Exploring AI-Driven Conversations as Dynamic OER for Self-Directed Learners

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Abstract

The integration of artificial intelligence (AI) into education is transforming how Open Educational Resources (OER) can be designed, delivered, and utilised [1]. This conceptual paper explores the potential of AI-driven conversations, such as those facilitated by ChatGPT, to function as dynamic OER that support self-directed learning (SDL). Unlike traditional static resources, AI-driven dialogues offer learners personalised, interactive, and adaptive experiences that align with their unique learning needs and goals [2]. By fostering autonomy, critical thinking, and problem-solving skills, these tools provide opportunities for learners to take greater control of their educational journeys. Grounded in theoretical frameworks of SDL and Open Educational Practices (OEP), this paper examines the role of AI in addressing challenges within open learning environments, including learner engagement, inclusivity, and scalability. It proposes a conceptual model for integrating AI-driven OER into multimodal learning environments, highlighting their potential to enhance the accessibility and openness of educational resources. Knowles [3] suggests that self-directed learners actively engage in their learning process by taking initiative, assessing their learning needs, setting goals, identifying relevant resources, implementing strategies, and evaluating the outcomes. The paper also identifies the key SDL competencies that AI-driven conversations can nurture, such as goal setting, self-monitoring, and reflective practice. The discussion further addresses the ethical, pedagogical, and technical considerations associated with using AI in education. Challenges, including biases in AI outputs, data privacy concerns, and the potential for over-reliance on AI, are critically analysed. However, the paper argues that with thoughtful design and implementation, AI-driven OER can complement human-led instruction, empowering learners and teachers alike. By reimagining OER as dynamic and responsive tools, this paper contributes to the discourse on the future of education. It calls for collaboration among facilitators, educational technology specialists, and policymakers to explore the full potential of AI-driven OER in fostering SDL. Through this exploration, the paper aims to provide a vision for how AI can transform open education, making it more inclusive, learner-centred, and responsive to the needs of diverse educational contexts.

Keywords: *Self-Directed Learning (SDL), Open Educational Resources (OER), Open Educational Practices (OEP)*

1. Introduction

Artificial Intelligence (AI) is increasingly recognised as a key technology shaping the future of education [4]. Among recent developments, large language models (LLMs) have demonstrated the capacity to produce fluent and coherent dialogues through user prompting [5], enabling new forms of interaction in digital learning environments. These capabilities create opportunities to enhance personalisation, feedback, and learner-driven exploration—elements that align closely with the principles of self-directed learning (SDL). In a systematic review, Chiu et al. [6] found that AI-supported real-time feedback platforms contribute to the sustainable development of a range of competencies among university students. These include enhanced online collaboration, creativity, problem-solving, and communication skills, all of which align with the characteristics of SDL. These findings reinforce the potential of AI to support personalised and autonomous learning processes.

However, while the educational promise of AI is gaining momentum, critical questions remain regarding its alignment with open educational practices (OEP). Downes [7] points out that many existing platforms and repositories are still static, limiting transparency, adaptability, and user control. To fully realise the potential of AI in support of OEP, it is essential to redesign these environments into more open, transparent and adaptable systems [8]. Such a shift would enable more meaningful interaction with open educational resources (OER), allowing learners to remix, adapt, and personalise their learning, which are central tenets of both open education and SDL. This paper proposes a

conceptualisation of dynamic OER as AI-driven, interactive resources that adapt to learners' real-time inputs, thereby opening new avenues for fostering SDL in open education.

At the same time, an important yet frequently overlooked issue is how synthetically generated AI content will be integrated into the educational discourse on openness [1]. If designed with inclusivity and learner agency in mind, AI-generated dialogues and feedback could contribute to dynamic OER, promoting a more flexible and participatory learning experience. However, this integration requires thoughtful policy, pedagogical vision, and technical design to ensure alignment with the values of access, equity, and transparency that underpin open education.

2. Theoretical Framework

This section outlines the theoretical foundations underpinning this study. The concepts discussed provide the conceptual grounding for understanding how AI-driven tools can support learner autonomy, openness, and inclusivity in contemporary educational contexts.

2.1 Self-Directed Learning

Self-directed learning is a foundational concept in adult education. Knowles defines SDL as a process in which “individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes” [3, p. 18]. This definition emphasises the active, intentional role that learners play in shaping their educational journeys. Unlike traditional, instructor-led models of learning, SDL centres on the development of autonomy, responsibility, and self-motivation. In contemporary education systems, particularly those embracing OEP and flexible learning environments, the principles of SDL are critical for preparing learners to navigate complex and rapidly evolving knowledge landscapes [9].

Gunness et al. [10] argue that self-directed learners, those equipped with the necessary dispositions, tools, and technologies, are best positioned to thrive through active engagement with OEP. By exercising critical awareness and discernment in identifying their capacities and learning needs, these learners not only enhance their own educational experiences but also contribute meaningfully to the global growth of OER. Within open and multimodal learning environments, particularly those enhanced by AI, learners must increasingly take charge of their own learning processes, selecting and adapting resources to meet personal goals [11]. In this context, AI-driven OER offer new opportunities for fostering SDL by providing personalised, adaptive, and responsive learning experiences [12]. Core SDL competencies such as goal setting, self-monitoring, and reflective evaluation [3] are essential for meaningful engagement with AI-enhanced learning environments. Wu et al. [11] provide empirical support to show that generative AI tools enhance SDL by improving learners' capacity to plan, regulate, and reflect on their learning. These tools also help personalise the use of resources and foster metacognitive engagement, which are skills central to SDL. Furthermore, the recent emergence of LLMs such as ChatGPT has created new possibilities for learners to engage in multimodal interactions that include text, images, and audio, which further enhances engagement and autonomy [5].

2.2 Open Educational Practices (OEP) and Open Educational Resources (OER)

Openness in education, open learning, and OEP are closely interconnected, each reflecting a shared commitment to broadening educational access and removing learning barriers [10]. The Cape Town Open Education Declaration of emphasises that open education extends beyond OER to include open technologies that support collaborative and flexible learning, as well as the open sharing of teaching practices. Cronin [13] defines OEP as a broad concept that “includes the creation, use and reuse of OER, open pedagogies, and open sharing of teaching practices”. Cronin and MacLaren [14] offer a comprehensive analysis of evolving conceptualisations of OEP, drawing on key definitions such as Geser’s [15] focus on student engagement and creativity, Andrade et al.'s [16] emphasis on co-production and lifelong learning, and Hodgkinson-Williams' [17] dimensions of openness. For the purposes of this paper, we adopt Andrade et al.'s definition of OEP: “practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path” [16, p. 12]. This definition aligns closely with SDL as it recognises learners as autonomous agents engaged in lifelong learning.

The theoretical foundations of OEP and related concepts are grounded in constructivist, social constructivist, and connectivist philosophies [14]. These traditions emphasise social learning, co-construction of knowledge, and learner agency, values that also underpin SDL. OEP fosters collaboration and flexibility, providing access to educational resources and peer engagement that support the development of SDL competencies [10].

2.3 AI in Education

AI technologies are increasingly central to the future of OEP and OER [8], offering adaptive, personalised, and engaging learning experiences that complement SDL. However, as Bozkurt [1] notes, a key challenge is determining how synthetically generated AI content fits within the framework of openness. The UNESCO *Guidance for Generative AI in Education and Research* [18] addresses this concern by calling for inclusive, ethical, and equitable policies that respect linguistic and cultural diversity and promote the use of generative AI to support lifelong learners "of all ages, locations, and backgrounds" [18, p. 24]. This aligns well with both OEP and SDL, which aim to foster learner autonomy and ensure access to flexible, contextually relevant learning.

UNESCO's *AI Competency Framework for Teachers* [19] further promotes the idea of lifelong professional learning as a key principle. The framework highlights transferable competencies and iterative reflection cycles that mirror core SDL processes such as goal setting, self-monitoring, and ongoing evaluation. In her foreword to the framework, Dr Stefania Giannini, UNESCO Assistant Director-General for Education, underscores this urgency by stating that "teachers urgently need to be empowered to better understand the technical, ethical and pedagogical dimensions" [19, p. 5] of AI. In the light of this statement, SDL becomes not only a desirable outcome for students, but also an essential capability for teachers navigating AI-enhanced environments. With AI's rapid advancement [20] and increasing calls for AI literacy [21], both students and teachers must engage in continuous learning. Self-directed learning provides a crucial foundation for developing the adaptive, ethical, and critical capacities needed to navigate the evolving educational landscape.

When integrated thoughtfully, generative AI can function as a form of dynamic OER, offering personalised feedback, supporting multimodal interaction, and enabling learners to co-construct knowledge in open, self-directed ways. Generative AI has the potential to address long-standing challenges in open education, such as learner engagement, the wider reach and adaptability of resources, and inclusive access. This integration underscores the synergy between SDL, OEP, and AI in shaping a more inclusive, adaptive, and participatory future for education.

3. AI-Driven Conversations as Dynamic OER

Although limited research has explored the impact of AI-driven conversations on learning, early findings suggest promising directions [22]. Unlike traditional teacher-centred classrooms, where teachers dominate most of the dialogue, AI-driven classroom conversations shift the focus to learners. This supports student-centred approaches and aligns well with SDL, as it empowers students to take greater responsibility, make autonomous decisions, and actively construct knowledge through dialogue. Well-designed AI-driven dialogues enhance learners' independence and autonomy during interactions [22]. These characteristics are integral to SDL, encouraging learners to initiate, plan, and manage their learning processes. Furthermore, when AI tools improve engagement, they benefit both students and teachers by creating interactive, responsive learning environments.

Generative AI also supports the creation of diverse and inclusive learning resources, facilitating multilingual and culturally relevant content generation [1]. This dynamic capability contrasts with static OER and allows for the development of more personalised, adaptive resources. As Tlili et al. [23] note, AI can assist in tagging OER with rich metadata, building smart virtual agents to support learners when teachers are not available, and ranking resources based on quality metrics. These features increase discoverability, accessibility, and relevance, which are critical components of both OEP and SDL.

AI-generated conversations thus function as dynamic OER: resources that respond in real time to learners' needs, provide contextualised feedback, and promote co-construction of knowledge. Wu et al. [11] reinforce this by showing that generative AI tools help learners set goals, reflect, and regulate their learning more effectively. While they do not refer directly to OER, the use of flexible, learner-guided resources aligns with the ethos of OEP. Integrating generative AI into open learning environments enhances not only access, but also learner agency and participation, core aims of both SDL and open education.

4. Proposed Conceptual Model

The conceptual model in Figure 1 presents a model of how AI-driven conversations as dynamic OER, situated within OEP, can promote SDL and empower learners. The model illustrates how such dynamic OER serve as a catalyst for SDL by fostering autonomy, reflective thinking, and goal-oriented learning behaviours. As learners engage with AI-mediated content that adapts in real time, they are better equipped to take initiative in managing their own educational journeys.

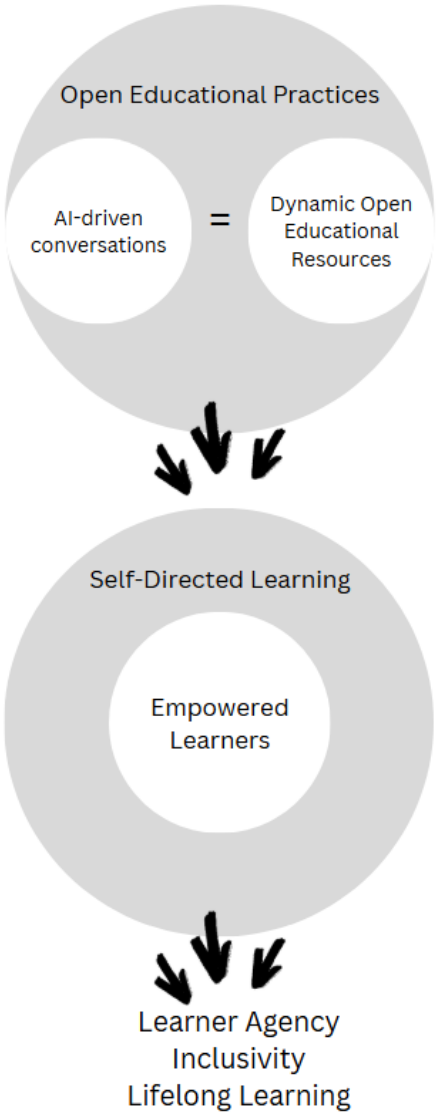

Fig. 1. Empowering Learners Through AI-Enhanced Open Educational Practices

At the centre of this process are empowered learners, individuals who develop the confidence, skills, and motivation to drive their own learning within open, AI-supported contexts. The outcome of this process aligns with the overarching goals of open education: to advance learner agency, inclusivity, and lifelong learning. This model underscores the importance of designing AI-enhanced learning environments that not only personalise content but also respect and elevate learners' roles as co-constructors of knowledge.

5. Challenges and Considerations

Integrating AI within OEP brings significant promise but also introduces a range of pedagogical, technical, and ethical challenges that must be critically addressed [8]. While AI can support personalised, inclusive, and dynamic learning experiences, its implementation within open education ecosystems is complex. One pressing challenge relates to legal and ethical concerns, particularly around copyright infringement, data privacy, and the normalisation of data across different systems [8]. In open environments, where materials are openly shared, reused, and remixed, the use of generative AI tools raises questions about authorship, ownership, and responsible content generation. There is also a danger of reinforcing systemic biases if the underlying datasets used to train AI models do not reflect diverse cultural, linguistic, and socio-economic perspectives. When AI systems fail to account for these variables, learners may be unfairly treated or excluded [8]. Another practical constraint involves the fragmentation of OER infrastructure. OER are often stored in unconnected repositories across different countries or regions, making it difficult for teachers and learners to locate, adapt, or remix materials effectively [8]. This structural limitation undermines the openness, interoperability, and contextual adaptability that OEP and SDL rely upon.

Teacher preparedness represents an additional and critical concern. As Rampelt et al. [4] observe, many teachers lack foundational knowledge of AI technologies and often exhibit low levels of confidence in using them. This gap poses a significant barrier to the adoption of AI-driven OEP, especially when teachers are expected to act as facilitators of learner-centred, self-directed, and technology-enhanced learning. Without appropriate training and support, teachers may struggle to integrate AI tools into their teaching practice in ways that uphold the values of openness, inclusion, and learner empowerment. Moreover, generative AI tools themselves present pedagogical challenges: their outputs may not always be reliable, transparent, or aligned with curriculum goals. Teachers and learners need to develop critical AI literacy to evaluate, adapt, and effectively use AI-generated content. While AI offers powerful tools for enhancing OEP and SDL, realising its full potential requires addressing these multi-layered challenges through thoughtful design, robust infrastructure, inclusive policies, and sustained professional development.

6. Implications and Recommendations

The integration of AI into OEP has far-reaching implications for the design, delivery, and accessibility of learning. As generative AI technologies become more widely adopted, they offer the potential to transform OER into dynamic, interactive, and personalised learning tools that support SDL. However, to realise this potential equitably and effectively, several key considerations must guide policy, practice, and research.

First, the integration of AI within open education requires a renewed focus on ethical and inclusive design. Policymakers and developers must ensure that generative AI systems are trained and applied in ways that account for cultural, linguistic, and socio-economic diversity, so that no learner is disadvantaged by biased or non-contextual outputs. This includes ensuring that AI-generated content aligns with principles of transparency, explainability, and openness. Second, institutions must address the technical limitations of existing OER infrastructure. The disjointed nature of global OER repositories makes it difficult to remix or adapt content across platforms. There is a clear need to develop compatible systems that enable teachers and learners to access and customise resources regardless of their location. Artificial intelligence can assist by automating metadata generation and quality ranking, but this depends on robust and connected platforms. Third, professional development must be prioritised. Many teachers still lack the AI competencies needed to implement AI-enhanced OEP [4]. To effectively navigate and integrate generative AI within the contexts of OER and OEP, teachers and stakeholders must be equipped with the requisite skills and knowledge, highlighting the critical need for focused professional development and training [1]. This points to a broader systemic implication: the success of AI in education depends not only on the technology itself, but on the readiness and agency of teachers to use it effectively. Upskilling initiatives should therefore promote not only AI literacy but also SDL skills among teachers, enabling them to model self-directed, lifelong learning.

Finally, researchers must continue to evaluate the impact of AI-driven OEP on learning outcomes, learner engagement, and equity. While conceptual work highlights the promise of AI in fostering SDL, empirical evidence remains limited. As highlighted in a recent scoping review, Roe and Perkins [24] found that a recurring theme in the literature is the potential of generative AI tools, such as ChatGPT, to support and enrich learning within an SDL context. Li et al. [25] also describe SDL as a context in which learners can explore and evaluate generative AI tools for their personal learning

goals. Ongoing inquiry is necessary to determine which models are most effective and under what conditions.

In light of these considerations, this paper recommends that institutions and policymakers:

- Develop and enforce clear ethical guidelines for AI use in open education, ensuring alignment with SDL principles and learner agency.
- Invest in compatible and accessible OER infrastructure that supports remixing and contextual adaptation.
- Promote inclusive AI design that reflects the diverse cultural, linguistic, and educational backgrounds of learners.
- Provide sustained, reflexive professional development that fosters both AI literacy and SDL among teachers.
- Encourage ongoing, cross-disciplinary research on the effectiveness and equity of AI-enhanced, open, SDL environments.

By addressing these areas proactively, stakeholders can help shape an open educational future where AI empowers rather than marginalises, and where learners are equipped to direct their own educational journeys with confidence.

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