

AI, Acronyms, and the Future of Facets: Mnemonics as Heuristic Instructional Tools for Structuring GenAI Prompts

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Abstract: This paper explores the evolving landscape of library discovery through the lens of generative artificial intelligence (GenAI), focusing on potential impacts on traditional faceted search interfaces. As AI-driven conversational search begins to reshape information retrieval, concerns arise regarding the potential to obscure facets, which are critical to search result refinement. This study introduces mnemonic acronyms as a heuristic device to guide users in structuring effective prompts for AI-based search. Observational studies in academic settings demonstrate how acronyms can enhance precision and user understanding of AI-driven search. Findings indicate that providing heuristic tools can be an effective strategy to guide initial AI searches, but challenges such as accuracy and bias highlight the ongoing need for critical evaluation.

Keywords: artificial intelligence, acronyms, facets, mnemonics, information literacy instruction

1. Introduction

Since the 1990s, facets have been an integral function of advanced search in library discovery (Pollitt et. al, 1998). With the advent of generative artificial intelligence (GenAI) a new search interface is on the horizon. The shift to more conversational search offered by GenAI may hide facets and their utility in filtering large amounts of search results. Facets are important. They allow searchers to be less precise, then narrow results based on specific criteria offered in a visual format. Conversational search may obfuscate this opportunity. It will be more important than ever to consider the development of the initial search query and teach users to integrate the same limiters without the visual cue that facets offer.



This paper imagines what natural language searching will be like for students within library discovery. Using observational studies of student behavior both within an instructional and research setting, it proposes a structured instruction tool which could assist future users. We propose effective faceted search strategies in GenAI can be learned through a heuristic approach by using an acronym. Presented are the results of an experiment involving an undergraduate honors class and a structured overt-participant observation research study to test AI-generated heuristic acronyms and consider their success and efficacy in finding information sources.

2. Background

In faceted search, all objects in a collection (closed system) are tagged with a set of mutually independent (and traditionally mutually exclusive) attributes that allow greater search and browse flexibility. Today faceted search allows for an enhanced search experience, improves relevance of search results, and allows for complex queries as well as browsing and refining. It empowers users to discover related content. Popularized as an advanced search feature with the advent of the Online Public Access Catalog in the 1990s, faceted search has continued to be a dominant search strategy. In the early 2010s faceted searching was the latest and greatest new development in library discovery. It was built off years of work by generations of library professionals creating rich and meaningful metadata.

What makes these environments work so well is the complexity of the MARC format and the sophisticated work on controlled access points (names, subjects, etc.) that libraries have spent many decades creating and maintaining. Faceted search is one of the most notable of these recent developments. It has opened the discovery experience in unmatched ways. (Schruer, 2012, p.236).

Today, facets are widely taught in information literacy instruction, despite more recent developments such as artificial intelligence and linked data, and newer metadata schemas such as BIBFRAME.

As noted by Spitelli and Tarulli (2012), “Today's library catalogues are competing against powerful alternatives for information discovery” (para. 1). To remain competitive, library vendors look to integrate AI into search and discovery systems. Similar to open models, they use natural language processing to interpret user queries. Soon AI algorithms will analyze content, recommend resources based on user interest, and summarize key concepts.

Looking at vendor proposals, AI and machine learning are set to replace the vertical facet filters menu with conversational search. This change opens new search possibilities, but also presents the prospect that detailed faceted search capabilities will be lost. Ex Libris are working on integrating such a model into discovery through Primo VE, and anticipate an August 2024 release. In September 2023, they purchased Alethea, an AI engine trained on scholarly material that can be used to build conversational search. In a recent White Paper, Ex Libris (2024) summarized:

Through Generative AI, a transformational trend has emerged in the realm of discovery experiences: conversational discovery – users “chat” with the search engine, asking it questions and continually training it to refine the answers the engine delivers. Unlike traditional search engines, which search the internet without distinction of content sources or their levels of reliability, the library discovery process is grounded in reliable, trusted, scholarly content produced by trustworthy sources and validated by experienced librarians.” (p.5)

Broughton (2004) likens facets to LEGO bricks “little bricks and building blocks that must be put together to achieve the end result” (p. 258) This is a useful way to think about integrating facets into prompting AI models in order to retrieve scholarly content for academic purposes. This innovative practice applies a tried and tested information literacy instruction method to artificial intelligence assisted information retrieval using prompts.

A prompt is instructions issued to a computer system using natural language, as opposed to code. It doesn't have to be a question - it can be a phrase, a command, a statement, or a series of keywords. Prompts in AI conversational practices have many uses - for example feedback, self-assessment, personalized learning, proofreading, and image generation. Korzyński et. al. (2023) discuss the profound importance of prompt design for a range of future industries. They summarize that well-crafted prompts, “contribute to improved accuracy by guiding AI models to generate more relevant and valuable content.” (p.26) Indeed the notion that prompt development will become a new digital competence is gaining traction. Creating effective prompts for research inquiry is a subset requiring unique and specific knowledge practices and dispositions, many of which are outlined in the Association for College and Research Libraries (ACRL) Framework for Information Literacy.

Adopted in 2016, the framework provides a conceptual approach to understanding information literacy as a set of abilities necessary for navigating information environments. Several frames relate directly to advanced faceted searching using GenAI, for example, the frame dispositions and knowledge practices explored in “searching as strategic exploration.” This frame emphasizes that information discovery is contextual and requires strategic exploration. Faceted search aligns with this frame by teaching students to refine their searches using specific attributes to effectively narrow results.

The framework supports the development of information literacy skills necessary for building facets directly into prompts for search with GenAI. By intentionally thinking through how we can integrate the knowledge practices outlined in *Searching as Strategic Exploration for AI search*, Librarians can effectively prepare students to navigate and contribute to future AI-driven information landscapes.

Heuristics devices have long been used by librarians to guide researchers in developing effective research questions. Gigerenzer and Gaissmaier (2011) define heuristics as, “strategies that ignore information to make decisions faster, more frugally, and/or more accurately than more complex methods” (p.454). A heuristic is a short cut into learning a new approach. Heuristic techniques are useful ways to balance effort, efficiency, and accuracy. “In this view, humans ... rely on heuristics because information search and computation cost time and effort; heuristics trade- off some loss in accuracy for faster and more frugal cognition” (p. 457).

Mnemonic acronyms used as heuristic devices have long been integrated into library search and as a pedagogical tool for library instruction. A mnemonic acronym is a letter pattern that assists in remembering something, formed from the first letters of a series of words and pronounced as a single word. One of the most notable mnemonic acronyms used in library search is PICO. First proposed by Robinson et al (1995), it reminds health researchers of the four characteristics of a well-articulated clinical question in the health sciences, the “PICO,” or the Patient, the Intervention, the Comparison intervention, and the desired clinical Outcome. They proposed a well-built clinical question should be “directly relevant to the problem” and “phrased to facilitate searching for a precise answer.” (p. 12).

Another notable use of mnemonic acronyms in information literacy instruction is as a method of walking students through the evaluation of sources. Examples include the CRAAP Test (Meriam Library, California State University-Chico, 2024) leading the researcher to consider the Currency, Relevance, Authority, Accuracy, and Purpose of an information source, and SIFT (The Four Moves)

which encourages users to Stop, Investigate the source, Find better coverage and Trace claims made (Caulfield, 2019). They are helpful tools that allow users to stop and think about the process and take a systematic approach to their everyday practice.

Heuristic acronyms are also being used for effective prompt writing. Developed by Birss (2023) the CREATE framework is one example, although not specific to scholarly research. CREATE stands for Character, Request, Examples, Additions, Type of Output, and Extras.

3. Methods

Imagining how library researchers might interact with the conversational AI search interfaces, the researchers looked to the development of a mnemonic acronym to guide library users through the search process. In order to develop these devices, the GenAI models CoPilot and ChatGPT 3.0 were leveraged. One acronym generated by each was selected. The prompt used in the AI Models to generate the acronyms was: "Provide a good acronym that is easy to remember to develop a successful prompt for AI to do a faceted search for information resources". The acronyms selected were:

Acronym One (CoPilot) = S.O.R.T

S - Specify: Clearly define your search query or topic. Example: Focus on solar power, wind energy, or geothermal solutions.

O - Organize: Arrange relevant facets (such as date, author, type, etc.) to narrow down results. Example: Consider factors like efficiency, cost, environmental impact, and scalability.

R - Refine: Use facets to filter and refine your search. Example: Refine your query to find the most efficient solar panels or the latest wind turbine designs.

T - Target: Focus on the most relevant resources based on your refined criteria. Example: Look for research papers, case studies, or industry reports related to your chosen renewable energy technology.

Acronym Two (ChatGPT 3.0) = F.A.C.E.T.E.D

F - Focus: Define the focus of your search. Be specific about the topic or keywords you're interested in. Example: "Search for information on renewable energy technologies."

A - Attributes: Identify the key attributes or facets you want the AI to consider during the search. These could include categories, dates, authors, etc. Example: "Consider facets such as cost, efficiency, and environmental impact."

C - Criteria: Set criteria for relevance. Specify any criteria that should be met for a resource to be considered valuable. Example: "Include only resources published within the last two years."

E - Exclude: Clearly mention any terms or types of information that should be excluded from the search results.
Example: "Exclude results related to outdated technologies."

T - Type: Specify the type of resources you are looking for, such as articles, videos, research papers, etc.
Example: "Retrieve scholarly articles and peer-reviewed research papers."

E - Expand: Allow for the possibility of expanding the search beyond the initial query. This could involve related terms or broader concepts.
Example: "Expand the search to include related terms like 'sustainable energy'."

D - Delimiters: Use delimiters or connectors to guide the AI in understanding the relationships between different facets or criteria.
Example: "Use AND to connect attributes and OR to connect related terms."

These were selected as the mnemonics were intuitive, easy to remember, and potentially useful for increasing precision within a conversational search. Once selected, the efficacy of this approach was tested by using the acronyms themselves to develop prompts. The researchers developed a plan to test the usefulness of the acronyms as an instructional tool in two environments. The first was an informal test tied to a discussion of the use of facets in library search within a classroom setting. The second was a more formal structured study conducted one on one with students.

4. The Class

For the in-class study, researchers utilized a 100-level three-credit seminar that used the lens of misinformation to frame information literacy instruction. The course met once a week for two hours and forty minutes and often employed a

flipped classroom approach. The 16 Sophomores and Juniors enrolled in Spring semester 2024 were part of an honors college which enrolls students across disciplines and uses an interdisciplinary approach. The researchers chose to use this course for two reasons. First, it provided access to semi-novice users to test the acronym approach, allowing for assessment and refinement of the acronym based on observations and feedback. Second, it allowed the integration of a deeper discussion of search techniques and strategies, as well as emerging technologies such as AI into the course.

5. The Assignment

The instructor chose a week focused on search strategies where students learned advanced search techniques such as Boolean operators, keyword searching, and the application of facets to broaden or narrow search results. The original assignment had students assigned to groups and practice applying search techniques learned in the readings and tutorials assigned and reflect on how things worked and why. This assignment stayed in its original form, and a second assignment was collaboratively developed that tasked students to use AI to search the same research question. Students were instructed to use the acronyms to develop prompts, then reflect on AI search, and the usefulness of the acronyms. They were also asked to compare what they encountered with the initial assignment and reflect on the advantages and disadvantages of each strategy.

The objective of the assignment was to “explore and test different search strategies for locating research articles using AI tools, evaluate their effectiveness, and reflect on the process.” (See Appendix A) The Learning Outcomes for this formative assessment were:

- Investigate advanced search techniques and understand the effectiveness of faceted search in the context of conversational AI interfaces.
- Evaluate the use of acronyms to enhance information retrieval skills in the context of conversational AI interfaces.

The class was initially broken into four groups of four students. Each group was tasked to develop two prompts - one for each of the acronyms provided based on the research question: How does environmental misinformation impact

public perceptions and policy decisions in California? This question was selected to engage students with a topic related to the misinformation focus of the class, broadly applicable from a variety of disciplinary perspectives, and locally relevant. Groups One and Two were asked to test their prompts in CoPilot with an option to test it in an additional AI Model of their choice. Groups Three and Four were asked to test their prompts in ChatGPT. Students were asked to copy their conversation into a document and upload to the Canvas classroom, allowing researchers to make their own observations on the interactions.

Students were guided in their discussions and reflections by the following questions:

1. Share your process for developing your prompts (copy and paste the conversations with the AI interface) here:
2. Which prompt provided better results? Why? (provide your reasoning and evidence)
3. How did these AI models compare to the library catalog search?
4. Do you think AI tools could help to enhance the research process? If so, how? If not, why not?

Once completed, the final 10 minutes of the class was set aside for students to share their experience searching with AI and using the acronyms.

Several weeks prior to the scheduled class, an introduction and preview of the activity was presented to prepare students for their participation. The activity was tied to a discussion of the scientific process and the types of studies they may encounter in peer-reviewed journals. On the day of the class all of the researchers attended and provided an introduction to the investigation. Researchers worked with students to answer questions, help them through the process, and work on the assignment.

Grading for the assignment focused on the evaluation and reflections on the mnemonic acronyms as a heuristic aid for library search and not the student research queries themselves. This allowed for more mental flexibility, experimentation and creativity in their approaches. It was observed that students did not always use an initial prompt that included all elements in the acronym, but instead used the acronym to refine results and guide the creation of follow-up prompts, similar to how they would use facets in a library search. By including this assignment in our discussion of search strategies, students were not only able to test the acronyms, but also critically evaluate the results and compare the search process in both the Library and AI environments. This deepened their understanding of how computers process search inquiries which

is aligned with most of the knowledge practices and dispositions outlined in the Searching as Strategic Exploration frame and most of the dispositions and several of the knowledge practices of the Research as Inquiry frame. (ACRL, 2016).

By allowing students to become a crucial part in the development of the acronym and be an initial part of our qualitative study the instructor was also able to make connections to topics explored earlier in the semester and develop a richer understanding of the iterative nature of scientific research, peer-review, and the “Scholarship as a Conversation” frame (ACRL, 2016). Students were encouraged to feel empowered to contribute to the scholarly conversation through the assignment’s critically evaluating and reflecting on their own discoveries interacting with the AI interfaces in this manner. This encouraged them to “see themselves as contributors to scholarship rather than only consumers of it” (ACRL, 2016).

Following the class, the researchers met to review assignments, discuss challenges, and develop the observational study. During the activity it became clear that the initial research plan needed modification. There were barriers to access encountered using the individual AI platforms, such as login and registration requirements. Students were reluctant to use their own AI accounts for this research for privacy reasons, as logging in exposed their search history to the class. For the observational study a single login provided by the researchers was used. The in-class trial of the acronyms also surfaced an issue not observed in our initial tests; the free version of ChatGPT used for the in-class session would not provide scholarly research. CoPilot was instead used for the structured observational study.

6. The Observational Study

Following the in-class instruction session, the researchers selected one acronym for further study and exploration in a controlled setting. The acronym that had the most engagement and engendered most in-class discussion was FACETED, although some felt it was unwieldy. Therefore, for step two a shorter version was adopted - FACET. The acronym guided the search process with its mnemonic representation of steps: Focus, Attributes, Criteria, Exclude & Expand, and Type. An explanation was provided to student participants, with illustrative examples relevant to tasks.

F - Focus: Define the focus of your search. Be specific about the topic or keywords you're interested in.

Example: "Search for information on renewable energy technologies."

A - Attributes: Identify the key attributes or facets you want the AI to consider during the search. These could include categories, dates, authors, etc.

Example: "Consider facets such as cost, efficiency, and environmental impact."

C - Criteria: Set criteria for relevance. Specify any criteria that should be met for a resource to be considered valuable.

Example: "Include only resources published within the last two years."

E - Exclude & Expand: Clearly mention any terms or types of information that should be excluded from the search results.

Example: "Exclude results related to outdated technologies."

Allow for the possibility of expanding the search beyond the initial query. This could involve related terms or broader concepts.

Example: "Expand the search to include related terms like 'sustainable energy'."

T - Type: Specify the type of resources you are looking for, such as articles, videos, research papers, etc.

Example: "Retrieve scholarly articles and peer-reviewed research papers."

The participant observation research study aimed to assess how structured facilitated information retrieval using conversational generative AI compared to traditional library search methods. The researcher provided student participants with a task, observed their actions, and asked clarifying questions to understand decision-making processes. Students were provided with a research question and the heuristic acronym, then asked to develop a prompt, enter it into Microsoft CoPilot, and assess the results. To maintain local context and consistency, the research question remained: "How does environmental misinformation impact public perceptions and policy decisions in California?" Finally, participants were asked to compare results with a similar topic-based search in the conventional library discovery service.

Over the course of three hours, 13 observational study sessions were completed. All stages were captured in a google form for later review, including prompt development utilizing the acronym, results provided by the GenAI model, and student thoughts and feedback on the process and results (see Appendix B). Participants were assured that the study focused on evaluating the heuristic acronym and not their individual performance. Informed consent was obtained,

and anonymity maintained throughout the data collection and analysis phases. By combining instructional guidance with empirical observation, the study contributes valuable insights into optimizing information retrieval processes through structured search methodologies and AI-driven tools.

7. Conclusion

Heuristic acronyms as a learning tool are widely adopted and applied in information literacy instruction. This makes them an appropriate method for approaching the new topic of scholarly search and GenAI. Findings are largely based on student feedback and demonstrate promising opportunities for using the FACET heuristic acronym with GenAI for scholarly research and retrieval. However, there was also a general sense of distrust towards the technology, especially from students who were low adopters prior to the study.

Students generally found prompts developed using the FACET heuristic to be helpful, particularly when they clearly defined search parameters. This specificity was crucial in guiding the AI to deliver more relevant and targeted results. The structured nature of the acronym facilitated clearer articulation of search intentions, enhancing the efficiency of information retrieval tasks.

Among the elements of the FACET acronym, specifying the type of resources desired (e.g., scholarly articles, research papers etc.) was noted as particularly useful by students. Including this element significantly improved the quality of search results obtained from the GenAI tool, demonstrating the practical utility of structured prompts in directing AI-driven searches towards desired outcomes. Students expressed a mixed perception regarding the use of conversational GenAI compared to traditional library search interfaces. While one shared they found the, "AI model ... way easier than the library catalog," another appreciated that, "Library databases are complex and take time to construct a search" but also felt, "AI requires no explanation and gives more relevant results." There was a prevailing sentiment that library databases, despite their complexity, offered more reliable and concrete information. One felt it was, "not as specific as the library catalog," while another shared that the AI was, "hard to trust." This dichotomy suggests that while GenAI serves as a convenient starting point for information gathering, the trustworthiness of library resources remains unparalleled.

For many students, this study represented their first extensive interaction with GenAI for academic research purposes. Feedback indicated that while it simplified the search process, it also contributed to a better understanding of source evaluation—a critical skill in academic research. As one student participant predicted, “I think [GenAI] gives people a better understanding of sources... I think it will help future students.” Indeed, students recognized the potential to aid future research, albeit with the caveat that it should complement rather than replace traditional library resources.

Despite advantages, students acknowledged several challenges and limitations. Concerns included a tendency to provide general rather than specific information, occasional inaccuracies in search results, and the presence of biases in the algorithms. When comparing results, one student felt, “It can be inaccurate or vague and sometimes even incorrect with information it gives out. It is important to always double-check its results.” This underscores the importance of critical thinking when utilizing AI-generated information and reinforces the role of human judgment in research. As one participant succinctly summed up, “AI isn’t perfect, you have to do the research yourself.”

Further research can be undertaken once vendor AI search interfaces are in effect. There will be opportunities for more robust comparison between conversational AI interfaces and the more traditional Boolean or faceted advanced search interfaces. However, another potential limitation to consider is that AI applied to library search may only include full-text content, and not integrate cataloging metadata (Stohn, 2024). This could exclude collections where only metadata exists, such as print. The researchers speculate that custom AI search tools may surface siloed vendor-based subscription content, as opposed to federated library content.

This preliminary research provides an initial investigation into future implications, gains, and losses with AI search. It concludes there is significant potential for the use of mnemonic acronyms as a heuristic learning tool for integrating facets into AI based library search. As future GenAI search interfaces are developed and progress, further research is warranted.

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