

Introducing a Novel Research Education Initiative: The URNCST Journal Artificial Intelligence-Assisted Encyclopedia Entry Initiative



URNCST Journal
"Research in Earnest"

Ankush Sharma, BSc [1], Grace Li, BSc [1], Hamas Tariq, BSc [1],
Dorna Ahmadi Aliabadi, BSc [1], Chun Ju Liang, HBSc [1], Ahmad Yasir Omar, HBSc [1],
Neha Dhanvanthry, HBSc [1], Jeremy Y. Ng, MSc, PhD [1]*

[1] URNCST Journal, Toronto, Ontario, Canada

*Corresponding Author: editor@urncst.com

Abstract

The Undergraduate Research in Natural and Clinical Science and Technology (URNCST) Journal Artificial Intelligence-Assisted Encyclopedia Entry Initiative (AI-AEEI) is an innovative program designed to empower undergraduate and professional-undergraduate degree students to contribute to research literature by leveraging artificial intelligence chatbots (AICs) to write encyclopedia articles. Participants will develop critical thinking and scientific writing skills, learn to use AI responsibly, and gain experience summarizing key concepts. By working with AICs, students will enhance their ability to conduct literature reviews, synthesize information, and communicate complex ideas clearly and concisely. This initiative addresses the need for more accessible and guided research opportunities for undergraduate students, fostering their growth as future scientists and researchers. This short editorial provides a brief overview of how the URNCST Journal editorial team successfully designed, cultivated, and established the AI-AEEI.

Keywords: AI-assisted writing; encyclopedia entry; undergraduate research; STEM education; research education; undergraduate journal; URNCST Journal

Introduction

The Undergraduate Research in Natural and Clinical Science and Technology (URNCST) Journal Artificial Intelligence-Assisted Encyclopedia Entry Initiative (AI-AEEI) aims to provide students with the unique opportunity to engage in meaningful research writing, regardless of their prior experience. Using artificial intelligence chatbots (AICs), students will effectively summarize a natural or clinical science topic by synthesizing an encyclopedia entry. The AI-AEEI plays a crucial role in bridging the gap between undergraduate studies and entry into the competitive research field. It incorporates technology into education to prepare students for the evolving landscape of scientific inquiry and publication amidst the rise of artificial intelligence (AI) technologies. As AI becomes more commonly used in research and writing, it is crucial to understand how to assess the quality of AI-generated text to ensure its accuracy and reliability in today's technological landscape. AI platforms, particularly chatbots (e.g., ChatGPT), have the potential to assist researchers in various tasks, such as identifying research sources, formulating search terms, data collection, summarizing information, generating initial drafts, and refining written content. By incorporating AICs into this initiative, we aim to provide students with the opportunity to practice how to utilize these tools effectively and responsibly. This will not

only familiarize students with the nature of scientific research but also enhance their ability to use AI as a resource to improve writing and extract information efficiently, all while adhering to ethical research conduct and maintaining accuracy and reliability. This four-week program provides a structured timeline for students to gain hands-on experience in using AICs to assist in their scientific writing. By working on an encyclopedia entry, students will engage extensively with their chosen topics to develop skills applicable to conducting thorough literature reviews, synthesize information from diverse sources, and effectively communicate their findings. Ultimately, this initiative seeks to prepare undergraduate students for future research endeavours.

Eligibility and Application Process

The URNCST Journal AI-AEEI is open to students enrolled in undergraduate (i.e., BSc, BEng, BA) or professional-undergraduate (i.e., MD, DDS, PharmD, OD, RN) degree programs. A call for abstract submissions will be made at the beginning of each competition round, which is to occur in three rounds annually (summer, fall, and winter). Applications can be submitted individually or in teams of up to three members, and the abstract should summarize a topic of interest based on the eligible topic disciplines provided by the URNCST Journal in the area of

natural and clinical sciences. Abstracts may be written with AICs, but students must demonstrate a solid understanding of the topic and the ability to convey key information concisely. Once submitted, the abstracts undergo a review process conducted by the URNCST Journal editorial team. Abstracts are evaluated for content quality, clarity, and the overall strength of students' scientific writing. Each abstract is reviewed by two members of the team using the "Checklist for Reviewing AI-AEEI Submissions" to ensure consistency in scoring before a final decision on acceptance is made. Successful applicants must exhibit a strong understanding of their chosen topic, as well as the potential to develop a comprehensive and informative encyclopedia entry. Additionally, applicants are expected to demonstrate a commitment to learning and the ability to use AICs responsibly and ethically in their writing process. Accepted students will be invited to draft a full-length encyclopedia entry manuscript, which will undergo peer review by the URNCST Journal. This rigorous selection and review process ensures that dedicated and motivated students have the opportunity to participate in this initiative and gain the necessary skills to remain competitive in the undergraduate research field.

During the four-week period, the author(s) will follow the program timeline to optimize the use of AICs in the production of a final encyclopedia entry. Students are expected to carefully craft prompts to be inputted into AICs and verify the returned information using reputable sources before incorporation into their work. The completed encyclopedia entry will be submitted to the URNCST Journal, where an editor or associate editor will evaluate the manuscript for quality and criteria standards. This includes, but is not limited to, inclusion of required sections, correct reference style, appropriate content, and clarity. If deemed satisfactory, the submission will be sent out for peer review by the URNCST Journal; otherwise, it will be returned to the author(s) for further revisions. Peer review feedback will be shared with the author(s) to address any critiques before the work is resubmitted. After another review by an editor or associate editor, the article could be accepted, requiring additional revisions, or rejected for publication. This process may require multiple rounds of modifications; however, the author(s) are supported through every step in achieving a publishable, high-quality encyclopedia article.

Promoting the Initiative: The Role of Engagement Officers

A key factor for the success of the URNCST Journal AI-AEEI is ensuring that prospective candidates are aware of the initiative. Engagement officers (EOs) play a key role in the daily operations of the URNCST Journal by handling the program's promotional tasks. This team, primarily made up of undergraduate students, receives weekly assignments that are adjusted based on the journal's current initiatives. Since the target audience of the AI-AEEI is undergraduates

seeking experience in writing encyclopedia entries on science and technology topics, EOs handle a significant portion of its marketing. Some key strategies EOs utilize include leveraging social media and other popular online communities (e.g. Facebook, Discord, Instagram) to share information, important dates and deadlines, and maximizing the awareness and participation of the initiative.

Standardizing Promotion and Managing Abstract Submissions: The Role of Engagement Leads

Engagement Leads (ELs) are a division of the senior team of the URNCST Journal and are composed of former EOs who have extensive experience in the journal's operations and displayed outstanding commitment to the journal's mission. As supervisors, ELs assign various tasks to EOs while holding meetings on a weekly basis to ensure all promotional activities are completed with a high degree of quality and professionalism. ELs also coordinate with the Editor-In-Chief and Deputy Editor to understand the program's needs and delegate tasks to the EOs accordingly. Once the application period for the AI-AEEI is over, ELs sort the abstracts by research topic and conduct preliminary checks for completeness, then return submissions to applicants for correction if necessary. All completed applications are then sent to the URNCST Journal editorial team for evaluation.

Program Structure and Guidelines

Participants in the URNCST Journal AI-AEEI will leverage AIC platforms, to aid in the writing process. The use of these tools is intended to enhance the students' ability to concisely summarize information, draft initial content, and refine their entries into well-organized encyclopedia articles. For instance, if participants chose to write about cancer therapeutic antibodies, a prompt they may consider entering into AIC platforms could be to "describe the mechanisms of action of cancer therapeutic antibodies". Participants would take the generated information from the AIC platform and fact check it against reputable sources to ensure that the information matches prior to using it within their entry. Next, a key component of this initiative is educating students on the responsible and ethical use of AICs. Participants must read the "Responsible Use of AI Chatbots" guidelines provided by the URNCST Journal before beginning their work [1]. This ensures students understand the importance of using AI tools ethically and responsibly, acknowledging their limitations, critically evaluating their outputs, and providing appropriate citations for AI-assisted content. Students are required to select a topic from a list of eligible topic disciplines, which include biology, chemistry, earth and environmental sciences, medical, health, and clinical sciences, physics, psychology (must fall within the natural or clinical sciences), and technology. Furthermore, students are encouraged to

select topics that interest them if they fall within the eligible disciplines. Topics can be broad (e.g., "Disease") or specific (e.g., a specific type of cancer). Importantly, students must ensure their proposed topic does not duplicate existing entries by checking the archive of encyclopedia articles already published in the URNCST Journal.

The AI-AEEI schedule ([Table 1](#)) is structured to provide ongoing support and feedback. During the four-week commitment, students are expected to verify content for accuracy, relevance, and credibility derived from AICs against established scholarly sources (e.g., peer-reviewed literature). Solely relying on responses generated from AICs is deemed unacceptable as AICs often are known to generate content that appears credible (but is in fact, false), especially if the student is less familiar with the topic area they have inquired about. Students should provide the AICs they are using with prompts that are as specific as possible to generate more targeted responses. Additionally, students should critically evaluate content derived from AICs for quality and reliability. This information should be supplemented and revised, based on the student's discretion. The content derived from AICs should be corroborated with multiple sources, to ensure accuracy and comprehensiveness. Additionally, individuals are not required to have a complete background or understanding of their selected topic. However, they must conduct prior research and demonstrate the dedication needed to independently research and write their encyclopedia entry. Furthermore, and to ensure transparency, participants must declare what AIC(s), among other tools, they used to assist them in the writing of their encyclopedia entry.

Developing Schedules for Mentees: Routine Check-ins & "Block" Schedule Design

The URNCST Journal AI-AEEI follows a structured and systematic approach to ensure the smooth progression and completion of tasks. The initiative is scheduled to occur thrice annually (summer, fall and winter academic terms), whereby each round is comprised of a four-week period. The program schedule ([Table 1](#)) outlines the timeline of deliverables distributed throughout the duration of the four-week period. It is designed to ensure both accountability

and adequate time for the completion of weekly milestone tasks expected from participants, culminating in a full-length encyclopedia entry to be submitted to the journal at the end of the program.

The schedule is organized in a block format, dividing the 1-month scheduled period into four weekly "blocks". Pre-block preparations are required by students prior to block one. These preliminary tasks involve familiarizing themselves with the AICs that will be used during the program. Students are expected to familiarize themselves with their chosen topic as well as with the encyclopedia entry article manuscript template, using initial research and resources, such as peer-reviewed articles. The aim of the pre-block period is to address any knowledge gaps the student may have regarding their topic. At the beginning of block one, students are to identify one or more AICs to be used and begin generating test prompts prior to writing the encyclopedia entry article. Students working in teams will determine the ideal frequency of meetings for the next month, if they are applying as a group of two or three. The program schedule is intentionally designed to account for the timeline of students concurrently pursuing full-time undergraduate degrees. As a result, flexibility is a key consideration when the AI-AEEI block schedule was created; participants work toward the completion of their tasks at any time during the one-week period of each given block, which accounts for participants' competing obligations. The consistency of the one-week deadlines for each interval of new deliverables also allows for participant accountability and serves to prevent the participant from completing all tasks at the last moment. As an added measure, URNCST Journal representatives will send check-in emails to students at the start of blocks two, three, and four so that our internal team can monitor participants progression throughout the course of the program. This will also allow for participants to provide a recap of their progress from the previous week, including their work on the scheduled deliverables. Students may also indicate whether they have any questions or concerns at this time. Thus, the structure of the program, with its clear milestones and supportive framework, is designed to ensure the successful completion of high-quality encyclopedia entries.

Table 1. URNCST Journal Artificial Intelligence-Assisted Encyclopedia Entry Initiative Schedule

Block	Deliverables
Block 1 (Week 1)	<ol style="list-style-type: none"> 1. Hold introductory meeting (if more than one participant) 2. Identify one or more artificial intelligence chatbots that will be used to assist with the writing of the encyclopedia entry article 3. Use the artificial intelligence chatbots to begin generating test prompts 4. Be familiarized with the encyclopedia entry article manuscript template and ask the journal staff any questions
Block 2 (Week 2)	<ol style="list-style-type: none"> 1. Compile list of potential references to cite in the final manuscript 2. Start and finish writing and citing the Introduction section of the article 3. Start writing and citing the Body section of the article
Block 3 (Week 3)	<ol style="list-style-type: none"> 1. Finish writing and citing the Body section of the article
Block 4 (Week 4)	<ol style="list-style-type: none"> 1. Finalize all writing and references (both in-text and bibliography) 2. Format manuscript according to URNCST Journal submission guidelines 3. Submit manuscript

Conclusion

The URNCST Journal AI-AEEI aims to provide students with a unique opportunity to develop essential research and writing skills. This is accomplished through learning to responsibly and ethically use AICs to summarize complex information to produce high-quality encyclopedia entries. These experiences are designed to bridge the gap between undergraduate coursework and advanced research, preparing students for future academic and professional endeavours. This program presents a forward-thinking approach to undergraduate research education through integrating AICs into the scientific writing process. Thus, the structured four-week program ensures that participants develop critical thinking, scientific writing, and ethical research practices.

List of Abbreviations Used

AI: artificial intelligence
 AI-AEEI: Artificial Intelligence-Assisted Encyclopedia Entry Initiative
 EL: Engagement Lead
 EO: Engagement Officer
 URNCST: Undergraduate Research in Natural and Clinical Science and Technology

Conflicts of Interest

The author(s) declare that they have no conflict of interests.

Authors' Contributions

AS: is currently an Assistant Editor and Engagement Lead for the URNCST Journal, co-drafted the manuscript, and gave final approval of the version to be published.
 GL: is currently an Engagement Lead for the URNCST Journal, co-drafted the manuscript, and gave final approval of the version to be published.
 HT: is currently an Engagement Lead for the URNCST Journal, co-drafted the manuscript, and gave final approval of the version to be published.
 DAA: is currently an Assistant Editor and Conference Outreach Liaison for the URNCST Journal, critically revised the manuscript, and gave final approval of the version to be published.
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 AYO: is currently an Assistant Editor for the URNCST Journal, critically revised the manuscript, and gave final approval of the version to be published.
 ND: is currently an Assistant Editor and Deputy Editor for the URNCST Journal, critically revised the manuscript, and gave final approval of the version to be published.
 JYN: is the founding Editor-in-Chief of the URNCST Journal, critically revised the manuscript, and gave final approval of the version to be published.

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