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Using Generative AI to Support Inclusion: Insights from a Psychological Perspective

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ABSTRACT

This article considers the insights of viewing (Artificial Intelligence) AI personalization from a psychological perspective by offering detailed consideration of the psychological constraints, both cognitive and socio-emotional, to the current and future application of personalized AI solutions in higher educational settings. It maps the relationship between AI personalized solutions and psychological substrates to illustrate how and why AI is an effective way to promote inclusion. Consideration of psychological infrastructure and the skills that support effective learning highlights the importance of individual differences and reminds us that diversity is present in all students, not only those with disabilities. Learner profiles are variable, and the application of a psychological lens provides a way to conceptualise and operationalise this variability by utilising the concept of psychological barriers and enablers. Psychological attributes such as working memory, executive function, metacognition, self-esteem and motivation can influence learning in a positive or negative manner depending on the degree to which they are present; for example, low working memory capacity is a barrier, but high capacity is an enabler. This variability allows them to be targeted and developed. Human intelligence, unlike artificial intelligence, is psychologically constrained, so AI personalisation must be psychologically informed to maximise its educational and inclusive potential.

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Highlights:

- The Importance of cognitive and socio-emotional skills in learning.
- Identifies psychological barriers and enablers to learning using AI.
- Raises awareness of individual differences in all learners.
- AI personalisation must be psychologically informed to maximise its educational and inclusive potential.

Keywords: Psychology; Personalisation; AI; Inclusion

1. AI and Higher Education

Artificial intelligence (AI) is becoming increasingly pervasive in all aspects of daily life, and education is no exception. The increasing reach and sophistication of AI is often viewed with a mix of excitement and trepidation. The use of AI in education is highly divisive with much concern being voiced around the negative impact of ChatGPT in terms of integrity, deception and plagiarism[1,2]. However, AI can have a positive impact on students learning and achievement; AI based study aids have immense potential to provide personalised study support and promote the inclusion and attainment of students with disabilities[3].

Despite the commitment to educational inclusion, many barriers remain for neurodivergent and disabled students. For example, in a recent survey of higher education students in the UK 66% of students with a disability reported that their needs were not fully met, despite their being a legal obligation to do so[4]. A key challenge to meeting needs is the resource intensive nature of individual adjustments and the burden it places on staff and the difficulties encountered by students in using specific assistive technology[5]. AI offers immense opportunities; it can support inclusion as we currently know it, in terms of reasonable adjustments, it offers dynamic multilevel personalisation: (1) personalisation based on the psychological profile and preferences of the learner; (2) personalisation based on their learning environment- course and assessment type, and (3) personalised support for situated and collaborative learning as it adapts over time to meet the evolving needs of the learner and their assessments[6].

2. Viewing Personlisation through a Psychological Lens

If AI is to maximise its potential to deliver fully individualised content, then it needs to be informed by a psychological perspective. Psychological theory and research have an established history of informing educational theory and practice in both traditional and online contexts for students with and without disabilities[7,8]. Viewing the benefits of AI-based personalisation through a psychological lens sharply focuses attention on the importance of understanding individual differences in the psychological profile of the learner in context and is in keeping with social models of disability[9]. Successful learning is a complex process involving cognitive and socio-emotional activities such as memory, attention, executive function, metacognition, motivation and self-esteem. Effective learning, especially reflective, critical and creative thinking often occurs in a collaborative and interactive manner. AI is changing the educational infrastructure, so it is essential that students have the appropriate psychological infrastructure and skill set to enable them to engage successfully with this new learning ecosystem[7,10].

To illustrate why it is essential to take a psychological perspective, we consider the different levels of personalisation AI offers and the psychological structures and processes involved. We begin by considering personalisation based on the psychological profile and preferences of the learner as it underpins personalisation at all levels across all contexts. Students, particularly those with disabilities often struggle to process information due to cognitive constraints and social-emotional constraints may limit willingness to share ideas and opinions, and acceptance of feedback and challenge[6].

Cognitive load[11] is widely recognised as a factor influencing learning and is particularly problematic for students with attentional, memory and specific reading difficulties. Multi-modal AI offers ways to reduce both extrinsic and intrinsic cognitive load by personalisation of the format of information medium (visual or verbal) for content and assessment. AI generated summaries of lectures and recommended reading highlighting key points supports the pacing of educa-

tion content to assist understanding, planning and scaffolding. Scaffolding is beneficial in personalising affective aspects of learning as targeted scaffolding of positive feedback for students with poor self-esteem, low self-efficacy and reduced motivation not only supports learning and critical thinking but also promotes engagement and emotional well-being [6]. It has been practically demonstrated that the application of personalised AI tutoring in this way has positive outcomes on motivation for learners [12].

Beyond cognitive aspects, affective and self-regulatory processes also play a crucial role in personalized learning, namely meta-cognitive awareness (what we know about our academic strengths and weakness) and self-regulation (the strategies and processes used to organise thinking) are key determinants of learning as they allow awareness and planning and enable recognition of difficulties e.g., difficulty understanding content or staying engaged. Identifying difficulties allows the delivery of AI personalised interventions.AI also offers personalisation based on the learning environment, in particular the course and assessment type. AI generated summary notes and tests help with knowledge acquisition and practice problems and critical questions enable learners to synthesize information and think critically. At a general level, AI offers real time personalised writing support in terms of spelling and grammar, removing the need for time consuming proof reading, while building writing skills and confidence.

There is a tendency to think about personalisation at the individual level, however applying a psychological lens highlights that learning occurs in context and is socially constructed [13,14]. Interactive and collaborative learning is key to the development of higher order critical analysis and synthesis. Therefore, it is essential to situate the learner and examine how their unique psychological profile influences their ability to engage and achieve in collaborative learning contexts. AI personalisation can support this process. For example, the generation of a discussion structure and personalised feedback may facilitate participation in group discussions and group-based work [14] by targeting cognitive aspects of the learner profile such as memory, executive function and metacognition, whilst also supporting self-esteem self-efficacy and motivation to build learner confidence and promote increased participation. Knowledge, understanding and skills evolve over time, and the nature of AI personalisation can also adapt to ensure that target personalised support is delivered as and when required.

3. Psychological Barriers and Enablers

Having a nuanced understanding of the nature of psychological mechanisms reminds us to consider individual differences between and within groups to support inclusion. However, understanding the psychological infra-structure is necessary but not sufficient; it is also essential to understand skills, not only the skills for learning, but more specifically the skills necessary to learn using AI. Here too a psychological lens is informative. Conceptualising the psychological skill set in terms of barriers and enablers that inhibit or enable engagement across a range of e-learning contexts has been beneficial [13] and we propose that it is also a productive way to consider the skill-set required for AI personalisation for students and developers alike.

A psychological enabler is a psychological attribute either cognitive or socio- emotional that supports learning; psychological enablers are dynamic in nature and vary over time, task, level and context [10,14]. A psychological characteristic may act as a barrier or an enabler depending on their level. For example, low motivation, poor self-esteem and limited working memory capacity may be barriers to learning and achievement, whereas high motivation, self-esteem and working memory may function as enablers; metacognition and self-regulation are enablers when present, but barriers when absent. This variability allows them to be developed and targeted for personalisation. Further insight can be gained from psychologically based Technology Acceptance Models that explore students' attitudes and behavioural intentions to use AI to learn [15]

It is important to avoid the tendency to blindly adopt technology, not matter how appealing it may be. Having a nuanced understanding of the psychological constraints on learning can inform AI development. From a psychological perspective, AI is not risk free and concerns have been voiced about the detrimental impact on the educational process in general by disrupting knowledge acquisition and higher order critical thinking and problem-solving skills via cognitive offloading and the acceptance of erroneous and misleading information via the automation bias [16,17]. However, the benefits outweigh these risks, and raising awareness of possible

negative impacts allows them to be mitigated both by design and practice.

Even more sophisticated benefits are expected to be gained from the combination of continuous learning analytics and generative AI[18]. *C*ontinuous learning analytics track real time engagement with educational resources and provide a profile of user activity, preferences and attainment which can informs AI personalisation. Recent developments in assessing AI literacy such GenAI Literacy Assessment Test [GLAT] provides a measure of AI literacy better than self-ratings[19] and offer promise as they raise awareness of skills and abilities thereby supporting meta-cognition.

4. Conclusions

In this discussion, we have highlighted how learner-centred AI is changing the educational landscape and supporting inclusion by addressing learning needs. A truly learner-centred approach requires a psychological perspective to ensure that AI products have the psychological validity to meet the needs and skills of all students. Human intelligence, unlike artificial intelligence, is psychologically constrained, so AI personalisation must be informed by psychological frameworks to maximise its educational and inclusive potential. Future research should examine how psychological profiling can inform adaptive AI systems to optimize inclusion in higher education.

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