

Workshop Report: Text Analytics for Inclusive AI Education in the Humanities & Special Needs - 28 February 2024

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1. Introduction

The workshop “Text Analytics for Inclusive AI Education in the Humanities & Special Needs”, held on the 28th of February 2024, at University College London, brought together educational technology providers, academic researchers, and secondary schools in a collaborative effort to explore the enhancement of language and literacy development in humanities subjects. Building upon the success of a prior workshop that explored partnerships for data sharing and educational AI applications to enhance writing skills, the February workshop invited talks by Sandra Leaton-Gray and Akira Borba Colen França on the topics of Digital Textual Analysis for AI-based Monitoring of Student Progress in the Humanities and Challenges in Writing Analytics and the Provision of Formative Feedback Considering Typical and Atypical Students, respectively. Participants engaged in structured and thought-provoking discussions that connected diverse perspectives from academia, edtech companies, and secondary schools, all with the goal of advancing writing skills and broader language and literacy development.

The workshop offered the opportunity to identify barriers and enablers for leveraging text analytics to support writing development in secondary schools, fostering a deeper understanding of challenges and opportunities to improve learning in the humanities and languages. It offered multidisciplinary insights to derive holistic pathways for improving writing skills and language development whilst placing a special emphasis on including perspectives from the Global South and ensuring language diversity, identifying barriers and enablers to the adoption of text analytics, and aligning the interests of all stakeholders toward shared educational objectives. Discussions also covered ethical considerations such as data ownership and the equitable distribution of benefits, providing participants with a deep understanding of the complexities involved in implementing AI in educational settings. Those in attendance gained valuable insights, expanded their professional networks, and contributed to the future direction of AI learning environments, affirming the workshop’s role as a stepping stone towards inclusive educational practices.

The workshop adopted the user-centred methodology “Design Thinking” to drive the main data collection and collaboration activity. It is a widely applied methodology for solving complex problems and navigating uncertain environments that involves a series of iterative steps that encourage empathy with users, creative and critical thinking, and rapid prototyping to test solutions. During the workshop participants engaged with a series of questions that addressed experiences, challenges, and solutions, reflecting the

three main stages of the method, empathise, define, and ideate, respectively. The session concluded with a final networking activity, designed to lay the groundwork for a forthcoming prototyping phase.

A range of thought-provoking questions were disseminated to 5 groups (3 in person and 2 online) involving approximately 50(?) participants. The questions were crafted to span three critical areas of focus: *Empathize*, for gaining an empathetic understanding of their experiences and challenges, *Define*, for scoping and understating the core problem and *Ideate*, for brainstorming and exploring possible solutions. Moreover, the questions were tailored to elicit insights specific to the three principal categories of stakeholders involved: Educators, Researchers, and Educational Technology Companies. Participants, regardless of their actual affiliation, were invited to adopt the perspective of one of these stakeholder types. This imaginative exercise was designed to enrich the discussion by encouraging participants to explore and articulate viewpoints from positions they might not naturally inhabit.

2. Participant Responses

2.1 Researchers

Two separate groups, an online and in-person, were engaged in the workshop, addressing questions that elucidated the viewpoints of researcher. The questions focused on the topics of “Potentials and Limitations of Artificial Intelligence (AI)” and “Collaboration with Different Stakeholders” each exploring viewpoints from participant’s experiences, challenges, and potential solutions. In total the two groups addressed six separate questions as seen in Appendix 1.

Researchers engaged in discussions on the "Potentials and Limitations of Artificial Intelligence (AI)" identified significant challenges that impede the widespread adoption of AI technologies in the educational sector. A primary concern is the challenge of over-generalization, where AI tools are designed with a one-size-fits-all approach that fails to accommodate the diversity of educational contexts and individual learner needs. This lack of customization can render AI tools less effective and hinder their acceptance among educators and learners. Additionally, there is a notable lack of understanding and explainability associated with AI systems. The often complex and opaque nature of AI algorithms can lead to skepticism and mistrust among educators, who may be reluctant to adopt technologies they do not fully comprehend or cannot explain to their students. To overcome these challenges, participants suggested a more nuanced development of AI technologies that prioritise adaptability to various educational environments and a stronger focus on creating transparent, explainable AI systems. This could involve the collaboration of AI developers with educators and pedagogical experts to ensure that AI tools are both understandable and tailored to the specific requirements of different educational settings, thereby increasing their efficacy and facilitating broader adoption.

Focusing on solutions in connection to the potentials and limitations of Artificial Intelligence (AI) in education, the participants have highlighted the need for specific

insights into the design constraints and requirements for AI-powered solutions, particularly for writing skills development and inclusive education. A critical aspect emphasised the exploration of non-generalization techniques in AI development. These techniques would allow AI solutions to move away from one-size-fits-all models and instead adapt to the individual learning styles, abilities, and needs of each student. By prioritising personalisation, AI tools could more effectively support a diverse range of students, including those with special educational needs. Furthermore, researchers stressed the importance of enhancing the public understanding of AI. They believe that demystifying AI and increasing transparency around how AI tools function and are applied within educational settings can lead to greater trust and a willingness to integrate these technologies into teaching and learning processes. Through educational outreach and clear communication, stakeholders can better grasp the benefits and limitations of AI, leading to more informed and supportive attitudes toward the adoption of AI in education.

In response to the questions about “Collaboration with Different Stakeholders”, participants highlighted the increasing pressure on collaboration among researchers to foster innovative solutions and methodologies in text analytics for education. Such collaborative efforts are deemed essential in navigating the complexities of integrating AI technologies into educational practices. Moreover, the participants brought attention to the significant challenges posed by terminology and communication barriers. These barriers not only hinder the effective dissemination of research findings but also complicate the engagement with diverse stakeholders. Therefore, to ensure that research outcomes are both relevant and practically applicable to real-world educational settings, it is crucial to address these communication challenges, promoting a clearer understanding and exchange of knowledge among educators, technologists, and researchers alike.

The participants emphasised the critical need for identifying effective approaches that educational leaders can utilise to seamlessly integrate AI technologies into the curriculum that can help to overcome challenges in developing and adopting text analytics tools for education. Such strategies are pivotal not only in fostering the acceptance and utilisation of text analytics tools among educators and students but also in ensuring these tools effectively meet educational objectives and enhance learning outcomes. It was also noted the need to advocate for a collaborative effort among stakeholders, including educators, policymakers, technology developers, and academic researchers, to jointly advance this area of research and practice. Through such collaboration, the integration of text analytics tools in education can be optimised, making these technologies more accessible and impactful in enriching the learning experience.

To forge ahead in overcoming the barriers to developing and adopting text analytics tools in education, workshop participants outlined a visionary approach centred around the establishment of collaborative research networks or consortia. This strategy hinges on three pivotal solutions: Firstly, it emphasises training leaders in pedagogy, ensuring those at the helm of educational institutions and initiatives are well-versed in integrating technology with teaching methodologies. Secondly, the approach calls for providing

transparent insights into educational technology (EdTech), advocating for openness and clarity about the capabilities, limitations, and impacts of EdTech tools to foster informed decision-making across the board. Lastly, it recognises the critical need to address diversity in classrooms, ensuring that text analytics tools are designed and deployed in a manner that caters to the varied needs, backgrounds, and learning styles of students. The participants concluded that by bringing together a diverse group of stakeholders, including researchers, educators, EdTech companies, and policymakers, we could potentially enhance the efficacy and inclusivity of educational practices through text analytics.

2.2 Educators

Similarly to researchers, two separate groups, an online and in-person, were engaged in the workshop, addressing questions that elucidated the viewpoints of educators. The questions focused on the topics of “Potentials and Limitations of Artificial Intelligence (AI)” and “Collaboration with Different Stakeholders” each exploring viewpoints from participant’s experiences, challenges, and potential solutions. In total the two groups addressed six separate questions as seen in Appendix 1.

In response to the potential and limitations of AI in education, the educator groups have emphasised the importance of personalised learning adaptations in their teaching methods to meet the diverse needs of students, ensuring that each student receives support that is suited to their individual learning style, abilities, and challenges. The participants argued that personalised learning is especially crucial for students with special needs, as it allows for accommodations and modifications that can significantly enhance their learning experience. In terms of developing writing skills, personalized feedback and instruction play a pivotal role in fostering growth and improvement. The groups expressed optimism about the potential of AI technologies to enhance these efforts, envisioning AI as a powerful tool that could provide more nuanced and scalable personalised learning experiences whilst empowering students with special needs or those working to develop specific skills such as writing.

In the discussion on the challenges faced by educators in meeting the needs of students with special needs and fostering the development of writing skills, two key issues were prominently highlighted. Firstly, the limitation of resources stands out as a significant concern. Teachers often find themselves grappling with a scarcity of tailored materials and support systems that can cater to the wide spectrum of individual requirements presented by students with special needs. This shortage is a substantial hurdle in providing personalized educational experiences that such students require. Secondly, a critical mismatch was identified between the prevailing evaluation methods and the actual skills and abilities of students, particularly in the context of writing. Standardised assessments may not adequately reflect the diverse competencies of all students, especially those with unique learning challenges.

The potential of AI could address these issues and lead to the development of more personalised learning tools that adapt to the abilities and learning paces of each student, thereby addressing the resource gap. Additionally, AI-driven analytics could provide

alternative assessment methods that align more closely with individual student profiles, offering a more nuanced evaluation of their writing skills. The participants also noted that by leveraging AI, we could gain a more accurate understanding of each student's abilities, allowing them to tailor their teaching approaches and assessment techniques to better support the development of every student's writing skill.

Potential solutions should harness the technology and adopt creative strategies to account for individual strengths, weaknesses, cultural differences, and neurodiversity. A primary strategy involves utilising AI to not only correct grammatical errors but also provide constructive criticism tailored to each student's unique learning profile, thereby addressing their specific weaknesses, and reinforcing their strengths. Such bespoke feedback can be instrumental in fostering students' writing abilities more effectively. Furthermore, engaging students with AI-based resources could stimulate interest and facilitate learning. Such resources could include interactive writing platforms that adapt to diverse cultural contexts and learning styles, making writing instruction more inclusive and accessible.

In terms of collaboration with different stakeholders, the participants underscored the critical importance of having clear project goals when liaising with external partners to ensure that such partnerships are in lockstep with their instructional goals and priorities. Clarity in the intended outcomes and roles of each collaborator is fundamental to creating a cohesive alliance where each party's contributions are directed towards a common educational aim. Additionally, they highlighted the issue of 'soloing' or the tendency of individual entities to work in isolation within a collaborative project. To mitigate this, we should advocate for frequent and open communication, ensuring all partners are actively engaged and contributing to the collective effort. The effectiveness of these collaborations is evaluated by reviewing progress against the established goals and determining if the partnership is yielding the desired impact on educational objectives. Through monitoring and communication, we can ensure that collaborations are synergetic and productive, advancing instructional goals effectively.

In the discussions about establishing benchmarks for evaluating the effectiveness of text analytics tools in education, particularly concerning inclusion and diversity, participants emphasised the need to create useful evaluation criteria that accurately reflect the nuances of these areas. They suggested that these criteria should not only measure the immediate outcomes of tool usage but also cater for the long-term impact on promoting inclusivity and diversity in the learning environment. Furthermore, they stressed the importance of ensuring that feedback mechanisms are adaptive, allowing for ongoing input from a broad range of stakeholders. Feedback should be essential for iteratively refining text analytics tools and the collaborative processes surrounding their implementation, ensuring that the tools and strategies employed are continually optimised to meet the evolving student needs.

The participants recognised that effective solutions should involve students directly in the development and implementation of text analytics tools for education. By engaging students in the co-design process, educators can harness their unique insights and perspectives, which can lead to the creation of more effective and user-centred tools.

Such an inclusive approach ensures that the tools are not only tailored to the actual needs and preferences of the end-users (i.e. students), but also promote a sense of ownership and relevance among them. Additionally, encouraging students to take part in projects related to text analytics allows them to apply their knowledge in real-world scenarios, fostering a deeper understanding of the subject matter and a greater appreciation for the complexities of tool development.

2.3 Ed Tech Companies

A single in-person group engaged in the workshop, addressing questions that elucidated the viewpoints of Ed Tech Companies. The questions focused on the topic of “Potentials and Limitations of Artificial Intelligence (AI)”, exploring viewpoints from participant’s experiences, challenges, and potential solutions. In total the group addressed three separate questions as seen in Appendix 1.

In response to the potential and limitations of AI in education, the EdTech companies group shared valuable perspectives on educators' and researchers' concerns about addressing the fears related to cheating detection in educational settings. Participants agreed that the deployment of AI must be managed to uphold academic integrity while supporting learning. EdTech companies are actively working to develop sophisticated solutions that can differentiate between genuine student work and dishonest practices. Another priority identified is the necessity for user-friendly products that come with robust teacher support systems, ensuring that both educators and students can seamlessly adopt and utilise these technologies without steep learning curves or resistance due to complexity. Lastly, the participants recognised the essential need for enhancing data literacy among educators. By increasing educators' understanding of how to interpret and use data effectively. EdTech companies are developing and refining a range of AI-driven tools and platforms that are not only designed to be intuitive and supportive but also equip educators with the insights needed to harness data for improved educational practices.

In reflecting on the specific needs and priorities of educators and researchers in the realms of inclusive education and writing skills development, participants acknowledged that existing solutions and products do not fully address certain aspects. A notable gap is the lack of skills among educators for creating effective prompts that stimulate student thinking and writing. Prompt creation is a nuanced art that requires an understanding of student abilities and interests, and many educators feel ill-equipped in this area without additional support. The companies are aware of these challenges and are striving to develop more sophisticated tools and resources that can empower educators to craft engaging prompts and cater to a variety of learning modalities, ensuring that every student has the opportunity to succeed.

In contemplating the design of AI-powered tools and platforms that cater to students with special needs, participants suggested an innovative concept: the introduction of Digital Buddies. These AI-driven companions could provide personalized support for students, offering assistance tailored to individual learning preferences and needs. Digital Buddies can act as virtual tutors that guide students through writing exercises,

provide real-time feedback, and help to develop writing skills in a manner that aligns with each student's unique learning profile. Such AI companions could be programmed to understand and adapt to a student's preferred pace of learning, areas of difficulty, and even personal interests, thereby creating a supportive and engaging learning environment. By integrating the Digital Buddy system into educational platforms, EdTech companies aim to empower students with special needs to become more confident and autonomous writers, ensuring that technology enhances their learning experience in a meaningful way.

3. Conclusions

During the workshop, researchers, educators, and EdTech companies discussed how to tackle the multifaceted challenges and opportunities presented by AI in writing skills and literacy with particular focus on special needs education. From point of view of researchers, AI tools need to be flexible, understandable, and specifically designed to meet the diverse requirements of individual learners. Participants pointed towards a future where AI in education is developed through closer collaboration with pedagogical experts, ensuring tools are both effective and accessible for all types of learners. This discussion highlighted a broader call for AI solutions that prioritise adaptability and transparency, laying the foundations for more widespread acceptance and application of AI in educational settings.

Viewpoints of Educators and EdTech companies, on the other hand, highlighted the practical implications and applications of AI technologies in classrooms. Participants expressed an the need for AI to facilitate personalised learning pathways, particularly for students with special needs, identifying a gap in resources and appropriate assessment methodologies that currently hinders personalised education. They envisage AI as a pivotal element in bridging these gaps, offering scalable and nuanced feedback mechanisms to aid in the development of writing skills. EdTech viewpoints highlighted the need for innovation, presenting solutions like Digital Buddies to provide bespoke support for students, enhancing engagement and learning outcomes. Focus should be directed towards creating user-friendly, supportive technologies that align with educators' goals for academic integrity, reflecting a proactive approach for addressing the demands of modern education. Together, these discussions at the workshop not only highlighted the challenges at the intersection of AI and education but also signified a hopeful and actionable pathway putting emphasis on collaboration, innovation, and commitment to inclusivity and personalisation in learning.

4. Appendix

Researchers

Topic: Potentials and Limitations of Artificial Intelligence (AI)

Your Experiences

What are the main challenges or barriers hindering the widespread adoption of AI technologies in education, and how might these challenges be overcome?

- Challenges of over-generalization of AI.
- Lack of understanding and explainability of AI.

Your Challenges

What design constraints or requirements should be considered in the development of AI-powered solutions for writing skills development and inclusive education?

Your Solutions

How might we leverage the data insights generated by AI-powered text analytics tools to inform instructional decision-making and pedagogical interventions, ultimately improving the quality and effectiveness of writing instruction for all students?

- Exploring non-generalization techniques.
- Enhancing public understanding of AI.

Topic: Collaboration with Different Stakeholders

Your Experiences

What methodologies or approaches do you use in your research on text analytics for education, and how do you ensure that your findings are relevant and applicable to real-world educational settings?

- Rapid research needed for edtech.
- Pressure on collaboration with researchers.
- Terminology/communication challenges.

Your Challenges

What specific resources or support do researchers believe are necessary to address the identified challenges and barriers in the development and adoption of text analytics tools for education, and how can stakeholders collaborate to advance this area of research and practice?

- Identifying useful approaches for leaders.
- Addressing gaps in curriculum.

Your Solutions

How might we establish collaborative research networks or consortia that bring together researchers, educators, EdTech companies, policymakers, and other stakeholders to collectively address the identified challenges and barriers in the development and adoption of text analytics tools for education?

- Training leaders in pedagogy.
- Providing transparent insights into edtech.

- Addressing diversity in classrooms.

Educators

Topic: Potentials and Limitations of Artificial Intelligence (AI)

Your Experiences

How do you currently address the needs of students with special needs/ foster and assess the development of students writing skills in your teaching methods, and do you see the potential for AI technologies to enhance these efforts?

- Personalized learning adaptations

Your Challenges

What are the key challenges or main points teachers face in addressing the needs of students with special needs and fostering the development of writing skills? How can AI be leveraged to address these issues?

- Limited resources for diverse student needs.
- Mismatch between evaluation methods and student skills.

Your Solutions

What creative strategies or approaches can we explore to personalise the use of AI in writing instruction, taking into account the individual strengths, weaknesses, cultural differences, and neurodiversity of students?

- Utilizing AI for individualized feedback.
- Engaging students with AI-based resources.

Topic: Collaboration with Different Stakeholders

Your Experiences

How do you ensure that collaboration with external partners aligns with your instructional goals and priorities, and how do you evaluate the effectiveness of these collaborations?

- Importance of clear project goals.
- Avoiding soloing in collaboration.

Your Challenges

How might we establish criteria or benchmarks for evaluating the effectiveness of text analytics tools in promoting inclusion and diversity in education, and how can feedback mechanisms be incorporated to inform future collaboration efforts?

- Establishing useful evaluation criteria.
- Ensuring adaptive feedback.

Your Solutions

What opportunities exist for educators to engage students as co-designers and co-researchers in the development and implementation of text analytics tools for education?

- Engaging students as co-designers.
- Encouraging student project involvement.