Theoretically Rich Design Thinking: Blended Approaches for Educational Technology Workshops

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Abstract
This paper is a reflective account that outlines the design of two Continual Professional Development (CPD) workshop sessions based on a blend of theory for design thinking about aspects of curriculum, pedagogy and technology. The theoretical approach blended aspects of design-based research, speculative design, Activity Theory and subtractive change to address issues, barriers and explore opportunities in each workshop example that is presented. The first of these workshops brought university engineering lecturers together to explore the opportunities and barriers for integrating 'co-creation' as a pedagogical strategy to subject teaching alongside a new interface into their curriculum. The results show how design thinking exposes limitations and challenges that prevent the realisation of pedagogically rich interventions. The second workshop brought together post-compulsory vocational lecturers to a teacher education workshop and used the same theoretical reference points to inform and antagonise the implications that Large Language Models, such as Chat GPT, present to subject knowledge, curriculum design and modes of assessment. Here these theoretically rich forms are proposed for planning use in learning design and for reshaping curricula, where academics and other professionals supporting teaching and learning may want to introduce new technologies and integrate innovative pedagogical methods or confront new challenges to their work. They may also be used as continual professional development sessions in highly participatory, practical and creative ways that allow for lucid experimentation and to imbue professionals with agency and trust.

Keywords: Participatory Workshop, Continual Professional Development, Curriculum Design, Subtractive Change, Artificial Intelligence

1. Introduction

This paper outlines the use of a blend of design-influenced theory to guide workshops for teacher education. The paper starts with an overview of the relevant aspects of theory and makes the case that these can be aligned to people-centred design. These theories were combined into prompts and activities for participants to think about their curriculum and praxis situated in the context of professional development workshops.

Speculative design (SD) has been shown as a valuable way of improving 'technological fluency', often through processes where solutions can be reached in accordance with clearly identified problems (Lukens and Di Salvo, 2012). Those authors also show how SD can assist participants in developing skills, while also considering the application of the technology simultaneous to learning about the technology. It seemed apparent that in looking at opportunities for bringing together participatory professional practice with academics and other professionals who teach or support learning own insights about their contexts, there was potential in a blend of theoretical reference points that bridge the domains of teaching, research and design-thinking. Speculative design has variously been used to explore challenges and opportunities (Khan et al., 2021), potential, limitations and margins for future design (Ruller et al, 2022) and give imagination to affordances and possibility of Artificial Intelligence through collective storytelling (Bozkurt et al., 2023). These reports were inspirational and remind us that Ross points to SD as handling uncertainty and, in citing Biesta, for engagement with complexity. Ross cites Cortile et al. (2020) and Uncertain Commons (2013) in outlining two approaches to SD: "Firmative speculation is one approach which seeks to solidify, pin down or enclose the future…Affirmative speculation, on the other hand, creatively engages with uncertainty, using intuition and play" (Ross, 2023: 57). This second approach is more in fitting with a practical-based workshop approach, particularly where attendees are professionals situated in varied and diverse contexts, and especially where 'low trust' is a central tenet of how management have come to perceive educational staff (Ball, 2003). In those cases, academics and other professionals who teach or support learning involved in Continual Professional Development (CPD) workshops must feel endowed with decision-making that is right and fitting for their own domains and contexts.

Scenarios are shown by Carvalho et al. (2022) as a basis for participants to conceptualise the future where the impact of a new technological advancement is to be considered and that educators and learners work together to imagine educational futures. This approach complements that of other areas of design thinking, where participants views are key to speculating technology's impact on curriculum.

'Participants' in this paper is a deliberate term: it's accepted that design thinking is often deployed with students and to enhance collaboration (Bene and McNeilly, 2020). But this can risk separating such approaches within contexts (course modules, learning outcomes, classroom activities) that may make them detached from real world problems. Where educators and management are the primary participants in these problem-based workshops, the implications (for pedagogy, assessment, staff

development needs, decision-making, etc) may become rooted in organisations that can enable transformation (Dzombak and Beckman, 2020), but where especially it is rooted in criticality (Kimbell and Sloane, 2020) that is inherent to Speculative methods (Ross, 2022). The focus on problems evident in design thinking entails the 'radical collaboration' (Bene and McNeilly, 2020) and iterative processing that have overlaps located in design-based research approaches.

Design-based research (DBR) is a facet that enriched the workshop with its overlaps between design, research and practice. DBR has roots in educational technology implementation and bridges theory and practice by engaging multiple stakeholders, often students, in evaluative and iterative cycles of feedback (Wang and Hannafin, 2005). According to Reeves, DBR has three main principles:
- addressing complex problems in real contexts in collaboration with practitioners;
- integrating known and hypothetical design principles with technological advances to render plausible solutions to these complex problems; and,
- conducting rigorous and reflective inquiry to test and refine innovative learning environments as well as to define new design principles (Reeves, 2006: 58)

The role of DBR is less centred on problem-solving and more focused on 'reflection-in-action' (Kennedy-Clark, 2013), whereby different members work together in cyclical (Plomp, 2007) feedback loops that enable revision and refinement to how technologies are introduced or used. This is on a pragmatic level, but DBR also has potential beyond this to developing theoretical understanding and even claims "to understanding the relationships among theory, designed artefacts, and practice." (Design-Based Research Collective 2003: 6).

Given the focus in design-based research, it was important to create a planning activity that enabled participants to map out their different contexts. This would help put the different domains front and central to sessions, as participants could visibly show the various stakeholders both inherent (i.e., students, technical support) and often invisible (i.e., management, policymakers) to their curricula planning.

Mapping has long been an exercise for educators and curriculum designers to improve transparency and potentially identify disconnect between what is supposed to be taught and what is actually taught (English, 1980). Uchiyama and Radin (2009) argue that for too long academics and other professionals who teach or support learning in HE were left to fly solo, rather than in formation, and show how curriculum mapping can be a more collaborative exercise that starts individually and leads to stages of review, aggregation and revision. Collaboration here is shown as markedly important in terms of who the curriculum is designed by, how familiar it is to academics and other professionals who teach or support learning, how much freedom and autonomy they have to design it and how much trust they are imbued with in the process. However, the understanding here is of curricula as the whole experience, including not just the content that is being taught but the processes, the people, the environment and the tools.

The mapping approach taken in these workshops was partly informed by a methodological approach previously shown by Mwanza-Simwami (2011) to researching mobile learning. Mwanza-Simwami's own model arises from Activity Theory from the work of Engeström (1999) which aims to make account for the various members ('subjects') involved in human activities and processes, their interaction with environment and context ('community') objects and how these might help realise objectives. On the surface, it may seem a crude fit to use Engerstrom's Activity Theory with educational planning. With its focus on 'division of labour' and 'rules' it may seem a model situated in Fordian-industrial and capitalist language, but its focus is purely on collegial collaboration, with process and outcomes training attention on human activity. Mwanza-Simwami, distilled these components into the 8-step model (2011) shown in Figure below that was operationalised for the workshops. This entailed a mapping activity that allowed participants to highlight for their own thinking the core criteria of their curricula, according to the prompts from Mwanza-Simwami, shown in Figure 1. For instance, step 1 asks about activity, which might involve participants mapping their subject to focus on 'assessment' as the activity the participants are interested in exploring. Later, step 5 asks about rules and regulations. This could, for example, be the approach to types of assessment, either group or individual, practical or theoretical. In this version and for the purpose of the workshop, participants were encouraged to use whatever aspects mapped to their domain, allowing for modification of the domain rather than following each and every step.

Figure 1: Mwanza-Simwami's 8-step model

The Eight-Step-Model		
Identify the: -		Question to Ask
Step 1	Activity of interest	What sort of activity am I interested in?
Step 2	Object-ive	Why is the activity taking place?
Step 3	Subjects	Who is involved in carrying out this activity?
Step 4	Tools	By what means are the subjects performing this activity?
Step 5	Rules & Regulations	Are there any cultural norms, rules or regulations governing the performance of this activity?
Step 6	Division of labour	Who is responsible for what, when carrying out this activity and how are the roles organised?
Step 7	Community	What is the environment in which activity is carried out?
Step 8	Outcome	What is the desired Outcome from carrying out this activity?

Source: Mwanza-Simwami (2011: 80)

2. Methods

As stated, the mapping exercise enabled participants to work individually or in groups to bring the curricula front and centre to their thinking. It was with SD in mind that

planning began for sessions that would enable practitioners to have practical hands-on interaction with tools in a workshop environment, but which also enable participants to imagine the possibilities inherent to introducing new elements to planning teaching: "Speculative methods are often described as research methods but they are equally suited to teaching contexts – and their close couplings of provocation, engagement and inquiry are a good fit with the complex knowledge-production spaces of learning and education." (Ross, 2023: 57).

The final element of creating a theoretically rich approach to the workshops were drawn from another area of design thinking. This time the notion was based on an approach where technology is used to change or improve processes and changes, but is based on removal of components. We note that in CPD there is often a focus on complementing existing practices with extra tools. The number of tools is highly western in character, based on an abundance of resources that lead practitioners and planners to add more elements as default, defining continual innovation in terms of accumulation and acquisition, over reinvention or modification of existing resources. This alternative approach to contextual issues is labelled 'subtractive change' and has reduction at its core, rather than adding more layers and options added (Adams, Converse, Hales and Klotz, 2021). Subtractive change is based on identifying extraneous parts and the removal of components as a prompt in design thinking that can be argued to be more sustainable in a world where abundance, more platforms and more and more options has become the norm. Using this, participants were invited to consider which specific elements of their contexts could be removed in light of other elements that may be introduced. This gives participants rise to critically discuss aspects of their work which may be superfluous: whether that be particular tools or protocols. The responses may be hypothetical and even destabilising, but they should allow for analytical distance to means and processes in systems.

These considerations were helpful in designing two workshops outlined in this paper, which are now described with some participants results shared, before being evaluated. In each case that is presented, slight variations of the theoretical blended approach to design thinking is characterised by the different context and different problems being addressed, some of which are barriers to change and some of which are the potential impact of new technologies and their implementation.

3. Context for examples:

It should be noted that the work of this writer is primarily situated in teacher education at an English university, as part of a team that provides a Postgraduate Certificate of Education in the post-compulsory sector, which is often also called the skills or vocational sector. This is a sector that has been fecund for innovation with digital technologies through varying bodies and principally in recent year through the publication of the influential 2014 Further Education Learning Technologies Action Group (FELTAG) report (2014), which called for greater upskilling of digital technologies and literacies among staff and students. As such, teaching staff for post-compulsory education are often innovative and flexible in terms of professional

learning design (Scott et al., 2022). The second example in this paper outlines an example where speculative design was applied in a second workshop with post-compulsory educators. Both examples are physically situated in Higher Education.

Example One: Speculative Design and Design-based research in University of Maribor, Slovenia, with Engineering Students

The first workshop was part of an Erasmus+-funded project, where the writer was part of a team aimed at promoting the use of 'co-creation' as a pedagogical tool, through the development of a new interface called 'Nextbook', which in its prototype was an interactive textbook platform. The writer was tasked with persuading users to adapt both the pedagogical form and the technology into their teaching. That this happened during the Covid-19 campus closures made the task more challenging, for at once practitioners were simultaneously pivoting to online formats to continue provision, looking for new tools that they could quickly get themselves and their students to grips with, and developing skills among staff to teach online (among other demands and challenges). When we were finally able to make a case for travel, UK partners attended a partner university in Slovenia from the project, where the first workshop happened.

The environment was a regular classroom, with a Smartboard where the interface Nextbook was demonstrated and presentations were then made about the affordances that can be drawn from 'co-creative' approaches to teaching and learning. In co-creation, students are engaged as partners in the teaching and content of their learning (Bovill, 2020), while Ramaswamy and Ozcan define it as creation through interaction (2018). Nextbook was an online platform were learning materials were uploaded to the interface and academics and other professionals who teach or support learning and students interacted with the resources so that annotated comments, questions and answers from students were visible to all. As part of that project, we were tasked with inviting academics and other professionals who teach or support learning to use the platform in their teaching, hence the workshop session which explained these details. Although it may seem something of a sales pitch approach to a commercial product, the real intent was to promote active learning through co-creation. This can involve students choosing resources, having more choice on mode of delivery and assessment and even co-designing courses and curricula (Delpish et al., 2010).

Following presentations of the platform and ideas around co-creation, participants were able to use the platform itself, uploading documents, highlighting sections of core texts, posing questions to (hypothetical) students, responding to one another or adding annotations or identifying problems. The workshop began with instructions for each theoretical phase of the activities handed out to participants, along with flip chart paper to capture their thinking and their conversations. We started with objectives: to identify where there were opportunities for co-creation in the engineers' modules and courses. This began with the mapping activity where the practitioners could work in groups and pairs or individually to consider, based on Mwanza-Simwami's 8-step model which was part of the handout;

- the different people involved,
- the types of tools you use
- some aspects of the core curriculum content
- the boundaries around our teaching
- the environments where teaching and learning might take place
- the pedagogical approaches we use (including any beliefs or perceptions we have about what makes a good educational experience, and
- the assessment methods we use

The next instructions involved close discussions and note-taking postulating what would happen if Nextbook and co-creation were introduced to their subject (invoking Speculative Design). Alongside this we also asked the participants to consider what may need to be removed to enable this to happen (invoking Subtractive Change). Prompts here included questions such as: What could the impact be? Would it make things less stable? How would it improve the learning context? What else might you need? What is missing and what is added? At the end of the mapping, discussions and note-taking, practitioners fed back their main insights, points and findings to the whole group. This is where discussions were raised about the potential intervention that co-creation could have among the tensions and barriers that prevented it.

Nextbook was considered to have potential and was considered to be a decent addition to the technology repertoire, but was not without issues including the potential problems with uploading textbooks to online platforms, with concerns over copyright, as well as group sizes and the possibility for interactions from students becoming messy and hard to monitor given the large group sizes being taught. Co-creation was considered a plausible approach.

Overall, the workshop activities resulted in commonly perceived issues in institutional barriers. Of interest were that many issues were identified in the shape of how organisations work, including the expectation from faculty of solely using learning management systems as the main virtual environments, despite its drawbacks and limitations. Other issues identified were the prescription of teaching methods by organisations. This results in the dominance of didactic, direct instructional forms of teaching that prohibit student motivation for ownership, personalisation and problem-solving. A common issue reported was lack of time among staff for professional development opportunities or to stray from the set objectives of curricula. Finally, the didactic and instructional nature of teaching in this area of the University of Maribor was commonly explained as the most efficient approach of teaching to the mode of assessment (exams, based on memorised content). In other words, qualification grades and results determine planning and can impact on staff's ability to be innovative. Another issue that can be related to the results driven nature of HE was that the practitioners speculated that their students wouldn't post and share their ideas to the platform, because it would allow less motivated students to claim them as their own.

A conclusion here is that, as was endorsed in the 2014 FELTAG report for the vocational sector mentioned earlier, students and staff still need opportunities for

innovation so that technologies can be exploited. An overarching endeavour should be for students to learn how to learn, which technologies can support. This kind of approach to planning and design enables convergence of practitioners' views where issues can be commonly identified and potentials for change imagined. The workshop approach had enough scope for staffs' views to be respected and listened to and opportunities for experimenting with the interface independently.

4. Evaluation

This was the first attempt at this kind of participatory session and the group of engineering practitioners were pleasingly involved and self-determined, relishing the chance to take time out and learn. They appreciated that there were not specific set outcomes to be met and that the discursive nature allowed some flexibility in how the session played out through collegial interaction.

Each component of theory seemed to enhance and overlap neatly with the others, moving the mapping activity and discussions into new areas. Mapping itself with these theories enabled the interplay of personal and interpersonal elements of teaching and learning but helped draw cultural and institutional factors into account, also. The notion of subtractive change is an interesting area to consider, given it prompts users to have some sense of empowerment, asking: 'if anything what would you remove from the systems you work within?' This appears to be tantalising for staff, whose instinct for change is normally based on making life simpler, but also research shows that when we consider changing an element of something it is almost exclusively done to improve a situation. Their instinct was that there were great affordances linked to co-creation as a pedagogical approach, speculating how it could be invaluable in developing independent thinking and problem-solving capacity for higher order aspects of their engineering courses, but they note that the culture is not yet ready for such transition. The institutional barriers persist that prevent free innovation also seem to stifle students' creativity and risk-taking, but they envisaged that developing open interactivity through platforms such as Nextbook could be a way to enable that creativity.

Handling these theories in practice was straightforward compared to writing about theory, which is the more conventional route for thinking with theory. Here, the theory can be converted into questions and prompts that nudge discussions in particular directions, enabling the academics and other professionals who teach or support learning to contextualise their subject knowledge, teaching and other aspects with problems and opportunities in mind and to work through those to consider transformative possibilities. If one conceptual aspect would be removed, the claims towards this as a form of design-based research, in its most classical sense, are tenuous. This, as mentioned earlier, is based on iterative cycles and continual feedback and modification. Similar to Mwanza-Simwami's proposal for the 8-Step model, DBR is usually based on research around a technological product, so there is relatability to this process, with more focus perhaps needed on the speculative design elements.

Figure 2: Curriculum mapping sheet from Maribor
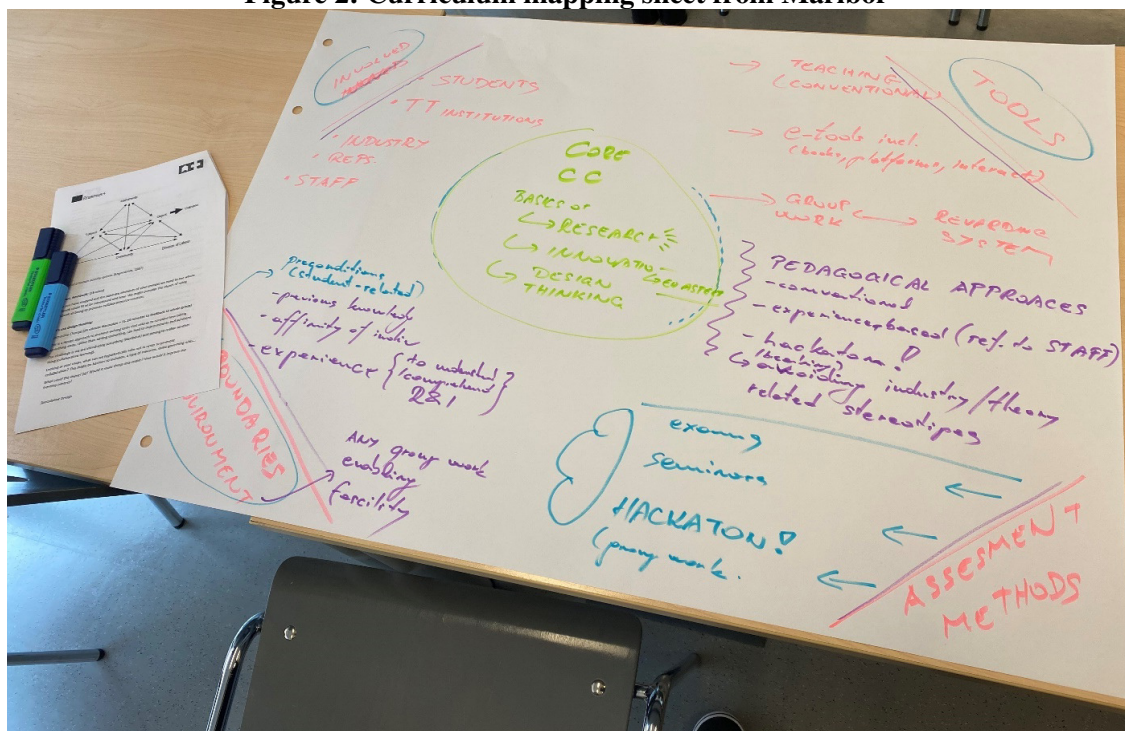
Example Two: Speculative Design and Design-based research in University of Wolverhampton, England, with Post-Compulsory Education vocational lecturers

The second example replicated the first in approach, using the same theoretical reference points and similar prompts, but in a different context entirely. Here, the focus was on the potential impact of AIED (Artificial Intelligence in Education), particularly with regard to the prominent rise of large language models such as ChatGPT. In this instance, because of the emergent nature of these tools and their apparent impact on industries and sectors, more weight for the theoretical dimension was attributed to speculative design. This entailed more communication explaining what it is and how it can work, specifically in terms of being imaginative in terms of what can occur in a future without limitations and what not yet happened. Nevertheless, the instructions on handouts was almost identical, with the mapping activity and discussions centred on prompts and questions, albeit here with slight differences to focus attendees attention on the implications of AI for specific aspects of their work. There were also two differences in purpose: the first workshop was based on the potential introduction of pedagogy and a tool into a specific domain of teaching (engineering). The second was considering the potential impact (positive or negative) of AI on teaching, generally – though situated in individual's subject knowledge. Both were presented as participatory CPD sessions but both were also used to capture data from the mapping and questionnaires in Workshop 2 for potential research papers.

The context for this workshop was, as stated, the prominence of AIED and its potential for impact on the Further and Vocational education sector. This is, as stated earlier, a sector that should be amenable to innovation as it reflects social and technical changes

in the outside world, but is also a sector that faces continual challenge, despite its significance to a changing labour market and economic base in the UK. Automation of processes and employment using machine learning technologies remains a credible and realistic threat (Avis, 2021), but the potential for AI technologies to be harnessed to rejuvenate teaching practices is also appealing (Treviranus, 2022) and giving vent to imagination. This is mainly the case where academics and other professionals who teach or support learning are given the opportunity to draw it not only into their teaching, but into their regular meetings and professional discourse – and it seems this is all too rare (Nemorin et al., 2023), with institutions instead hoping a policy arrives from elsewhere (Bearman et al., 2022).

The workshop was located in an English university computer laboratory. There were 20 teachers in attendance who were invited to come along to learn about AI and explore its potential impact on the skills sector, one which is conventionally focused on practical skills in studios and workshops, rather than text-based approaches related to academic courses, such as Humanities subjects. The teachers in attendance were from across post-compulsory education, teaching a variety of subjects. The workshop was started by the writer, presenting some of the critical debates around AI that have appeared in early warnings about its impact on working practices, education and assessment. This was done to prime the attendees to some extent, with a critical lens to arm them against some of the hype as well as some of the warnings about the supposed issues with AI. This was neatly balanced by presentations from a colleague in teacher education with a local partner college, who demonstrated some of the opportunities and creative ways he has been utilising AI to prepare students for job interviews or to support teachers with workload. We modelled four different AI-platforms, with teachers then invited to use the computers to use the technologies for themselves, giving instructions and prompts related to their subjects.

Following this, the same process as in the first workshop applied, with the attendees invited to use the handouts to guide their thinking through the theoretical prompts to map their subjects.

Evaluation:
There were some notable differences between the workshops. In the second one, the focus was on speculative change: what could happen, with an emphasis on being imaginative in thinking and thinking beyond any typical restrictions that might bound our scope for thinking (i.e. "there is no money for using this", or "our students will never do this"). We were really seeking to transcend value judgments in responses that limit consideration of technologies to what is good or bad. As an emergent phenomena, AI has uncertainty around it and we wanted to capture the emergent questions, concerns and "future possibilities" (Bozkurt et al., 2023: 56) from the "radical imagination" (Houlden and Veletsianos, 2022) using speculative methodology. The additional components enhanced the mapping approach: using Mwanza-Simwami's model helps to add the detail of what is there in the curriculum already and prompts the people-centredness of thinking about students and colleagues, as well as learning support assistants, technicians and managers, etc. Subtractive change had impact again

in terms of considerations of what could be removed, both in terms of barriers, norms or rules.

The mapping was interesting in this occasion as participants came from a broader array of subject disciplines and insights were drawn commonly as participants worked in groups from these differing perspectives. Among these were concerns that were raised in the earlier presentations by the host were participants were primed about the implications. These were echoed, so that the lecturers expanded on issues around plagiarism, AI as leading to automation in work, and what drives the responses from language model prompts. It may be perceived that this echoing is something of a weakness in the response. The point of speculative design is that is relatively unharnessed from existing barriers and allows for proposals of "futuristic fictional concepts catering to some of the contemporary challenges within education delivery such as access, quality, monitoring etc" (Khan et al, 2021: 1752). In other words, speculative design should allow for free thinking; perhaps the priming by the host that highlighted some of the mainstream concerns around AIED was unhelpful and eclipsed this thinking, or it could be that the speculative approach is particularly unique and allows for more free thinking than practitioners may normally be accustomed to in CPD sessions.

With regards the prompt around 'subtractive change', it was notable that participants predominantly considered the essay as assessment method needed to be changed to allow for the potential of students cheating using AI. Potential alternatives proposed were for:
- more continual assessment
- controlled assessments (essay writing under controlled conditions) or
- for students to have multiple modes of assessment that enabled more choice for them in how they could be assessed and on what topics.

In the mapping activities, when asked what the implication would be of introducing tools like ChatGPT into teaching and learning, lecturers tended to see positive, rather than negative, impact. Some lecturers considered the potential impact of AI to assist with learning support needs, while others pointed to the potential detriment in widening the digital divide, with students of falling behind who didn't have sufficient access to explore and exploit such tools at a disadvantage. However, nearly all participants expressed concern at the level where management or leadership in their cultures would impose outright bans onto the technologies, as has happened in some cases with mobile phones in colleges. It was expressed that this may be due to poor understanding of the technology and moral panic around the hype in contemporary media discourse. Countering this, the potential banning or regulating of such technologies was speculated to be pointless both at institutional and even state level. Participants even identified that banning was simply a means for gifting advantage to others (states or organisations who do not ban the technologies).

Figure 3: Example of mapping responses from workshop 2
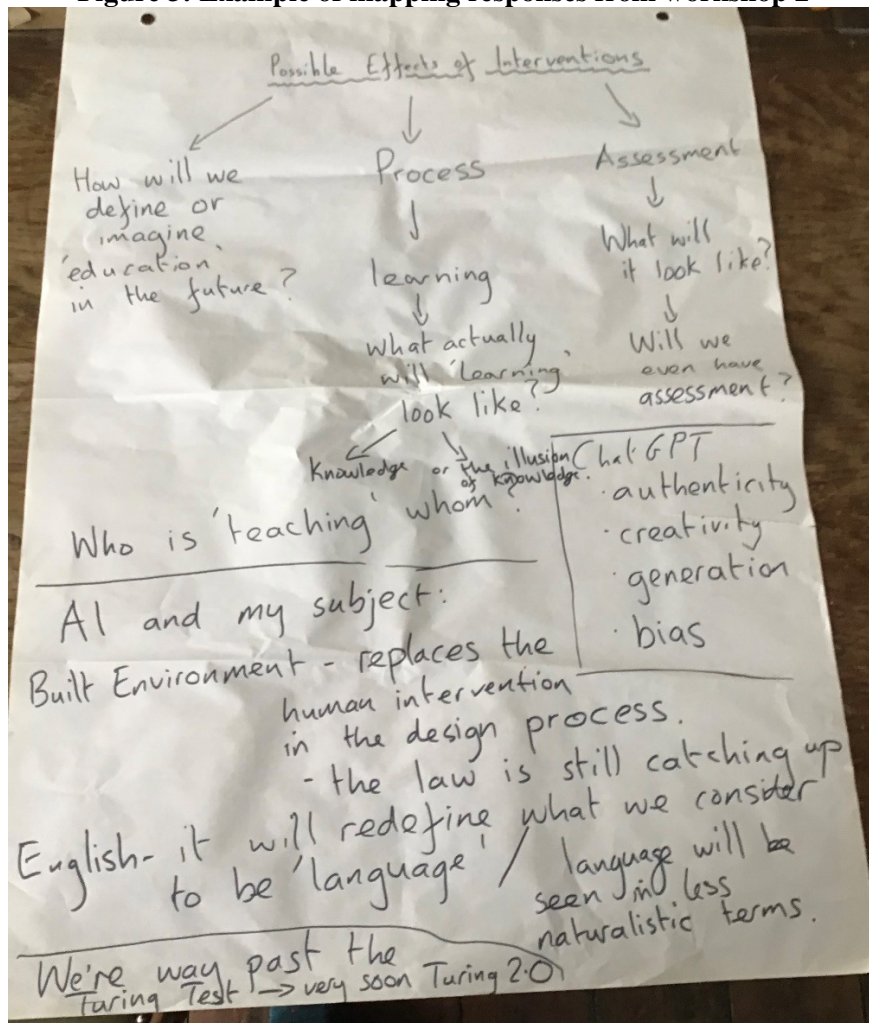
Participants fed back their enjoyment of the free-range approach, where participants were able to learn from one another and thinking was allowed. They stated how this was an alternative to normal CPD events, which tend to be utilitarian and instrumentalist and aimed at improving results.

One drawback is that there may be better means to capture the thinking after the planning, as this second AI workshop was planned in a slightly ad hoc manner and as a trial. A questionnaire was issued which replicated many of the prompts in the activities in a formal way, allowing participants to lock in and elaborate on their individual perceptions, which can be helpful to avoiding the potential for group-think that can arise in clustered group activities where one voice may be more dominant.

Next steps

These approaches were variously used to:
*   develop staff technical and pedagogical capacities
*   conceptualise the impact of new technologies

- help staff to work with theory and
- allow them to collaboratively extrapolate and confront the limitations and constrains they work within

In the event of the theoretical approaches utilised, we are left with i) implications that have been conceived ii) lessons learned about the technology and iii) identify staff needs for the future. Rather than address these individually, it could be worthwhile to anticipate the value of implications and conceive of these results as concerns or opportunities to:

- separate the theoretical input according to a focused output from a workshop. It's possible that the blend of theory, while useful here for overview of context, required much disparate thinking, i.e. 'speculations', 'problem-solving', 'raising collaboration', 'developing staff knowledge and skills', which took focus from the workshops of what was salient.

- use the highlighted concerns from such sessions to feedback to the institution and management

- empower willing practitioners to form special interest groups around 'Artificial Intelligence in Education' as guidance to management and departments

- engage with practitioners to look at what is currently used in technical terms and (resulting from subtractive change and DBR work) consider abandoning or persisting with products and tools that may be superfluous

- precipitate potential change to assessment mode or as guidance for organisational decisions. For example, we can see from example one that a free (and open source) interface has potential to save organisations money and develop richer collaboration, while in example two its possible to see how sessions around Large Language Models might support staff with workload

- develop further models of CPD for staff based on practicalities of technological use to realise the opportunities afforded from new technologies.

5. Conclusion

The approaches outlined here were useful on a number of levels. Firstly, using the Mwanza-Simwami 8-step model, it allowed staff to look at their curricula holistically. With speculative design, opportunities and barriers could be extrapolated. In terms of challenges, this included the purpose of the workshops: introducing more innovative and inclusive approaches to planning curriculum design, whether that includes content, tools, environment, or processes of assessment, but especially the impact of innovative pedagogy and new tools.

The trust and agency of key practitioners is critical to these processes and in the collaborative, theoretically-informed approaches described here, it is possible that teaching and planning teams can support a convergent approach to account for multiple voices and stakeholders, as according to Design-Based Research (DBR). Presented as CPD sessions, these approaches may help to empower staff to have

increased choice and ownership of matters that impact directly on their practice (i.e. style of teaching, types of technologies used, assessment method) and where management can be included in such sessions, CPD designed in this active, participatory manner with its underpinning theory may help to reduce barriers.

Finally, it was mentioned before that there may be a poor fit with design-based research (DBR), with its focus on product refinement and through the development of theory. In evaluating the two workshops, it's possible this view can be reconsidered. With these sequential cycles of implementation and review, it is fair to consider these a series of approaches (Barab and Squire, 2004) that harness reflective and ongoing findings and configure these into the design, in keeping with the principles of DBR. Moreover, given the focus on pedagogical outcomes, these configured and iterative adaptations may focus on new ways of using a tool, need for more technical skill or a more appropriate pedagogical underpinning. The DBR approach can be applied to the refinement of tools or artefacts for learning, but also to extend understandings of teaching and learning in different contexts. This can include designing innovations with technologies, but also re-thinking innovations in pedagogical strategy: "activity structures, institutions, scaffolds, and curricula. Importantly, design-based research goes beyond merely designing and testing particular interventions. Interventions embody specific theoretical claims about teaching and learning and reflect a commitment to understanding the relationships among theory, designed artefacts, and practice" (Design-Based Research Collective 2003: 6). It seems that these approaches enable staff to have time to consider particular problems within their context in collaboration with other stakeholders. In the final instance, it may be possible to refine and utilise the approaches outlined here as variously continual professional development, research methodology and evaluation of formal processes.

6. References

1. Adams, G.S., Converse, B.A., Hales, A.H. and Klotz, L.E., (2021), "People systematically overlook subtractive changes", *Nature*, Vol. 592, No. 7853, pp.258-261. https://doi.org/10.1038/s41586-021-03380-y

2. Avis, J. (2021), *Vocational education in the fourth industrial revolution: Education and employment in a post-work Age*. Cham: Palgrave Pivot. https://doi.org/10.1007/978-3-030-52032-8

3. Barab, S. A. and Squire, K. (2004), "Design-based research: Putting a stake in the ground", *Journal of the Learning Sciences*, Vol. 13, No. 1, pp. 1 - 14. https://doi.org/10.1207/s15327809jls1301_1

4. Bearman, M., Ryan, J. and Ajjawi, R. (2022), "Discourses of artificial intelligence in higher education: a critical literature review", *Higher Education*, Vol. 86, No. 2, pp. 369–385. https://doi.org/10.1007/s10734-022-00937-2

5. Bene, R. and McNeilly, E. (2020), "Getting Radical: Using design thinking to tackle collaboration issues", *Papers on Postsecondary Learning and Teaching*, Vol. 4, pp. 50-57 https://doi.org/10.11575/pplt.v4i.68832

6. Bovill, C. (2020), "Co-creation in learning and teaching: The case for a whole-class approach in higher education", *Higher Education*, Vol. 79, No. 6, pp.1023-1037. https://doi.org/10.1007/s10734-019-00453-w

7. Bozkurt, A., Xiao, J., Lambert, S., Pazurek, A., Crompton, H., Koseoglu, S., Farrow, R., Bond, M., Nerantzi, C., Honeychurch, S., Bali, M., Dron, J., Mir, K., Stewart, B., Costello, E., Mason, J., Stracke, C. M., Romero-Hall, E., Koutropoulos, A., Toquero, C. M., Singh, L., Tlili, A., Lee, K., Nichols, M., Ossiannilsson, E., Brown, M., Irvine, V., Raffaghelli, J. E., Santos-Hermosa, G., Farrell, O., Adam, T., Thong, Y. L., Sani-Bozkurt, S., Sharma, R. C., Hrastinski, S., and Jandrić, P. (2023), "Speculative Futures on ChatGPT and Generative Artificial Intelligence (AI): A Collective Reflection from the Educational Landscape", *Asian Journal of Distance Education*, Vol. 18, No. 1, Retrieved from https://www.asianjde.com/ojs/index.php/AsianJDE/article/view/709

8. Carvalho, L., Martinez-Maldonado, R., Tsai, Y. S., Markauskaite, L., and De Laat, M. (2022), "How can we design for learning in an AI world?", *Computers and Education: Artificial Intelligence*, Vol. 3, Article No. 100053. https://doi.org/10.1016/j.caeai.2022.100053

9. Delpish, A., Holmes, A., Knight-McKenna, M., Mihans, R., Darby, A., King, K., and Felten, P. (2010), "Equalizing voices: student-faculty partnership in course design", In: Werder, C. and Otis, M. (Eds.), *Engaging student voices in the study of teaching and learning*, Sterling: Stylus. pp. 96–114

10. Design-Based Research Collective (2003), "Design-based research: An emerging paradigm for educational inquiry", *Educational researcher*, Vol. 32, No. 1, pp.5-8. https://doi.org/10.3102/0013189X032001005

11. Dzombak, R. and Beckman, S. (2020), "The road to becoming a design thinking business professional: Expected bumps along the way", In: Melles, G. (Eds.) *Design Thinking in Higher Education*. Singapore: Springer, pp. 17-39. https://doi.org/10.1007/978-981-15-5780-4_2

12. Engeström, Y. (1999), "Activity theory and individual and social transformation", In: Engeström, Y.; Miettinen, R. and Punamäki, R. (Eds.), *Perspectives on Activity Theory*, Cambridge: Cambridge University Press, pp. 19-38 https://doi.org/10.1017/CBO9780511812774.003

13. English, F.W. (1980), "Curriculum Mapping", *Educational Leadership*, Vol. 37, No. 7, pp.558-59.

14. Houlden, S., and Veletsianos, G. (2022), "Impossible dreaming: On speculative education fiction and hopeful learning futures", *Postdigital Science and Education*, pp. 1-18. https://doi.org/10.1007/s42438-022-00348-7

15. Kennedy-Clark, S., (2013), "Research by Design: Design-Based Research and the Higher Degree Research student", *Journal of Learning Design*, Vol. 6, No. 2, pp. 26-32.

16. Khan, A.H., Ejaz, N., Matthews, S., Snow, S. and Matthews, B., (2021), "Speculative design for education: Using participatory methods to map design

challenges and opportunities in Pakistan", In: *DIS '21: Proceedings of the 2021 ACM Designing Interactive Systems Conference*, June 2021, pp. 1748–1764. https://doi.org/10.1145/3461778.3462117

17. Kimbell, L. and Sloane, M. (2020), "Mapping Design Thinking Resources Outside of Higher Education—An Exploratory Study", In: Melles, G. (Eds.), *Design Thinking in Higher Education*. Singapore: Springer, pp. 141-164. https://doi.org/10.1007/978-981-15-5780-4_7

18. Lukens, J. and DiSalvo, C. (2012), "Speculative design and technological fluency", *International Journal of Learning and Media*, Vol. 3, No. 4, pp. 23 – 40.

19. Mwanza-Simwami, D. (2011), "AODM as a framework and model for characterising learner experiences with technology", *Journal of e-Learning and Knowledge Society*, Vol. 7, No. 3, pp. 75-85. https://doi.org/10.20368/1971-8829/553

20. Nemorin, S., Vlachidis, A., Ayerakwa, H.M. and Andriotis, P., (2023), "AI hyped? A horizon scan of discourse on artificial intelligence in education (AIED) and development", *Learning, Media and Technology*, Vol. 48, No. 1, pp.38-51. https://doi.org/10.1080/17439884.20

21. Plomp, T. (2007), "Educational design research: An introduction", In: Plomp, T. and Nieveen, N. (Eds.), *An introduction to educational design research*. Enschede: SLO.

22. Ramaswamy, V. and Ozcan, K. (2018), "What is co-creation? An interactional creation framework and its implications for value creation", *Journal of business research*, Vol. 84, pp. 196-205. https://doi.org/10.1016/j.jbusres.2017.11.027

23. Reeves, T. (2006), "Design-based research from a technology perspective", In: Akker, J. V. D.; Gravemeijer, K.; McKenney, S. and Nieveen, N. (Eds.), *Educational Design-based Research*, New York: Routledge. pp. 52– 66

24. Ross, J., (2022), *Digital futures for learning: Speculative methods and pedagogies*. New York: Routledge. https://doi.org/10.4324/9781003202134

25. Scott, H., Iredale, A. and Harrison, B., (2022), "FELTAG in rearview: FE from the past to the future through plague times", In: Smith, M. and Traxler, J. (Eds.), *Digital learning in higher education: COVID-19 and beyond*, Cheltenham: Edward Elgar Publishing, pp.24-36. https://doi.org/10.4337/9781800379404.00009

26. Treviranus, J., (2022), "Learning to learn differently", In: Holmes, W. and Porayska-Pomsta, K. (Eds.), *The Ethics of Artificial Intelligence in Education: Practices, Challenges, and Debates*. New York: Routledge, pp. 25-46. https://doi.org/10.4324/9780429329067-1

27. Uchiyama, K.P. and Radin, J.L., (2009), "Curriculum mapping in higher education: A vehicle for collaboration", *Innovative Higher Education*, Vol. 33, No. 4, pp.271-280. https://doi.org/10.1007/s10755-008-9078-8