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Staff development for generative artificial intelligence and collaborative learning using Iterationism as a theoretical framework

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Abstract

Generative artificial intelligence has confronted academic developers with the challenge of understanding new technologies and simultaneously providing authentic pedagogical support for academics who are also struggling to adapt. This empirical study responds to these challenges by reviewing a staff development workshop for generative AI and collaborative learning delivered to academics from various disciplines at the University of Derby, UK. This is an example of online academic lecturers working in 'third space' roles, providing professional development support for other academics on campus. A focus group was used immediately after the experiential workshop as a means of gathering empirical data. Findings show lecturers are concerned about AI, but classroom-based staff development workshops can provide useful third spaces for discussion and sharing good practice. Interestingly, AI prompts emerged as a way of making cognitive effort visible, and the article responds to this finding with Iterationism as an emergent theory for learning with generative AI. This reflects a process-oriented view of learning with these technologies. Beyond developing theory for generative AI and learning, we make four contributions to the literature on third spaces. They are (1) that online lecturers occupy and create third

spaces across different modes; (2) that collaboration on applications of AI technologies can address relational tensions highlighted in third space research (Daza, Gudmundsdottir and Lund, 2021); (3) that AI can be understood as a third space for the way it feeds into discussions across students, academics, and external organisations; and (4) that we have developed theory from cross-modal third space practice.

Keywords: staff development; third spaces; artificial intelligence; collaborative learning; learning theory; iterationism.

Introduction

Staff developers are still coping with the pedagogical shock of the global pandemic and the resulting need to deliver support for academics online at short notice. Generative artificial intelligence has compounded this situation by confronting developers with the challenge of understanding these new technologies and providing authentic pedagogical support for academics who are likewise struggling to adapt. Staff developers and academics alike are confronted by artificial intelligence (AI) with implications for practice which may be as far-reaching in terms of their impact as the arrival of the internet or the mobile phone.

This article responds to these challenges by reviewing a staff development workshop on AI and collaborative learning delivered to academics from various disciplines at the University of Derby. Throughout this article, we use the term AI as a catch-all to include its generative form recognising the fluidity and interplay between multiple technologies involved. We do so for simplicity and to maintain the focus on organisational and pedagogical issues in this article whilst acknowledging the complex fast-changing reality of AI technologies.

Following the original idea of 'third space' as the coming together of different cultures (Bhabha, 1990), we are a group of online lecturers working in 'an emergent territory between academic and professional domains' and 'creating new institutional spaces, knowledges and relationships' (Whitchurch, 2008, p.377, p.386). As online lecturers, we delivered professional development in the classroom for campus-based lecturers in the spirit of 'partnership' (Whitchurch, 2024). This formed part of the Collaborative Learning and AI (CLAI) research project funded during spring 2023. The project had three aims:

1) Firstly, we sought to move the focus on AI beyond the inevitable and still important concerns about 'cheating'. Such concerns remain valid and important, but we know industry and education are already making extensive use of these technologies and there is an imperative to understand the pedagogical applications and opportunities at the very least for purposes of student employability.

2) Secondly, we sought to create an early space for cross-disciplinary dialogue to share current thinking and best practice. This is partly to address anxieties and partly to develop and share existing knowledge about 'what works'.

3) Thirdly, we sought to address the need for effective staff development for using AI in the classroom as an authentic application of these technologies. Most educators still teach in classrooms therefore academic developers need to understand how best to model and support good practice using AI for collaborative learning in traditional social settings.

In this empirical study, we evaluate our experiential provision and further develop our emergent theory of learning with AI technologies (Bowskill et al., 2023) to make connections between Iterationism (Bowskill, 2024), Constructivism (Ackermann, 2001), and Constructionism (Papert and Harel,1991). This will guide pedagogy and learning design with AI. We address the research question: How can online lecturers work as third space professionals in a staff development role to support the use of AI for collaborative learning using a classroom-based approach?

Understanding artificial intelligence

A common view of AI refers to the capability of machines to perform tasks which simulate human-like cognition. This can include perception, reasoning, learning, decision-making, natural language processing, learning from experience, and taking actions to achieve desired objectives (Lee and Qiufan, 2021; Nilsson, 2021; Russell and Norvig, 2021). The extent to which they can achieve this overall aim is still unclear and may have already happened. Others argue this comparison with human cognition is a misunderstanding of the impact and potential of these technologies (Floridi, 2017). Indeed, Floridi (2017) argues that we should be disinterested in the ability of a machine to think like a human, and rather more interested in what AI might do without humans. Regardless of how we

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define these technologies, they have been widely used since the arrival of ChatGPT in late
2022. This has been seen as another watershed moment in education and technology.

Generative AI tools are software applications that use artificial intelligence technologies to
automate various tasks (Fadel, Holmes and Bialik, 2021). Examples include Microsoft
Bing; Google Gemini; Grammarly; and ChatGPT. Many combine a range of functions and
their abilities are constantly evolving. We used Perplexity for the workshop discussed in
this study only because it was regarded as more reliable and trustworthy at that time.
Perplexity also provided relevant authentic sources to accompany responses.

Although the implications of AI technologies are being discussed in the literature (Cotton,
Cotton and Shipway, 2023) there is little empirical research into staff development
provision in a classroom context. As in the earlier Covid-19 pandemic, most
establishments are therefore under-prepared.

Third space professionals

Third spaces provide opportunities for collaboration where different roles come together to
support and develop practice. Third space professionals are those operating across
various divides. This covers differences between professionals and academics; work
across subject boundaries; and collaboration across and between institutions (Whitchurch,
2024). However, it is unclear how to put the third space concept into operation (Daza,
Gudmundsdottir and Lund, 2021).

Identity is seen as central to the third space conversation in the literature (Bhabha, 1990;
Whitchurch, 2013). On the one hand, new hybrid identities are being formed in third
spaces. On the other, identities are fluid and ambiguous in and between such spaces
(Smith et al., 2021). Identity is under constant negotiation in third space roles, being co-
constructed through dialogue and interaction with colleagues (Whitchurch, 2013). As
online academics delivering professional development in the classroom, we argue that AI
specifically necessitates new thinking about existing roles which requires a situated view of
development in third spaces. We go further and argue this is not only a view of third

spaces in relation to merging roles but one which needs to recognise AI itself as a new non-human partner in development activities and identity formation.

Mindful of the growing trend towards online teaching in the post-Covid-19 era, there are calls to further develop technology-enhanced third spaces in order to support collaboration and flexibility across space and time (White, White and Borthwick, 2020). Technology is seen as particularly useful to enable and support the development of third spaces. For example, digital third spaces have been used for online cooperation between schools and universities to support initial teacher education (Chan, 2020). Elsewhere, developers of digital learning content have described themselves as third space or 'blended professionals' performing both technical and academic roles (White, White and Borthwick, 2020). We argue that the impact of AI cuts across all roles and modes of practice. As such, AI may itself be regarded as a particular form of third space enabling and demanding new forms of collaboration some of which may be automated.

The wish to exploit the potential of third spaces can be compromised by relationships and the struggle to achieve consensus. It is difficult to bring together diverse views and still support equal participation in such spaces. These are relational tensions (Daza, Gudmundsdottir and Lund, 2021). Likewise, it is difficult to maintain initial work in third spaces for any length of time without the necessary funding and focused support. These are development and sustainability tensions (Daza, Gudmundsdottir and Lund, 2021). We argue that diversity and not consensus may be a more useful instructional goal (Stroup et al., 2007) for third space development with AI. Practitioners may better understand uses of AI from a diversity of shared examples than might be gained from a single case. We further argue, the shared quest to understand pedagogical applications of AI, in a rapidly evolving environment, may provide a vehicle for sustained third space development.

Research context

The Collaborative Learning and AI (CLAI) Project is a 'Seedcorn' research project funded by the University of Derby. To initiate this project, we submitted a successful proposal which was approved by the University Ethics Committee. Our focus was on academic

development with the aim to deliver an experiential classroom-based workshop for participants wishing to explore applications of AI to collaborative learning.

Specifically, we used scenario-based learning, which is an approach locating the learner in 'near-world' situations (Errington, 2011). This was delivered as a collaborative learning strategy with AI and as a form of experiential learning (Kolb, 2014) where participants could develop their knowledge in a safe setting. These instructional strategies are already familiar to many academics making it easier to isolate features of AI technology for discussion and possible transfer.

Workshop design

We designed a workshop in which participants were placed in groups and most used their own device. The session began with a brief orientation to the project, the AI technologies, and the workshop structure. There was an early opportunity for participants to introduce themselves to their colleagues and to share their motivation for attending the workshop.

Participants were provided with an initial prompt to input into the AI tool. The technology would then generate a given scenario for a healthy river. After each participant had generated the scenario, they were invited to discuss the potential in groups. Participants were then asked to identify a variable of their choice to be introduced to the healthy scenario. An example was given in which pollution entered the river for three hours a day over the course of a year.

Groups were then invited to iterate on their chosen variable to explore different possible outcomes before sharing their experiences in their groups. A plenary was then organised to review the potential for this activity structure and the use of AI in their practice. The activity was followed by focus group session to explore their experience of the activity, the workshop, and their subsequent thoughts about AI in education.

Literature review

Collaborative learning is a joint intellectual effort by peers and is widely acknowledged as a constructivist, pedagogical approach that fosters learning (Ashman and Gillies, 2003; Chi and Wylie, 2014; Hernández-Sellés, 2021; Nasir et al., 2021). In the current landscape of education, with digital content and learning technologies taking centre stage, the integration of collaborative learning, purposeful learning technologies, and digital content has the potential to push the boundaries of student learning beyond that which is achievable in traditional, non-digital settings (Jones et al., 2006). Additionally, the introduction of AI into collaborative learning amplifies the pedagogical possibilities, making it potentially transformative (Rienties, Simonsen and Herodotou, 2020; Kuleto et al., 2021).

AI can support the collaborative learning process helping students achieve shared learning objectives (Ghavifekr, 2020; Major, 2020; Chen et al., 2022). Collaborative learning with AI plays a potentially valuable role in enriching collaborative learning experiences through intelligent support, communication and facilitation, personalised feedback and guidance, and suggestions for intervention (Kasepalu et al., 2020; Li and Xing, 2021; Cotton, Cotton and Shipway, 2023; Du Boulay, Mitrovic and Yacef, 2023). Table 1 below shows several techniques for supporting collaborative learning with AI (Martinez-Maldonado, van Leeuwen and Swiecki, 2023).

Table 1. Techniques for supporting collaborative learning with AI (Martinez-Maldonado, van Leeuwen and Swiecki, 2023, p.432).

Type of support	AI techniques used	Contexts explored
Group formation	Genetic algorithms, swarm intelligence algorithms, multi-agent formation algorithms, clustering, semantic web ontologies, social network analysis, word embeddings, decision trees, naive Bayes, logistic regression. Recommender systems, intelligent tutoring systems, adaptive intelligent hints, data visualisation, dashboards.	Mostly online

Formative feedback to learners	Recommender systems, intelligent tutoring systems, adaptive intelligent hints, data visualisation, dashboards.	Mostly online (some face-to-face cases)
Adaptive scripting	Adaptive scripting, end-user scripting, dynamic modelling, intelligent tutoring systems, classification of group conversations, NLP.	Mostly online
Group awareness	Data aggregation, clustering, basic statistics, data visualisation, affective computing (e.g. facial recognition algorithms).	Mostly online (some face-to-face cases)
Teacher awareness	Data aggregation, clustering, basic statistics, data visualisation, affective computing (e.g. facial recognition algorithms).	Mostly online (some face-to-face cases)
Summative assessment	NLP, automatic conversation coding, classifiers, multimodal analytics, dynamic Bayesian networks, cohesion networks, contingency graphs, epistemic network analysis, group communication analysis.	Mostly online (some face-to-face cases)

Teachers currently use AI to increase engagement in student debates within the classroom (Birenbaum, 2023; Zhu et al., 2023). AI can generate scenarios for collaborative group activities (Rudolph, Tan and Tan, 2023). AI facilitates structured discussions providing real-time feedback (Kasneci et al., 2023). Group interactions are improved along with better outcomes from problem-solving activities (Gilson et al., 2023).

ChatGPT has emerged as a valuable tool in educational settings (Birenbaum, 2023; Zhu et al, 2023). Tools such as ChatGPT, help learners exchange ideas, seek collective understanding, and potentially improve communication skills and teamwork (Nguyen et al., 2023). However, results are inconsistent, and adoption should be approached carefully (Mena-Guacas et al., 2023). Further research is needed to address concerns about

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accuracy, reliability, and reduced human interaction using AI (Vasconcelos and Santos, 2023).

Overall, the response to ChatGPT's launch varies. Early adopters are often excited about user-friendly accessibility and the potential of AI in collaborative learning. However, concerns remain regarding the impact of AI on academic integrity invoking fears about negative implications for different stakeholders (García-Peñalvo, 2023). However, responsible use of AI, alongside effective learning design, can yield significant benefits in higher education (Marron, 2023). Figure 1 below outlines an agenda for future research for the use of AI in education based on different perspectives (Dwivedi et al., 2023).

**Figure 1. Perspectives for future research (Dwivedi et al, 2023).**

Tool Perspective
Developing techniques to enhance the transparency of AI models which will help explain outcome responses.

Proxy Perspective
How responsible and ethical policies, practices, and regulations can help diffusion of AI in organisations; and what is the impact of these on AI tools within organisations?

Ensemble Perspective
Where, when, and under what contexts, is it best to implement AI tools, and how do societal views shape the outcomes of adopting these tools from an ethical and moral perspective?

Skills Perspective
Which skills, resources, and capabilities (technical and non-technical) are necessary to implement and understand the impact of AI tools? What role does the government, training provides, developers, and higher education have in developing these skills?

Researchers have explored different applications of ChatGPT in education. Students given practical experiences and hands-on AI training saw improved learning outcomes from

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collaborative learning across different disciplines (Baskara, 2023). ChatGPT showed potential as a cognitive partner in collaborative learning scenarios producing improvements in critical thinking and problem-solving skills (Cain, 2023). When used for digital story-telling, ChatGPT has been effective for sharing knowledge in collaborative learning activities (Cranfield, Venter and Daniels, 2023). Figure 2 below show a variety of strategies for integrating ChatGPT in education (Zhu et al., 2023).

In summary, these technologies and their outputs can be understood as 'objects-to-think-with' (Vasconcelos and Santos, 2023). As part of collaborative learning, AI can enhance reflective thinking, creativity, problem-solving, and concept comprehension.

Figure 2. Strategies for integrating ChatGPT (Zhu et al., 2023).
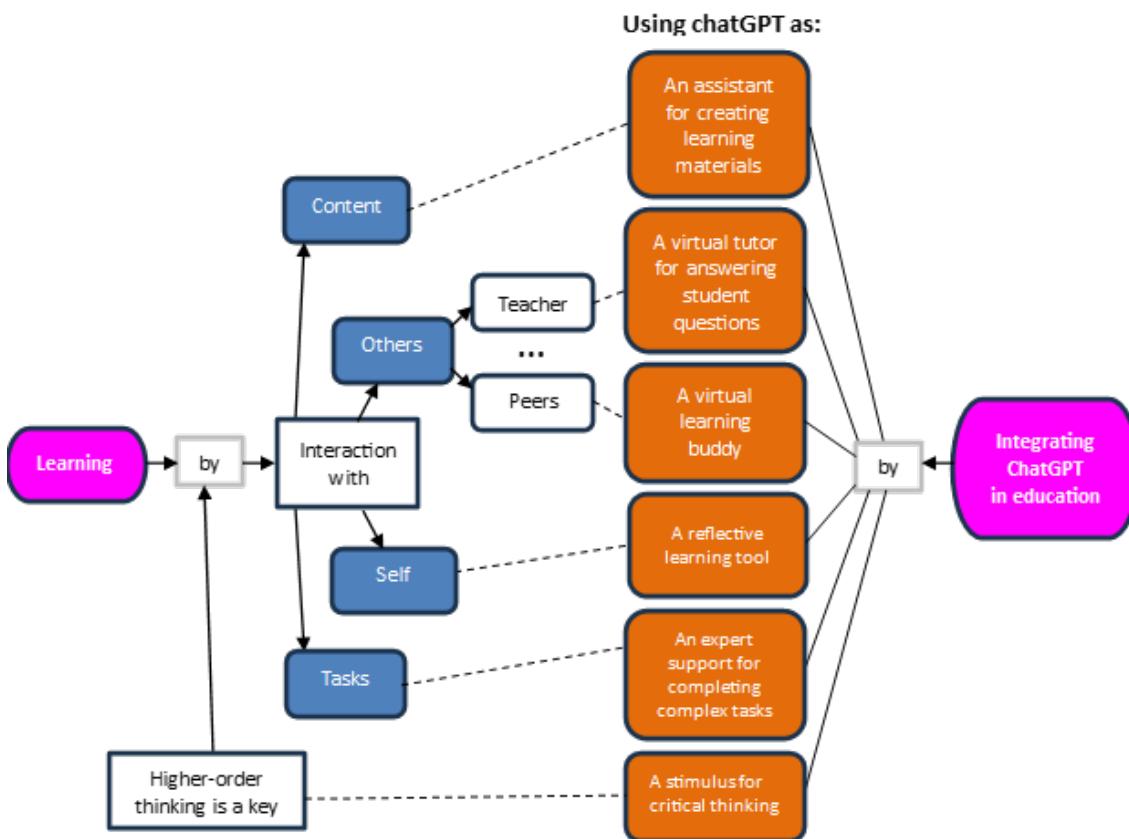
Methodology

We recognise practitioners hold subjective views of academic practice and new technologies. We therefore framed this study within an Interpretivist paradigm which

recognises multiple realities (Kivunja and Kuyini, 2017). Within a world of subjective reality, meaning is constructed through dialogue and social interaction; therefore, our study is designed around a subjective ontology and a social constructivist epistemology.

We adopted a qualitative methodology seeking to understand situated perspectives of participants in a staff development workshop within a UK university. Specifically, we used a workshop on AI for collaborative learning as a vehicle to prepare participants to participate meaningfully in the subsequent focus group session.

Focus groups have the advantage of being one of the few methods for sampling a group-level discussion. They are valid as a means of exploring socially situated perspectives and as a way of exploring common experiences held by a group (Krueger and Casey, 2014). They have the disadvantage of being vulnerable to individuals remaining quiet or involving others who may dominate discussions. Hosting focus group discussions is therefore a key skill for researchers.

The sample was purposive. We sought to recruit those who were interested in exploring applications of AI to collaborative learning and who were best suited to provide the appropriate data. As both the workshop and focus group are social activities, we thought those willing to participate in one would likely be open to actively participating in the other.

Ethical issues were addressed. A research proposal was submitted and approved by the university. Consent was gained from participants who were briefed verbally and in writing before the workshop and again before the focus group.

Findings

The audio recording from the focus group was transcribed and analysed using thematic analysis (Braun, Clarke and Hayfield, 2022). Four themes emerged from the focus group discussion which were:

1. Concerns and challenges in AI adoption.
2. Perceptions of students' use of AI.

3. Impact of the workshop.
4. Iterating prompts is thinking aloud.

Concerns and challenges in AI adoption

Participants often felt unprepared and anxious about any technology being introduced into their practice. One participant said, 'I think people are quite nervous about just not knowing how to do it, not understanding it, being worried that they're going to break something' (Lecturer 2). This fear of negative consequences risks acting as a barrier to AI adoption, but more research was required as evidence to encourage adoption. However, this was recognised as problematic: 'How generative AI is developing right now and the time it takes to get a very good, reliable peer reviewed bank of research data…there's going to be quite a big gap there' (Lecturer 6).

Others were concerned about the implications for assessment and the constraints imposed by exam boards. These external factors were an important determinant of adoption: 'We will have to change the way that we examine the students. But we are accredited by the IET…and that's a body that still insists 60% of the work has to be exams' (Lecturer 3). Some of these concerns will possibly be addressed as the technologies improve, but nonetheless, this highlights the need for further professional development for classroom-based delivery.

Perceptions of students' use of AI

There was a general concern that these technologies should not become a replacement for critical and reflective thought and that AI was already being used for dubious purposes: 'We've got a student, who's never written a thousand words ever before, sending a thousand words on why he should get an extension to his essay' (Lecturer 2).

Tutors recognised that AI has considerable potential to process information but students relying on these technologies may not have the skills to understand the significance of the output in professional learning settings: 'Law is a lot of information…and we worry that, yes, this will give them all of that information, but if they don't have the basic skills …you

would kind of turn out people who would turn up in Law firms, and… you can't do that extra step' (Lecturer 8).

Teaching staff were likewise concerned about students who were already adopting technologies which gave out inaccurate information: '…we got an essay from a student who was talking about two papers that had been published …last year…And it's like, and we checked them, they didn't exist' (Lecturer 2). Students are already using AI but without guidance from lecturers, they risk ineffective or inappropriate use. This highlights the need for academic development to understand opportunities and implications of AI in practice.

Impact of the workshop

The workshop was valued for the way it modelled a pedagogical application of AI which might then feed into conversations with colleagues: 'The more research around how we can use it pedagogically like we've been doing this morning, the easier that becomes, … that's what we're about, isn't it? It enables us to talk to colleagues about using it' (Lecturer 5). Another participant went further and passed details to colleagues immediately after the focus group: 'The one thing I have shared straight away is Perplexity. I bumped into two colleagues and bombarded them enthusiastically with talk of AI with citations!' (Lecturer 10).

At a more general level, the workshop provided a networking opportunity with those interested in AI and learning: 'The opportunity to think about it, even in its infancy, with people from different disciplines is really useful. Even at this stage, there was some interesting, good practice being shared which I think is really exciting' (Lecturer 9). At a more technical level, the workshop also helped participants understand the importance of prompts to achieve effective outcomes and in that respect, it gave them new skills: 'That's actually my first real experience of doing that prompt engineering and understanding how to frame questions better, but also how to do that' (Lecturer 5).

Iterating prompts is thinking aloud

Through the experience of working with the given scenario, the participants became aware of the need to further develop their initial prompts to achieve their learning goals, and that

iteration was a form of thinking aloud: 'That layered approach where you've asked it your first question and then you refine it. So, that's the first time I've done that. So that was really good' (Lecturer 5). Participants realised that the process mattered as much as the product: 'What are you actually typing and what are you writing down? Because that information is probably more effective. Are you actually asking the right question?' (Lecturer 4).

Participants appreciated the ability to develop and explore the given scenario generated by AI which offered ways to personalise learning. However, this required more than a single prompt to achieve a meaningful outcome. This required thought and care: 'I just asked it a series of questions. We started off about the river, and I ended up in Level 4 chemistry, but in three or four very selectively worded sets of questions' (Lecturer 6). Participants recognised that the initial prompt was rarely enough to provide the desired information and that a great deal of engagement and cognitive effort was necessary: 'It is learning using your intellectual processes to ask questions properly and to ask focused questions. And that's a lot of what we're trying to get the students to do, to use their intellect to ask focused questions' (Lecturer 2).

The workshop experience also served as a model of alternative assessment in which tutors might explore student's thinking through an examination of their prompts: 'That would be a really nice exercise to do with students. So, rather than an assessment, if you did some sort of workshop where … you're not really getting to the answer with the question, but you want to see how they're finding out research' (Lecturer 6). In this way, the prompts provided a window on how students were thinking and how their thoughts evolved in relation to the AI outputs.

Discussion

From our findings, we can see an interesting picture emerging of lecturers who are again anxious about more new technologies. AI is also rapidly evolving, as they struggle to understand implications for practice. At the same time, there are various pressures exerted on tutors from inside the institution and from without. Students are already using these technologies for producing assessments and requests for extensions. Tutors are struggling

to know how to respond. Similarly, professional bodies are proving slow to react, meaning that tutors are still required to maintain conventional practices they know are already vulnerable to AI technologies. Research is also struggling to keep up with developments, meaning that evidence which might be used as a basis for change is slow to arrive or is already outdated when published.

Classroom-based workshops do provide opportunities for discussing these and other concerns. Such provision provides a means for sharing current practice from across the university, and our workshop experience is already feeding into conversations with colleagues in various departments. These experiential workshops provide pedagogical models for consideration and adaptation. They provide initial starting points for engaging with AI technologies in a supportive atmosphere. This event was several months after the arrival of ChatGPT and for many tutors this was the first opportunity to discuss issues and solutions. Similar experiential classroom-based events are needed because most of the teaching in the university still happens on-campus, but this will also change. We are therefore developing online versions of this workshop to support our work as online tutors but equally to help on-campus lecturers who increasingly make use of the digital environment.

These technologies are interesting for the way they engage participants to go beyond the initial inputs. Tutors have recognised prompts are iterated several times and they evidence thinking at each stage. This suggests the process may be at least as important for learning with AI compared to the products generated. We therefore theorise prompts and their role in making thinking visible and externalising thought processes and cognitive effort.

Iterationism as a theory of learning with AI

We have coined the term Iterationism as an emergent theory of learning with AI (Bowskill et al., 2023). Here we will add further detail based on this study. As we briefly explain below, Iterationism relates closely to Constructivism (Ackermann, 2001) and Constructionism (Papert and Harel, 1991).

Constructivism (Ackermann, 2001; Fosnot and Perry, 1996) argues that if learners engage with social experience to make sense of it, they may change internal structures in the

development of new knowledge. This process involves either assimilating new information into existing schema or adding new schema to accommodate these changes. This theory therefore gives a sense of the process and product of learning.

Constructionism (Papert and Harel, 1991) acknowledges these internal change processes and seeks to make them visible by having the learner create digital representations of inner thought. This process initially used simplified programming languages. These digital creations then become shareable digital objects for discussion and review. We argue that although this theory proposes the creation of digital representations of inner thought, the process of generating such representational products requires cognitive work most of which remains invisible.

We argue that Constructionism implicitly shows the product of cognitive effort rather than the process. Such a process likely extends beyond a single interaction. Learning is rarely instant. Iterationism addresses this issue through a focus on AI which regards prompts as traces of thinking. Engagement with AI is rarely finished first time and users of ChatGPT and Generative AI iterate prompts several times to achieve a given purpose. We argue that these iterations reflect and visualise the thinking process. Over a series of prompts, the learner records and displays the cognitive effort involved in achieving their learning goal. These prompts can be used as a basis for sharing, reflection, and assessment of cognitive effort and their thought process as it evolved. Iterationism thereby addresses the theoretical gap. Evolving AI prompts represent the internal cognitive process and thereby externalise the mental effort, which is so central to Constructivism, and which is not really evident in Constructionism.

Therefore, if Constructivism argues that inner changes are achieved through mental effort then that internal process is reflected in Iterationism. The trail of prompts and the resulting outputs from using Generative AI tools allow us to focus on the thought process as much as the resulting representational outputs. This combination makes visible the cognitive effort which can be used for discussion and an alternative basis for development. Indeed, Iterationism combines Constructivism and Constructionism visualising both the process and the products in an externalised and shareable form. This was evidenced in the focus group discussions and the actions of participants in the above workshop. This offers an agenda for further research.

Iterationism has implications for theory and practice. We have provided a theoretical framework for thinking about applications of AI to education. Iterationism addresses the gap between Constructivism and Constructionism. Iterationism extends current theory to open new perspectives on practice specifically as it relates to AI in education. At a minimum, this has implications for reflective practice, assessment, and collaborative learning. It has implications and guidance for classroom-based learning, online learning and independent learning. This extends into the online space with additional possibilities for exploring individual and collective thinking processes beyond the classroom. It has considerable implications for professional development wherever and however process-oriented learning is delivered and researched.

Conclusion

This article sought to answer the research question: how can online lecturers work as third space professionals in a staff development role to support the use of AI for collaborative learning using a classroom-based approach? In response, we make four distinct contributions to the literature on third space professionals, which are:

1) Online lecturers can occupy and create third spaces across different modes including while working in a staff development role centred upon the on-campus classroom. This further highlights the fluidity of role-based identity.

2) Collaboration on pedagogical applications of AI can help overcome relational tensions inherent in much of the work already done on third space research (Daza, Gudmundsdottir and Lund, 2023).

3) We conceptualise AI as a third space technology, not only for the way it provides a common interest across all stakeholders, but for the way it feeds into and maintains dialogue between students, academics, and external organisations. This addresses the challenge of development and sustainability tensions in third space research (Daza, Gudmundsdottir and Lund, 2023).

4) As a result of our third space work, we developed theory to help understand and develop AI and collaborative learning online, on-campus, and off-campus (Bowskill, 2024). Our third space work spans different modes and different locations.

It is not currently realistic to expect that any specific role or department will be experts in the pedagogical implications of AI. These technologies are varied and constantly evolving. We argue that our work shows the value of a shared or distributed leadership approach (Spillane, 2005) to institutional development of AI for learning, teaching, and research. All stakeholders need to be mutually supportive and to cooperate for mutual benefit. As a group of online lecturers, we have created a third space bringing together academics from across the university for a staff development workshop. We believe this exemplifies third space professionalism spanning staff development, online tutoring, and campus-based academics.

Pedagogical development for effective use of new technologies already provides opportunities for third space development. AI is a specific example of the ways in which new technologies provide a common cause for all roles within and beyond the university. Sharing best practice for using AI safely, ethically, and effectively can alleviate the various tensions which characterise third space work. Indeed, we argue that AI demands a third space approach.

We go further and argue that AI is itself a third space. Our work as online lecturers is a case in point. We explored collaborative learning with AI and our emerging theory of Iterationism is developed in collaboration with online students, on-campus academics, and off-site military educators. Each interaction creates specific overlapping spaces and generates conversations running within and across these different boundaries.

We have developed our theory of AI and learning from third space work. We have bridged the theoretical gap between Constructivism and Constructionism to show how both cognitive effort and representational thinking can be achieved by focusing on AI prompts individually, collectively and in sequence. These cognitive traces can also be considered in relation to the outputs showing how each was developed.

Finally, we have expanded our initial staff development workshop in terms of scale and audience. We extended the initial work into a full day session to cover both theory and practice in an experiential model (Bowskill, 2024). This work continues to feed back into online provision with distributed students. We continue to develop our research into these

different strands on staff development, Iterationism and third space professionalism. This work reflects our growing focus upon AI and a process-oriented view of learning.

Acknowledgements

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