Empowered or Lost? How Search Tools and Social Networks Shape Teen Learning in an AI World

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Abstract

The way people seek, access, and use information for learning has changed. Once the primary gateway to information, search engines now share the stage with various digital/social platforms. This change is perhaps more notable among teenagers and has undoubtedly influenced how they browse and select resources to support their learning. To understand their habits and how alternatives to search engines have influenced them, in this work, we explore how high school students conduct online inquiries in the classroom. Our findings reveal that search engines are not always students' first choice; social networks often play a leading role. This shift has important implications for the design of information retrieval technology, as researchers should consider how teenagers—an understudied population—use this range of tools. In addition, it is critical to foster search and media literacy skills among young users, who increasingly turn to tools not designed to search for information for educational purposes.

Keywords

Children, Search, Education, Information Retrieval, Social Media, Education, Generative AI, CEUR-WS

1. Teens Searching the World: Introduction

In the contemporary educational landscape, the proliferation of digital information has fundamentally transformed the way students and educators engage with learning resources [1, 2]. Digital technologies have facilitated access to vast knowledge repositories. They have also introduced complex challenges in information discovery and access—from digital literacy gaps [3] to issues of information quality and reliability [4, 5], raising critical questions about equity, accessibility, and pedagogical effectiveness. The increasing reliance on algorithmic content curation and recommendation systems in educational contexts presents opportunities for personalised learning pathways [6]; it also introduces concerns, such as potential information bubbles [7]. Understanding these multifaceted challenges is crucial to developing effective educational strategies that promote meaningful engagement with digital information resources [8] while addressing potential barriers to equitable access and learning outcomes [9].

Popular search engines (**SE**) like Google have historically been the go-to starting point for online information discovery [10, 11]. However, social networks (**SN**), such as TikTok, YouTube, and Instagram, have emerged as novel learning and teaching environments, offering users access to high-quality resources that facilitate personal development [12, 13]. These platforms serve as online learning ecosystems where, in addition to creating, processing, and disseminating content (encompassing text, images, and videos), students also foster communication among peers [14]. The adaptability of SNs allows learners to generate content tailored to their specific interests and educational requirements, thus addressing individualised learning needs in some way. Some SNs, such as Facebook, Twitter, and

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Flickr, have been identified as potential tools for enhancing collaborative learning, research capabilities, inquiry-based learning, critical discourse, analytical thinking, and problem-solving competencies [15].

The pervasive role of social media in contemporary youth culture has prompted educators to investigate its potential as a pedagogical application. However, educators generally agree that it is critical to reconcile these platforms' educational possibilities with their inherent capacity for distraction [16]. Triggered by the emergence of generative tools based on Large Language Models (**LLMs**), like ChatGPT, that offer direct answers to prompts, students' behaviour has undergone significant transformations when seeking online information for learning, as this group is among the early adopters [17].

Mindful that information seeking in the classroom is an activity that becomes more frequent and complex as students progress from the first years of primary to intermediate and high school, we investigate high school students' search habits and practices, assuming their literacy skills concerning reading and writing have also consolidated over time. Specifically, in this work, we explore whether and how high school students' search behaviour has changed, focusing on the tools[1] and sources they rely on to become informed. Through a mixed-method exploration, we aim to understand the tools and platforms students ages 14 to 18 use to satisfy their information needs to learn in the classroom context in this evolving digital environment. Furthermore, via a preliminary investigation based on qualitative and quantitative data from small groups of students working in teams, we also seek to understand the practices they adopt when they search for learning.

To guide our exploration, we outline two research questions:

- **(RQ1)** *Which tools do young searchers use to seek information in the classroom?*
- **(RQ2)** *What criteria guide young searchers in the school when selecting retrieved sources/results?*

Our findings spotlight the advantages, limitations, and considerations of adopting technologies within the educational context. In fact, by scrutinising the preferences and behaviours of high school students, focusing on their use of SE, social media, and other digital resources that can support their learning (see [18]), we identify future research directions to possibly result in the design of innovative interactions supported by ad-hoc algorithmic solutions and complemented by an adequate coverage of search and media literacy. This effort will support students in harnessing the full potential of online resources while mitigating adverse effects. Ultimately, this research contributes to the ongoing discourse on integrating emerging technologies in learning and provides insights that can inform educational policies and curriculum design (echoing the suggestions proposed by Antoine Van Den Beemt and Willems [16]). It will also inform research directions for the Child-Computer Interaction (**CCI**) and Information Retrieval (**IR**) communities pertaining to the design of tools to support the development of optimal information-seeking practices for the next generation of learners.

2. How Teen Navigate the Information World: Background & Related Work

In this section, we briefly discuss background and related literature informing our work.

Background Focusing on the process of children searching for information at home, Druin et al. [19] explored the various roles children play. The authors isolated seven different profiles: (i) Non-motivated (happy with the very first results); (ii) Distracted (easily sidetracked and so abandons the search to follow other paths); (iii) Visual (predominance for images over text); (iv) Rule-Bound (overly reliant on given steps rather that trust their capabilities); (v) Developing (eager, not yet skilled enough for complex tasks); (vi) Content (rely on known websites); and (vii) Power (highly skilled searchers). Similar roles are found by Foss et al. when considering teenagers and observing how, compared with younger children, this user group is more social and proficient at identifying good sources of information [20]. Landoni et al. [21] explored how the aforementioned roles apply to children searching in the school context. They

[1]We use 'tool' in its broader sense, to refer primarily to online tools, but also tools used in the educational context, e.g. books.

approached the analysis from a quantitative perspective, using performance indicators such as session length, the number of query terms, the number of clicks, and the rank position of clicked sources. Searching in the classroom differs from searching at home. Children at school have tasks assigned by their teachers. Motivational rewards, such as good grades, often accompany these tasks. They have limited time to accomplish the tasks and can rely on the support of peers and teachers. Even so, the authors found that the roles identified by Druin et al. [19] could also be observed in the classroom. The very same setting that provided a "sample task situation" for Jarvelin and Sormunen when discussing the need for a new metrics, multi-dimensional cumulated utility (MDCU), to better account for the many facets that compose the overall usability of a document and in so doing going beyond traditional relevance [22]. Our study, also conducted in a high school classroom, explored how teens search for learning resources under similar constraints: limited time, defined tasks, and extrinsic motivation. Working in groups—as is common among teens [20, 23]—made it difficult to assign individual searcher roles. Instead, we focused on the criteria groups used to select sources and make collective decisions.

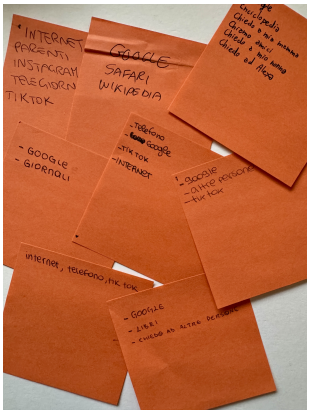
Related Work Research in the IR domain focusing on children—defined by General Assembly of United Nations in Article 1 of the Convention on the Rights of the Child, as individuals from 0 to 18 [24]—remains scarce and insufficient to provide a detailed picture of their specific needs and an in-depth account of their search behaviour [11, 25, 26]. The few available studies are often conducted on a small scale, and with a focus on primary school children [27]. Therefore, results cannot be generalised nor inform the implementation of new algorithmic interventions [28, 29, 30]. What is clear is that children are not small adults, their voices need to be heard and teenagers, high school children, are a neglected sub-group that deserves more attention also in light of them having a more intense exposure to technology while looking to assert their physical and digital identity in the transition from child to adulthood [23, 20].

Recently, several reports have reflected on the impact of the IR community on research that advances understanding and supports teenagers in their learning pursuits. They have evinced that children, and teenagers even more so, are a very complex user group to investigate: the variability index is very high among them, with many factors influencing their search behaviour, starting from developmental stage [31], cultural backgrounds, attitude, skills, experience [32] and inclinations to mention a few. Additionally, ethical considerations are paramount when dealing with these vulnerable users, and legal restrictions in place to protect them pose limitations to the running of TREC-like studies, where the availability of user data plays a crucial role. This lack of knowledge evinced the need for studies such as the one we report in this work.

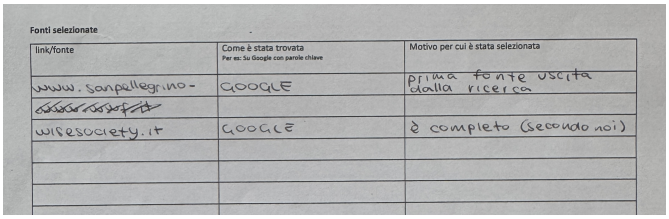
However, recall that as we mentioned in Section 1, teenagers searching for learning do not seem to be limited to the IR realm. Given their habits, we also consider research focused on the social media and social networks areas of study. In this case, researchers are focusing on teenagers' digital lives, from their access to and use of the Internet [33] to their use of social networks (SN), to investigate the effects on their development. A minimal number of studies are directed explicitly to adolescents' information-seeking habits, either for general or for learning purposes. From these works [34], we know that teenagers make different choices if they live in an urban area versus a rural one [35]; the formers still rely on adults such as teachers, parents, or grandparents, while the latter prioritise digital tools [36]. They also tend to prioritise tools that provide entertainment, such as TikTok, despite its lack of reliability [13]. Young searchers are prone to relying on and sharing SN contents, even when they have no clue about their reliability, to be part of their communities [37], thereby exposing themselves to disinformation.

3. Profiling Teens Searching for Learning: Methodology

Below, we describe the setup of our exploration to identify adolescents' (i) habits when looking for information (i.e., choices of search tools and sources they use to learn and become informed), and (ii) criteria for selecting retrieved results (i.e., the process that leads them to choose vs. discard a source they



(a) Samples of the sticky notes collected during the activity in the school environment



(b) Paper form which students used to record the choice of the tools and sources

Figure 1: Materials used for the study.

are exposed to). For this, we adopted a mixed-method approach to collect quantitative and qualitative data in a high school context.

To answer RQ1, we collected data using empty sticky notes (see Figure 1a), asking students to indicate which tool or tools they rely on when searching online. We also provided a form on paper (as shown in Figure 1b) to let students record the steps of their seeking process, with particular attention on tool choice and the reasons why they choose or discard a source. This is the data that enabled us to answer RQ2. As they only have smartphones as devices, the choice was to provide them with paper forms to ease the work, as filling out a table on a small screen was, in their words, difficult. During the activity, no requirements were given about search tool choices or guidance on retrieving information better. In agreement with the teachers, the data collection was inserted into the regular activity for two main reasons: from an education point of view, to facilitate students in activating a metacognitive process; for the research side, to provide intrinsic motivation and keep them involved and committed, such as in a regular school task.

Task Description In collaboration with teachers, we designed an activity from the citizenship education curriculum. The general topic was climate change, which is a curriculum topic for every school level in Italian schools. The goals were to make students aware of climate change and also help them understand the risks of disinformation, emphasising the importance of access to efficient and reliable information search.

The activity was designed to work in small groups (4-5 students each) in a four-step plan:

1. Collect information on a specific topic by searching online in a BYOD (Bring Your Own Device) setting;
2. Create a short resume of the retrieved information, following Wikipedia's five pillars and teachers' instructions;
3. Create or find online an image that could help visualise the information.
4. Share their findings with the class and collect feedback from pairs

The teachers and researchers introduced the topics (environment and disinformation) by interacting with students with questions and images that were used as a stimulus for further thought. Then they described how Wikipedia authors have to follow 'five Pillars'[2] when writing content for this platform. In Step 1, each group was invited to choose a subtopic of climate change and search for the needed information using their device. During Step 2, they were asked to write a short text that is complete, coherent, lexically precise, and correct from a grammatical and syntactical side, but also aligned with

[2]https://en.wikipedia.org/wiki/Wikipedia:Five_pillars

Wikipedia's five pillars. To complete the task, students had to add an image, leaving them the choice to do it by searching online or creating an original one by drawing or using a generative AI app. Teachers allowed students to search for information (text and image) without any direction regarding the choice of tool, not even online vs. on paper. Moreover, students must compile an on-paper form describing which sites/sources they selected and why, what sources they discarded and why (Figure 1b). In other words, the students were invited to record their path in the search as a part of the activity. Teachers agreed with the proposal to ask students to register details of the search process as it could improve metacognition and, therefore, make students more aware of their choices when searching online.

Participants For data collection, we involved high school students aged 14 to 18 from a high school in northern Italy. The students belonging to different grades[3]: Prima M, Seconda L, Terza D, Quarta B and Quinta B. The student participants were distributed as follows: 26 in Prima M (14-year-olds), 25 in Seconda L (15-year-olds), 15 in Terza D (16-year-olds), 21 in Quarta B (17-year-olds) and 20 in Quinta B (18-year-olds). Note that the students in Terza D could not complete the same activity as the other classes, and students in Seconda L did not complete the sticky note activity. Therefore, we have four different grades for the collection on sticky notes (82 students) and four for the data collection via the paper form (91 students).

Data Collection Protocol During regular classroom instruction, we ran an activity (as described in Task Description earlier in this Section), which enabled us to elicit students' reactions. We introduced the focus of our investigation and started the activity with an icebreaker, during which students received blank sticky notes and were asked to answer one question about the tools they use to seek information.

We asked participants to write the answer, as quickly as possible, to the question: "*Which tool or tools do you use when seeking information?* for general purposes, including learning and following personal interests. After collecting the responses, we put them on the whiteboard and briefly reviewed the results with the students. Data collection involved several steps aiming at comprehensively understanding the students' information-seeking behaviours. During Step 1, students working in small groups had to seek information on a specific subtopic of the general one, climate change. They also have to compile the mentioned form, specifying on the first page which tools, websites/SN accounts they choose as reliable sources and why they thought they were a good choice. They had to record the discarded websites, among those retrieved by SE, as well as the abandoned accounts when consulting SN, on the second page, specifying why (see Figure 1b).

Collected Data & Analysis The data collected was pre-processed to handle missing values and ensure consistency. Some students left one or more response fields blank. We included these respondents in the dataset but excluded any empty cells from all counts and statistics. As a result, only the tools explicitly mentioned by each student were analyzed, while blank cells were disregarded. Similarly, entries such as "none" or "nessuno" were treated the same way, as they indicate that no additional tools were reported. This approach ensures that the valid answers of every respondent are preserved while preventing empty fields from distorting frequency estimates or measures of diversity. As previously stated, participants in Terza D (15 students) answered only on the sticky notes; participants in Seconda L only answered the form. This resulted in 82 response samples inferred from sticky notes and 91 samples inferred from the on-paper form used for eliciting how students select and discard sources. In data collection terms, Seconda L supplied qualitative data for their choices, but did not specify the tools they utilised. Conversely, Terza D detailed the tools used but omitted the corresponding qualitative data. Consequently, Seconda L was excluded from all quantitative statistics related to tool usage, while Terza D was left out of analyses that linked tool choice to evaluative criteria. All summary tables present the effective sample size (N) for each analysis. Sensitivity checks—removing Terza D from tool counts and Seconda L from reasoning counts—demonstrated that the rank orders remained unchanged and that the variations in effect sizes were not statistically significant. This suggests that the omissions do not

[3]Prima to Quinta in the Italian system maps to the 7^{th} to 12^{th} in the International one.

materially impact the main findings. Nevertheless, the absence of a fully crossed tool-by-reason matrix restricts our ability to compare how specific evaluative strategies align with particular information resources across the entire sample. To answer RQ1, we focused on identifying patterns in used tools, such as SN or traditional SE, on how many different tools were used by each student as in the *diversity index*, to describe the heterogeneity of the tools chosen by students for each grade and across grades, and how these tools were combined, if at all. Quantitative analysis was performed to calculate the frequency of tool mentions and the diversity index for each grade to understand how diverse the tools used by students are. The correlation analysis explored the relationship between tool diversity and SN usage. To address RQ2, we analysed the reasons that are behind students' choices of tools and sources when seeking information to better understand what led to their choices. We then compared the data among the grades to probe for emerging patterns among students of different ages.

Note that, for analysis purposes, we grouped the collected samples by grade, which allowed us to perform a more nuanced scrutiny in terms of understanding potential differences among user groups with respect to their preferred tools for online search.

4. Teens Searching for Learning: Results

Using the protocol outlined in Section 3, we analysed the collected data to gain insights into high school students' choice of search tools, as well as their information seeking habits and practices.

Which tools do young searchers use to seek information in the classroom? We prepared the data in a spreadsheet and then used Julius[4] for the analysis, the version called Lite, that requires a subscription. From the quantitative data coming from the sticky notes, students presented a wide range of tools, as per the average Diversity Index (**DI**) is 3.52. In fact, the DI scores reported in Table 1 indicate that the participants in Prima M are more open to a broader range of tools (DI = 4.51), whereas the participants in Terza D have the lowest number of tools mentioned (DI = 2.67).

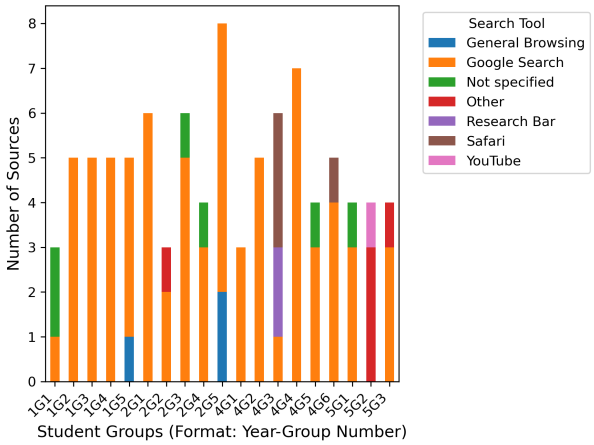
Table 1
Summary of statistics on tool choice.

Grade	Diversity Index	Unique Tools	Most Common Tool	Tool Concentration
Prima M	4.51	40	Google	41.3
Terza D	2.66	11	Google	70.7
Quarta B	3.5	21	Google	58.8
Quinta B	3.39	19	Google	56.9

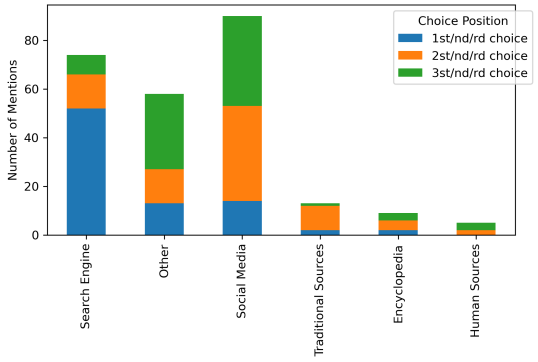
If we consider the tool selection per grade, as shown in Figure 2b, among the 27 students in Prima M, the most common first choice is Google, but the second is variable, with 12 different options (see Figure 2d). Our data reveal that at this age, books, including dictionaries, encyclopedias, and school books, are still relevant sources as a second choice, together with TikTok. Furthermore, many students declared they were asking humans, such as mothers (but not fathers), grandparents, or friends. With 15 students' answers in Terza D, Google dominates as the first choice (12 students), while TikTok is popular as the second and third choice. In Quarta B, out of 21 students, 12 chose Google as their first choice. This group presents more SN platform variety, including international ones like Baidu, Xianohongshu, and WeChat. We inferred that the culture and origin of the students' families played a role as the mention of these specific tools came from students whose families come from countries where these SN are popular. The few mentions of ChatGPT came from students in this group (17-year-olds).

Participants in the last grade of high school, Quinta B, seemed to favour traditional tools (e.g., encyclopedias and books, in general) besides SE and SN. Among SN, YouTube is the most common as a

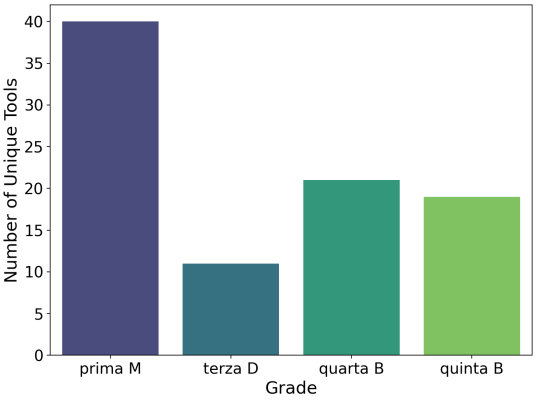
[4]Julius is an AI research and data analysis assistant created by Julius AI https://julius.ai, capable of data analysis and visualisation, scientific computing and statistical analysis, document processing and text analysis, image analysis and interpretation, code execution and debugging in Python, mathematical and technical computations.



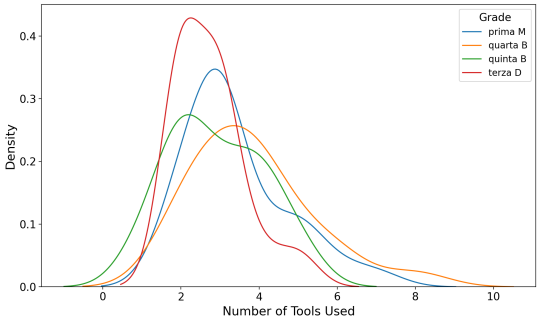
(a) Search tools used across student groups



(b) Ranking of preferred tools for information seeking across grades.



(c) Tool distribution among students grouped by grade.



(d) Search tools choices distribution per grade.

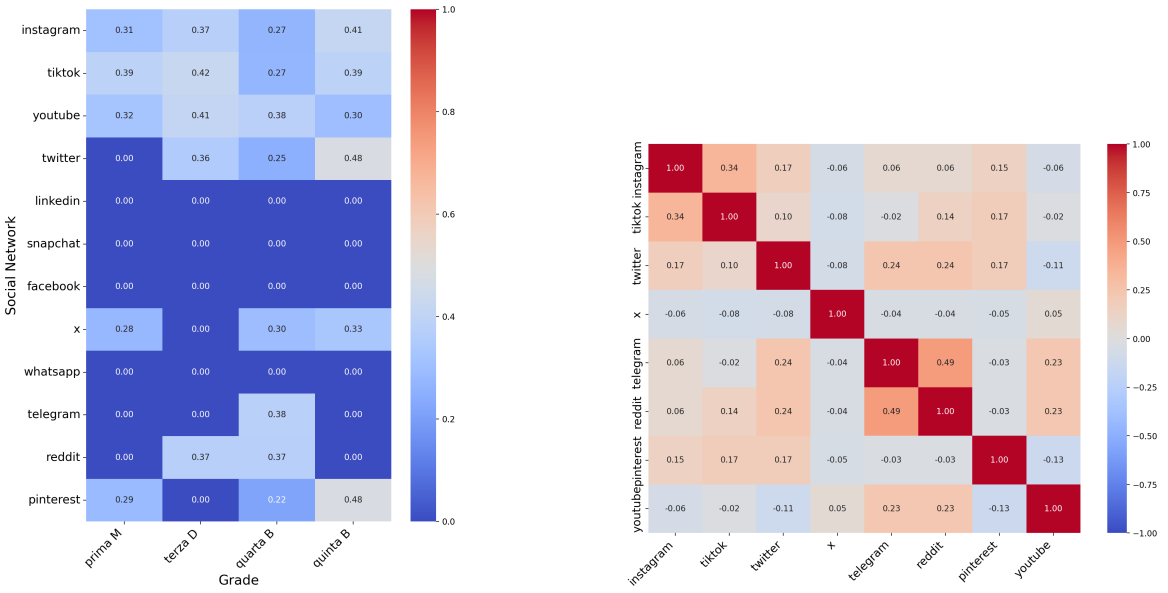
Figure 2: Search tool usage and preferences across grades.

second choice. Interestingly, this group mentioned more "trusted websites" than other grades, possibly because of their more established experience in searching online.

There are also common patterns among grades. Google remains consistently the first choice across grades; SN emerges as a common second and third choice, particularly from the Terza D onward. Among these platforms, TikTok is more popular with younger students, whereas YouTube is preferred for Quinta B (Figure 3a).

As captured in Figure 2c and Table 1, in examining the tools' diversity index across different grades, we note that the Prima M demonstrated the highest diversity, employing 24 unique tools. In contrast, the Terza D exhibited the lowest diversity, employing only 11 unique tools. In particular, the participants in Quarta B and Quinta B utilised 21 and 17 unique tools, respectively. An interesting point is that the number of sources diminishes from participants in Prima M to those in Quinta B, probably because of the different expertise in seeking information. A clear pattern emerged across all grades, with the combination of 'Google-TikTok' being the most prevalent. Additionally, Instagram frequently appeared coupled with both Google and TikTok, highlighting its role in student information-seeking processes (see Figure 3b. These findings underscore the varied approaches to tool usage among different grades.

The results reported in Figure 2a indicate that high school students still use SE when looking for information. Nevertheless, they would rather take advantage of various tools; students typically mention using 2 to 4 tools. While the most popular first choice is Google, the most common second and third tools are SNs. Among SNs, TikTok and YouTube are the favourites, followed by Instagram. Considering the different groups of students, age appears to influence their choices: in Prima M, no one mentioned ChatGPT, but many of them turned to knowledgeable adults, such as mothers, but not fathers, grandparents, or friends, as sources of information. In Quinta B, the "*trusted websites*"



(a) Usage of social networks per grade

(b) Tool combination

Figure 3: Correlation analysis.

have more mentions than in other grades, probably indicating superior awareness of the importance of selecting reliable sources to avoid disinformation. These elder students appear to be moving from Content to Power Searcher role [19, 21].

This analysis of the *tool combination* index shows students typically start with traditional SE and then move to social media platforms for more information or verification. The analysis identified the usage patterns of SNs, highlighting the platforms most frequently mentioned and their positions in user preferences. It also provides insights into SNs' role in information-seeking behaviour among students. Finally, it suggests that students have developed an information search strategy that combines traditional search methods with social media platforms. This indicates an evolution in how students access information, moving away from using books or oral sources besides online research to an information gathering entirely based on online resources.

The quantitative data collected from the on-paper form shows that Google remains the favoured among the tools. Interestingly, we also noted that sometimes students are unaware that they are, in fact, using Google (students reported using "*Safari, keywords*" and "*Google, keywords*", as two distinct ways to search, even though the Safari browser uses Google as the default SE).

Overall, the insights emerging from our data analysis allowed us to address RQ1: students show a significant variety of tools students use to access information, depending on their experience in search, origin and cultural background.

Young searchers criteria in selecting retrieved sources/results in the school To address RQ2, we analysed the qualitative data from the form on paper, comparing the choices that led the students to adopt or discard the retrieved sources. Analyzing the collected data on the form on paper, related to the search process, resulted in several interesting insights. As we presented in Section 4, Google is overwhelmingly at the top of the list of search tools across all grades, but students use it mainly as a starting point, just by inputting the given keywords. The older students (17 to 18 year olds) prefer more specific search queries. For instance, it came across that they tend to formulate more complex queries with multiple questions in the same query, e.g., "*allevamenti intensivi: cosa sono e le conseguenze su cibo e persone*", (intensive livestock farming: what is it and consequences for food and people), whereas Prima M (14 years old) often prefer to use the provided keywords.

Complexity is a barrier ("*too many technicalities*"), but also the excess of simplification; they reject

sources that are too basic or "trivial". The pervading presence of advertising makes students discard a source as unreliable. Moreover, from the students' records about why they select/discard a source, it emerges that students are aware of the importance of coherence and specificity in the retrieved information. There are also some patterns in the source selections: students show a preference for institutional and well-known websites such as WWF (environmental organisation), National Geographic, Government websites, Educational platforms, and News sources (like La7, an Italian private television News service). In general, they present some ability to assess the source's credibility, and it seems to rise with age, as does the level of their general knowledge: students in Quinta B demonstrated to be better at assessing the credibility of sources.

Informed by our reported results, we can answer RQ2: students select sources retrieved based on perceived reliability, preferring official and trusted sources (such as governmental or news websites) while also relying on their prior knowledge. Referring these results to the search roles identified in [19], these groups are not yet Power Searchers, but they are moving toward it from Developing and Content roles.

5. Searching in the classroom: Discussion

Our data analysis suggests that students combine traditional SE-centred search with the information recommended by a SN while sometimes asking LLMs for direct answers (RQ1), as answered by a student in Quarta B. On the one hand, the main advantage of using such a variety of tools is that they can define the best strategy for the task at hand while becoming proficient in using new tools and better understanding their potential. However, choosing among different paradigms, push-and-pull, and search-and-search adds to the complexity when defining an information-seeking strategy to suit search roles (i.e., "patterns of behavior common to groups" [20]) and specific tasks. In addition, there is a high risk of being presented and trusting results when sources are not clearly available and are known to be biased, as in LLMs and SN.

The mix and match approach, powerful in theory, works only if users are aware of the differences in terms of authority and reputation of sources and have developed critical skills to navigate the different presented results, recognising their value in terms of relevance and assigning them the trust they deserve. This brings many ethical considerations and highlights the responsibility of the IR together with the CCI communities to provide a safe and transparent environment for young searchers to be trained and learn when and how to properly and successfully combine and use these tools.

In light of the trends emerging from our RQ1 results, we conclude that teens have moved beyond using SE as their only port of call for information discovery in the classroom. Moving forward, the IR community should then focus on this underserved user group and undertake studies that can document high school students' interactions with a broad range of tools that, in their eyes, help them locate information in the learning context, possibly keeping into consideration cultural and geographical factors as well as different degrees of experience in search. Consequently, technologies that best address the needs and expectations of adolescents and how to combine them in an effective search strategy would be a natural next step [38, 22].

Considering RQ2, the on-paper form describes which sites/sources students selected and why, what sources they discarded, and why. These returned a wide range of choices when it comes to selecting a tool to search. We note that this range of choices that emerged from the answers on sticky notes was drastically reduced when we analysed the data on usage for school activities. From the on-paper form data, almost all students seeking information for school activities chose Google as their first access to information. Trusted or previously known sources play a role in students' choices. Next to well-established criteria such as relevance and accuracy, readability and clarity are students' focuses when evaluating sources, while poor usability ("messy websites") and lack of authority and credibility issues are exclusion criteria.

We can conclude that students need guidance to understand and evaluate the output of their online search between different tools and within each tool to elicit information versus disinformation or

misinformation [39, 40]. This calls for the inclusion of search and media literacy in the curriculum to empower adolescents to better understand which tool to use best while explicitly mitigating misinformation issues–crucial among this demographic [5, 41]. It is also vital to allocate research efforts to focus on the collaborative design of novel algorithms and interfaces that can guide children and make it easier to look at results in a critical way [42, 43].

Limitations The insights from this exploration are interesting as a foundation for further analysis, but the study has limitations. The sample size is small: the average number of responses per group is only 3.15, with some groups contributing as few as one response. This sample size limits the reliability of the findings. We can deploy insights, but not generalise the results. We have complete coverage from the participants using sticky notes, as we have one note per student involved. The forms on paper, instead, were filled out in groups, with some having more responses than others, which could impact the results. Groups with more responses may influence the overall trends.

6. Looking at The Future of Teens Searching for Learning: Concluding Remarks

In this work, we report the results of an exploratory study conducted to better grasp how high school students aged 14 to 18 undertake online information seeking tasks to support their learning. The aim was to understand their behaviour when addressing online inquiries related to the classroom context. The insights inferred from collected data, such as the most common tool combinations as well as how many times each tool has been chosen and its relative order of preference, yielded a comprehensive picture of patterns and trends among high schoolers when searching for learning. Notably, the results reveal a very diverse scenario, as students tend to turn to various tools, from SE to SN platforms, and rarely LLMs, with significant variability among students. Students appear to perceive each tool differently and choose the one they think can best support a given task. Still, research shows that they are not as proficient as they should be using any of them when searching for learning[44], [45]. The emergence of generative AI and assistive agents based on this technology have the potential to best support high-schoolers [46], but whether students will be able to use them properly remains to be seen.

Our findings call for the IR, together with the CCI communities to investigate these habits further to understand the many factors in place, from searchers' previous experience to trust and reputation, as well as reconsider how to support students searching and browsing by expanding the pulling and pushing models with the one-shot approach offered by LLM and the colloquial insights provided by SN. Whether young searchers can meet their information needs using different tools is a challenge that requires a joint effort. Starting from the definition of how to effectively query these different tools and helping searchers devise the best information strategy, to be transparent regarding the trust and reputation of the results they are exposed to.

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Declaration on Generative AI

During the preparation of this work, the authors utilized Grammarly to check grammar and spelling, as well as to paraphrase and reword. They also used Julius AI for the data analysis. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the publication's content. No sections in the experimental code or manuscript have been created using Generative AI tool(s)/service(s).

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