Students' Perception of Online Disinformation, Misinformation, and Malinformation

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Abstract **– Many users encounter a large amount of harmful information in the form of disinformation, misinformation, and malinformation when searching for information. This phenomenon is particularly significant among the student population, as students primarily satisfy information needs online. However, both everyday and academic information sources are filled with misleading content, making students' use of such information largely dependent on their level of information literacy. This paper is based on research conducted at the Faculty of Humanities and Social Sciences in Osijek between November 2022 and January 2023 among undergraduate and graduate students of Information Sciences and English Language and Literature. The aim of this study is to assess the level of information literacy within these groups, with a particular focus on their habits of disseminating and evaluating information. The findings indicate that although mostly trustworthy analog media and academic information sources, students still spread false information and do not sufficiently evaluate the information encountered. These results should serve as a call to raise awareness among young people about the availability of information sources for research and the evaluation of retrieved information, especially for those with access to a wide range of freely available academic portals.**

Keywords **– Harmful online content, information behaviour, information dissemination, information evaluation.**

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1. Introduction

When discussing 21st-century competencies, it is impossible not to mention information literacy (IL) as one of the key skills necessary for survival in the digital age. Individuals who develop their IL skills, among other things, recognize issues and the lack of access to information sources, decide where and how their information is published, understand how the commodification of their personal data and online interactions affects the information they receive and the information they share online, and make informed decisions about their online activities while being fully aware of privacy and data commodification concerns [1]. The increasing exposure to vast amounts of information, consequently makes the interpretation, meaningful use, and dissemination of information more difficult [2]. When searching for information, especially on social media, many users encounter an abundance of harmful and malicious information, including disinformation, misinformation, and malinformation, which vary in volume across different information sources. Information was once much more strictly controlled by media personnel and information professionals [2]. However, the open nature of the digital sphere has significantly complicated the safeguarding of this domain and the management of information being disseminated within it. For example, scientific databases are online platforms that do not tolerate any harmful content and are therefore constantly monitored by information professionals who thoroughly review all published content. The main issue lies in browsing and searching for information on websites used for everyday purposes – forums, blogs, platforms for audiovisual content, news portals, and, above all, social media. The boundaries between entertainment, advertising, lies, and fiction are becoming increasingly blurred. As a result, when disinformation and misinformation emerge, the social news-sharing system, which relies on user sharing, often makes such content highly popular, rendering it nearly impossible to remove – even if journalists and fact-checkers successfully debunk it [3].

Given the subject and research needed for this paper, the everyday information sources that the student population consults in the academic life/domain can be divided into two distinct categories: general information sources (public and private news portals, television reports, newspapers, magazines, social media, etc.) and academic information sources (scientific databases, academic journals, scientific bibliographies, books written by scholars, etc.). A key characteristic inherent to general information sources is that the data published in them does not necessarily have to be fact-checked, professionally reviewed, especially by multiple independent sources. In some cases, the information presented is not evaluated at all, particularly if it is shared by media users, especially on social networks – this is a phenomenon that, is safe to say, most users of such sources have experienced. Furthermore, these sources, by their very nature, require an extraordinary speed of information dissemination, which does not allow sufficient time for proper evaluation before publication. Some sources, such as newspapers and television reports, update their news on a daily basis. Many people rely on news portals for this very reason, wanting to stay as informed as possible about current events. In contrast, information available in academic sources must undergo a significant amount of expert review, plagiarism checks, and general fact-checking. This ensures that the data and information found in these sources are accurate and that end users can always access verified, relevant, and timely information.

Building on this foundation, the following literature review examines important concepts such as misinformation, disinformation, and malinformation, alongside discussions of open access and information evaluation practices that inform this study's approach.

2. Literature Review

Misinformation consists of false information, but the person spreading it believes to be true. Disinformation, on the other hand, is also false information, but it is deliberately spread with the knowledge that it is untrue. A common issue related to these two phenomena is that people often confuse them, being unaware of the difference. Finally, the term malinformation refers to information that is based on truth but is used to cause harm to a person, organization, or country. Users actively consume false content published online [3].

Both general and academic sources offer two types of access to information: open access and closed access. When it comes to academic information sources, the first type is open access, which allows access to information without any financial transaction, while the second type is closed access, where a fee is required to access the information.

Open access can be defined as free and unrestricted online access to scientific publications [4] and there are several types of open access [5]. In Gold Open Access, the publisher provides full access to articles on the journal's website under a creative commons or similar license. In this case, the author (or the funding entity) is required to pay a fee for the publication of the article, known as the Article Processing Charge (APC). In Hybrid Open Access, the publisher allows authors to pay for their articles to be available as open access in a journal that otherwise requires a subscription. This differs from Gold Open Access in that subscribers still pay for access to the journal, meaning the publisher receives double payment—one from the subscription fee and another from the open access publication fee. Diamond and Platinum Open Access refer to journals that publish articles as open access but do not charge an APC, instead being funded by institutions, advertising, donations, and similar sources. Bronze Open Access applies to journals that offer free online reading but do not provide a license for reuse. Finally, Green Open Access refers to self-archiving preprints or postprints of articles in repositories. The general public widely believes that all online content should be open access. However, this process is rather slow [6], and approximately 50 to 55% of documents become available in open access three to four years after publication [7].

For general information sources on the internet, such as online versions of newspapers and magazines, as well as news portals, have a somewhat different situation. While some argue that news should be accessible to everyone and therefore freely available, others see a significant opportunity for profit from the large number of visitors to such sites. Recently, third-party advertisements have often been used for this purpose, generating revenue for the website whenever someone clicks on them. However, these ads are widely disliked by users, partly due to their omnipresence and interference with uninterrupted reading, but also because of their violation of users' privacy, which is a major concern. Although personalized advertising offers advertisers the opportunity to reach targeted groups who might be interested in the message conveyed by the ad [8], [9], [10]. Such behavior-based advertising, which relies on users' online habits, can lead to various privacy issues and make people feel exposed, potentially having the opposite effect on advertisers [11], [12], [13]. Discussions on this topic often include the issue of data mining, as many internet users fear that their personal data – such as location, browsing history, and credit card details – might be used for malicious purposes. Similar to academic information sources, some content in general information sources is freely accessible, while access to certain articles is restricted to those who pay for a subscription.

Newspaper subscriptions have existed since the 1930s [14] and have seamlessly transitioned to the online space along with the newspapers themselves, albeit with some delay [15].

When discussing harmful online content, it is important to emphasize that it is the duty of a publication, whether academic or general, to ensure that the content shared under its name is at the very least accurate. Academic and scientific publications have established strict rules to guarantee that the information contained in their texts is not only accurate but also relevant and used in an appropriate context. The process of verifying accuracy can take months, and articles submitted for publication are reviewed by multiple scientists and experts in the field. Only when the publication is absolutely certain that all data is accurate and relevant, the article is allowed to be published. On the other hand, general information sources have faced issues with the spread of misinformation and disinformation since their inception. In the context of harmful content and fact-checking on such platforms, for the purposes of this study, general information sources can be categorized into two groups. The first group consists of sources where the authors of publications are expected to be professional journalists entrusted with ensuring that the information being shared is truthful and impartial. The second group includes sources where end users have the freedom to publish whatever they want. The first category includes newspapers and their online versions, as well as television programs and online news portals, while the second category encompasses forums, blogs, chat rooms, and, primarily, social media. A particularly interesting phenomenon that needs to be highlighted is that of online versions of newspapers and news portals, which partially allow users to post anything in the comment sections, often serving as an additional source of information.

Similar to academic publications, though certainly not to the same extent, newspapers and TV are also considered reliable and credible sources of news, and many people typically use them to stay informed about global events on a daily basis. Although in recent years there has been a significant shift toward digital media as the primary source of news, 32% of U.S. adults get their news from print sources at least occasionally, an additional 50% receive news through radio, and 68% through television [16]. Traditional media have also proven to be more credible than social media, as 71% of adults trust the information they receive from their local news agencies and 61% from national news agencies, while only 33% trust what they read on social media [17]. This is likely due to the relatively high standard of integrity that journalists are believed to uphold, as well as the fact-checking process that these media ideally require.

However, the possibility of spreading misinformation still exists on these platforms, especially when it comes to daily news, whether in print, on the radio, or on television. Given the short processing time required in such cases, it is possible that by the time news reaches the end user, it is already outdated, particularly in the case of rapidly developing events such as natural disasters, crimes, or political occurrences. On the other hand, social media platforms are largely unmoderated due to the sheer volume of information being shared simultaneously, making them a hub for mis-, dis-, and malinformation. Although in 2020, 86% of adults admitted to using social media to obtain news [16], less than 30% stated believing the news they read was true [17], so it is not surprising that social media contains so much harmful content.

Citizen journalism – "journalism carried out by people who are not professional journalists but who disseminate information using websites, blogs, and social media" – is primarily practiced by individuals in disaster zones or regions where the media are controlled by a corrupt government. Some online newspaper versions and news portals allow readers to contribute to local news [18]. Although the practice of newspapers using unpaid citizen reporters has existed for centuries, it has only become widespread today due to the vast reach of the internet. Over the years, as the practice gained popularity, it expanded from newspapers, which verified submitted articles before publication, to blogs and social media, where anyone can post anything with almost no moderation [19]. This has paved the way for the rapid spread of fake news, a term that has become omnipresent in recent years and a significant problem for anyone using social media or news portals as a source of information. The term can be defined as "fabricated information that mimics news content in form but not in organizational process or intent" [20], making it closely related to misinformation and disinformation. These three phenomena are often discussed together when it comes to news and social media or, more recently, even in the context of news in general. However, these phenomena still not seem to be taken seriously enough, either by users or by the platforms themselves. Although most platforms use both artificial intelligence and manual fact-checking to moderate their content to some extent [21], the issue is far from resolved. As a result, the continuous spread of harmful content in the form of misinformation, disinformation, and malinformation persists. Since fact-checking processes on most social media platforms are not rigorous enough, the responsibility falls on the end user to verify the accuracy of the information shared. While a user can not be entirely certain that the information read is accurate, it is possible to verify it by consulting multiple sources.

The easiest way to do this is through a simple internet search to confirm that multiple sources have reported on the same event. This is especially important if the information comes from a source of questionable credibility, such as news portals, blogs, forums, or social media, and particularly if it originates from someone who is not a professional journalist or reporter. This step is where information literacy (IL) plays a crucial role, as it involves a degree of critical thinking – an essential skill in this era of information hyperproduction, where data is readily available at every turn. An information-literate person can be defined as someone who can recognize when information is needed and has the ability to locate, evaluate, and effectively use it [22]. Specifically, IL helps users distinguish fake news from the truth and identify any misinformation, disinformation, or malinformation encountered.

These insights from prior research highlight gaps in student IL practices, which the current study addresses through a quantitative methodology focused on students at the Faculty of Humanities and Social Sciences in Osijek.

3. Methodology

This study employs a quantitative approach to assess the level of information literacy (IL) among students at the Faculty of Humanities and Social Sciences in Osijek. An online Google Forms questionnaire was distributed to undergraduate and graduate students of Information Sciences (IS) and English Language and Literature (ELL) via e-mail and the Faculty's MOODLE platform from November 2022 to January 2023. The data collected were statistically analyzed in SPSS v26. The first 18 closed-ended questions, aimed to identify literacy levels, were analyzed and presented with descriptive (frequencies and percentages) and inferential (Chi-square and Mann-Whitney tests) statistics, while the final, open-ended question on experiences and attitudes, which was validly answered by only one respondent (N=1), was presented verbatim to preserve their perspective.

As the volume of these types of harmful content grows day by day, it is more important than ever for internet users to become information literate. Just as children and young people, who spend much more time online than their parents and get most of their news from digital media, so do adults, especially older citizens, who are more often victims of misinformation and disinformation than younger users.

With all of this in mind, as well as the fact that children start using social media at a younger age, IL should begin in elementary school at a basic level and continue to develop alongside students' informational needs. As for adults, there should certainly be continuous workshops and courses for both information and digital literacy.

3.1. Research Aim and Research Questions

The study investigates the level of students' IL to identify potential gaps in their location, evaluation, usage, and dissemination habits. It aims to evaluate students' previous education on- and level of IL, information seeking and searching habits and their habits of information dissemination, especially in terms of disinformation, misinformation and malinformation. To achieve this, the study addresses the following research questions, from which the corresponding hypotheses are derived:

1. What is the level of students' IL in terms of information searching, seeking, use and evaluation proficiency and is there a statistically significant difference between IS and ELL students in this context?
   H1: Students exhibit a high level of IL in terms of information searching, seeking, use, and evaluation proficiency and there is a statistically significant difference in the degree of IL between IS and ELL students, with IS students demonstrating higher proficiency.
2. How thoroughly do students evaluate the obtained information and is there a statistically significant difference between IS and ELL students in this context?
   H2: Students thoroughly evaluate the credibility, relevance, accuracy, and timeliness of the obtained information and there is a statistically significant difference between IS and ELL students in terms of their evaluation habits, with IS students being more rigorous in their evaluation.
3. To what extent do students recognize the terms and distinguish between types of harmful content in various information sources and is there a statistically significant difference between IS and ELL students in this context?
   H3: Students can proficiently recognize and distinguish between types of harmful content in various information sources and there is a statistically significant difference between IS and ELL students, with IS students being more adept at identifying harmful content.

3.2. Sample

The study sample included students of the following study groups at the Faculty of Humanities and Social Sciences in Osijek:

- Information Sciences, undergraduate, single-major
- Information Sciences, undergraduate, double-major
- Information Sciences, graduate, double-major
- English Language and Literature, undergraduate, double-major
- English Language and Literature, graduate, double-major (Teaching module)
- English Language and Literature, graduate, double-major (Translating module).

The study groups have been chosen due to a noticeable difference in the degree of IL in terms of information seeking and searching methods, information source selection, and information evaluation methods between students of IS and ELL students. This discrepancy was noticed during one of the authors' employment at the Faculty's library, where the students' habits of researching relevant references for seminar papers, presentations and theses were observed and discussed. IS students were observed to be more well-versed in information retrieval, especially when it comes to scientific databases such as EBSCO, JSTOR etc., and scientific bibliographies such as Google Scholar, CROSBI etc., and also showed the tendency to recognize malicious content far quicker and with greater certainty than ELL students. Furthermore, ELL students faced more difficulties in navigating these information sources, especially in terms of deciding which information source would fit their needs best. This said, an excellent addition to this research were double-major students of Information Sciences and English Language and Literature (IS-ELL), who received both educations simultaneously and could provide further insight into these patterns.

With a 109 valid responses, the response rate was sufficient for analysis. For the purposes of this research, the study groups were divided into IS (N=51), ELL (N=52) and IS-ELL double-major combination (N=6).

The limitation in this sample selection lies in the facts that the IS-ELL study program has a relatively small student size (N=13) due to its introduction in the academic year 2020/2021, and in its limited number of questions, as overly extensive online surveys risk participant dropout. Future research could benefit from incorporating a paper-based survey under controlled conditions to ensure participant focus and comprehension of all questions.

3.3. Research Instrument

The research instrument was a 19-item online Google Forms questionnaire addressing students' level of IL in terms of information seeking, searching, evaluation, and dissemination habits. In the last ten years, IL in Croatia has been discussed and examined in the contexts of employability [23], workers' rights [24] and law and medicine [25], but most notably among the student population [26], [27], [28], [29], [30].

The first group of questions (Q1-3) covered the respondents' demographic information, such as study group, year of study and previous education. The second group of questions (Q4-7) explored students' acquaintance with the concept of IL, their self-evaluation of IL competencies and previous education on the topic. The third group of questions (Q8-13) explored which sources do students use for retrieving information for everyday (e.g. news, leisure etc.) and academic (e.g. literature for exams, theses etc.) purposes and the extent of their evaluating of these sources. The fourth group of questions (Q14-18) explored students' acquaintance with the concepts of disinformation, misinformation and malinformation, their frequency of encountering these types of information in various information sources and their habits of disseminating harmful information. The final question (Q19) was open-ended and was aimed at qualitative feedback.

The following section will present the quantitative findings from this survey, organized by demographic profiles, IL levels, source evaluation habits, and perceptions of harmful content, directly testing the proposed hypotheses.

4. Results

This section presents the findings from the quantitative analysis of students' perceptions and behaviors related to online disinformation, misinformation, and malinformation, as well as their IL skills. The data collected via questionnaire responses from IS, ELL, and IS-ELL students at the Faculty of Humanities and Social Sciences is analyzed to assess their IL proficiency, information source preferences, evaluation practices, exposure to harmful information, and sharing habits. Statistical comparisons between study groups are included to identify significant differences or trends.

4.1. Demographic Profile of Respondents

The overall response rate is nearly equal among students of IS (51, 64.8%) and ELL (52, 47.7%), with very few students of the combined study (6, 0.1%) (Table 1).

Table 1. Distribution of students' study groups

	N	%
Information Sciences	51	46.8
English Language and Literature	52	47.7
Information Sciences and English Language and Literature	6	0.1

The largest share of respondents is made up of 3rd year undergraduate students (32, 29.4%), while the smallest comes from 2nd year graduate ones (7, 6.4%) (Table 2).

Table 2. Distribution of students' study years and levels

	N	%
1st year undergraduate	24	22
2nd year undergraduate	29	26.6
3rd year undergraduate	32	29.4
1st year graduate	17	15.6
2nd year graduate	7	6.4

When it comes to secondary education prior to enrolment at the faculty, a large majority of the respondents come from grammar schools (75, 68.8%), while only three of them (2.8%) come from art schools (Table 3).

4.2. Information Literacy Level

The largest share of the students who had previously been acquainted with IL come from grammar schools (70, 64.2%), while the smallest comes from art schools (3, 2.8%). Only 5 respondents from grammar schools (0.05%) and 2 of them from trade schools (0.02%) have not been acquainted with IL before, and there are no such cases in art schools (Table 3).

Table 3. Students' previous secondary education and IL knowledge

School Type	N	%	Previous IL Knowledge			
			Yes		No	
			N	%	N	%
Grammar school	75	68.8	70	64.2	5	4.6
Trade school	31	28.4	29	26.6	2	1.8
Art school	3	2.8	3	2.8	0	0
Total			102	93.6	7	6.4

Furthermore, the respondents were asked to rate their skill level from 1 (extremely poor) to 5 (excellent, without any issues) in several dimensions of IL. Table 4 presents the results of the Mann-Whitney U test comparing the perceptions of IL proficiency between IS and ELL students across different dimensions of IL. Some notable variations can be observed cross-dimensionally, but despite these differences in mean ranks, none of them are statistically significant, indicating that both study groups have a fairly similar perception of their proficiency in all aspects of IL.

For online information searching and seeking, IS students had a mean rank of 48.91, while that of ELL students was 55.03, showing a higher perception of skill among ELL students ($p = 0.224$). When it comes to searching for information at the library, IS students had a mean rank of 54.43 compared to 49.62 for ELL students, with IS students slightly outperforming their ELL peers ($p = 0.383$). When evaluating the retrieved information's accuracy, the mean ranks were nearly identical, with that of IS students being 51.52 and that of ELL students being 52.47, indicating a very similar self-assessment of accuracy evaluation skills ($p = 0.853$). In the dimension of evaluating the retrieved information's relevance, IS students had a mean rank of 54.08, while ELL students had a mean rank of 49.96, again showing a slight variation in self-perception, with IS students rating themselves higher in this area ($p = 0.430$). Similarly, for evaluating the information's timeliness, the mean ranks were nearly identical, with IS students at 51.75 and ELL students at 52.25, reflecting nearly the same perceptions of timeliness skills across both groups ($p = 0.925$). Finally, in detecting fake, harmful, and incomplete information, IS students had a mean rank of 50.88, while ELL students had a mean rank of 53.10, showing a small variation in perceptions, with ELL students rating themselves slightly higher ($p = 0.680$).

Table 4. Students' self-evaluated IL proficiency by study group (IS and ELL)

	IS Mean Rank	ELL Mean Rank	Mann-Whitney U	Z	p*
online information searching and seeking	48.91	55.03	1168.500	-1.216	0.224
searching for information at the library	54.43	49.62	1202	-0.872	0.383
evaluating the retrieved information's accuracy	51.52	52.47	1301.500	-0.185	0.853
evaluating the retrieved information's relevance	54.08	49.96	1220	-0.789	0.430
evaluating the retrieved information's timeliness	51.75	52.25	1313	-0.094	0.925
detecting fake, harmful and incomplete information	50.88	53.10	1269	-0.412	0.680

**Statistically significant when $p < 0.05$.*

When asked about having been taught any form of IL during secondary education, 57.8% (N=63) have responded that they have, while 42.2% (N=46) have not.

Nearly half (51, 81%) of those who responded positively have had it in their information technology (IT) classes, while very few have done so during their weekly meetings with their class masters (8, 12.7%) and in some form of extracurricular workshop (4, 6.3%) (Table 5).

Table 5. Distribution of IL instruction across educational settings

	N	%
IT classes	51	81
weekly meetings with class master	8	12.7
extracurricular workshops	4	6.3

These results reveal that students exhibit a fairly consistent level of IL across various dimensions, with no statistically significant differences between IS and ELL students. Although slight variations between mean ranks were noticed in certain dimensions, none of these differences are statistically significant. This suggests that both IS and ELL students perceive their IL skills similarly across all aspects tested. Additionally, the majority of students had encountered IL concepts in previous education. Thus, H1 is rejected.

4.3. Information Sources Selection and Evaluation

The analysis of sources used for getting information related to everyday life (e.g. news, politics, society, culture etc.) shows that the vast majority of respondents rely on social media (96, 88.1%), online newspapers (73, 67%) and nearly half of them on independent internet news portals (55, 50.5%). Traditional media sources, such as television and radio, are still used to an extent (46, 42.2%). The fact that only 8 respondents (7.3%) use physical newspapers signifies a shift from physical media and a preference for its digital, online counterparts. Two respondents (1.8%) get these types of information from their surroundings, while one (0.9%) does not consume them at all (Table 6).

When inquired about whether the credibility of the information collected for everyday use is evaluated, more than half of the respondents (64, 58.7%) do so, which signifies that 41.3% (N=45) of them operate with this information on an *as-is* basis, supposedly trusting it to be entirely true (for detailed analysis, see Table 10).

Table 6. Information sources used for acquiring information related to everyday life

	N	%
social media	96	88.1
online newspapers	73	67
independent internet news portals*	55	50.5
traditional media (TV and radio)	46	42.2
physical newspapers	8	7.3
via interaction with surroundings	2	1.8
does not consume such information	1	0.9

**In this context, independent news portals were described as online news feeds which do not produce physical copies (i.e. newspapers), but rather post some independent journalistic research while aggregating news from other sites.*

Out of those respondents who evaluate the credibility of the collected information, half (32, 50%) consult 2-3 sources of the same type and nearly half (30, 46.9%) 2-3 sources of a different type. The least chosen options are evaluating one source of a different type (7, 10.9%) and more than three sources of a different type (4, 6.3%). This indicates that students place a strong emphasis on consulting multiple sources to assess information credibility, however with a preference for sources of the same type, most likely due to practicality and ease (Table 7).

Table 7. Frequency and number of additional information sources used for evaluating everyday-life information

	N	%
1 source of the same type	12	18.8
2-3 sources of the same type	32	50.0
>3 sources of the same type	10	15.6
1 source of a different type	7	10.9
2-3 sources of a different type	30	46.9
>3 sources of a different type	4	6.3

On the other hand, the analysis of sources used for getting information related to academic life (e.g. literature for writing seminars/theses, articles for exam preparation etc.) shows that students equally use scientific databases and scientific bibliographies (84, 77.1% each). However, students would rather conduct a simple Google search (67, 61.5%) than go to the library (61, 56%) (Table 8). Despite this being fairly reasonable due to ease of use, time saving and other pragmatic reasons, further research could highlight the difference between using these sources for acquiring information used to solved lower-stake tasks (e.g. homework and studying for quizzes) and higher-stake tasks (e.g. final exams and bachelor's and master's theses).

When inquired about whether they evaluate the credibility of the information collected for academic use, a significant part of the respondents (67, 61.5%) do so, however 42% (N=38.5) do not evaluate this kind of information at all (for detailed analysis, see Table 10).

Table 8. Information sources used for acquiring information related to academic tasks

	N	%
scientific databases	84	77.1
scientific bibliographies	84	77.1
simple Google query	67	61.5
library	61	56

Similar to the case with everyday information, out of those respondents who evaluate the credibility of academic information, the largest share consults 2-3 sources of the same (36, 52.2%) and different (25, 36.2%) type, while the least favorite option by far is consulting more than three sources of a different type (3, 4.3%) (Table 9).

Table 9. Frequency and number of additional information sources used for evaluating academic information

	N	%
1 source of the same type	10	14.5
2-3 sources of the same type	36	52.2
>3 sources of the same type	10	14.5
1 source of a different type	9	13.0
2-3 sources of a different type	25	36.2
>3 sources of a different type	3	4.3

Table 10 presents the differences in the frequency of checking information with additional sources for everyday life and academic tasks. While ELL students are more prone to additionally assessing information when it comes to everyday life information (33, 30.3%), both IS and ELL students (31, 28.4% each) do so with information related to academic tasks. However, it is possible to see that there are no statistically significant differences between the study groups' habits of evaluation in this sense, both for information pertaining to everyday life ($p = 0.198$) and academia ($p = 0.523$).

Table 10. Frequency of checking information with additional information sources for everyday life and academic tasks

		YES		NO		χ^2*	p**
		N	%	N	%		
Everyday life	IS	26	23.9	25	22.9	3.242	0.198
	ELL	33	30.3	19	17.4		
	IS-ELL	5	4.6	1	0.9		
Academic tasks	IS	31	28.4	20	18.3	1.297	0.523
	ELL	31	28.4	21	19.3		
	IS-ELL	5	4.6	1	0.9		

**df = 2 for all χ^2-values.*
***Statistically significant when $p < 0.05$.*

These results indicate that students evaluate the information acquired for both everyday and academic purposes to a certain extent, but there are no statistically significant differences between IS and ELL students in their evaluation habits. Therefore, H2 is rejected.

4.4. Disinformation, Misinformation and Malinformation Perception

In the fourth group of questions, Q14 started by giving the definitions of disinformation, misinformation and malinformation to the respondents and asking them about previous acquaintance with these terms and their meanings before the survey. 66 respondents (60.6%) claimed to have known them beforehand. It was also observed that IS students (38, 34.9%) have a statistically significant higher degree of acquaintance ($p = 0.012$) with these terms than their ELL (24, 22%) and IS-ELL (4, 3.7%) peers (Table 11).

Table 11. Previous acquaintance with the definitions of disinformation, misinformation and malinformation

	YES		NO		χ^2*	p**
	N	%	N	%		
IS	38	34.9	13	11.9	8.766	0.012
ELL	24	22.0	28	25.7		
IS-ELL	4	3.7	2	1.8		

**df = 2 for all χ^2-values.*
***Statistically significant when $p < 0.05$.*

Table 12 shows the ratings of how often the respondents encounter harmful information (disinformation, misinformation and malinformation) in the following information sources from 1 (never) to 7 (always). The analysis reveals that, overall, IS-ELL students consistently report encountering higher frequencies of harmful information (disinformation, misinformation, and malinformation) across various information sources compared to IS and ELL students. This trend is highlighted in independent news portals, where IS-ELL students reported a mean rank of 77.08, significantly higher than both IS (52.23) and ELL (55.17) ones, although the difference was not statistically significant ($\chi^2 = 3.524$, $p = 0.172$). Similarly, IS-ELL students also reported higher mean ranks for physical newspapers (71.33), online newspapers (72.08), and social media (68.17), although these differences did also not reach any statistical significance ($\chi^2 = 1.820$, $p = 0.403$; $\chi^2 = 1.968$, $p = 0.374$; $\chi^2 = 1.202$, $p = 0.548$, respectively). In contrast, scientific databases and scientific bibliographies showed minimal differences in perceived harmful information, with all groups reporting lower mean ranks in more authoritative sources such as these.

These findings suggest that, while IS-ELL students perceive a higher frequency of harmful information, especially in less authoritative and formal information sources, the differences across groups are not statistically significant, highlighting the need for further research to explore the underlying factors contributing to such perceptions.

Table 12. Ratings of disinformation, misinformation and malinformation frequency in information sources

Group	N	Mean Rank	χ^2*	p**
Physical newspapers				
IS	51	54.15	1.820	0.403
ELL	52	53.95		
IS-ELL	6	71.33		
Online newspapers				
IS	51	53.94	1.968	0.374
ELL	52	54.07		
IS-ELL	6	72.08		
Independent news portals				
IS	51	52.23	3.524	0.172
ELL	52	55.17		
IS-ELL	6	77.08		
TV				
IS	51	54.53	0.190	0.910
ELL	52	54.86		
IS-ELL	6	60.25		
Social media				
IS	51	54.34	1.202	0.548
ELL	52	54.13		
IS-ELL	6	68.17		
Library				
IS	51	52.71	1.077	0.584
ELL	52	58.00		
IS-ELL	6	48.50		
Scientific databases				
IS	51	51.64	1.186	0.553
ELL	52	58.10		
IS-ELL	6	56.75		
Scientific bibliographies				
IS	51	50.75	1.896	0.388
ELL	52	58.92		
IS-ELL	6	57.17		

**df = 2 for all χ^2-values.*
***Statistically significant when p < 0.05.*

Table 13 shows the distribution of respondents' assessment on sharing disinformation, misinformation and malinformation. For disinformation, 10 IS students (9.2%), 5 ELL students (4.6%), and 1 IS-ELL student (0.9%) reported sharing it, while 36 IS students (33%), 31 ELL students (28.4%), and 5 IS-ELL students (4.6%) denied doing so. The chi-square test revealed a statistically significant difference between the groups (χ^2=9.622; p=0.047), indicating variations in the likelihood of sharing disinformation across groups.

For misinformation, 25 IS students (22.9%), 23 ELL students (21.1%), and 4 IS-ELL students (3.7%) reported sharing it, while 11 IS students (10.1%), 8 ELL students (7.3%), and 1 IS-ELL student (0.9%) denied doing so. Here, however, the chi-square test showed no statistically significant differences between the groups (χ^2=2.620; p=0.623). For malinformation, 7 IS students (6.4%), 5 ELL students (4.6%), and 1 IS-ELL student (0.9%) reported sharing it, while 38 IS students (34.9%), 34 ELL students (31.2%), and 4 IS-ELL students (3.7%) denied doing so. Similar to the case with misinformation, no statistically significant differences were observed between the groups for sharing malinformation (χ^2=3.268; p=0.514). Overall, these results suggest that, while sharing disinformation significantly varies across study groups, sharing misinformation and malinformation does not.

Table 13. Students' sharing of disinformation, misinformation and malinformation

	YES		NO		N/D*		χ^2**	p***
	N	%	N	%	N	%		
Disinformation								
IS	10	9.2	36	33	5	4.6	9.622	0.047
ELL	5	4.6	31	28.4	16	14.7		
IS-ELL	1	0.9	5	4.6	0	0		
Misinformation								
IS	25	22.9	11	10.1	15	13.8	2.620	0.623
ELL	23	21.1	8	7.3	21	19.3		
IS-ELL	4	3.7	1	0.9	1	0.9		
Malinformation								
IS	7	6.4	38	34.9	6	5.5	3.268	0.514
ELL	5	4.6	34	31.2	13	11.9		
IS-ELL	1	0.9	4	3.7	1	0.9		

**Cannot determine.*
***df = 4 for all χ^2-values.*
****Statistically significant when p < 0.05.*

The results show that students' ability to recognize and distinguish harmful content, such as disinformation, misinformation, and malinformation, varies across groups, but with no significant differences between IS and ELL students. Thus, H3 is rejected.

4.5. Experiences and Attitudes

The final question (Q19) was an open-ended one, inviting respondents to share their experiences, opinions, attitudes, or examples related to harmful content such as disinformation, misinformation, and malinformation.

Three responses were initially collected, however after data screening, only one was deemed valid and relevant to the research topic. The respondent highlighted that "the largest source of such information are religious fanatics who systematically attempt to take away the rights of many people by spreading false (most often medical) information." This comment highlights the concern about the organized dissemination of harmful information by specific ideological groups. Furthermore, it reflects on the societal implications of disinformation, particularly when it targets critical domains such as healthcare. Even though the extremely limited response rate prevents any broader generalizations, this response does provide a qualitative depth to the quantitative findings, emphasizing the perceived intentionality and societal impact of certain groups disseminating potentially harmful content.

5. Discussion

The findings of this study provide useful insights into students' perceptions of online disinformation, misinformation and malinformation, as well as their level of information literacy (IL) skills. The results indicate that students generally trust academic sources and traditional media outlets, but still engage in the dissemination of false information to a notable degree. This paradox suggests a gap between theoretical awareness and practical experience, where students recognize the importance of credible sources, but fail to critically evaluate the information retrieved and disseminated.

A key finding in this research is the lack of significant differences in IL proficiency between IS and ELL students, despite IS students having more experience in information retrieval. This suggests that formal education in IS alone does not necessarily ensure better IL practices and indicates a need for a more integrated approach to cross-disciplinary IL education. In that light, previous studies [2] emphasized the need to incorporate IL training into curricula across fields to combat the spread of fake news and improve digital literacy. The present study supports this argument, demonstrating that even students from information-intensive disciplines may still struggle with evaluating and disseminating current, relevant and timely information.

Furthermore, while students reported frequent encounters with harmful content on various platforms, especially social media and independent news portals, their ability to distinguish between different types of misleading information remains fairly inconsistent.

IS students exhibited a higher degree of familiarity with the definitions of disinformation, misinformation and malinformation compared to their ELL colleagues, however, this did not translate into a significant difference in their habits of information evaluation and dissemination. This aligns with the notion [3] that individuals may be aware of misleading information, but may also still be susceptible to the influence of that information due to various cognitive biases and habitual online behavior.

Interestingly enough, students have shown a tendency to cross-check information, but primarily within sources of the same type. This behavior suggests a form of confirmation bias, where students prefer sources that align with their existing beliefs, or in this case, more likely familiarity. The reliance on digital and social media for news further exacerbates this problem, as algorithms often reinforce pre-existing viewpoints [3], [17]. Encouraging students and educating them to use a wider range of information sources, including verified academic and journalistic content, could be of great importance in improving their IL competencies.

One of the more concerning findings is that a substantial number of students admitted to sharing misinformation, though often unknowingly. This phenomenon highlights the need for more robust IL training, with focus on practical skills, such as verifying information sources and identifying doctored and manipulated content. While students generally recognize the importance of evaluating academic information, they are less cautious when it comes to everyday information consumption. This aligns with findings [20] that even individuals with high levels of IL struggle to apply these skills effectively in digital spaces, which further emphasizes the need for IL education that goes beyond academic settings.

There were several limitations to this study. The sample was limited to students at a single faculty, which may not be representative of broader student populations. Additionally, self-reported data may be biased, as student might have overestimated their IL skills. Future research on this topic could explore more diverse samples and incorporate qualitative methods, such as interviews or focus groups, to gain a deeper insight into students' reasoning behind their information consumption, manipulation, evaluation and dissemination habits.

In summary of these interpretations, the following chapter will synthesize the study's contributions and proposes directions for future research to address ongoing challenges in IL and mitigation of harmful content.

6. Conclusion

The study reveals several important findings regarding students' information literacy IL competencies and behaviors. Firstly, no statistically significant difference in information literacy (IL) proficiency was found between Information Sciences (IS) and English Language and Literature (ELL) students across various IL dimensions, including information searching, evaluation of accuracy, relevance, timeliness, and detection of fake or harmful information. This indicates that IL education should be reinforced broadly across disciplines rather than confined to specific fields. Secondly, students exhibited a preference for verifying information within sources of the same type rather than consulting a wider variety of sources, reflecting a confirmation bias that may limit critical engagement and increase susceptibility to misinformation. Thirdly, a notable proportion of students reported having shared misinformation unknowingly, despite a general awareness of disinformation, misinformation, and malinformation. While sharing disinformation significantly differed between study groups, sharing misinformation and malinformation did not, which highlights the need for targeted practical IL training focused on real-world applications. The study also found that students strongly rely on social media and online news portals as primary information sources, even though being aware of misleading content, which indicates a knowledge-practice gap, and emphasizes the importance of addressing students' media consumption habits within IL education. Furthermore, students tend to cross-check academic information to some extent but generally favor sources of the same type, and no significant difference was found between the study groups in terms of their evaluation habits. To improve students' IL skills and mitigate the spread of harmful online content, universities, especially library and information science schools, should design and implement more comprehensive IL programs that incorporate real-world scenarios and critical information analysis exercises. Given the enormous influence of digital media on nearly all demographic groups, equipping students with the tools to navigate the information landscape responsibly is more important than ever.

Building on these findings, future research could include longitudinal studies to track how IL competencies evolve over time, especially as students transition from academic settings to professional and everyday information environments. In addition, examining the effectiveness of various pedagogical approaches to IL education, such as experimental learning, gamification, or interdisciplinary collaboration, may yield evidence-based strategies to enhance IL instruction.

Further studies might explore the role of cognitive biases in information verification behavior, indicating why students tend to favor sources that align with their existing knowledge or beliefs. Investigating the impact of emerging digital technologies, including AI-driven news feeds and social media algorithms, on students' information exposure and evaluation practices could be of great importance in adapting IL training to current and future digital ecosystems. Finally, given the diversity of student backgrounds in higher education, comparative research across universities, socio-cultural contexts, and educational systems could reveal how contextual factors influence IL proficiency and information-sharing behaviors.

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