# Is AI good for agency?

Redaktør: Maria Hvid Stenalt, Aalborg University
Redaktør: Roland Hachmann, UC SYD

## Introduction

This special issue addresses pressing questions related to the interaction between education technology and agency and motivation: how are teacher and student agency and motivation affected by education technology, and how do technology and institutional decision-making and implementation take student and teacher agency and motivation into account? While this special issue comes at a moment with a lot of hype surrounding AI, it does not include studies on this subject. Thus, this editorial sets out to bring in some perspectives. First, however, we will offer a brief reflection on the research field.

Positioning agency and motivation as the focus of interest paves the way for various research perspectives. Zooming in on students' agency, authors might be interested in students' epistemic agency; enabling students themselves to pursue learning and advancement of understanding (Muukkonen et al., 2005), transformative agency; the orientation toward the future and not simply sticking to habits, but engaging with challenges in activity (Damşa, Crina et al., 2021) or the sense of professional agency in the professional community; typically referring to student teachers' abilities to facilitate the learning of others around them and their own learning (Toom et al., 2017).

Authors might also conceptualise agency and motivation within understandings of student-centred learning and student-centeredness. Indeed, analysis of student-centred learning reveals an association with student agency (Starkey, 2019), positioning students as the locus of power. As suggested by Neumann (2013), SCL comprises learning contexts that centre in students, on students and with students. This understanding encompasses the empowerment of students (Starkey, 2019) and, thus, aligns with understandings of agency as involving the capability to influence one's life. With Hannafin and Land (2000, p. 4) note that, '(p)erhaps no single factor has influenced the growth of interest in student-centred learning as the emergence of powerful, user-friendly computer tools and the concurrent growth of the Internet and World Wide Web', an interest in the interplay between digital technologies, agency and SCL is expected.

Despite the wide landscape of relevant and promising perspectives, the research into agency, motivation and educational technology is considered limited. Specifically, Marin et al. (2020) found that the educational technology research field falls in terms of conceptualisations of agency not being clear, and lacking definitions and operationalizations of the phenomenon. On the other hand, educational studies with a clear focus on agency have been found to background digital features and their impact on human perception and behaviour (Stenalt, 2021). These observations point to a need for more nuanced conceptualisations of the way agency, motivation and technology interact.

With the challenges of the research field in mind, we are happy to have amassed two research articles in this special issue. The article by Leth Rasmussen and peers explores how the use of Multiple-Choice systems and questions mirroring past exam questions influence 126 medical and 70 dental students' motivation and self-directed learning. The study demonstrates that students are motivated by the feedback offered in the systems. The study by Leistner and Hansen departs from a designed-based case

study. It explores the critical elements in a personalized learning environment (PLE) supporting students' development of metacognitive and self-regulative skills. Moreover, the study explores student's decision-making process. In this case, the study comprises eight postgraduate students in Germany and Denmark with various disciplinary backgrounds. In terms of self-regulated learning and its implications for the design of PLE, the authors conclude that further research is needed. Additionally, they conclude that the extent to which learners are self-directed and autonomous depends on their prior knowledge and skills. Although each study in the thematic section presents valuable contributions, the need for further research is evident to anyone with even a passing interest in the original question.

# AI and agency – some things to consider

To move forward, we set out to bring in some future perspectives on agency and AI, in which the latter rapidly integrates into education and society. We begin by outlining some mainstream expectations of AI.

Generative AI platforms such as ChatGPT, DALLE and Copilot are now prevalent topics of discussion across education forums. The platforms have already caused significant challenges to academic practices and thinking of education, thus, equipping teachers and students to use these platforms is a key concern. Great efforts have been invested in pinpointing the benefits of generative AI. Reviews of empirical studies originating in higher education on the use of AI have identified a broad range of benefits such as facilitating assessment, remote learning, supporting students' academic writing, enhancing peer communication, automating repetitive and time-consuming tasks, and predicting aspects of student learning (Crompton & Burke, 2023; Perera & Lankathilaka, 2023). These benefits push us towards an understanding of AI supporting student agency.

Of course, AI discussions extend far beyond the benefits of engaging with AI. Rather than striving to keep up with AI developments, researchers and scholars are keen to discuss the consequences of AI in broader terms. With the ability of AI systems to craft original texts and images based on prompts offered by users, students are now able to develop artefacts that are fully or partly created by technology. Recognising student artefacts as representations of student learning quality, the lack of ability to identify human use of AI, in particular for artefacts that can be distributed to others in space and time, has caused a significant stir in the education sector (Børne- og Undervisningsministeriet, 2024; Chiu et al., 2023; Lodge et al., 2023). Following this line of thinking, there is the concern that students will develop an overreliance on technology that might lead to shortcuts, surface learning and bullshit knowledge on the students' part (Rudolph et al., 2023). Thus, the long-term impacts of AI on cognitive development and critical thinking skills are a key concern. Another concern is students' motivation to learn and the extent to which their ability to learn complex matters will decrease with options to move fast forward. Relatedly, the ethical implications of AI use in education, such as issues of academic integrity and the fairness of AI-generated feedback, warrant some caution (Nguyen et al., 2023). Perhaps less obvious is the concern that students will be compelled to distrust typical sources of agency in academia, such as peers and teachers, leading to decreasing agency or even the erosion of collaborative learning (Tan et al., 2022). In the same vein, it might result in lower levels of relational agency (Edwards, 2005), geared towards enhancing collective expertise (Pappa et al., 2019) and, thus, negatively affecting a critical component of professional work. All told, these concerns point to the risk of AI undermining student agency (Yu, 2023).

The next section focuses on the ways in which AI is *actually* affecting student agency – departing from findings emerging from international research.

# AI-dependency

We need to think carefully about the extent to which the uses of AI in higher education led to AI dependency and decreased learning outcomes. Of course, research has started to explore this issue. Here, the study by Davishi and peers (2024) is particularly insightful. The study explores the influence of AI scaffolding and nudges on student agency. In this case, the agency is conceptualised as actively and responsibly shaping and controlling one's learning experience. In an experiment involving 1626 undergraduate students across 10 courses, all students received AI prompts during the first peer review period lasting 4 weeks. Following the first feedback period, students were divided into groups receiving different kinds of feedback during the next 4 weeks. One group received AI prompts, one group received no prompts, one group received self-monitoring checklists, and one group received AI prompts and had access to self-monitoring checklists. Student agency was operationalised through metrics that illuminated students' choices and their self-regulation abilities in the learning process (rate of flagged reviews, similarity score, relatedness score, length of comments, average time spent on writing comments, and rate of likes). The study identified that AI prompts helped maintain students' feedback quality, avoiding generic feedback. Self-monitoring was also found to maintain student performance. A combination of resources was not found to significantly affect student peer review behaviour. Yet, the study also found that when the AI assistance was removed, students struggled to provide feedback of the same quality, suggesting that students tend to rely on AI assistance without learning from it.

Jin et al. (2023) focused on students' perspectives on AI applications in supporting self-regulated learning (SRL) in online learning. 16 university students from various majors and with online learning experiences were interviewed in the study, which adopted a user experience design method (speed dating with storyboards) to allow students to engage with various AI applications without extensive AI knowledge and experience. Departing from a theoretical framework for SRL strategies, a total of 10 AI application scenarios were developed. The study found that students recognised AI applications as generally helpful in supporting metacognitive, cognitive, and behavioural regulation but not motivational regulation. Additionally, aspects of learner identity, learner activeness, and learner position were identified as critical. For example, participants depicted AI applications that did not match their individual characteristics (learner identity) as interfering and pressuring. Learner activeness ranged from AI dependence to learner agency. Most often, participants were concerned with developing a dependency on AI agents. Finally, the study identified two learner positions: The independent learner and the dependent learner – at the same time engaged in learning responsibly and subordinate to institutionalised requirements and evaluations. Each position influenced students' perception of AI applications differently. Independent learners took to AI applications as a means of individual learning. Dependent learners, however, focused on the relationship between AI applications and exams or grades. That is, how the information offered by the AI application supported tests and grades was the most important criterion for AI application use.

Yang and colleagues (2023) explored 47 postgraduate students' use of a specialised GenAI application and the role of student agency in shaping the learning experience. Similar to the other study, agency was conceptualized as active engagement and mastery over one's learning. A conceptual framework of agency by Damsa (2010) was adopted, focusing on students' knowledge and process-related actions. Students reported several advantages from the utilisation of GenAI in the initial phase of the course, in particular learning efficacy of the subject matter and enjoyment in the learning process. Following the progression of the course, students' satisfaction with GenAI declined, among others due to the application's superficial relation to the subject matter. In terms of student agency, four categories of student learning experiences were identified: resistive, receptive, resourceful, and reflective learning approaches. For the resistive learning approach, students expressed scepticism towards GenAI and rarely used the application. Students with a receptive learning approach were interested in the application but showed limited agentic power and did not question the content produced by GenAI. Students with a resourceful learning approach embraced the new technology and sought to refine the

outputs of GenAI towards more complex learning requirements. However, they showed less reflexivity in the process of application. Finally, a reflective learning approach was adopted by students engaging in a thought-provoking exploration process of GenAI, moving beyond students' immediate needs. In this case, GenAI was positioned as a learning facilitator controlled by students' agency.

While many seem to presume that uses of AI lead to learning or AI dependency, respectively, the studies illustrate that such presumptions offer a simplified representation of students and their learning. Instead, the studies indicate addressing vital questions of progression and approaches to AI and perceptions of learning to ensure a better understanding of the relationship between AI and meaningful learning and development. Investigating when AI is leveraged to foster deeper understanding and critical analysis rather than just providing surface-level solutions is essential.

## Is more agency better?

Another thing that we need to think carefully about is the relationship between agency and student learning. While many seem to presume that high degrees of agency link to quality student learning outcomes, empirical studies illustrate that this might not be the case. For example, Sawyer et al. (2017) explored student learning and three conditions of agency. Whereas *low agency* involved students completing prescribed activities in a fixed order, *high agency* was associated with freedom of choice. *No agency* included watching a video walkthrough of the learning environment. Although all conditions supported learning, conditions of low agency supported significantly higher learning gains. Seeking explanations, students in low agency conditions spend more time on the learning material. On the other hand, they exhibited more unproductive behaviours (scanning objects and guessing solutions) in the following phases with equal conditions for all students. The empirical findings chime with the study by Lou et al. (2019). Adopting a repeated-measures experimental design method, the study compared three levels of agency in a flipped course targeting undergraduate students. They identified agency conditions to impact academic performance significantly and perceived learning experience. In particular, low levels of student agency appeared to incite higher levels of performance and evaluations.

While high levels of agency have been depicted as purposeful design features in the pursuit of student learning, results from highlighted studies exploring varying agency conditions in digital contexts challenge such thinking. Yet, a strong argument can be made that we should be less surprised by the limited effect of initiative in which sources of agency are interpreted along the lines of *freedom from and absence of human guidance*. As noted elsewhere, human relations, particularly continuous student-teacher interaction, are critical for student agency and learning. For example, Moallem (2019, p. 116) noted that for problem-based learning to be successful: 'it is critical that when students encounter a challenging problem, the teacher or facilitator supports students in the form of scaffolding and guidance to enhance understanding of the concepts and to maintain student autonomy, interest, and self-determination in solving the problem.' Also, of interest here is the notion of agency as 'the capability to exercise choice in reference to preferences" (Winne, 2006, p. 8) – i.e. sources of agency depend on individual preferences. Thus, paying more attention to the actual sources of agency and counter-simplified versions of agency is critical.

## Discussing AI in terms of its influence on agency

At a base level, learning designers, teachers, and the education system must strike a balance between navigating technology and cultivating student agency. Exactly what AI platforms can do to support student agency needs to be critically assessed. Indeed, it seems unwise to be impressed by statements of digital technologies and features bestowed with agency. Rather, educaion researchers and practitioners are best advised to be critical of suggested relationships between student agency and AI.

The base-level discussion calls for closer attention to the ways AI technologies promote human agency. While we are beginning to see some legislation enforced (European Council, 2024) and recommendations and principles for policy (Nguyen et al., 2023; Nordic Innovation, 2024; OECD, 2019), it still falls to the education system and community to work out how to shape education that is respectful of teacher and student agency (Nøhr et al., 2023; Pischetola et al., 2024). We were beginning to see some suggestions prior to the AI hype. For example, Stenalt (2021) offered the *Digital Student Agency framework* comprising five domains crucial to identifying how agency is constructed in digital contexts of education, i.e. (1) agentic possibility, (2) digital self-representation, (3) data uses, (4) digital sociality, and (5) digital temporality. Brod et al. (2023) provided guiding principles for EdTech designs to take agency into account, suggesting paying attention to what is controlled (i.e. the appearance of an activity, progression of activities) and who exerts control (i.e. student has full control, the control is shared between student and EdTech). Emerging work focusing on steering and developing the relationship between AI and human agency appears to continue this line of thought (Miao, 2024; Tsamados et al., 2024).

## Concluding remarks

The special issue explores the intersection of educational technology with teacher and student agency and motivation. The studies published demonstrate how the use of technology can help benefit student learning: Leth Rasmussen et al. found that multiple-choice systems can boost student motivation and self-directed learning. Leistner and Hansen showed that personalised learning environments help develop metacognitive and self-regulative skills. To broaden the perspective, the editorial highlights areas of concern for student agency in using AI. While AI has the potential to help students tackle educational difficulties, it is essential to pay attention to the relationship between AI and learning from a student agency perspective to ensure meaningful and ethical learning experiences.

All told, this editorial has outlined an argument for moving away from depicting technology as a source of agency per se and instead paying attention to what makes sense and how things emerge to students and fit their prior conceptions of higher education learning. We would like to encourage the field of research to engage in future discussions raised here and look forward to seeing how the field develops.

## References

Børne- og Undervisningsministeriet. (2024, Ekspertgruppe klar med anbefalinger for brug af ChatGPT ved prøver. Retrieved May 22, 2024, from https://www.uvm.dk/aktuelt/nyheder/uvm/2024/april/240424-ekspertgruppe-klar-med-anbefalinger-for-brug-af-chatgpt-ved-proever

Brod, G., Kucirkova, N., Shepherd, J., Jolles, D., & Molenaar, I. (2023). Agency in Educational Technology: Interdisciplinary Perspectives and Implications for Learning Design. Educational Psychology Review, 35(1), 25. 10.1007/s10648-023-09749-x

Chiu, T. K. F., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. Computers and Education: Artificial Intelligence, 4, 100118. 10.1016/j.caeai.2022.100118

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. International Journal of Educational Technology in Higher Education, 20(1), 22.

Damşa, C.,I., Kirschner, P. A., Andriessen, J. E. B., Erkens, G., & Sins, P. H. M. (2010). Shared epistemic agency: An empirical study of an emergent construct. The Journal of the Learning Sciences, 19(2), 143-186.

Damşa, C., Langford, M., Uehara, D., & Scherer, R. (2021). Teachers' agency and online education in times of crisis. Computers in Human Behavior, 121, 106793. 10.1016/j.chb.2021.106793

Darvishi, A., Khosravi, H., Sadiq, S., Gašević, D., & Siemens, G. (2024). Impact of AI assistance on student agency. Computers & Education, 210, 104967. 10.1016/j.compedu.2023.104967

Edwards, A. (2005). Relational agency: Learning to be a resourceful practitioner. International Journal of Educational Research, 43(3), 168-182.

European Council. (2024, May 21,). Artificial intelligence (AI) act: Council gives final green light to the first worldwide rules on AI. Retrieved May 22, 2024, from https://www.consilium.europa.eu/en/press/press-releases/2024/05/21/artificial-intelligence-ai-act-council-gives-final-green-light-to-the-first-worldwide-rules-on-ai/

Jin, S., Im, K., Yoo, M., Roll, I., & Seo, K. (2023). Supporting students' self-regulated learning in online learning using artificial intelligence applications. International Journal of Educational Technology in Higher Education, 20(1), 37. 10.1186/s41239-023-00406-5

Lodge, J. M., Howard, S., Bearman, M., Dawson, P., Agostinho, S., Buckingham Shum, S., Deneen, C., Ellis, C., Fawns, T., & Gniel, H. (2023). Assessment reform for the age of artificial intelligence. (). https://www.teqsa.gov.au/sites/default/files/2023-09/assessment-reform-age-artificial-intelligence-discussion-paper.pdf

Luo, H., Yang, T., Xue, J., & Zuo, M. (2019). Impact of student agency on learning performance and learning experience in a flipped classroom. British Journal of Educational Technology, 50(2), 819-831.

Marín, V.,I., de Benito, B., & Darder, A. (2020). Technology-Enhanced Learning for Student Agency in Higher Education: a Systematic Literature Review. Interaction Design and Architecture(s) Journal IxD&A, 45, 15-49.

Miao, F. (2024, June 10,). A taxonomy on human agency in designing and using AI. LinkedInd. Retrieved June 13, 2024, from https://www.linkedin.com/in/fengchun-miao-5b999077/

Moallem, M. (2019). Effects of PBL on learning outcomes, knowledge acquisition, and higher-order thinking skills. The Wiley Handbook of Problem-Based Learning, , 107-133.

Muukkonen, H., Lakkala, M., & Hakkarainen, K. (2005). Technology-Mediation and Tutoring: How Do They Shape Progressive Inquiry Discourse? Journal of the Learning Sciences, 14(4), 527-565. 10.1207/s15327809jls1404_3

Neumann, J. W. (2013). Developing a new framework for conceptualizing "student-centered learning". Paper presented at the The Educational Forum, , 77(2) 161-175.

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B. T. (2023). Ethical principles for artificial intelligence in education. Education and Information Technologies, 28(4), 4221-4241. 10.1007/s10639-022-11316-w

Nøhr, L., Stenalt, M. H., & Hagood, D. (2023). University Teachers' Agency in Relation to Technology Use in Teaching: A Quantitative Investigation. Edutec.Revista Electrónica De Tecnología Educativa, (86), 40-61.

Nordic Innovation. (2024, Launch of Nordic Ethical AI Recommendations. Nordic Innovation. Retrieved May 22nd, 2024, from https://www.nordicinnovation.org/events/2024/launch-nordic-ethical-ai-recommendations

OECD. (2019, AI Principles overview. OECD.AI. Retrieved May 22nd, 2024, from https://oecd.ai/en/ai-principles?ref=viden.ai

Pappa, S., Moate, J., Ruohotie-Lyhty, M., & Eteläpelto, A. (2019). Teacher agency within the Finnish CLIL context: tensions and resources. International Journal of Bilingual Education and Bilingualism, 22(5), 593-613. 10.1080/13670050.2017.1286292

Perera, P., & Lankathilaka, M. (2023). AI in higher education: A literature review of chatgpt and guidelines for responsible implementation. International Journal of Research and Innovation in Social Science, 7(6), 306-314.

Pischetola, M., Stenalt, M. H., Nøhr, L., Hagood, D. E., & Misfeldt, M. (2024). Desirable and realistic futures of the university: a mixed-methods study with teachers in Denmark. International Journal of Educational Technology in Higher Education, 21(1), 29.

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? Journal of Applied Learning and Teaching, 6(1), 342-363.

Sawyer, R., Smith, A., Rowe, J., Azevedo, R., & Lester, J. (2017). Is more agency better? The impact of student agency on game-based learning. Paper presented at the Artificial Intelligence in Education: 18th International Conference, AIED 2017, Wuhan, China, June 28–July 1, 2017, Proceedings 18, 335-346.

Starkey, L. (2019). Three dimensions of student-centred education: a framework for policy and practice. Critical Studies in Education, 60(3), 375-390.

Stenalt, M. H. (2021). Digital Student Agency: Approaching Agency in Digital Contexts from a Critical Perspective. Frontline Learning Research, 9(3), 52-68.

Tan, S. C., Lee, A. V. Y., & Lee, M. (2022). A systematic review of artificial intelligence techniques for collaborative learning over the past two decades. Computers and Education: Artificial Intelligence, 3, 100097. 10.1016/j.caeai.2022.100097

Toom, A., Pietarinen, J., Soini, T., & Pyhältö, K. (2017). How does the learning environment in teacher education cultivate first year student teachers' sense of professional agency in the professional community? Teaching and Teacher Education, 63, 126-136.

Tsamados, A., Floridi, L., & Taddeo, M. (2024). Human control of AI systems: from supervision to teaming. AI and Ethics, , 1-14.

Winne, P. H. (2006). How software technologies can improve research on learning and bolster school reform. Educational Psychologist, 41(1), 5-17.

Yang, Y., Luo, J., Yang, M., Yang, R., & Chen, J. (2023). From surface to deep learning approaches with Generative AI in higher education: an analytical framework of student agency. Studies in Higher Education, 20(37), 1-14. 10.1080/03075079.2024.2327003

Yu, H. (2023). Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching. Frontiers in Psychology, 14, 1181712.
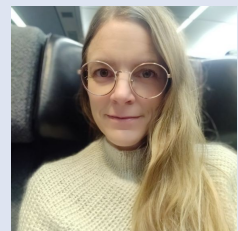
# Forfattere

## Maria Hvid Stenalt

Postdoc, Ph.d.

Aalborg University

mariahs@ikl.aau.dk



## Roland Hachmann

Lektor, Ph.d.

Institut for Skole, UCSYD

rhac@ucsyd.dk