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ARTIFICIAL INTELLIGENCE IN TERTIARY EDUCATION:
LEARNING REVOLUTION OR ROOM FOR IMPROVEMENT?

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INTRODUCTION

In the constantly changing landscape of vocational education, the challenging interplay between human learning and artificial intelligence (AI) is reshaping the foundations of how knowledge and skills are acquired. Our collaborative exploration examines the complex relationship between AI and learning in vocational environments. As educators, we have observed the powerful changes taking place in both traditional classroom settings and the increasingly common blended learning models. These shifts have introduced new methods of engagement, expanded access to a wealth of resources, and reshaped how teaching and learning occur. The integration of technology has brought fresh possibilities for creativity and flexibility in teaching and learning, while also encouraging us to rethink traditional approaches. However, these changes also require a careful balance to ensure that learners remain actively involved and connected in meaningful ways as they navigate this changing environment.

In this article, we explore AI's impact on vocational education, considering its impact on learners, while recognising the challenges it brings. To provide real-world insights, one of the authors conducted a survey at Otago Polytechnic (ethics approval number 1009), focusing on neurodiverse learners ($n = 46$) and AI. The survey aimed to explore learners' beliefs, apprehensions, and expectations regarding AI in their learning processes. The results revealed a significant reliance on AI tools for various tasks, including writing, editing, research, and the generation of ideas. Neurodiverse learners reported that AI customisation played a crucial role in addressing their unique needs, with tools being used to improve their academic performance.

These findings provide a foundation for examining AI in vocational education, ensuring that our analysis remains relevant and reflects current learner experiences. As educators, we have observed changes taking place in learning environments. While AI promises to revolutionise the learning experience by offering personalisation, adaptability, and efficiency, it also raises concerns about potential drawbacks such as overdependence, loss of critical thinking skills, and the risk of biased algorithms.

Our focus remains on how AI can continue to develop autonomy, relatedness, and independence, as outlined in Deci and Ryan's (1985, 2008) motivational theory, while maintaining human engagement. These principles underscore the importance of allowing learners to have control over their learning process, fostering connections and collaboration within learning environments, and promoting a sense of self-directedness and empowerment. As we navigate the integration of AI into vocational education, we must ensure that these fundamental elements of motivation and engagement are upheld, facilitating meaningful and fulfilling learning experiences for all individuals involved.

SURVEY

To position our analysis in today's environment, one of the authors of this paper conducted a survey, seeking the perspectives of learners to understand better their beliefs, apprehensions, and expectations regarding AI in the learning process. The synthesis of this survey data provided a valuable foundation for our examination of the relationship between neurodiverse learners and AI. This feedback helped us to shed light on the current situation, offering practical insights and recommendations to ensure that AI is employed in a manner that aligns with the growing needs and aspirations of learners in their ongoing learning as well as prepare them for the workplace of the future.

To gather genuine feedback from learners using AI, the researcher chose to delve into the experiences of neurodiverse learners to find out:

- How AI tools such as Google, Chat GPT, Claude, QuillBot, Gemini, Gencraft, and Dall-E can all support writing and editing tasks.
- The role of AI in research and idea creation.
- The potential benefits of AI personalised for learning.

Feedback from the survey learners reported that the usage of AI tools was beneficial as it assisted them in discovering new information sources, brainstorming ideas, and improving writing skills through personalised feedback for various purposes:

"[It] helped me by showing me different ways to achieve my desired outcome."

"AI could help me to correct my grammar mistakes, and it gives so many new words with the same meaning but different words."

"Even though AI showed me new information, I learned from that and have expanded my own vocabulary."

Learners reported that they used AI to improve the shape of their thoughts, ideas and content, helping them fast-track their work. Examples include:

"Being confident in handing in what I have written."

"It used to take me hours of looking to find what I needed, but now I can ask for starting points, and 9 times out of 10, I can get the work done faster."

Writing and editing

The results indicate that neurodivergent learners often turn to AI tools for writing and editing assistance, utilising them to refine their content and enhance overall writing quality. Learners can talk to the AI, which will appreciate their voice commands or convert spoken words into written text. These ideas can be helpful for learners who have difficulty processing what they hear. AI can point out mistakes and show them how to fix them instantly. This immediate feedback is helpful for learners who need extra support and guidance. AI can also give them personalised tips or suggestions based on their requirements, creating a friendly and supportive learning environment (Mollick & Mollick, 2022).

Research and idea creation

The survey revealed a significant reliance on AI for research, idea creation, and the process of forming a concept or idea, showcasing the flexibility of these tools in supporting neurodiverse learners throughout various stages of their academic projects. Tools such as Grammarly and ChatGPT assist with generating ideas, refining writing quality, and directing assignment hurdles. For example:

“It helps me to think of ways to structure work, new ideas, and different things to add or to use different words.”

“Quillbot’s rephrasing tool helps me see my writing from different angles. It’s like having a second pair of eyes to improve clarity and style from draft to final version.”

Personalised learning

Learning experiences can be personalised by using data to tailor content and feedback to individual learning patterns and knowledge (Boyd et al., 2018). AI tools provide individualised learning support for neurodivergent learners. Users appreciate the flexibility of these tools in addressing their unique needs, emphasising the positive impact AI has on their learning.

Balancing support and independence

The survey revealed the role of AI in the lives of neurodivergent learners, underlining its significance in various tasks such as support for writing and research. While many learners acknowledged the invaluable support provided by AI tools in enabling their academic progress, significant concerns were raised regarding its potential drawbacks.

Among the insights gathered from the survey, some learners expressed concerns about the overreliance on AI, noting its tendency to weaken opportunities for human discussion and connection. Several learners highlighted the importance of engaging in debates and discussions with peers, expressing a desire for more opportunities to interact directly with fellow learners and their educators. This underscores the need for a balanced approach that harnesses AI’s benefits while maintaining opportunities for interpersonal engagement and collaborative learning experiences. Participants also stressed the importance of preserving their own autonomy and ability to deeply and critically think, cautioning against excessive dependence on AI-driven solutions that may restrict individual agency and creativity.

Overall, the survey findings underscore the importance of balancing AI support and fostering independence among neurodiverse learners. By recognising and addressing both the strengths and limitations of AI tools, educators can create inclusive learning environments that empower neurodivergent individuals to thrive academically while also cultivating their autonomy and critical thinking abilities. The findings highlight that neurodivergent learners often turn to AI tools for writing and editing assistance, showcasing their reliance on these technological aids to refine content and improve overall writing quality. The survey underscores the substantial role of AI, demonstrating its flexibility across various stages of academic learning. The adaptability of AI tools in addressing the unique needs of neurodiverse learners is acknowledged, with users expressing appreciation for the positive impact AI has on their academic education.

EXPLORING THE MANY POSSIBILITIES OFFERED BY AI

Personalised learning

AI can adapt teaching and learning programmes to individual strengths and weaknesses, ensuring a more effective learning experience. For example, educators can use data analysis to personalise learning programmes, catering to each learner's unique needs. This involves analysing a learner's performance (through quizzes and assignments, for example) and behaviour (for example, time spent on topics or preferred materials) to identify strengths and weaknesses. These insights allow educators to tailor learning materials (such as articles and tutorials) and activities to target specific areas. This ensures focused skill development as learners receive materials matching their learning styles and difficulty levels adjusted to keep them challenged. Recognising that learners have diverse learning styles and needs, educators can guide them in becoming self-advocates. This means learners will learn to identify their own strengths and weaknesses and collaborate in groups to share their preferred learning processes. Through these interactions, learners can support each other's understanding while also considering the needs of others in group activities. Ultimately, this empowers learners to advocate for their preferred communication styles and processing methods, ensuring success in achieving the desired learning outcomes (Jesse, 2023).

One of the authors of this paper incorporates AI technology in her classroom to accommodate the diverse learning styles of her learners, including those who face challenges such as ADHD and dyslexia. They all receive tailored materials and activities that match their learning styles and challenge levels. The author uses AI platforms to assess individual needs and adapt content as needed, ensuring each learner receives a personalised learning experience, adapting course material and finding practical activities to do in class. Neurodiverse learners may experience information overload, struggle focusing, or difficulty processing information. In class, the author undertakes regular check-ins, provides real-time feedback, and uses AI tools to help track progress and adjust tasks in response to learners' performance. AI-powered tutors can customise learning materials and pace, reducing overload and catering to individual learning styles (Castaño-Calle et al., 2022).

Real-time feedback

AI provides immediate feedback on performance, allowing for quicker learning and skill development. Unlike traditional methods with delayed feedback, AI highlights errors or inefficiencies instantly, allowing learners to adjust their approach immediately, preventing bad habits and reinforcing the correct techniques. This quick feedback loop promotes continuous improvement and mastery. Learners crave quick feedback and rapid turnaround times in today's fast-paced learning environment. This allows them to identify areas for improvement while the information is still fresh. Tools such as ChatGPT can instantly bridge this gap by providing personalised feedback on assignments and exams. This creates a learning cycle where learners can adjust their approach and improve their work, based on the feedback received (Atlas, 2023). Grammarly is an AI-driven writing assistant that provides immediate spelling, grammar, and writing style feedback. As learners write, Grammarly highlights errors and offers suggestions to improve clarity, tone, and readability in real time. This instant feedback helps learners refine their writing skills by improving sentence structure and vocabulary. Beyond basic corrections, Grammarly offers insights into writing style and tone, promoting continuous improvement and making it an important tool for learners aiming to develop their writing abilities. Claude, developed by Anthropic, is an advanced AI assistant that provides detailed feedback. It offers immediate, comprehensive feedback on essays, research proposals, and problem-solving tasks tailored to the learner's level. Claude excels in analysing arguments, suggesting improvements, and fostering critical thinking through constructive feedback. It also adapts its communication style to meet the learner's expertise, making it a valuable tool for deeper learning and academic growth.

Learners receive ongoing insights into their performance, motivating them to keep practising and refining their skills. One of the authors of this paper works with her learners to understand the benefits of AI tools, motivating them to learn from AI and refine their skills continuously. She believes that AI-powered tools like chatbots and virtual assistants offer 24/7 support and information, making learning more accessible. These tools break down barriers by providing constant support and access to resources, empowering learners to fit studies into their busy lives. She incorporates AI-powered chatbots and virtual assistants into their classrooms, ensuring that learners have continuous access to support and resources.

The authors have devised a range of ideas to encourage colleagues and learners to engage actively in self-reflection, problem-solving, and independent analysis. They propose the following:

Learning activities should go beyond AI-provided answers. Design exercises that require learners to analyse information, identify the causes of problems, and develop their own solutions. This encourages independent thinking and problem-solving rather than simply following pre-determined solutions. The aim is to simplify AI's impact on learning while acknowledging its need for improvement. Learning should involve active thinking, not just receiving AI answers. Ker (2017) emphasises the importance of deep reflection for learners to take charge of their learning journey. Instead of depending solely on AI, learners are encouraged to engage in profound and critical reflection on their own life and work experiences, using real-life problems and approaches to solving them. This approach not only enhances their understanding and mastery of subjects but also empowers them to actively shape their future trajectory. By promoting reflective practice over reliance on AI, learners can cultivate critical thinking skills and self-directed growth, drawing insights from past experiences to make informed decisions and drive positive change for the future.

Strategically delay feedback in specific situations. While AI's immediate feedback loop offers benefits, consider delaying it for certain tasks to allow the learners to deal with challenges and attempt solutions independently. Giving one learner we work with, for example, space to process information and sort through problems independently makes her learning more effective and stronger. However, once she has had this time to reflect, AI's prompt feedback can be incredibly helpful in refining her understanding and identifying areas for improvement. This creates a powerful balance between independent learning and targeted guidance.

Shift the focus from “what” to “why.” Do not rely solely on AI error-flagging. Encourage learners to ask why something is wrong and explore the underlying principles involved. This deeper understanding encourages critical thinking skills that go beyond simply identifying errors.

Promote open-ended discussions and collaboration. Assist group work and discussions both in class and online where learners can debate approaches, challenge assumptions, and defend their reasoning. This collaborative environment promotes critical thinking and problem-solving through an exchange of ideas and perspectives.

Introduce scenarios with limited AI support. Present learners with problems where AI support is unavailable or limited. For example, give learners a case study or real-world problem to solve without access to AI tools, such as requiring them to manually analyse data, draft reports, or create problem-solving strategies. This forces them to rely on their own critical thinking skills to analyse situations, identify solutions, and navigate challenges independently.

ADDRESSING LINGERING CONCERNS

Overreliance on AI in educational settings may diminish analytical thinking and the ability to tackle complex challenges, both of which are essential across many professions. While AI offers significant advantages, depending on it too much can impede learners' growth in logical reasoning. Instant access to solutions might lead to passivity, depriving learners of opportunities to fully engage with the material. To address this, the authors suggest that

educators design activities that encourage active participation, self-reflection, and thoughtful analysis. These exercises challenge learners to interpret information and devise their own solutions, fostering deeper thinking and intellectual growth.

Another significant challenge is the risk of bias in AI algorithms, which can create unequal learning opportunities. AI systems can inadvertently recommend different learning paths based on biased training data, potentially disadvantaging learners based on factors like gender or race (Bozkurt, 2023; Mollick & Mollick, 2023). To reduce this risk, training data should be diverse and representative, and algorithms must be regularly monitored for fairness. This oversight can be handled internally or by external experts. Careful management of these factors ensures that AI tools foster equitable learning experiences.

While AI can offer personalised learning and feedback, human interaction remains a crucial component of education, particularly in fostering creativity, innovation, and critical thinking. Human educators provide mentorship, individual guidance and support, which are aspects AI cannot replicate. A balanced approach – using AI for feedback while maintaining strong human oversight – ensures a comprehensive and constant learning experience. Research shows that creativity thrives on human interaction and collaboration, offering insights AI systems currently cannot match (Atlas, 2023; Boyd et al., 2018) For example, in a marketing team, AI might contribute data and analysis, but the human exchange of ideas often leads to breakthrough innovations. Human guidance creates an environment where learners are encouraged to experiment, challenge assumptions, and think creatively, skills that are critical for future success.

The authors say: “Take your time with practical learning! In-class discussions and online analysis of real-world problems build critical thinking, communication, and social intelligence – all essential for navigating the complexities of work.”

CONCLUSION

The integration of AI in vocational education offers many possibilities for personalised learning and efficient feedback. However, educators must carefully guide learners, helping them recognise both the benefits and the limitations of AI. As highlighted in van Gorp’s (2022) master’s thesis, which focused on neurodiversity in vocational education, it is crucial to ensure that AI tools are used to support diverse learners without undermining their ability to think critically or independently. Her research underscores the value of tailored approaches that address individual learning needs while preserving the autonomy of learners.

Educators must emphasise the importance of fostering analytical thinking and self-generated ideas, encouraging learners to use AI as a complement to, rather than a replacement for, their investigative and creative processes. By providing an overview of various AI tools available, educators can empower learners to select the tools that best meet their needs while ensuring the focus remains on developing their own thoughts and work first. This approach, grounded in van Gorp’s (2022) insights, ensures that AI is used to develop the learning experience without restricting personal development or critical thinking.

Rachel van Gorp is an accomplished Principal Lecturer with a wide-ranging background, including experience in banking, personal training, massage therapy, business ownership, mentorship, and volunteering. As a member of the Otago Polytechnic School of Business, Rachel brings a wealth of knowledge and expertise to her undergraduate teaching programmes. Rachel is a dedicated advocate for neurodiverse individuals in vocational education and serves as the chair of the Neurodiversity Community of Practice. She is committed to promoting inclusion and equal opportunities for individuals with diverse learning abilities. Her recent Master of Professional Practice reflects her focus on the essential topic of “Neurodiversity in Vocational Education: Facilitating Success.” With her unique combination of experience, Rachel is able to bring a practical perspective to her teaching, engaging learners in real-world scenarios and helping them to develop the skills they need to succeed in their future careers. Her dedication to the field of vocational education has made her a highly respected member of the academic community, and her commitment to promoting neurodiversity is making a significant impact on the lives of her learners and the wider community.

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