# Generative AI and Learning Analytics

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**Abstract**
This editorial looks back at the Journal of Learning Analytics (JLA) in 2023 and forward to 2024. Considering the recent proliferation of large language models such as GPT4 and Bard, the first section of this editorial points to the need for robust Generative AI (GenAI) analytics, calling for consideration of how GenAI may impact learning analytics research and practice. The second section looks back over the past year, providing statistics on submissions and considering the cost of publication in an open-access journal.

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## 1. Introduction

The emergence of Generative AI (GenAI), particularly in the realm of large language models and conversational agents like ChatGPT, has ushered in a new era of human–AI collaboration. Armed with an ability to generate human-like writing, images, audio, code, and video, GenAI models represent a significant advancement beyond the automation of repetitive, low-cognition tasks typical of earlier industrial and technological revolutions. We are witnessing a broader range of tasks, previously thought to be exclusive to human cognition, now being targeted for automation. This shift aims to either completely replace human efforts or augment human intelligence with AI assistance to enhance decision-making and productivity. Prominent examples include the use of AI for generating artwork (Zhang et al., 2023), producing code or analyzing datasets (Nguyen & Nadi, 2022), assisting in medical diagnoses and treatment recommendations (Shen et al., 2019), conducting financial and market analysis (Chui et al., 2023), administering basic legal advice (Susskind, 2023), or even generating coherent articles (Stokel-Walker & Van Noorden, 2023).

The growth of GenAI is expected to extend well beyond early conversational agents like ChatGPT, signalling its potential for broad adoption across a wide range of tools and technologies. This aligns with the strategic direction of OpenAI, which is evidenced by the company's rollout of specialized GPT models (GPTs) and current research into leveraging large language models to enhance user interface design (MacNeil et al., 2023). Embedding specialized GPT models designed for discipline-specific tasks complemented with user-friendly interfaces into organizational tools and ecosystems offers substantial benefits. In particular, the system is pre-configured to assist with organizational tasks, eliminating the need for users to master prompt engineering. Instead, they can interact naturally with the AI, which "intuitively" understands and executes their requirements, streamlining task completion. Beyond simplifying user interaction, it also automates and streamlines routine organizational tasks that often require access to sensitive internal data and processes that should not be exposed to external conversational agents. Personalization stands out as another core advantage (Chen et al., 2023), with algorithms adapting to the distinct needs and preferences of individual users, thereby offering a tailored experience (e.g., Salemi et al., 2023). Finally, the possibility of introducing multimodal interaction capabilities further enriches this landscape, permitting the use of various input and output modalities to complete a broader range of tasks and accommodate diverse user preferences (e.g., Hao et al., 2023).

The deployment of GenAI in education has sparked a vibrant discourse, highlighting a spectrum of opportunities and concerns. Considering the positives, GenAI promises to revolutionize learning by offering personalized education pathways (e.g., Liu et al., 2023), automating administrative tasks to give educators more time with students (e.g., Chiu, 2023), and providing instant feedback to learners (e.g., Javaid et al., 2023). There are also valid concerns. The foremost is about assessment in the age of AI (Swiecki et al., 2022) and the potential for academic dishonesty, as students might rely on AI to complete assignments, undermining the learning process (e.g., Cotton et al., 2023). There are also issues of hallucination where they

provide factually incorrect outputs, notable lack of transparency in explaining how their outputs are produced (Khosravi et al., 2022), and data privacy (e.g., Moreno, 2023), as these systems require access to students' personal information and learning records. Additionally, the integration of GenAI could widen the digital divide, privileging those with access to cutting-edge technology while leaving others behind.

A key strategy in harnessing GenAI's potential to enrich education while mitigating risks is to incorporate learning analytics lens to understand how students engage with GenAI-powered tools and how to measure their impact on student learning and experience. This query accentuates the need for robust and rigorous research at the intersection of GenAI and learning analytics. Below, we highlight some promising research directions in this emerging field:

- **Data Points Essential for GenAI Analytics:** What specific data points — such as prompts, preceding conversational elements, model parameters, and user responses — must be stored and analyzed within GenAI analytics to comprehensively understand and optimize user interactions and experiences?

- **Metrics of Engagement in GenAI Interactions:** What key metrics — such as duration of interaction, number of characters input, conversational depth, and interaction frequency — are critical in evaluating and interpreting user engagement with GenAI, and how might these metrics be effectively harnessed to provide insights that could further refine and enhance user experiences within GenAI frameworks?

- **Capturing User Perception Relative to Specific Prompts and Settings:** What approaches and methodologies can be employed within GenAI analytics to accurately capture and analyze user perceptions and experiences relative to specific prompts and settings in GenAI-driven interfaces?

- **Measuring the Impact of GenAI on Learning Outcomes:** What methodologies and metrics can be effectively employed to ascertain the impact of GenAI on individual and group learning outcomes? How might these elements be synthesized within the analytics to forge a comprehensive understanding and facilitation of learning within GenAI-enhanced environments?

- **Frameworks for Evaluating the Effectiveness of Prompts:** How can frameworks within GenAI analytics be designed to evaluate, compare, and contrast the effectiveness of various prompts in steering user interactions, engagements, and learning?

- **GenAI for Cross-Platform Educational Data Synthesis:** How can GenAI be employed to collect, scrutinize and analyze data from varied educational platforms, tools, and mediums to develop actionable insights that empower educators to make informed decisions?

- **GenAI in Advancing Learning Analytics Research:** How can GenAI be systematically incorporated into various phases of the learning analytics lifecycle, from theoretical exploration and prototype development to practical application and efficacy assessment and reporting, to advance the research and development of learning analytics solutions?

As we embark on the journey from 2023 into 2024, the intersection of GenAI and learning analytics presents a fertile ground for exploration and innovation. In anticipation of submissions for the upcoming year, we invite contributions that explore the various points discussed above for advancing our understanding and application of GenAI in education, addressing both its potential and its challenges, and shaping its role in the future of learning.

## 2. Submission Overview

Over the past year, the journal received 159 submissions — significantly more than in previous years. During that same period, 101 submissions received a "desk reject" from the journal editors and were not sent out for review. In most cases, these rejected papers did not focus on learning analytics or did not show awareness of existing learning analytics research in their subject area. The percentage of desk rejections is much higher than in previous years due to a steep rise in the number of submissions that have little or no connection with learning analytics. While final decisions are pending on several papers currently under review, 22 papers sent out for review were declined and 22 were accepted, with an overall acceptance rate in this calendar year of 14%, which is in line with the two previous years. Table 1 shows comparative statistics for the past five years.

**Table 1**. Journal publication statistics, 2018–2023

|  | 2018–2019 | 2019–2020 | 2020–2021 | 2021–2022 | 2022–2023 |
|---|---|---|---|---|---|
| Received during the year | 85 | 82 | 93 | 115 | 159 |
| Accepted during the year | 30 | 19 | 33 | 29 | 22 |
| Acceptance rate | 36% | 44% | 23% | 12% | 14% |
| Declined (desk reject) | 16 | 24 | 56 | 70 | 101 |
| Declined rate (desk reject) | 25% | 32% | 63% | 76% | 64% |
| Declined (after review) | 21 | 29 | 22 | 15 | 22 |
| Declined rate (after review) | 39% | 24% | 14% | 12% | 14% |

*Note: Papers received during one calendar year may be accepted or rejected in the following calendar year.*
*Some papers received in 2022 were still under review when these figures were generated on 5 December 2023.*

The journal has continued its regular cycle of three issues a year, published in spring, late summer, and winter. Volume 10 began with a special section on Fairness, Equity, and Responsibility in Learning Analytics, edited by Mohammad Khalil, Paul Prinsloo, and Sharon Slade. This section included nine papers, written by 33 authors, approaching the theme from a variety of perspectives, plus the editorial. A further two research papers in issue 10.1 took the total number of authors to 41, based in ten countries in Africa, Australasia, Europe, and North America.

The August issue (10.2) included our first-ever open peer commentary paper and its responses. Open peer commentary papers are intended to promote cross-community dialogue on matters of significance within the field of learning analytics. These papers are first published as early access and opened for peer commentary; the original paper and the commentaries are then published together. Also in the issue were three research papers and three data and tools reports. The 66 issue authors came from ten countries across Australasia, Europe, and North America.

By the start of December, three of the papers for the current issue (10.3) had been published as early access, and the 13 individual authors came from five countries in Australia, Asia, Europe, and North America. The total number of individual authors (some named on more than one paper) in 2023 was 117, based in 15 different countries, as shown in Table 2.

**Table 2.** Country of residence of 117 JLA authors,
1 January 2023 to 29 November 2023

| Country | Authors |
|---|---|
| Australia | 15 |
| Canada | 4 |
| Finland | 6 |
| Germany | 14 |
| Ireland | 1 |
| Italy | 2 |
| Malaysia | 1 |
| Netherlands | 20 |
| Norway | 1 |
| Serbia | 1 |
| South Africa | 1 |
| Sweden | 3 |
| Thailand | 1 |
| UK | 6 |
| USA | 41 |

Each of these papers was published at no cost to the authors or their institution. In the following section we look at the costs associated with publishing the journal and at how these are covered.

## 3. Journal Costs

For many years, the costs involved in publishing an academic paper have provoked controversy. In particular, academics and other experts question why, when they carry out editorial duties and peer review free of charge for journals, they or their institutions must pay to publish and must also pay to access what is published. In turn, the journal publishers point to the

services they provide, summarized by Morris (2005) as creating journals, developing online systems, managing the peer-review process, supporting the editor and editorial board, content editing, illustrations, marketing, sales, customer service, and archiving.

Despite these costs associated with journal publishing, an estimate published a decade ago suggested that "the science-publishing industry generated $9.4 billion in revenue in 2011 and published around 1.8 million English-language articles — an average revenue per article of roughly $5,000" (Van Noorden, 2013). More recently, a review of the political economy of academic publishing published in PLOS One (Puehringer et al., 2021) noted that "Academic publishers sell a highly profitable, yet immensely publicly subsidized product." The authors pointed to four ways in which publishers can benefit from public funding: 1) subscription fees, 2) article processing charges and submission fees, 3) unpaid provision of reviews and journal editing, and 4) unpaid submission of content.

At the same time, "the headquarters of the major publishers, the major scholarly journals and the major scientific societies and associations are largely found in the global North" (Collyer, 2018), facilitating a flow of both knowledge and resources away from the global South. Collyer points to a range of ways in which this can happen. For example, the larger publishing houses have an effective monopolization in some areas, which means they can inflate prices, thus excluding academics in poorer countries and institutions from publishing work and from reading the work of their peers. The dominance of these publishing houses also increases pressure to publish only in English, and to engage with frameworks and priorities established in the global North.

Open-access journals provide a partial solution to these issues, but the inevitable overheads mean that even this publishing is usually associated with a cost to authors or their institutions. In addition, academics and institutions have been concerned about the practice of double dipping, "the term used to describe a publisher gaining from two income streams, APCs [article processing charges] and subscriptions, in a way that its overall income from the same customer rises" (Pinfield et al., 2016, p. 1751). A 2014 study from the UK found that the mean article-processing charge paid by universities rose from £1,310 in 2007 to £1,652 in 2014 (using 2023 conversion rates, that latter figure equates to approximately $3,159 AUD, $2,810 CAD, €1,888 EUR, and $2,047 USD).

From the time of its founding in 2012, the *Journal of Learning Analytics* (JLA) has been open access in that it does not charge authors to publish in it or readers to access it. All publishing costs are covered by the Society for Learning Analytics Research (SoLAR). Many learned societies use the income from their journal(s) to fund their other activities. SoLAR does the opposite, using its income from membership fees and other sources to fund the journal in addition to other community initiatives.

As the influence and credibility of the journal has grown (for example, it now has a Journal Impact Factor of 3.9), the number of submissions has increased, thus potentially increasing both workload and costs. The editorial team has made two changes to address this situation. To reduce individual workload while increasing our range of experience and expertise, we welcomed Hassan Khosravi as a fourth editor-in-chief this year. We also tightened the restrictions on word count for papers submitted to the journal. Full details of current word limits are available on the journal website under "Focus and Scope." The most significant of these is the limit of 9,000 words for research papers, with papers up to 12,000 words in length considered only if their additional length is adequately justified in a covering letter.

To clarify the costs involved in publishing the journal, the editors-in-chief examined the figures for one complete calendar year, 2022. The time taken from review to submission means that some work published in 2022 was reviewed and entered the production process in 2021, and some work that was reviewed and entered the production process in 2022 was published in 2023. Taking these limitations into account, the financial and publication figures given below are from the 2022 budget.

In the case of the JLA, some work is carried out by SoLAR without being charged to the journal. This includes support for the editors-in-chief, publicity, accounting, and auditing. Other work on the journal is carried out at no cost to the JLA or to SoLAR. This includes the work involved in carrying out and writing up research and practice. In return for this work, journal publication offers routes to impact and dissemination and associated benefits. The journal's peer reviewers also carry out their work free of charge. Here the returns are not as clear-cut, but research has shown that reviewing is perceived by most as an enjoyable process (Mulligan et al., 2013), which can help academics keep up with the latest literature, establish the boundaries to a field, and function as an indicator of professional stature (Djuper, 2015). It is also a reciprocal arrangement — most academics will submit work for peer review at some point and so benefit from maintaining the system and playing their part in the maintenance of their academic community (Ware, 2008). Both the workload and the benefits for editors are greater: the work may increase their status or lead to promotion, and it provides opportunities to shape and lead the field.

In addition to these unpaid roles, the JLA has one editorial assistant, two copy editors, and two production editors, all paid by the hour. The journal's two other expenses for the year were an annual subscription to Overleaf (a publishing tool used for editing LaTeX files) and an annual payment for website hosting. Together, these costs in 2022 amounted to $28,639 CAD (SoLAR's official base is in Canada, and therefore costs are calculated in Canadian dollars).

In 2022, the JLA published the three issues of volume 9. Together, these included 35 papers. This would put the cost to SoLAR of each paper published at around $818 CAD. However, this is misleading because the papers were of different types and lengths. Issue 9.1 included eight research papers, together making up a special section on Networks in Learning Analytics. Issue 9.2 included 11 research papers, one extended conference paper, two practical reports, and one data and tools report. Issue 9.3 included six research papers, an editorial, four research papers making up a special section on game-based learning, and a special section editorial.

Word counts for each of these papers were calculated by downloading the PDF files, pasting the content into Microsoft Word with no amendments, and using the tool's word count function. This method overcounts slightly by including headers, footers, and copyright information, as well as counting each cell in a table separately. However, as each of these elements has to be proofread and copy-edited, the resulting word counts were considered sufficiently accurate. Overall, the word count ranged from 1,608 for an editorial to 22,782 for an extended conference paper with multiple tables and appendices. The mean word count for papers published in JLA in 2022 was 11,889.

Prices fluctuate from year to year, as do currency conversion rates. Some short papers are complex to write, review, edit, and produce; some long papers are relatively straightforward. In 2022, the most recent year for which we have full figures, the average cost to SoLAR per 100 words published in the JLA was $6.88 CAD (approximately $7.7 AUD, €4.6 EUR, £4 GBP, or $5 USD).

Returning to 2023, our thanks go to all those who played key roles in making the journal a success this year, particularly to the journal's editorial assistant Sameen Reza, the copy editors, and the production editors. Thank you to the Society for Learning Analytics Research (SoLAR) for providing the funding to make this a truly open access journal that does not charge for submission, publication, or access. Special thanks, as always, go to our authors and reviewers for contributing both their time and expertise to the journal.

## Declaration of Conflicting Interest

## Funding

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