



Methods Of Organising Reflective Teaching On The Basis Of Artificial Intelligence Technologies

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ABSTRACT

The article examines the methods by which artificial intelligence technologies, and generative language models in particular, may be integrated into the organisation of reflective teaching in pedagogical higher education. The author proceeds from the thesis that the prevailing interpretation of artificial intelligence as an instrument for the automated production of answers and content contains a hidden threat to the very cognitive work through which learning occurs, since a tool that relieves the learner of intellectual effort may equally relieve him of reflection. At the same time, these technologies possess considerable potential for supporting reflection when they are positioned not as a source of ready-made solutions but as an interlocutor that elicits, structures and challenges the learner's own reasoning. Relying upon theoretical analysis, the comparative method and pedagogical modelling, the study correlates D. Schön's theory of the reflective practitioner, D. Kolb's experiential learning cycle, the model of reflection of D. Boud, R. Keogh and D. Walker, J. Flavell's theory of metacognition and the feedback model of J. Hattie and H. Timperley with the functional capabilities of contemporary AI tools. On this basis the principle of reflective primacy is formulated, a typology of AI-supported reflective methods is proposed, and the stages of a reflective learning cycle are defined.

Keywords: Reflective teaching, artificial intelligence, generative language models, metacognition, reflection-in-action, experiential learning, feedback, Socratic dialogue, cognitive offloading, self-regulation, academic integrity, pedagogical education.

INTRODUCTION

The rapid penetration of artificial intelligence technologies, and above all of generative language models, into higher education has confronted pedagogical theory with a problem that cannot be reduced to the question of technical implementation. The prevailing discourse describes these technologies predominantly in terms of efficiency: the personalisation of instruction, the automation of routine operations, the instantaneous generation of explanations, texts and assessments. Yet precisely this efficiency conceals a paradox. Learning, in the sense in which developmental pedagogy understands it, is inseparable from intellectual effort — from the effort of formulating a question, sustaining an unresolved difficulty and returning critically to one's own actions. A tool that performs this effort on behalf of the learner may raise the quality of the immediate product while simultaneously eliminating the process through which competence is formed. The pedagogical question, therefore, is no longer whether artificial intelligence should be admitted into the educational process — it has already entered it irreversibly — but on what didactic terms it is to operate there. The state of research in the field confirms that this problem has not yet been adequately addressed. A systematic

review of research on artificial intelligence applications in higher education conducted by O. Zawacki-Richter and colleagues found that the literature concentrated on four areas — profiling and prediction, assessment and evaluation, adaptive systems and personalisation, and intelligent tutoring systems — and that it was marked by a weak connection to theoretical pedagogical perspectives and by insufficient critical reflection on the risks of the technologies, which led the authors to ask where the educators were in this research [10, p. 1]. The analysis of the educational potential of large language models by E. Kasneci and co-authors likewise identified, alongside considerable opportunities, the danger of excessive reliance on the model and of the uncritical acceptance of its output, and underlined the need for new competencies among teachers and learners alike [2]. The theoretical framework within which this danger can be analysed and overcome is provided by the theory of reflective practice. D. Schön demonstrated that professional competence in fields characterised by uncertainty, uniqueness and value conflict cannot be reduced to the application of scientific knowledge to practical problems. The competent practitioner relies upon knowing-in-action, a tacit knowledge embedded in skilful performance, and develops it through reflection-in-action, the capacity to think about what one is doing while doing it, as well as through subsequent reflection-on-action [9, p. 49–69]. Teaching belongs paradigmatically to such fields: no pedagogical situation exactly repeats another, and the teacher who possesses only prescriptions is helpless before the unforeseen. The formation of reflective capacity is therefore not an auxiliary aim of teacher education but its central task. The structure of reflection as a learning process was elaborated in the theory of experiential learning. D. Kolb described learning as a cycle in which concrete experience is transformed through reflective observation into abstract conceptualisation, which is in turn tested through active experimentation that generates new experience [7, p. 20–38]. D. Boud, R. Keogh and D. Walker specified the internal composition of the reflective phase, distinguishing the return to experience, attention to the feelings associated with it, and the re-evaluation of the experience through association, integration, validation and appropriation [1, p. 26–36]. The common inference from both models is fundamental for the present study: reflection does not arise spontaneously from experience but requires a deliberately organised structure, and without such structure experience remains unprocessed. Reflective teaching is thus a problem of organisation — and precisely here the question of its technological support arises. The psychological mechanism of reflection is described by the theory of metacognition. J. Flavell distinguished metacognitive knowledge — knowledge about persons, tasks and strategies as factors influencing cognition — from metacognitive experiences, the conscious cognitive and affective experiences that accompany an intellectual enterprise, and proposed that the monitoring of cognition occurs through the interaction of these components with goals and actions [5, p. 906–908]. From this perspective, reflection is a form of metacognitive monitoring and regulation, and its development requires that the learner's own cognitive processes become objects of his attention. An artificial intelligence tool can contribute to this development only if it directs the learner's attention towards his own thinking rather than replacing that thinking with its output. The question of what kind of response a technological system should provide is illuminated by the model of feedback proposed by J. Hattie and H. Timperley. They distinguished feedback at four levels — about the task, about the processing of the task, about self-regulation, and about the self as a person — and established that feedback directed at the process and at self-regulation is the most powerful for deep learning and for

transfer, whereas praise addressed to the person has little effect [6, p. 86–97]. Most automated educational systems, however, provide feedback predominantly at the task level, communicating whether an answer is correct. The reorientation of AI-generated feedback towards the levels of process and self-regulation is therefore one of the key design principles for the use of artificial intelligence in reflective teaching. In the conditions of Uzbekistan the problem acquires particular urgency in connection with the adoption of national strategic documents on the development of artificial intelligence technologies, the digital transformation of higher education and the formation of new models of university activity [8, p. 325–328]. Pedagogical higher education institutions face the dual task of preparing teachers capable of using AI tools productively and of preserving the intellectual independence of their future pupils. This task is inseparable from the broader aim of forming a mature spiritual and philosophical worldview in young people through the system of continuous education, since a critical attitude towards algorithmically generated content is itself a worldview orientation [3, p. 314–316; 4, p. 10–13]. The aim of the present article consists in the substantiation of methods for organising reflective teaching on the basis of artificial intelligence technologies and in determining the conditions of their effective application. The scientific novelty of the work lies in the formulation of the principle of reflective primacy and in a typology of methods in which the artificial intelligence tool functions as an interlocutor that elicits reflection rather than as a source of ready answers.

The study relies upon the theoretical analysis and synthesis of the literature on reflective practice, experiential learning, metacognition and educational feedback. The comparative method has been applied in order to correlate the functional capabilities of contemporary AI tools — generative language models, automated feedback systems and learning analytics — with the requirements that the theory of reflection places upon the organisation of learning. Pedagogical modelling has been used to construct a typology of AI-supported reflective methods and a model of the reflective learning cycle. The systemic approach has made it possible to consider these methods in connection with the organisation of assessment, the role of the teacher and the ethical conditions governing the use of the technologies.

The first result consists in the formulation of the principle of reflective primacy, according to which the learner's own reflective effort must precede any intervention of the artificial intelligence tool. The sequence is decisive. Where the learner first addresses the model and only then reflects, the generated text becomes a ready template that displaces independent thought and is at best edited. Where the learner first formulates his own analysis of an experience and only then enters into dialogue with the model, the generated response becomes an object of comparison, critique and elaboration. The principle further implies that AI-generated feedback should be directed at the levels of process and self-regulation: instead of evaluating the correctness of a conclusion, the tool should ask how the learner arrived at it, which alternatives were considered, and what he would do differently. The second result consists in a typology of AI-supported reflective methods. The first is Socratic dialogue, in which the model is configured by the teacher through a system instruction to refrain from providing answers and to respond only with questions that lead the learner to examine the grounds of his own judgements. The second is the AI-supported reflective journal, in which entries structured according to the stages of the experiential cycle are analysed by the model for reflective depth, after which it poses clarifying questions to entries that remain at the descriptive level. The third is the method

of alternative perspectives, in which the model formulates counterarguments or describes the same pedagogical situation from the standpoint of a pupil, a parent or an administrator. The fourth is AI-assisted analysis of microteaching, in which anonymised transcripts of students' practice lessons are analysed for the balance of teacher and pupil speech and for the cognitive level of the questions posed, providing material for reflection-on-action. The third result concerns the organisation of the reflective cycle as a whole. It comprises a preparatory stage, at which reflective goals are set and the rules for the use of AI tools are agreed; a stage of experience, which may be a practice lesson, a case or a problem task; a stage of individual reflection conducted without technology; a stage of AI-mediated dialogue; a stage of collective discussion, at which the conclusions of individual dialogues are compared; and a stage of reconceptualisation and planning corresponding to active experimentation in Kolb's cycle. The role of the teacher is transformed accordingly: he becomes the designer of reflective tasks and system instructions, the moderator of collective discussion and the guarantor of the validity of the conclusions reached, since the model itself possesses no authority over the truth of its statements. The fourth result concerns the risks and conditions of implementation. Generative models may produce factually incorrect statements presented with an appearance of certainty, which necessitates the systematic verification of their output and turns such verification into a reflective exercise in its own right. Academic integrity requires transparency, with students indicating at which stages and for what purposes the tool was employed. The protection of personal data, particularly when lessons involving pupils are analysed, requires anonymisation. The quality of model responses in the Uzbek language and equal access to the technologies constitute further conditions, while the decisive one is the AI literacy of the teacher.

Conclusion

The analysis undertaken permits the following conclusions. First, the effect of artificial intelligence on reflection is determined not by the technology as such but by the pedagogical position assigned to it. Positioned as a source of answers, it substitutes for reflection and deprives the learner of the intellectual effort through which competence is formed; positioned as an interlocutor, it is capable of eliciting, structuring and deepening reflection. Second, the principle of reflective primacy constitutes the methodological foundation of AI-supported reflective teaching. The learner's own analysis must precede the intervention of the model, and the feedback provided by the model must be directed at the processes of thinking and self-regulation rather than at the correctness of the final product. Third, the proposed typology — Socratic dialogue, the AI-supported reflective journal, the method of alternative perspectives and AI-assisted analysis of microteaching — together with the six-stage reflective cycle provides an operational framework for integrating AI tools into the training of future teachers. Within this framework the teacher does not lose his significance but acquires new functions as designer, moderator and guarantor of validity. Fourth, the effective implementation of these methods in the pedagogical higher education of Uzbekistan depends upon the AI literacy of university teachers, upon clear norms of transparency and data protection, upon the quality of AI tools in the Uzbek language and upon the integration of reflective practice into the system of continuous education. The prospect of further research consists in the experimental

verification of the proposed methods and in the development of instruments for measuring the reflective competence of future teachers.

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