en sus procesos de aprendizaje formales y una limitada comprensión de sus fundamentos y alcances. Esta disonancia entre el uso funcional y la falta de integración académica subraya una brecha significativa, evidenciando la urgencia de que las instituciones de educación superior asuman un rol proactivo en el desarrollo de competencias en IA.

KEYWORDS · PALABRAS CLAVE
Artificial Intelligence Literacy; Higher Education; Digital Competencies; Educational Technology; University Curriculum.
Literacidad en Inteligencia Artificial; Educación Superior; Competencias Digitales; Tecnología Educativa; Currículo Universitario.

1. Introduction

No tools will make a man a skilled workman, or master of defence, nor be of any use to him who has not learned how to handle them, and has never bestowed any attention upon them

—Plato, The Republic

The field of artificial intelligence (AI), once the domain of science fiction, has become a subject of interest to the general public. However, it should be noted that this access does not guarantee correct use, which is understood as conscious, ethical, and effective use. The notion that ease of use is synonymous with competence is a pervasive misconception that persists with the advent of each new technology. Within the domain of education, this notion poses a significant challenge, as it fosters the erroneous belief that technological integration guarantees profound and effortless learning merely by virtue of its presence.

In the early days of silent film, Béla Balázs proposed a "Theory of Film" that began with reflections on education up to that point. It is noteworthy that the author's film theory commenced with a chapter entitled "The Dangers of Ignorance," which reads as follows:

> At our universities there are chairs for literature and all arts except that of the film. The first Art Academy which included the theory of film art in its curriculum was opened in Prague in 1947. The text-books used in our secondary schools discuss the other arts but say nothing of the film. Millions hear about the aesthetics of literature and painting who will never make use of such knowledge because they read no books and look at no pictures. But the who frequent the movies are left without guidance—no one teaches them to appreciate film art. (Balázs, 1970, p. 18)

He posits that 1947 marks a late date—he would perish in 1949, and the work containing the quote would be published in 1957—and even titles one of his chapters "Missed Opportunity." With respect to the notion of culture and the cultured individual, Balázs astutely noted that a cultivated individual would be familiar with the lives and works of Leonardo da Vinci, Beethoven, and Michelangelo. However, it was possible to be considered "cultured" without being acquainted with Eisenstein, a prominent director of his era. For the critic, it is essential that the audience be adequately prepared before encountering a film. He employs a term from one of his presentations to describe this preparation in film appreciation: film-conscious, which could be translated as "cinematic awareness." This term implies that it is not something spontaneous or fortuitous, but rather, it is something that must be acquired, refined, reflected upon, and worked on. Consequently, the optimal environment for cultivating cinematic awareness is within the structured environment of a school:

> Until there is a chapter on film art in every text-book on the history of art and on aesthetics; until the art of the film has a chair in our universities and a place in the curriculum of our secondary schools, we shall not have firmly established in the consciousness of our generation this most important artistic development of our century. (Balázs, 1970, p. 19)

Film classes have not been incorporated into the secondary school curriculum, nor are there any thematic units dedicated to films in textbooks. The concept of "film awareness" has not been established as either an objective or a subject of study. Bálazs asserts that we have not yet developed the capacity to engage in truly discerning film viewing. Subsequent to the advent of cinema, television emerged as a dominant medium, gaining a ubiquitous presence in households and institutions. This ascendance can be attributed to two key

factors: its extensive reach and its accessibility. Consequently, it was hypothesized that the platform would be highly accessible for students and educators, serving as an effective educational medium and pedagogical instrument for the state. At that time, Ferrés and Pisticelli sounded a note of caution:

> Media competition, therefore, necessitates the cultivation of a discerning aptitude, particularly concerning one's own critical faculties. This is due to the preeminence of the emotional brain over the rational brain, which renders it more precise to characterize human beings as rationalizing animals rather than as rational animal. (Ferrés & Piscitelli, 2012, p. 79)

A critical examination of the medium is imperative, extending beyond its mere utilization. These authors, particularly Ferrés, conducted extensive research, studying entire cities in Spain (Ferrés Prats et al., 2012) and a highly diverse population, for example in the Autonomous Community of Andalusia. The investigation revealed "serious deficiencies" in the capacity to interpret audiovisual messages in a reflective and critical manner. The study indicates that, in many cases, the degree of competence is not optimal. This finding refutes the hypothesis that ease of use will inevitably lead to mastery of the medium or technology.

Conversely, when discussing deficiencies, it is imperative to ascertain the specific elements that are absent. The researchers proposed a series of dimensions in which the degree of media competence of the individuals surveyed could be determined. As posited by Aguaded et al. (2011) on page 99, "Training needs affect the six dimensions that make up this competence: aesthetics, languages, ideology and values, technology, production and programming, and reception and audience." This reinterpretation of the act of "watching television" as a communicative act gives rise to further implications. The comprehensive understanding of television necessitates an amalgamation of competencies, including but not limited to language and speech proficiency, as well as expertise in cinematography and visual arts. Television can only be utilized to its full potential within the context of this paradigm. Television has long been the subject of criticism, particularly among children and young people, leading to the pejorative appellation "the idiot box." It is possible that not all of the effects can be attributed to the "idiot box," or alternatively, the "idiocy" of the box may be a reflection of the user's deficiency in media literacy.

At this juncture, parallels can be drawn between this work and previous cinematic experiences. Ferrés's (2019) work distinguishes between the concepts of "educating with television" and "educating on television," highlighting the significance of recognizing the distinct nature of these approaches in educational settings. The modification in preposition signifies a profounder reflection, as technology is regarded as an educational medium, yet scant attention is devoted to media education. The necessity of media literacy, which is defined as the ability to evaluate and comprehend the content of various media forms, stems from the need to ascertain the individual's level of mastery in the aforementioned dimensions. It is important to note that, as in cinema, merely watching television will not automatically develop these skills; they must be analyzed, reflected upon, and taught in school.

> In this context, if an educational institution neglects to instruct its students in the art of television viewing, what kind of world is it preparing them for? It is incumbent upon educational institutions to facilitate the interpretation of their culture's symbols by nascent generations of students. Which symbols does the educational system help to interpret in the present day? To which culture does this refer? If the purpose of education is to prepare citizens to integrate into society in a thoughtful and critical manner, it is pertinent to consider how citizens who are not prepared to critically

> engage in the activity to which they devote most of their time will integrate. (Ferrés, 1994, p. 15)

As indicated by several sources (Choi et al., 2023; National Survey on the Availability and Use of Information Technologies in Households [ENDUTIH] 2024, n.d.; Statistics on the Digital Situation in Mexico 2023-2024 - Branch, 2025; Ganson et al., 2023), the average user spends approximately eight hours per day engaging with digital content. This screen time is comparable to the time allocated for sleep or work, as noted by Ferrés. In light of this observation, it is recommended that the subject be incorporated into the school curriculum.

Digital technologies, including the internet, have introduced both challenges and opportunities across various aspects of daily life, a phenomenon referred to as the "digital divide." However, this divide can be seen as a reoccurrence of the earlier phenomenon of the television divide. According to Van Dijk (2017), the discourse surrounding the digital divide frequently gives rise to misinterpretations.

It is noteworthy that prior to Van Dijk's observation, Ferrés employed the term "degrees," aligning with the perspective that discourse on "gaps" signifies a void, reminiscent of a Manichean dichotomy between possession or non-possession. This static position precludes discourse on growth or improvement. After elucidating the aforementioned points, it is evident that a significant error occurs when discussing gaps in general terms. The author has categorized gaps into three distinct types: physical access, skills access, and usage access.

The initial disparity pertains to physical access, defined as a user's ability to access a device, such as a computer. The feasibility of this access is contingent upon a multifaceted set of factors, including economic, social, and geographic circumstances, in addition to other variables. Two additional points merit emphasis. First, this is the most extensively studied gap and is regarded as the most significant. It is attributed to individual characteristics, such as economic status or age, as these are associated with purchasing power. Secondly, teachers and schools exert minimal to no influence on this type of gap.

The second gap pertains to skills. It is important to acknowledge that the issue of digital inequality does not conclude once physical access has been attained; rather, it commences when digital media is integrated into daily life. As Van Dijk (2017, p. 2) asserts, the eight hours of internet use previously referenced demonstrate the significant role that digital technology plays in contemporary daily life.

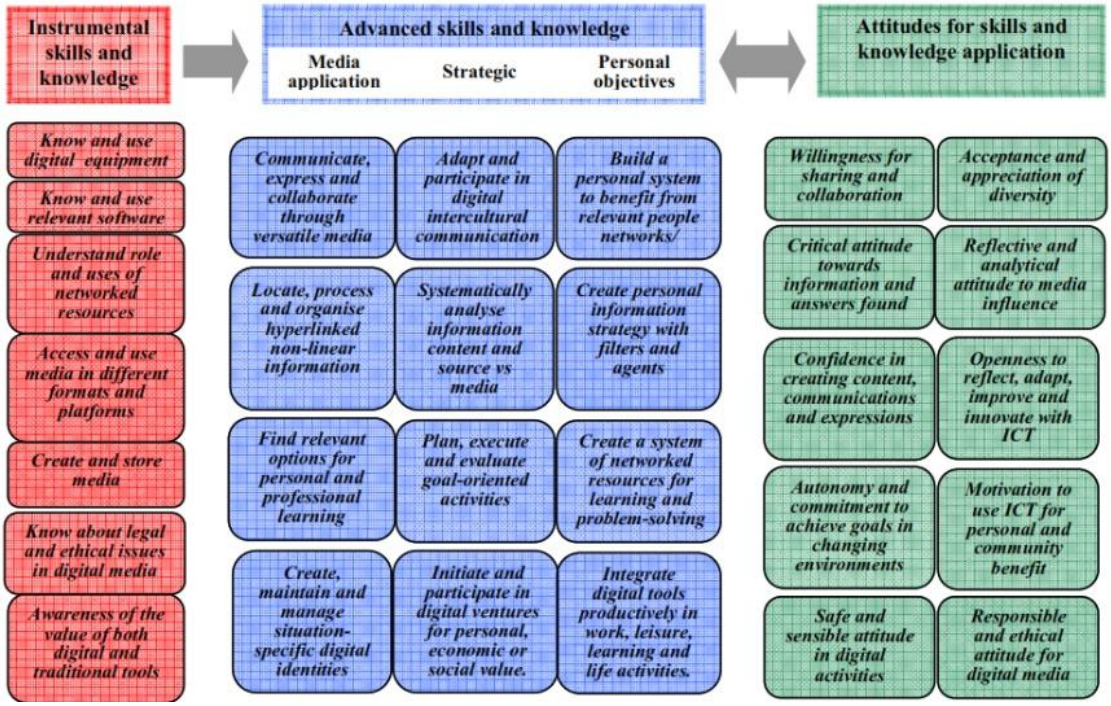
Consequently, the second gap constitutes a component of society's training requirements. The author designates these competencies as "digital or media literacy," though he cautions that assessing them poses significant challenges due to their absence from formal educational curricula. Instead, these competencies are cultivated through individuals' experiential learning and practical application. Consequently, he aligns with the perspectives of Bálazs and Ferrés, acknowledging the absence of a structured framework for this knowledge, which hinders its evaluation. The third barrier to access pertains to the utilization of the system, which is known as usability. This phenomenon is evident in the duration of technology usage, as well as in the activity and creativity exhibited during use, which can be defined as technological appropriation. It is only by surmounting the initial two obstacles that one can attain the third.

The advent of the concept of digital literacy has given rise to two fundamental inquiries: the establishment of a precise definition and the development of a reliable measurement

scale. Despite the numerous approaches to its definition, Ala-Mutka (2011) offers a comprehensive framework for understanding digital literacy.

Figure 1

Mapping Digital Literacy. (Source: Ala-Mutka, 2011, as cited in Álvarez, 2012)



Source: own elaboration.

In alignment with Bálazs's discernment of cinematic elements and Ferrés's proficiency in media, Ala-Mutka introduces a multifaceted array of components, a consequence of the inherent characteristics of the medium. In contrast to the relatively passive nature of film and television, the internet fosters a more dynamic and interactive environment, where users not only consume content but also actively produce it, including messages, content, and other forms of communication. For instance, ethical considerations in the former media milieu entailed the discretion to access or withhold access to content, or, in pertinent instances, to exhibit or refrain from exhibiting content. In essence, ethical action entailed the decision to either view or withhold viewing. In the context of digital tools, the ethical considerations are considerably more intricate, as they encompass the prerogative to view, share, edit, suggest, create, or modify content, among other potential actions.

Kirsti Ala-Mutka's approach does not exclude previous media forms such as film or television; rather, it integrates them as fundamental components of its methodology. Moreover, the notion of "everyday life" is understood to encompass both professional and leisurely activities (Eurostat, 2018). A hierarchical system of levels was established, ranging from mastery to skill to competence to literacy. A certain degree of technical expertise is also required in order to function effectively in the media and to ensure safe and ethical navigation.

The study of digital literacy witnessed a substantial surge around 2020 (Reddy et al., 2020, 2023; Tinmaz et al., 2022, 2023), attributable to the closure of educational institutions

due to the pandemic. Consequently, digital literacy assumed a more prominent role (Magallanes Ulloa, 2023). A significant proportion of this scientific output exhibited common denominators, including the necessity to integrate it into the curriculum and, in cases where it is included, to augment its presence (Alowais et al., 2024; Breakstone et al., 2018; W. Ng, 2012; Reddy et al., 2023; Spante et al., 2018). Consequently, its necessity was not only academic but also practical, as it had the potential to enhance employability (Nikou et al., 2022) and even act as a health variable (Arias López et al., 2023).

As the world was beginning to return to what was termed the "new normal" in the post-pandemic era, new Generative Artificial Intelligence services emerged in 2022. In contrast to the other technologies mentioned, Generative Artificial Intelligence immediately overcame the initial two barriers to AI adoption: access and skills. Although the notion of artificial intelligence is not a novel concept, it historically resided within the confines of secret laboratories and the realm of science fiction films. However, beginning in 2022, it has undergone a significant shift, becoming accessible on a vast scale through various devices and seamlessly integrating into critical aspects of modern communication, such as office automation, messaging services, and email. Moreover, they were, at least in part, free. The advent of user-friendly, chat-type interfaces, which utilize natural language, has effectively dismantled the skills barrier. The sole remaining impediment is the utilization barrier.

In the opinion of some scholars (Bender, 2024; H. Wang et al., 2020), the use of AI is simply another skill that should be included within the scope of digital literacy. However, the prevailing consensus is that a distinct framework should be developed for AI. Long and Magerko (2020) commence with four fundamental inquiries: What is AI? What can AI do? How does AI work? The utilization of AI is a subject that merits careful consideration. A further inquiry concerns the public's perception of AI. The approach's brilliance lies in its simplicity, which effectively eliminates AI specialization.

Consequently, the initial dimensions for AI literacy are delineated as follows: Awareness, Use, Evaluation, and Ethics. Awareness is defined as the ability to identify and comprehend AI technology when utilizing AI-related applications. The term "use" is employed to denote the capacity to employ and leverage AI technology to execute tasks with optimal efficiency. The evaluation process entails the capacity to meticulously analyze, methodically select, and critically assess AI applications and their outcomes. Ethics pertains to the capacity to discern the responsibilities and risks inherent in the utilization of AI technology. (B. Wang et al., 2023)

Conversely, Ng et al. (2021b) proposed a classification of AI literacy into four fundamental dimensions: knowledge and understanding of AI, utilization and application of AI, evaluation and development of AI, and consideration of ethics in AI. Touretzky et al. (2019) advanced a series of five fundamental concepts for the integration of artificial intelligence in K-12 education, encompassing the domains of perception, representation and reasoning, learning, natural interaction, and the social implications of AI. Zhang et al. (2023) developed a secondary school curriculum centered on fostering AI literacy, meticulously structured around three fundamental components: fundamental AI concepts, ethical and social implications, and vocational guidance in AI-related careers. From the literature, an alternative theoretical framework is posited, encompassing four dimensions: the ABCE (affective, behavioral, cognitive, and ethical) framework. The ABCE dimensions of AI literacy development in students comprise four essential areas: the affective aspect, which refers to attitudes, emotions, and interests toward AI; the behavioral aspect, related to actions and the practical application of knowledge about AI; the cognitive aspect, focused on the

theoretical and conceptual understanding of AI; and the ethical dimension, which involves critical reflection on the moral and social implications of using this technology.

As with digital literacy, these dimensions yield a catalogue of AI competencies.

Table 1

Essential skills for using AI by different authors

Author(es)	Focus Main	Key Components (Summary)
(Long & Magerko, 2020)	16 Holistic Competencies	Recognition, Understanding, ML Steps, Data Literacy, Ethics.
(Ng et al., 2021a, 2021b)	Cognitive Taxonomy (Bloom)	6 levels: Know, Understand, Apply, Analyze, Evaluate, Create in AI.
(Rizvi et al., 2023)	4 Levels of Depth	From Social/Ethical (biases) to the "Engine" (technical functioning).
(Annapureddy et al., 2024)	Generative AI Skills	12 skills: Prompt Engineering, Content Detection, Evaluation, Ethics.

Bloom's Taxonomy (1979) is widely regarded as a foundational work in this field, as it provides a taxonomic framework that enables the refinement and grading of AI literacy competencies. The dimensions and skills delineate a more expansive framework for the utilization of AI. A comprehensive understanding of the degree of mastery or knowledge, user profiles, and types of use facilitates the transcendence of dualisms such as "knows or does not know," "has or does not have." This understanding reveals that the relationship with AI is considerably more intricate than contracting a service or the specific use of a particular application. The aforementioned framework facilitates the formulation of inquiries that delineate this relationship and enable future comparisons. The instrument presented in this study is predicated on these theoretical frameworks.

2. Method

A digital questionnaire was disseminated via Google Forms to 392 university students representing various Mexican institutions. The sampling method was implemented for the sake of convenience. The sample included 203 women and 189 men, aged between 17 and 56 (M = 20.82, SD = 4.19). Participants were grouped into four areas: The distribution of disciplines is as follows: engineering (58.16%), social sciences (35.20%), basic sciences (3.32%), and health sciences (3.32%).

The instrument was composed of two sections. The initial phase of the study entailed the collection of sociodemographic data, encompassing age, gender, institutional affiliation, and the specific field of study. The second study incorporated 47 Likert items, which were

organized into five dimensions: knowledge and skills, affective dimension, ethical dimension, contextual application, and academic experience. Additionally, it included eight open-ended questions. Responses were then coded on a four-point scale ranging from 1, representing the lowest level of agreement, to 4, representing the highest level of agreement. The open-ended nature of the questions posed allowed for the articulation of opinions and perspectives in a manner that was not constrained by predefined responses.

The questionnaire was approached from two perspectives: quantitative and qualitative. In the first case, a Confirmatory Factor Analysis (CFA) was performed, and the five-factor model demonstrated an adequate fit (CFI = 0.914, TLI = 0.903, RMSEA = 0.043, SRMR = 0.052). Subsequently, a cluster analysis was applied to identify natural subgroups in the sample. The three-group solution was the most interpretable and statistically robust, delineating the profiles of "Curious Observers," "Informed Skeptics," and "Disconnected."

However, this article emphasizes qualitative and exploratory analysis, incorporating all responses, including those not integrated into the validated model, with special attention to open-ended questions. Instruments from previous studies (Carolus et al., 2023; Hornberger et al., 2023; Koch et al., 2024) and our own formulations, adapted to the Latin American context, were utilized to design the items.

Each subscale reflects a specific component of AI literacy:

- The possession of knowledge and skills is indicative of an individual's comprehension of AI principles and the utilization of its associated terminology. This understanding is further evidenced by the capacity to employ or elucidate the mechanisms employed by the field.
- The affective dimension is defined as the set of psychological and emotional responses associated with interacting with artificial intelligence systems. These responses include interest, motivation, and emotional comfort.
- The concept of ethical awareness encompasses a range of factors, including responsibility, the regulatory framework, and critical reflection on the social implications of AI.
- The contextual application of artificial intelligence (AI) involves the evaluation of its relevance and practicality within academic and professional contexts.
- Academic experience: This category encompasses the interaction with tools, content, or methodologies related to artificial intelligence within the context of a formal educational environment.

The open-ended responses in the questionnaire were analyzed using an R-assisted thematic analysis procedure aimed at identifying patterns of meaning in students' perceptions of Artificial Intelligence (AI).

The processing was executed with the tidytext, dplyr, stringr, and ggplot2 packages, employing a mixed exploratory approach. Initially, the text underwent tokenization, which entailed the conversion of each response into a distinct lexical unit. Subsequently, the text underwent lexical cleaning, a process that involved the removal of punctuation marks and stopwords in both Spanish and English. This approach ensured the retention of words with relevant semantic meaning, including accented variants of Spanish.

Subsequently, an inductive semantic classification based on lexical matches was applied, grouping terms according to their conceptual proximity. The analysis was conducted within the framework of three distinct thematic fields.

1. The utilization of instruments is frequently associated with various terms such as "use," "task," "tool," "application," "assistance," and "writing."
2. The following concepts are associated with the algorithm, data processing, machine intelligence, and learning:
3. The following ethical issues are to be considered: ethical and moral principles, responsibility, risk, privacy, and plagiarism.

The detection of each word was accompanied by its automatic assignment to the relevant field, facilitated by the implementation of regular expressions (str_detect). To ensure the semantic validity of the categories, a manual review process was conducted by researchers. Unclassifiable occurrences were grouped into the category Other, which was subsequently inspected to verify the absence of relevant terms. Representative textual citations were selected to illustrate the meaning of each category. These citations were anonymized and linked to the original questions.

3. Results

The following section presents a selection of the obtained results. First, in terms of knowledge:

Table 2

Comparison of items in the knowledge section

Item	Strongly agree	Agree	Disagree	Strongly disagree	Total
C3. I can describe what AI is	20.15%	70.15%	9.44%	0.26%	100.00%
C1. I can tell whether the technologies I use are based on AI	24.23%	65.82%	9.44%	0.51%	100.00%
C5. I can explain what an algorithm is	17.86%	55.36%	23.47%	3.32%	100.00%
C16. I know some programming language	17.86%	34.18%	31.63%	16.33%	100.00%

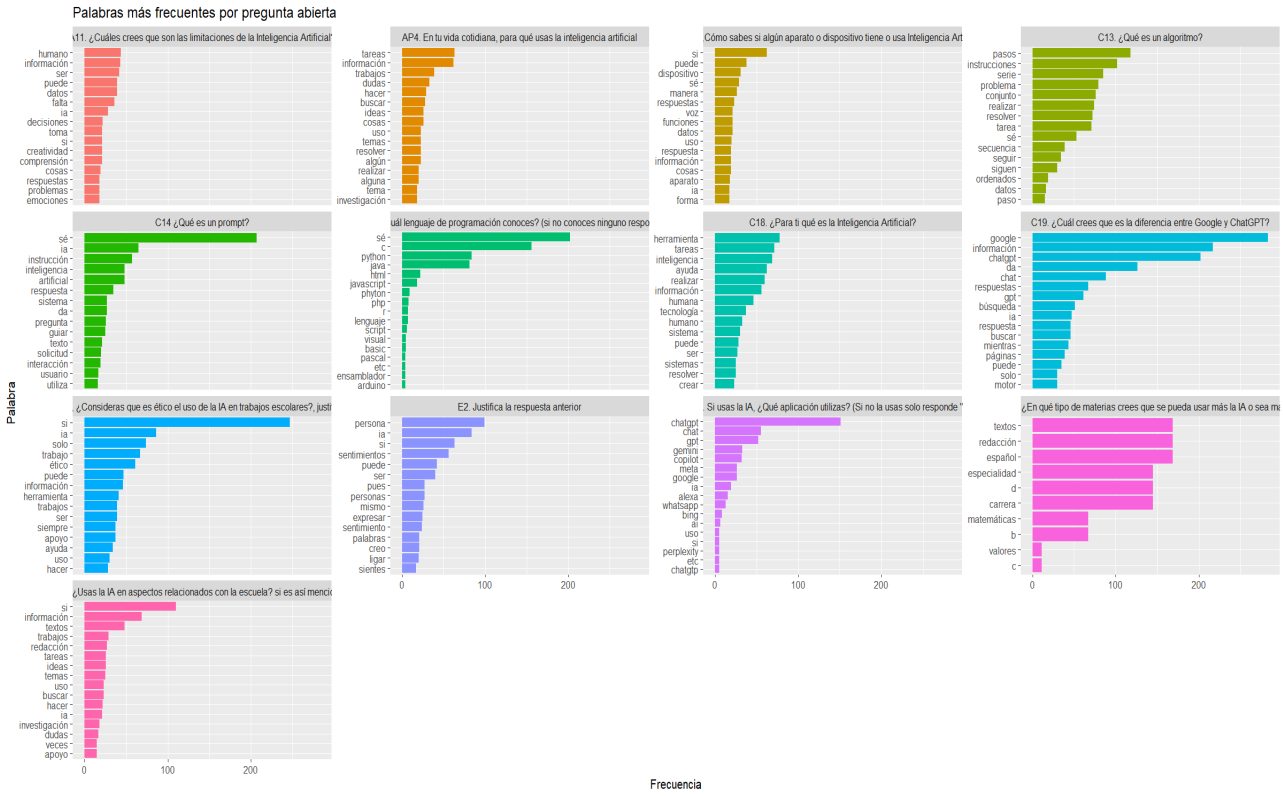
As demonstrated in Table 2, there is a negative correlation between the degree of specialization and the level of confidence. While students demonstrated an ability to describe AI, their confidence levels were lower when it came to recognizing it in technologies or explaining an algorithm, a fundamental concept for comprehending it.

It is imperative that when utilizing AI, there is at least a rudimentary understanding of its operational mechanisms, without attaining a level of specialization. In the domain of AI, generativity is a distinguishing feature that underscores the potential for creation. The knowledge of a programming language has been shown to broaden the scope of both understanding and use of the resource.

The textual exploration facilitated the identification of the most frequently occurring words in each of the open-ended questions in the questionnaire (Figure 2). A high recurrence of terms is observed in the context of the conceptual understanding of artificial intelligence (e.g., algorithm, data, learning, system), its instrumental use in academic contexts (e.g., tasks, writing, composition, help), and, to a lesser extent, ethical aspects (e.g., ethical, plagiarism, responsibility).

Figure 2

Most frequent words per open-ended question



Source: own elaboration.

The semantic classification procedure yielded three primary themes: instrumental use (n = 2,213), conceptual understanding (n = 1,401), and ethical reflection (n = 129). In addition to these main themes, a residual set of unclassifiable responses (n = 22,963) was identified. According to the established classification system, three distinct fields of meaning have been identified. The subsequent discussion will delve into the nature of these fields, supported by a series of illustrative quotations.

3.1. Instrumental use

The responses in this group describe artificial intelligence as a practical tool that facilitates everyday or academic tasks. Students have indicated the efficacy of the program in facilitating the composition of written texts, the execution of searches, and the expeditious resolution of problems. For instance, when queried about their conception of artificial intelligence, several students offered the following responses:

The advent of this novel technology signifies a paradigm shift in the realm of problem-solving methodologies, particularly in scenarios that demand expertise and cognitive acumen. This sophisticated apparatus facilitates expeditious and efficacious resolution of challenges, thereby redefining the landscape of problem-solving methodologies.

In a similar vein, when queried about the utilization of artificial intelligence in daily life, respondents frequently cited its application in writing and academic support:

"For tasks that require a tutor. The daily tasks are as follows: Writing texts, messages, etc."

The objective is to facilitate the research process and thereby reduce the time required to complete the task.

In this field, a functional perspective on AI, centered on efficiency and productivity, predominates, with minimal conceptual or ethical problematization.

3.2. Conceptual understanding.

The responses in this category demonstrate varying degrees of comprehension of concepts such as algorithms, learning, and data processing. Participants' definitions of AI vary, with some offering structured definitions and others confounding AI with databases or automatic systems. In response to the query "What is an algorithm?", several participants provided the following written responses:

"A clear, ordered set of data."

In the inquiry "What is the distinction between Google and ChatGPT?", the differentiation between information retrieval and automated response generation is discernible:

Google is a search engine, and ChatGPT is an artificial intelligence program designed to respond to a variety of problems.

These statements exemplify an emerging understanding, frequently associated with user experiences rather than formal technical knowledge.

3.3. Ethical reflection.

This group raises moral considerations about the responsible use of AI, especially in schools. A tension exists between recognizing its value as a support tool and concerns about plagiarism or loss of learning. When queried about the ethical considerations surrounding the integration of artificial intelligence in academic pursuits, respondents were invited to share their perspectives. Justify your answer," elicited ambivalent opinions:

The utilization of a foundation, a point of departure, or a source of correction and inspiration is essential for the effective application of this method. Conversely, the absence of such a basis renders the process unethical and ultimately ineffective.

The act in question is not regarded as ethical due to its resemblance to cheating. However, if it is deemed to be a method of encouraging learning, then it is considered ethically acceptable.

The act is ethically sound to a certain extent, but not in its entirety.

This category, although present in a limited number of cases, reflects an emerging critical stance towards the ethical dilemmas of using AI in education.

From an ethical standpoint, 69% of students expressed support for the utilization of AI in academic tasks, yet 67% deemed its application during examinations to be improper. When presented with a range of potential applications of AI, including calculations, data organization, and summaries, the most popular option was: It is recommended that the utilization of artificial intelligence be confined to tasks such as structuring, generating ideas, editing, or correcting. The execution of the majority of the work should be conducted by the individual. Conversely, in the context of examinations, the predominant responses were "Disagree" and "Strongly disagree," accounting for 67.35% of the responses.

A significant proportion of students, 43%, noted the heightened relevance of artificial intelligence in the domain of language and communication. This figure surpasses the 37% who identified its importance in their respective professional fields and the 17% who deemed it applicable to mathematics. Furthermore, a series of inquiries were posed, including the following: "I utilize AI for professional endeavors pertaining to..." The subsequent results were obtained:

· The fifth exercise pertains to calculus. The majority of students indicated that they rarely (44.64%) or never (38.01%) use AI for work related to calculus. A mere 13.78% of respondents indicated that they use the feature almost always, while a significantly smaller percentage of 3.57% reported using it always. This observation indicates a potential underutilization of AI in this domain, which may be attributed to either a preference for more conventional methods or the imposition of traditional practices.

· Graphs (EX6): The pattern exhibited by this phenomenon is analogous to that observed in calculus.

· Images (EX7): A more balanced distribution is evident, with the majority of students opting for the intermediate options.

· Writing (EX8): In this domain, the presence of AI is particularly pronounced. According to the findings of the study, 35.97% of the participants reported utilizing the tool for writing texts with high frequency, while 10.46% indicated that they employed it consistently. A mere 36.99% of respondents indicated that they use it rarely, while a significantly smaller percentage of 16.58% reported never using it. This finding underscores the notion that students perceive artificial intelligence as a valuable and readily available resource to facilitate writing processes.

While a substantial majority, amounting to 86%, concur that the integration of AI into the academic milieu is a favorable proposition, a notable proportion, amounting to 74%, assert that they do not employ AI in their instructional practices. Conversely, among students pursuing careers in education, the proportion who "agree" declines to 75.44%. With respect to homework, in the field of education, 10.53% of students strongly agree with the utilization

of AI for academic assistance, while 43.86% express agreement. Among the other fields of study, 15.22% strongly agree, and 62.69% agree. These data suggest a growing acceptance of the integration of artificial intelligence in academic pursuits among students from diverse disciplines, with the exception of those in the field of education. A correlation has thus been established between acceptance, use, and knowledge.

The qualitative results, when considered in conjunction with the statistical findings, serve to augment the understanding of the students' articulation of practical, conceptual, and ethical perceptions of artificial intelligence. This comprehensive perspective on the students' AI literacy provides a more nuanced and multifaceted understanding of their comprehension and application of artificial intelligence.

4. Conclusions

The selection of the sample was based on convenience, which limits the generalizability of the results. AI is employed by students primarily for writing purposes rather than for mathematical calculations. The extent of integration varies according to discipline. Computer science students demonstrate a greater degree of understanding, while education students exhibit a lack of confidence and skepticism, which may hinder its future educational implementation. From an ethical standpoint, there is a general consensus on the utilization of this method as a complement, with a notable exception regarding its application in assessments. The paucity of integration of artificial intelligence into academic life is highlighted, underscoring an urgent need for formal training.

This is analogous to the urgency that Béla Balázs identified in cinema, a sentiment that has also been transferred to other technologies. It is imperative to draw from prior experiences to ensure the effective integration of AI into academic life and to cultivate readiness for its growing significance in various facets of daily life.

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Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare no competing interests.

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