Beyond the Standalone AI: Embedding Educational Chatbots Through Scaffolded Pedagogical Design

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Abstract: Generative AI chatbots are rapidly being introduced into higher education as institutional learning technologies. However, much current implementation assumes that educational value emerges primarily through access to the technology itself. This paper argues that AI chatbots are pedagogically weak when deployed as standalone resources and that meaningful educational impact depends upon deliberate integration into learning design, teaching practice, and assessment structures. The paper presents a case study from a UK university initiative involving *BrunOwl*, an institutionally supported AI chatbot embedded within the virtual learning environment. Rather than positioning the chatbot as a generic student support tool, the initiative adopts a scaffolded pedagogical integration model led by a central Digital Education team. Academic staff complete an online curriculum-design form capturing disciplinary context, learning challenges, threshold concepts, assessment relationships, cohort characteristics, and intended uses of AI within teaching. These submissions are then used collaboratively to develop structured implementation plans tailored to specific modules and programmes. The paper examines how this process reframes AI adoption from technological deployment to educational design. Drawing on concepts from constructive alignment and socio-technical approaches to educational change, the study explores how academic partnership, contextualisation, and structured scaffolding mediate the effectiveness of AI-supported learning. Early findings from institutional implementation suggest that staff are more likely to integrate AI meaningfully when supported through iterative pedagogical dialogue rather than technical training alone. Similarly, students appear more likely to engage critically and productively with AI when chatbot activities are explicitly aligned with learning outcomes, teaching activities, and assessment expectations. The paper contributes a transferable institutional model for embedding generative AI within higher education curricula while also offering a critical perspective on the prevailing "provision-led" discourse surrounding AI in education. It will be of relevance to researchers, educational developers, learning technologists, and institutional leaders seeking sustainable and pedagogically grounded approaches to AI-enabled learning.

Keywords: Generative AI, AI Chatbots, Higher Education, Learning Design, Constructive Alignment, Socio-Technical Change

1. Introduction

Generative artificial intelligence has been adopted by higher education institutions with remarkable speed. In the space of little more than three years, universities have developed strategies, established governance groups, rewritten assessment regulations, and procured institutional AI tools. Student-facing chatbots have emerged as an almost ubiquitous response. They appear scalable, comparatively inexpensive, and offer the possibility of personalised support at a time when many universities of mass education face diminishing resources.

The speed of adoption has produced a familiar discourse for those of us involved with educational technologies. Much of the literature and institutional rhetoric surrounding generative AI appears to assume that educational value emerges primarily through access to the technology itself (e.g., Quality Assurance Agency for Higher Education, 2024). While universities and sector bodies rarely claim explicitly that AI provision alone will improve learning, the language of institutional AI adoption often implies a direct relationship between access to generative AI and educational enhancement, particularly through claims of personalised tutoring, 24/7 support, critical thinking and scalable feedback.

The history of educational technology offers reasons to be sceptical of such claims. The educational significance of technology has repeatedly been overstated. Radio, television, personal computers, virtual learning environments, MOOCs, and learning analytics have all, at various times, been heralded as transformative innovations that would fundamentally alter higher education (Loughlin, 2017). Yet universities remain remarkably resilient institutions, and the relationship between technological change and pedagogical practice is neither linear nor deterministic.

As Dewey observed over a century ago, educational practices often remain stubbornly resistant to theoretical and technological innovation (Dewey, 2012). Similarly, Selwyn (Selwyn, 2022a) cautions against technological solutionism and argues that educational technologies must be understood as socially situated and politically constructed rather than inherently transformative. The hype, hope, and disappointment of educational technologies and innovation have a long history. There is still an 'underlying assumption [within universities] that once adequate resources [are] obtained, integration [will] follow' (Ertmer, 1999, p. 50). Yet, it has been shown that access to technologies and the provision of skills workshops do not, alone, lead to an increased take-

up of learning technologies amongst academic staff (Kirkwood and Price, 2014; Bennett, 2010; Surry and Land, 2000); and, there is evidence that 'even if every [technical and physical] barrier were removed teachers would not automatically use technology' (Ertmer, 1999, p.51). Many studies have identified the link between teacher's belief systems and the integration of TEL into teaching practice and offered strategies to help overcome these (Newman, 2002; Cuban et al., 2001; Ertmer, 1999). Yet, the majority of institutional policies and TEL initiatives remain doggedly focused on the tangibles of skills training and technical provision.

The purpose of this paper is not to critique generative AI itself, nor to argue against the use of educational chatbots. Rather, it is to challenge the assumption that AI technologies possess educational value independent of their pedagogical context.

This paper argues that AI chatbots are pedagogically weak when deployed as standalone resources (OECD, 2026) and that meaningful educational value emerges through intentional integration into curriculum design, teaching practice, and assessment (Hon, 2026). And that without direct support for academics to help them in understanding AI in their context (and how to engage their students with it meaningfully), there is a strong chance AI will not achieve its potential in learning and teaching. Using a case study of the implementation of BrunOwl, an institutionally supported AI chatbot embedded within a UK university's virtual learning environment, the paper explores how a central Digital Education team sought to mediate AI adoption through a scaffolded academic partnership model.

The paper suggests that the critical work of educational innovation lies not in providing AI tools, but in creating the pedagogical conditions under which AI may become educationally meaningful.

2. Educational Technology and the Problem of Provision

The history of educational technology is, in many respects, a history of unfulfilled promises. Almost every significant technological development has been accompanied by claims that it would transform learning and render previous pedagogies obsolete. Laurillard et al (2008) said that 'education is on the brink of being transformed through learning technologies; however, it has been on that brink for some decades now'.

Generative AI may be in danger of providing another iteration of this recurring cycle. Educational technologies are frequently discussed as though pedagogical outcomes arise from the intrinsic properties of the technologies themselves. Such assumptions reflect a form of technological determinism in which technologies are treated as causal agents of educational change (Selwyn, 2022b; Oliver, 2011). As Feenberg observes, educational technologies are often imagined as 'technologies that do the educating' (2017, p. 364), obscuring the social, disciplinary, and pedagogical work through which educational value is actually produced.

Constructive alignment (Biggs and Tang, 2011) offers one way of understanding this relationship. Learning outcomes, learning activities, and assessment should form a coherent system. Technologies are not exempt from this requirement. An AI chatbot that exists independently of teaching activities and assessment structures is no more pedagogically meaningful than an uncommented collection of documents often seen on university VLE pages. Like the lecture theatres of mass higher education, AI chatbots may become ubiquitous features of the educational landscape while remaining largely pedagogically unexamined (Loughlin, 2025).

Yet there is already evidence that many institutional responses to AI are characterised by provision-led approaches. Universities procure tools and then encourage staff and students to "make use" of them. History has demonstrated that providing tools and staff development workshops has little impact on meaningful integration of educational technologies into teaching practice (Loughlin, 2017). The assumption that educational practices will naturally emerge around technological provision mirrors earlier approaches to virtual learning environments and learning analytics, where implementation frequently prioritised technical capability over pedagogical purpose. The result is often a form of unintentional practice, in which technologies become normalised but pedagogically weak.

3. AI and Pedagogical Intentionality

The educational promise of generative AI lies primarily in its conversational capabilities. Unlike previous educational technologies, large language models can engage in dialogue, generate explanations, ask questions, adapt responses, and present information in multiple ways. They possess characteristics that are potentially compatible with constructivist and student-centred approaches to learning.

The potential for personalised tutoring is particularly attractive. Bloom's (1984) "two sigma problem" demonstrated that students receiving one-to-one tutoring substantially outperformed those receiving conventional classroom instruction. Generative AI has therefore prompted renewed interest in the possibility of scalable, personalised learning support (Hippel, 2024).

However, the existence of conversational capabilities does not guarantee educational value. An AI chatbot can provide explanations, summaries, and answers, but equally it can encourage superficial engagement, shortcut productive struggle, and reinforce passive approaches to learning (e.g., Bastani et al., 2025). Whether AI functions as a tutor, a study companion, a writing assistant, or an answer machine depends largely upon how (or if) it is integrated into teaching practice.

This distinction between capability and educational function is important. The educational significance of AI resides not in what the technology can do, but in what students are invited, encouraged, and expected to do with it. The question, therefore, is not whether universities should provide AI chatbots, but how those chatbots become pedagogically situated within learning and teaching.

4. Context: BrunOwl

BrunOwl is an institutionally supported AI study buddy chatbot embedded within the university's virtual learning environment. The original ambition was to provide students with personalised support, opportunities for dialogue, and an accessible study companion capable of engaging with disciplinary content. BrunOwl was piloted in 2024-5 and implemented institution-wide for the start of the academic year 2025-6. Around 60% of students have accessed it, representing all colleges and disciplines. By the end of semester one, over 12,000 conversations had been logged.

On the face of it, these interactions were in-line with our expectations, and the take-up could be considered a success. However, early analysis of the chatbot conversations revealed primarily low-level and unstructured chats. This highlighted a familiar concern, merely making the chatbot available to students did not constitute meaningful educational innovation. There was little reason to assume that students would automatically use the chatbot in ways that promoted meaningful learning.

Consequently, the next phase of the implementation strategy focused on how to engage academics to embed AI into their modules in a way that would develop the AI literacy of their students and enhance their learning. The Digital Education team has moved beyond technological provision and towards pedagogical integration by developing simple online form which staff could complete to identify key aspects of their module and students which would be the start of a co-design process for integrating AI into their learning design.

The online form captures:

- Module context and learning outcomes;
- Student cohort size and characteristics;
- Learning challenges and concepts;
- Assessment requirements;
- Intended educational uses of ai;
- Ethical and disciplinary considerations.

The form functions as a pedagogical intervention in its own right. Staff are encouraged to articulate assumptions about learning, identify areas of student difficulty, and consider how AI might contribute to existing teaching activities. The process resembles curriculum design more than software implementation. The very act of expressing the intended learning outcomes and areas that students struggle with can be powerful in its own right, leading to improved learning design.

The answers from the online form are fed into a specially designed AI agent that also has access to the module content and assessment resources; it is designed to generate a teaching plan with step-by-step instructions for academic staff and detailed prompts for students using the principles of constructive alignment and active learning. This first-draft of a learning design is then used by the Digital Education team to co-design with academic staff a scaffolded integration plan.

These plans typically include:

- Module-specific prompt suggestions;
- Preparatory activities;

- Formative exercises;
- Reflective tasks;
- In-class follow-up activities;
- Guidance on ethical and transparent ai use;
- Alignment with learning outcomes and assessment.

The activities are designed to draw out the students existing understanding of key topics and build from there, while also developing and understanding of the utility and limits of AI in their disciplinary context. The emphasis is therefore not on using AI, but on designing educational experiences in which AI serves identifiable pedagogical purposes.

5. Discussion

The BrunOwl experience suggests that the implementation of educational AI is fundamentally a socio-pedagogical process. Three observations are noteworthy. Firstly, academic staff frequently understand generative AI at a general level but struggle to translate that understanding into concrete teaching practices. Technical demonstrations and generic training sessions often fail to bridge this gap. The challenge is not technological literacy alone, but pedagogical operationalisation. Secondly, the design form itself functions as a reflective mechanism. It prompts academics to make explicit their assumptions regarding student learning, threshold concepts, and assessment. In doing so, it encourages forms of pedagogical intentionality that might otherwise remain tacit. Thirdly, meaningful uses of AI appear highly contextual.

The implementation strategies developed for research methods, economics, occupational therapy, and nursing differ substantially. The educational value of AI is therefore inseparable from disciplinary context, learning outcomes, and assessment structures.

These observations challenge deterministic narratives surrounding generative AI. Educational technologies do not possess pedagogical agency. Universities often speak of technologies "transforming" learning, yet technologies transform little in isolation. Rather, educational change emerges through the decisions, practices, and relationships that surround technological adoption. AI differs from many previous technologies in that the work involved in integrating AI into the curriculum does not have to be onerous, and the rewards in terms of the potential for student learning are great.

Higher education's current adoption of AI resonates with broader critiques of educational technology. Technologies frequently fail to deliver transformative outcomes because institutions mistake provision for implementation. The chatbot itself is only a component of the educational intervention. The more significant intervention may be the pedagogical work undertaken by academics and educational developers to determine how the chatbot should function within particular learning environments.

This reframing also suggests an expanded role for educational developers. Rather than acting primarily as technical support staff or trainers, educational developers become translators and mediators between technological capability and pedagogical practice. Their work involves helping academic colleagues articulate educational purposes, align activities with outcomes, and develop contextually appropriate implementations. In this sense, pedagogical integration becomes a process of academic partnership.

6. Conclusion

The rapid adoption of generative AI has created understandable enthusiasm (along with many concerns) within higher education. Educational chatbots offer the possibility of personalised learning support at unprecedented scale. However, the history of educational technology cautions against assuming that access to new technologies necessarily produces educational improvement.

This paper has argued that AI chatbots are pedagogically weak when deployed as standalone resources. Their educational value emerges through intentional integration into learning design, assessment structures, and disciplinary contexts. The case of BrunOwl suggests that the critical work of educational innovation lies not in providing AI systems but in creating the pedagogical conditions under which those systems may contribute meaningfully to learning.

Universities have repeatedly demonstrated a tendency to mistake technological provision for pedagogical transformation. Generative AI may prove no different. The challenge facing higher education is therefore not

whether institutions can provide educational AI, but whether they possess the pedagogical structures and partnerships necessary to make that AI educationally meaningful.

Ethics Declaration

The online ethics portal indicated that ethical approval was not required for this research.

AI Declaration

The author used generative artificial intelligence (ChatGPT, OpenAI) during the preparation of this manuscript to support structural development, language refinement, and editorial review. The AI system was not used to generate original empirical findings, conduct analysis, interpret results, or formulate the paper's arguments independently. All substantive intellectual contributions, interpretations, conclusions, and final editorial decisions remain the responsibility of the author.

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