AI and higher education: A diffractive reading

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Abstract

The advent of artificial intelligence (AI) in higher education presents challenges for how the sector should think about research, curriculum work, and pedagogy. In this article, the authors performed a thought experiment to explore concepts and ideas, rather than asserting definitive conclusions, through a diffractive reading of vignettes we produced on AI's introduction into higher education in the domains of research, curriculum, and pedagogy. In preparation, each author independently wrote vignettes on the application of AI in the three domains. We did not access or read each other's vignettes before the diffractive reading, which comprised two phases. First, we constructed diffractive patterns by invigorating lines of connection between/among our three vignettes. Second, we each generated lines of connection between the two vignettes, not our own, on an aspect we had excluded in our own vignettes. Through a diffractive reading exercise, we generated new insights, resulting in a richer understanding of the complex intra-actions between human and non-human actors in higher education. By interrogating AI as a transformative enabler rather than a mere technological advancement, we uncover entanglements of AI with research, curriculum work, and pedagogy. Our diffractive methodology highlights the performativity of AI and the imperative of reconfiguring higher education to embrace complexity, relationality, and ethical response-ability. The article contributes to AI vis-à-vis higher education by providing a posthumanist critique of the affordances of AI, challenging the neoliberal and instrumentalist paradigms that dominate current higher education practices. Additionally, it provides practical insights into the ethical and ecological implications of the application of AI in higher education contexts.

Keywords: artificial intelligence (AI), assessment, curriculum work, ethics, higher education, pedagogy, posthumanism, research, teaching–learning

Introduction

In the same way that humanity had to reinvent itself (subjectivity) during the First Industrial Revolution because of the replacement of agricultural jobs with new technologies, it again faces a revolution that demands a radical change in human subjectivity and skill sets to benefit from new developments. In *The Age of AI*, Kissinger et al. (2021) argued that artificial intelligence (AI) is not a product or industry by itself, but an enabler of many industries and facets of human life including scientific research, education, manufacturing, defence, art, and so forth. Chiba (2024) explained that Karl Marx's 19th century notion of *boom or bust* in terms of economic expansions and contractions is an apt metaphor to explain the dilemma faced by emerging technologies like AI today because humans have embraced the promise of AI but are still unsure how to leverage it. This leaves many perplexed, uncertain, and even concerned about the future. Kissinger et al. (2021) argued that the disruptive and transformative nature of AI is the result of AI being able to learn, evolve, and surprise, which directly alters human subjectivity and experience of reality at levels not seen since the dawn of the modern age.

Our current condition is marked by multiple and intertwined accelerations of environmental destruction, capitalism, and advanced technologies. Braidotti (2019) referred to the current condition as the posthuman condition, which denotes both a historical marker for the present condition and a theoretical impetus to explore the material and discursive changes driven by advanced technologies and ecological change. For her, this condition is the coming together of posthumanism and post-anthropocentrism. The former is concerned with critiquing the ideal of "human" produced by Enlightenment Humanism, as "Man," the measure of all things. The latter is concerned with challenging human exceptionalism in the interest of fostering species equity. Le Grange and du Preez (2023, p. 60) went on to say that the posthuman condition "relates respectively, to how we now define human given humans' entanglement with new technologies, and the ethical response-ability of humans in intra-action[1] with the more-than-human-world in a context of impending ecological disaster." Braidotti (2019, p. 2) eloquently put it that we, "the human and non-human inhabitants of this particular planet . . . are in this together: between the algorithmic devil and the acidified deep blue sea."

When AI is understood as an enabler of many industries and facets of human life, such as scientific research and education, higher education might benefit from re/imagining and re/configuring enterprise to respond to these changes and concomitant opportunities and challenges. In this article, we open up debates about higher education and AI in terms of research, curriculum work, and pedagogy to begin experimenting with alternatives to

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[1]   The notion "intra-action" was first introduced by Donna Haraway and later developed by Barad (2007) within the framework of agential realism. The prefix "intra" is derived from Latin, meaning "within," "interior," and "during." Intra-action denotes the mutual constitution of entangled agencies or phenomena (Barad, 2007), highlighting a shift from individual to relational existence (Murris & Bozalek, 2022). Unlike interaction, which presupposes the existence of separate individual agencies before their interaction, intra-action posits that distinct agencies do not pre-exist but rather, emerge through intra-action (Barad, 2007). Interaction involves acting "between, towards, and among each other as separate entities" (Murris & Bozalek, 2022, p. 70), whereas intra-action emphasises the emergent nature of agencies through their mutual entanglement.

re/imagine and re/configure higher education spaces. Our work is a thought experiment rooted in a philosophical and methodological disposition that privileges speculative and conceptual exploration over conventional evidence-based validation. We divide the rest of the article as follows: we first discuss the diffractive methodology, outlining the approach we followed; secondly, we present the vignettes that each one of us wrote (Lesley's on higher education, AI, and research; Petro's on higher education, AI, and curriculum work; and Anja's on higher education, AI, and pedagogy); thirdly, we do a diffractive reading of the vignettes to invigorate alternative, creative lines of flight; we end with some parting thoughts.

Diffractive methodology

Our intra-active experimentation with AI and higher education as it relates to research, curriculum work, and pedagogy, emerged from a series of complicated conversations we were part of on this topic, and the opportunities and challenges it poses. The posthuman condition asks of us to stay with the trouble of our times (Haraway, 2016) and invigorate productive lines of connection with both human and non-human refugees. To invigorate such lines of connection, we stayed with the trouble and wrote through and theorised complicated dilemmas and opportunities as they relate to AI and higher education. We see writing, like Ulmer (2017), as a mode of inquiry—a way for us to experiment through productive writing to invoke alternative, creative lines of flight. Theory, for us, is a verb, rather than a noun. It is not "something out there" (it does not pre-exist scholarly intra-actions), but becomes through such intra-actions (le Grange et al., 2024). Barad and Gandorfer (2021) explained that "the world theorizes as well as experiments with itself," that "theorizing is a particular form of intra-acting and as such is part of the world" (p. 15), and that "theorizing in its radical openness provides not only possibilities for thinking otherwise, but for thinking thinking otherwise" (p. 17).

This postqualitative inquiry (le Grange, 2018; Murris, 2022) was not something that was pre-planned but emerged during our intra-actions with one another and the shared desire to complicate and experiment with AI and higher education in terms of research, curriculum work, and pedagogy. Our methodology was informed by the notion of *diffraction* as introduced by Donna Haraway and refined by Karen Barad. Diffraction is seen as an alternative to reflection. It is not only about mirroring and sameness, but also about difference. Leveraging their[2] expertise in quantum physics, Barad (2007) expanded on the concept by illustrating how wave behaviour—whether of light, water, or sound—creates patterns of difference when waves overlap or encounter obstacles. Barad (2007) explained that in physics, diffraction specifically refers to the combination and subsequent bending and spreading of waves that occur during these intra-actions. In social sciences, diffraction examines the entanglement of insights, ideas, and patterns of difference, encouraging the examination of these elements "through one another in ways that help illuminate differences as they emerge: how different differences get made, what gets excluded, and how those exclusions matter" (Barad 2007, p. 30). Building on Barad's insights, Bozalek and Murris (2022) emphasised that in diffractive methodology, "the details of one theory or

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2   Barad used the plural "their" instead of the singular "her" to emphasise the ecological nature of subjectivity.
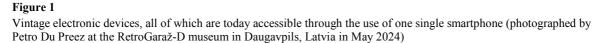
philosophical position are read attentively and with care *through* rather than *against* one another to come to more creative insights." Diffraction focuses on the relational nature of difference by mapping where the effects of differences manifest (Barad, 2007). It concerns "differences that our knowledge-making practices make and the effect they have on the world" (Barad 2007, p. 72).

Our desire to complicate and experiment with AI and higher education was triggered during a recent scholarly visit to Latvia.[3] That experience, the conversations that started there (and still continue) and a photo (Figure 1) that we took at the RetroGaraž-D museum in Daugavpils, Latvia, inspired our experimentation, theorising, and writing of this article.

The museum collection consists of retro cars and Soviet-era items, and this particular photo depicts a collection of various vintage electronic devices, including televisions, radios, and other media equipment, all of which are today accessible through the use of one single smartphone. This engaging visual display that contrasts with the sleek, compact designs of modern electronic devices offers a compelling entry point for engaging with the rapid evolution of technology we see today.

After an open discussion about the photograph, we agreed on the following approach to organise our writing and theorising: we used the photo as a prompt to each write a vignette about AI and higher education. Lesley wrote about research, Petro wrote about curriculum work, and Anja wrote about pedagogy (teaching–learning and assessment). We agreed that the vignette was not a personal narrative but a literature-informed position that we developed. We did not talk to one another about our respective vignettes until we all completed our individual writing because we did not want to pre-empt or influence one another's sense-making processes, and because we wanted to value difference. At this stage, we also decided that we would, after writing, engage in a diffractive reading of one another's vignettes. Diffractive readings are increasingly used by social scientists and education scholars to examine the entanglement of insights, ideas, and patterns of difference that emerge from and through writing experiments (see, for example, du Preez & du Toit, 2022; du Preez & le Grange, 2024; du Preez & Simmonds, 2021). Once we had all completed our vignettes, we read all the vignettes and soon after met to discuss our diffractive readings. To get us going in the diffractive reading, we asked two questions: "How is the photo narrated in the vignette?" and "How does the photo shape the viewpoints in the vignettes?"

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3   We recently participated in an Erasmus+ mobility exchange programme for staff between South African universities and Daugavpils University in Latvia. Erasmus+ is the EU's programme to support education, training, youth, and sport in Europe. The 2021–2027 programme strongly focuses on social inclusion, green and digital transitions, and promoting young people's participation in democratic life. It supports priorities and activities set out in the European Education Area, Digital Education Action Plan, and the European Skills Agenda. For more information, see https://erasmus-plus.ec.europa.eu/about-erasmus/what-is-erasmus.

Figure 1
Vintage electronic devices, all of which are today accessible through the use of one single smartphone (photographed by Petro Du Preez at the RetroGaraž-D museum in Daugavpils, Latvia in May 2024)

Vignettes: Writing through troubled times

Now that we have discussed our approach, we proceed by presenting our individual vignettes. Thereafter we embark on a diffractive reading thereof, and also outline the two phases of our diffractive reading.

Lesley's vignette: Higher education, AI, and research

The photograph in Figure 1 captures a range of human (in intra-action with non-human agents) technological innovations of the 20th century. In the 21st century, the affordances of all the inventions captured in the photograph are found in a handheld device called a smartphone. This revolutionary development is the consequence of the rapid acceleration of computer capacity. Moore's law,[4] which has held true to date, stated that the capacity of

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4   Moore's law is not a law of physics, but an observation of a historical trend projected forward.

transistors in computers would double every 18 months (le Grange, 2023). To the capability of the smartphone, we can add AI. The acceleration of AI capability in recent times is due the invention of AI chips, which have capabilities far beyond those of general use chips such as central processing units (CPUs). AI chips are thousands of times faster than CPUs and can make possible the performance of techniques such as deep neural networks, which are dependent on intensive parallel computation and high-bandwidth memory (Pang, 2022).

The acceleration of new technologies and AI affordances, made possible by the invention of AI chips, is the outcome of research conducted in a range of fields such as mathematics, computer science, engineering, cognitive psychology, cognitive science, and philosophy. Concerning the latter, it is interesting that in one survey, which asked AI researchers which discipline they felt most closely tied to, the most frequent response was philosophy (Brighton & Selina, 2010). This may have changed since 2010, but what is uncontested is that AI development is the outcome of research done over several decades—also prior to the first conference on AI where the term "artificial intelligence" was coined by John McCarthy and colleagues in 1956 (Pillay, 2022). Concerning more recent developments, Hagendorff and Wezel (2020, p. 355) wrote: "The current 'AI Summer' is marked by scientific breakthroughs and economic successes in fields of research, development, and application of systems with artificial intelligence."

Much of the research conducted on AI has happened in higher education institutions or at the interface of higher education and industry. In a socially distributed knowledge system where universities no longer hold the monopoly on knowledge production, those doing research and development vis-à-vis AI would, irrespective of the space, typically be university graduates. What this suggests is that higher education institutions have played and are likely to continue to conduct research that will advance AI capability whether the research is of a fundamental or applied kind. However, it is AI applications that have been touted to revolutionise higher education in the 21st century. For example, AI affordances are claimed to enhance data analytics, promote personalised learning, enable automated administrative tasks, engender predictive analysis, and power intelligent tutoring systems.

Of the mentioned affordances I shall briefly elaborate on two, enhanced data analytics and predictive analysis, because these aspects relate more directly to research, which is the focus of this section of the article. AI promises to markedly increase research capabilities in higher education through AI-powered data analysis. Saaida (2023) pointed out these tools enable the analysis and processing of large and complex data sets, which cannot be done using conventional tools. He pointed out that through using pattern recognition algorithms, AI can aid in identifying meaningful trends and correlations within research data, invigorating new research trajectories that can give rise to the production of new knowledge. Furthermore, AI-powered literature review tools enable the synthesis of large volumes of literature, saving a great deal of time and effort involved in conducting comprehensive reviews (Saaida, 2023). These tools promise to be very helpful in meta-studies that require large tomes of literature to be reviewed. AI-powered tools could also be used to perform content analyses of qualitative data through methods such as thematic analysis and constant comparison.

However, there is a danger that research that lends itself to analysis using AI-powered tools is privileged to the neglect of forms of inquiry that value the particular, and the creative and emotional expressions of human experiences. In other words, we could end up valuing what we can analyse and not analyse what we value. Gains made to legitimate arts-based methods of inquiry and the practice of speculative philosophy could be reversed, resulting in the re-positivisation of research. There are also other challenges that AI presents in relation to research in higher education that are more generally reported in literature: it raises ethical questions, including the misuse of data, bias, and data privacy issues; at times AI systems produce unreliable and inaccurate data, which impacts on the trustworthiness of the research; many researchers in universities are not AI literate and education and training of staff could be a demanding exercise; AI technologies are expensive and therefore access to AI resources will be inequitably distributed across higher education institutions; AI technologies often outpace the generation of regulations and policies aimed to govern it (Hagendorff & Wezel, 2020; Michel-Villarreal et al., 2023; Saaida, 2023). Concerning the latter challenge, we have witnessed many universities flounder vis-à-vis regulation, resulting in knee-jerk responses to the invention of generative AI and particularly, the chatbot, ChatGPT (Popenici, 2023).

There are many other challenges that AI presents for research in higher education, which require a more detailed discussion. These are challenges that arise from methodological and epistemological misconceptions concerning the affordances of AI, and 15 of these are examined by Hagendorff and Wezel (2020). Those authors were careful to insert "currently" in parenthesis in their article title—". . . What AI (Currently) Can't Do"—because what AI can't do today, it might be able to do tomorrow. The authors averred that 11 of the challenges are surmountable but that four might be more enduring. I shall focus on one of the challenges, a misconception that might be widely held. About the challenge, Hagendorff and Wezel wrote:

> Outputs from data processing do not represent the world, but construct it. Hence, AI systems will never generate knowledge that grasps and describes a given, data-independent reality. (2020, p. 363)

I agree with the authors but shall put it differently and then elaborate on my take on the issue. Simply put, AI-powered tools are not neutral but performative. This, I argue, is the case with all methods used in research. It is important to note, that method is not simply techniques for gathering evidence. As Law cogently wrote:

> Method is not . . . a more or less successful set of procedures for reporting on a given reality. Rather it is performative. It helps to produce realities. It does not do so freely and at whim. There is a hinterland of realities, of manifest absences and Othernesses, resonances and patterns of one kind or another, already being enacted, and it cannot ignore these. (2004, p. 143)

This holds true for AI-powered tools used in research. Moreover, method is also creative because it re-works, re-bundles and re-crafts realities and creates new versions of the world (Law, 2004). Therefore, method does not provide clarity about or simply describe something

that is out there but reconstructs the object or phenomenon it attempts to describe (le Grange, 2007). In other words, it creates the objects or phenomena that it seeks to describe. Consequently, method includes, and it excludes, it creates presences, absences, and othernesses. Le Grange (2007) argued that there are several implications for understanding method as performative and mentioned two: firstly, if method is parochially conceived and performed, it will construct reality parochially and secondly, if method is understood as being performative or enacted, then it could be re/imagined more broadly and generously and consequently construct a more just and generous world. Put differently, method makes and draws together things in particular ways and describes them accordingly but could also make and describe things differently.

If the world is complex, indeterminate,[5] an undecidable flux, a kaleidoscope, unpredictable, multiple, heterogeneous, ephemeral, and vague, then a question that begs to be answered is what such a view of reality means for the way research in higher education should or could be performed. Another critical question is how research using AI-generated tools will re/construct the world. Will it have transformative effects or exacerbate inequalities? And will AI-generated research be able to catch what Law (2004, p. 2) argued even social sciences methods hardly do:

> Pains and pleasures, hopes and horrors, intuitions and apprehensions, losses and redemptions, mundanities and visions, angels and demons, things that slip and slide, or appear and disappear, change shape or don't have much form at all, unpredictabilities . . . [?]

I agree with Hagendorff and Wezel (2020) that research using AI-generated tools is unlikely to have transformative effects that will result in solving pressing social problems such as inequality, poverty, and unemployment. It might, in fact, construct a world that exacerbates social problems. Therefore, research using AI-powered tools should be complemented with research that expresses human emotions and creativity so that higher education research can yield transformative effects in the world. Moreover, human intelligence and artificial intelligence should not be constructed in binary terms but viewed as together–apart, in Baradian terms, an agential cut (Barad, 2007): human intelligence/artificial intelligence.

Petro's vignette: Higher education, AI, and curriculum work

The photograph of various vintage technologies stacked together serves as a powerful metaphor for current curriculum work that remains anchored in outdated curriculum theories,

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5   Bozalek (2022), drawing from Barad (2007) who theorised Heisenberg's Uncertainty Principle and Bohr's Principle of Complementarity that addresses indeterminacy, made an important distinction between uncertainty and indeterminacy. Bozalek explained that uncertainty is epistemological and concerns the limits of what can be known, that is, what can be known about a state of affairs (e.g. whether something is here or there, now or then). Indeterminacy, on the other hand, addresses ontological aspects, questioning the inherent existence of discrete entities with fixed properties (Bozalek, 2022). It therefore suggests that entities do not possess inherent, predetermined characteristics. Indeterminacy challenges traditional views of static, individual entities and emphasises the fluid, relational, and immanent nature of reality.

such as Tyler's Rationale,[6] for example. Despite being once groundbreaking and providing essential structure and direction for curriculum development, these early curriculum theories (that still dominate and haunt the curriculum landscape in South Africa today), now resemble the obsolete technologies in the photograph (le Grange & du Preez, 2023). While once at the cutting edge of innovation, they no longer align with contemporary societal and education needs. Similarly, the static and rigid nature of much of our curriculum work, often compartmentalised and lacking room for transdisciplinary approaches, requires re/configuration and re/thinking through experimentation and improvisation, as will be argued later.

The photograph as metaphor further underscores the rigidity and inert nature of many curriculum theories that fail to adapt to rapidly changing education ecologies. Like old radios, televisions, and record players, these theories recall a time when communication was one-way and unidirectional. Traditional curriculum theories often emphasise rote learning and passive absorption of knowledge, much like these vintage technologies. In contrast, contemporary education demands curriculum approaches that are compact, accessible, agile, and flexible. Curriculum work can, in the light of this, no longer be marked by one-way and unidirectional communication, but should welcome complicated curriculum conversations. Drawing on William Pinar's (2004) notion of curriculum as complicated conversation, le Grange et al. (2024, p. 36) stated:

> Curriculum becomes a complicated conversation when, as pedagogues, we complicate students' understandings of the subject they are studying. . . . Pinar (2004, p. 2) suggested that such complicated conversations occur when we do not devise "airtight" arguments but provide spaces for students to find their own voices so that they "construct their own understanding of what it means to teach, to study, to become educated." Conversations also become complicated when scholars of curriculum engage with their peers (particularly those with different histories, beliefs, and ideas), and listen respectfully to them to interrogate their own understandings of self and of the field. Pinar suggested that complicated conversations are premised on a commitment of scholars of curriculum to engage with their peers, their students and themselves, and that such a commitment is accompanied by "frank and ongoing self-criticism" (p. 9).

To meet future demands, particularly with the rise of AI, curriculum theories should become ever more adaptive, personalised, and capable of advancing critical thinking, creativity, and problem-solving skills. Some curriculum scholars have been very aware of this context, and those engaging with posthumanist ideas and new (feminist) materialism/s have also argued that curriculum work ought to be re/configured and re/thought through experimentation and improvisation of all kinds. Le Grange and du Preez (2023), for example, explored the hauntology of the field of curriculum that gave rise to the dominance of Tyler's Rationale. From their posthuman critique, they discussed alternative improvisational forms of

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6   Ralph Tyler (1949) theorised curriculum development in terms of four elements or steps, namely, the setting of educational aims an institution wishes to attain, the educational engagements and activities planned to achieve the aims, the effective organisation of educational experiences to achieve the aims, and how the aims are achieved.

curriculum work, or put differently, experiment with alternative methods and approaches to curriculum work. In their posthumanist critique of techno-scientific approaches to curriculum development (such as those advocated by Tyler's Rationale), du Preez et al. (2022) argued in favour of curriculum-as-lived. Curriculum-as-lived is very different from curriculum-as-planned, which is characterised by preplanned/predetermined curriculum outcomes, aligned with bureaucratic principles, performativity-driven, and packaged in techno-scientific language. According to these authors, "curriculum-as-lived is intelligent, self-organising, experimental, improvisational and continually becoming" (du Preez et al., 2022, p. 12). Curriculum-as-lived assumes that lecturers are not merely technicians in curriculum delivery, as would be the case with curriculum-as-plan, but that they (entangled with nature and culture) are central to curriculum work as improvisers.

Le Grange (2015) extended Pinar's (1975) notion of *currere* as an autobiographical method[7] by introducing the notion of *ubuntu-currere*, which provides a useful way of understanding the centrality of lecturers as improvisers in curriculum work. Du Preez et al. (2022, pp. 15–16) explained:

> Ubuntu-currere invites a life of experimentation with the real: a life of experimenting with new ways of intra-action where humans and non-human subjects are produced through relations in response to social injustice; experimenting with new ways of connecting with the more-than-human world that may avert ecological disasters and engender love for life; and experimenting with new technologies to invigorate new assemblages of human/nature/technology that advance life (all modes of life).

Ubuntu-currere supports accessible, adaptive, and relevant education experiences and aligns with the need for personalised learning paths (personalised curriculum) that cater to diverse learning styles, paces, and interests. It supports the integration of AI and technology to provide real-time feedback, adaptive learning platforms, and personalised content tailored to each student's unique needs. This is also supportive of the increasing need for job-related reskilling and upskilling. Put differently, as the job market evolves, the need for lifelong learning to reskill and upskill workers becomes paramount. Curriculum work could focus on short course development and microcredentialing[8] to provide flexible, accessible, and targeted learning opportunities. By providing modular and stackable credentials, lecturers can offer students the opportunity to build skills incrementally and apply them in real-world contexts. This approach ensures that individuals remain adaptable and capable in an AI-driven world, addressing immediate skills needs and fostering a continuous learning mindset.

Ubuntu-currere further supports this by promoting a life of experimentation and intra-action, integrating human and non-human relations, and leveraging technology to advance life. This

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7   Pinar (1975, 2011) redefined curriculum by invoking its Latin root word, *currere*, which means, "to run." This marked a shift from viewing curriculum as a predetermined pathway (racetrack) to a focus on the human being, and the singularity of their journey because of unique significations from genes to gender, and so forth.

8   According to Brown and Kurzweil (2017), microcredentialing refers to the process of earning a small, specific certification that demonstrates a student's competence in a particular skill or area of knowledge. It can be awarded after completing a short course, a series of workshops, or even through recognition of prior learning and work experience. Microcredentialing is a flexible, accessible, and targeted approach to education and training, aligning closely with the needs of contemporary students and the demands of today's workforce.

philosophy encourages lecturers to create learning experiences that are not only relevant and practical but also transformative and life affirming. By focusing on short course development and modular credentials, lecturers can offer flexible and targeted learning opportunities that support life-long learning and skills development, and are generally accessible to more students. By focusing on microcredentialing and short courses, curriculum work can better prepare individuals for the complexities of modern careers and the continuous evolution of the workforce.

The integration of AI in curriculum development is crucial for creating personalised learning experiences that are adaptive, engaging, and effective. AI-driven tools incorporated in curriculum work can provide real-time feedback, support differentiated learning, and promote collaborative and project-based activities. These tools can analyse students' progress and preferences, offering tailored content and recommendations that enhance learning experiences. AI could play a significant role in advancing critical thinking, creativity, and problem-solving skills. By integrating AI-driven simulations and scenarios in curriculum development processes, a more immersive learning ecology can be created that challenges students to apply their knowledge and skills in complex, real-world situations. This approach not only improves learning outcomes but also prepares students for the demands of an AI-driven job market.

In conclusion, the transformation of curriculum theories and our approaches to curriculum work is essential for meeting the demands of contemporary society and orienting students for an indeterminate future. By embracing flexibility, relational thinking, and transdisciplinarity, curriculum work can become more adaptive, personalised, and capable of promoting advanced critical thinking, creativity, and problem-solving skills. The integration of AI in curriculum work, understood in line with ubuntu-currere, curriculum-as-lived, and curriculum as complicated conversation, provides an alternative to dominant, outdated curriculum theories. Lifelong learning and microcredentialing are potential examples of such an alternative approach, ensuring that individuals remain adaptable and capable in an ever-changing job market.

AI necessitates flexibility, relational thinking, transdisciplinarity, agility, experimentation, improvisation, and adaptability in curriculum work. The image of the stack of outdated technologies serves as a poignant reminder of the urgent need to re/configure and re/think our curriculum theories. Embracing innovative, versatile, and adaptable approaches to curriculum work can take us one step closer to leaving behind the curriculum theories of the past. By integrating forward-thinking approaches in curriculum work, we can better prepare students for the complexities of an AI-driven world, ensuring a more ecologically just and responsive education landscape.

Anja's vignette: Higher education, AI, and pedagogy (teaching-learning and assessment)

The portrayal of technological advancement stands out for me in the photograph (Figure 1). The devices are stacked in a pyramid-like shape, suggesting a progression of technology that

culminates in the most advanced technologies at the top. This advancement has led to the development of AI and even more sophisticated technologies powered by AI. The release of ChatGPT by OpenAI in November 2022 exemplifies this rapid advancement, which seemed to have caught higher education institutions off guard (Glaser, 2023). Higher education institutions were not ready to deal with the ramifications that the freely available AI brought about, while still licking its proverbial wounds caused by COVID-19 and trying to recover from emergency remote teaching, learning, and assessment. Higher education institutions have responded in different ways to AI: some banned it, and others are trying to embrace it (Bekker, 2024; Guo & Wang, 2023).

This section explores the potential of embracing and *working with* AI (as opposed to *using* AI) in learning-centred assemblages in higher education. When lecturers work with AI, they might be able to transform their pedagogical practices, free up time for meaningful reflections, encourage students to make informed choices to contribute to caring for the environment and others, and ensure that students are actively engaged with learning as the end goal. I play with the idea of learning-centred assemblages in higher education, and what they might offer.

The concept of learning-centred is nestled into the concept of assemblage. These assemblages are multifaceted, and I will now explore some of these facets. I am inspired by how le Grange et al. (2022) used the concept of *assemblage* within higher education. Le Grange et al. (2022, p. 7) stated:

> An assemblage in which neither humankind nor technology dominate could open new possibilities to rethink and reimagine educational technology in the university. . . . It is believed that invigorating hopeful affordances of educational technology is one way to create new assemblages in which both the human (as *bios*) and technology become imperceptible and in so doing ensure the enduring and becoming of all life (including pedagogical lives).

Viewing assemblages as articulated by le Grange et al. (2022) one can see the potential for working with AI to create balanced, non-dominant relationships between humans, non-human nature, and technology in educational contexts. This balance is essential for fostering environments where human, non-human, and technological elements contribute to the educational experience, advance "life, decolonise and open up pathways for the becoming of lives (including pedagogical lives)" (le Grange et al., 2022, p. 2).

The learning-centredness of these learning-centred assemblages means prioritising learning as one of the main purposes. I chose the concept of learning-centredness because there is a tension between using either teacher-centred or learner-centred methods (Bremner, 2019). As Schweisfurth (2013) has argued, thinking about teacher-centred education as opposed to learner-centred education creates a binary that does not include the subtleties of how lecturers facilitate learning or take into consideration local variations and interpretations of teaching–learning. Teacher-centred education has been widely criticised because the lecturer dominates the classroom by taking initiative, establishing rules, creating lesson plans, setting up

objectives, disseminating information, and so on (Altun, 2023). Teacher-centred education has also been criticised because it does not enable the development of critical thinking and problem-solving skills (Altun, 2023). On the other hand, Schweisfurth (2013) argued that, unfortunately, learner-centred education, especially in the Global South, is often poorly understood and implemented. In such classrooms, lecturers assume that students already possess new levels of understanding and skills, reducing the lecturers' role and knowledge to a minor one (Schweisfurth, 2013). This misconception leads to chaotic and unfocused activities, which can foster an anti-emancipatory culture and are not conducive to learning (Schweisfurth, 2013).

Integrating teacher-centred approaches and learner-centred approaches can lead to education being more effective and well rounded (Altun, 2023). By putting students' learning needs first, lecturers can create environments conducive to learning. Taking this one step further, I propose reimagining this learning environment as an assemblage that integrates AI, thus creating learning-centred assemblages. Creating such an assemblage should be a process rather than a product where students and lecturers are enabled to play a pivotal role in these assemblages by prioritising their learning needs (Yilmaz & Bulut, 2017).

One facet of learning-centred assemblages is the integration of AI to enhance learning. Working with AI would entail that lecturers and students be open-minded to engage with AI, other technologies, and each other in complicated conversations. One such complicated conversation should critically examine each role-player's responsibility towards one another and the environment. Le Grange et al. (2022, p.3) highlighted that "little attention is paid to the enormous energy consumption that is associated with educational technology usage— energy that largely relies on the use of fossil fuels." These critical conversations should extend to other aspects of the role-players' lives, encouraging them to become more conscious consumers who contribute to the conservation of our planet. To become more conscious of energy consumption and conservation of our planet, each role-player should carefully consider when AI can be better utilised to save energy for completing mundane tasks (without sacrificing critical thinking skills) and how complicated conversations can be organised so that learning takes place. Here, one should be careful that AI is not used as a crutch, which can then replace critical thinking skills. One way of fostering critical thinking is to consider prompt engineering. According to Cain (2023), effective prompt engineering is built on three pillars: content knowledge, critical thinking, and iterative design. This approach ensures AI responses align with educational aspirations and are continuously refined to maintain relevance and accuracy.

Using AI-powered tools for completing mundane tasks frees up time and consumes less energy resources. Examples of such tasks are setting up rubrics, refining assignment instructions, and brainstorming ideas for lesson plans. According to Chakraborty et al. (2023), ChatGPT (as one example of AI) can create practice quizzes and questions, generate translations, refine and improve content used for teaching material, personalise learning experiences based on requirements and learning preferences, and provide feedback on assessment. The opportunities of working with AI in learning-centred assemblages are

endless. This reduction in energy usage reflects a commitment to environmental consciousness. When lecturers save time through working with AI, they can become more intentional in their intra-actions with students. This means that the integration of learning technologies, as well as the roles of each participant in relation to AI, should be carefully considered to minimise environmental impact and enhance collaborative learning.

Working with AI such as ChatGPT, can complement assessment and improve students' writing proficiency by deepening their comprehension, encouraging students to make judgements regarding feedback, and promoting independent thinking about revisions (Lu et al., 2024). Lu et al. highlighted that combining ChatGPT assessment with lecturer feedback enhances students' understanding of feedback, promotes independent thinking during revisions, and provides benefits across various student writing levels. Caution is needed when working with AI during assessment so that is not implemented in an instrumentalist way. Assessment must be meaningful and authentic; if it is not and AI is used in an instrumentalist way, it could mean that lecturers use AI to create various forms of assessments, students can generate responses with AI, and copy responses without thinking. Lecturers then use AI to assess students' responses generated with AI. According to Bower et al. (2024), AI should assist in assessment by creating more adaptive and personalised assessment/evaluation methods, but there are concerns about academic integrity and the potential of plagiarism if AI-generated work is not properly supervised. Therefore, critical reflection and a commitment to learning during assessment are essential to ensure that authentic learning occurs, avoiding the pitfalls of over-reliance on AI, and maintaining the integrity of the educational process.

Another facet in learning-centred assemblages is the critical awareness of becoming. Le Grange et al. argued:

> Critical posthumanism necessitates the importance of learning to think differently about what people are in the process of becoming in an ever-changing world engendered by advanced technologies, climate change and capitalism. (2022, p. 6)

In the context of learning-centred assemblages, becoming refers to the continuous transformation of the various role-players in these assemblages. It is about recognising that education is not just about acquiring knowledge, but about developing as individuals in a constantly changing world. This process involves humans adapting to new technologies, technologies adapting to humans, being aware of environmental impacts, and the continuation of engaging in complicated conversations. By critically working with AI and fostering an environment of continuous learning and adaptation, both lecturers and students are encouraged to become lifelong learners to navigate the complexities of their world(s). Thus, learning-centred assemblages should focus not only on the content and tools of education but also on the ongoing development and transformation of all role players in the educational process.

Ethical concerns of working with AI in learning-centred assemblages are another important facet. When working within learner-centred assemblages, lecturers and students should be

critically aware of ethical concerns such as prompt engineering, verification of knowledge generated by AI, being able to identify potential biases (Cain, 2023), safeguarding of privacy and individual rights (UNESCO, 2022), academic integrity (Bower et al., 2024), and the provision of equitable access to AI tools.

To conclude, working with AI in learning-centred assemblages in higher education signifies a transformative shift in pedagogical practices where both lecturers and students engage with AI, other technologies, and each other in meaningful, complex conversations so that collaborative learning takes place. This approach necessitates a critical examination of responsibilities towards each other and the environment, ensuring that ethical concerns are addressed.

Diffractive reading of the vignettes

As mentioned, diffractive readings have increasingly been used by educational researchers. Our diffractive reading comprised two phases. First, we generated diffractive patterns by invigorating lines of connection between/among our three vignettes. Invigorating lines of connection were not aimed to achieve sameness nor to pit ideas in the different vignettes against one another but to generate creative insights. We valued difference by authors writing their vignettes independently and about different domains of education so that difference was the starting point of our diffractive reading. The way we went about it was for each one of us to independently read the other two's vignettes and to develop lines of connection across the vignettes. This was followed by a discussion on the Zoom platform where we shared the lines that each of us generated, and collaboratively decided on the vectors of connection we would elaborate upon in this article. This first diffractive reading approach increased each one's coefficient of transversality[9] and the transversal lines that we invigorated became new lines of connection across three domains of education: research, curriculum, and pedagogy. The second phase of our diffractive reading was for each of us to generate lines of connection between the two vignettes not our own, focusing on an aspect that we had excluded in our own vignettes. This connecting vector would serve as a basis from which to invigorate potential (virtual)[10] vectors of connection with the domain our vignette focused on so as to engender creative insights. We agreed that each of us would generate two potential (virtual) vectors of connection to generate new insights. We now turn to a discussion on how we began with difference to invigorate lines of connection that we generated in the first phase of our diffractive reading.

Invigorating lines of connection

In her vignette on the affordances of AI vis-à-vis pedagogy, Anja cautions against an instrumentalist approach to assessment whereby AI is used to generate easy responses that

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9   "Coefficient of transversality" is a term used by Felix Guattari (2001). It concerns the power one has to think and see transversally. Guattari used the figuration of a horse with blinkers. As you incrementally remove the blinkers of the horse, you increase the coefficient of transversality.

10   By potential or virtual, we mean that which exists but has not been actualised—in other words, that which exists potentially, prior to thought.

thwart critical thinking. Although not explicitly referred to, Petro's criticism of instrumentalism is implied in her criticism of curriculum fashioned in the Tylerian mould. Tyler's predetermined goals that schools are to achieve suggest an instrumentalist approach to curriculum. Tyler's curriculum (and all its iterations) is based on a factory model of efficiency, a tightly coupled system of aligning curriculum outcomes/aims to teaching, learning, and assessment (Gough, 2013; le Grange, 2014). If AI is used in higher education institutions without changing the approach to curriculum (or how curriculum is viewed) then one way of becoming/doing will become *the* way of becoming/doing, severing the potential of the multiple becoming of pedagogical lives. In Lesley's vignette even though there is no specific reference to instrumentalism, his argument that method (including AI-powered tools) is not neutral but performative suggests that the affordances of AI-powered tools can be used for instrumentalist purposes, and could also engender innovation, creativity and cultivate criticality. And by doing so have transformative effects in the world.

Our second line of connection was assemblage thinking. In their vignettes, both Anja and Petro explicitly use the term assemblage. Anja writes about learning-centred assemblages to decentre the human in the pedagogical process. Learning-centred assemblages for her are productive intra-relational entities in which humans and technology become imperceptible, consequently ascribing agency to assemblages. Petro suggests that we should experiment with new technologies to invigorate new assemblages of human/nature/technology that advance all of life. Although Lesley does not explicitly mention the term assemblage, it is implied in his vignette, where he argues that research using AI-powered tools should be complemented with research that expresses emotions and creativity. The insight gained from diffractively reading the three vignettes, is that the unit of reference for research, curriculum, and pedagogy should be assemblages rather than isolated entities. Moreover, AI-powered tools can form part of assemblages of control, but also form part of productive assemblages that affirm life.

Mention has already been made of the performativity of method. Lesley points out that, as is the case with all methods, AI-powered tools are performative, meaning that they construct reality rather than represent reality. A line of connection with Anja's and Petro's vignettes can be generated. Anja's learning-centred assemblages are performative because they open up new pathways for becoming in a technological mediated world. And Petro's curriculum as complicated conversation opposes curriculum in the Tylerian mould, which suggests a predeterminate representation of reality. Complicated conversations instead, are performative in the sense that each individual participating in such conversations engages in the study of self in intra-action with other humans, the physical environment, and AI-powered tools to reconstruct the self.

Performativity, our third line of connection, leads us to our fourth vector of connection, which is the notion of complicated conversation. Curriculum as complicated conversation is discussed in detail in Petro's vignette, and Anja suggests that the learning assemblage she puts forward may be viewed as a complicated conversation. There is no obvious line of connection with Lesley's vignette but he invigorates a potential line of connection of the

concept of complicated conversation with the domain of research in the second phase of our diffractive reading. Learning assemblages, complicated conversations, and the performativity method reminds us that research, curriculum, and pedagogy are, or should be experimentations with the real. Learning assemblages and complicated conversations do not have predetermined outcomes, and so invite experimentation that gives rise to unintended outcomes (newness). If the performativity of methods means that the methods we choose construct reality, then we should experiment with methods that potentially have transformative effects in the world. Our fifth line of connection is experimentation, which Petro gives particular attention to in her vignette vis-à-vis the construct ubuntu-currere.

Our sixth line of connection relates to ethics. Both Anja and Lesley raise ethical concerns with using AI in teaching–learning and research. Their concerns relate to matters such as the reliability and accuracy of information, bias, and ethical concerns about prompt engineering. Anja writes about the importance of being ethical towards one another in learning-centred assemblages However, there is another ethical dimension, of being response-able in such assemblages, that is, able to respond to that which is immanently present. Petro picks up on ethical concerns in the second phase of our diffractive reading. Aligned with ethics is the matter of justice, which is our seventh vector of connection. There are two arenas of justice, the first is a broader ecological justice that Anja and Petro discuss in their vignettes, and justice that relates to access to AI-technologies in an unequal world. There are many more lines of connection we generated in our zoom discussion, but we only have space to mention one more. Our eighth line of connection focuses on un/learning. Anja's and Petro's vignettes make reference to personalised learning, which involves learning to be response-able in learning-centred assemblages, and learning about what it means to study the self within the intra-actions that complicated conversations afford. The line of connection that we made to Lesley's vignette was that given the dominant understanding that method enables us to represent reality, understanding method as performative would necessarily require unlearning.

Generating new insights

Lesley

Petro and Anja's reference to complicated conversations made me think about how the concept could have relevance to research. In the qualitative interview, the researcher elicits responses from interviewees to open-ended questions posed by the researcher, to be analysed so as to answer a research question. However, the qualitative interview could be reimagined as a complicated conversation where the researcher listens to interviewees with the aim of interrogating the self, as part of being a reflexive researcher. Furthermore, Anja's and Petro's connections that they make with the more/other-than-human world, and not made explicit in my vignette, is a reminder that all activities including research are embedded in the more/other-than-human-world. Haraway (2016) reminds us that since time immemorial, humans have been terraforming the planet in intra-actions with other modes of life. And in the posthuman condition, intra-actions with other modes of life through research should be of the kind that affirm and enhance life.

Petro

Intra-acting with Lesley and Anja's vignettes raised numerous questions about method (as it pertains to research and pedagogy) in the performative sense thereof. It highlighted the need to escape outdated (quantitative, positivist, instrumentalist) methods and to experiment with alternative methods (with AI) that can challenge any dominant, outdated ones. This escape (and those to come) might require researchers and lecturers to engage in an ongoing process of unlearning (lifelong un/learning). Herewith, AI literacy skills acquisition (understanding the performative nature of AI and working with it) also seem to become more important in navigating complex tasks and issues relating to higher education research and pedagogy. Students might benefit when the ideas of lifelong un/learning and fostering of AI literacy are included in different forms of curriculum work. This requires innovative, alternative methods to be used in curriculum work with AI.

Anja

Lesley highlights the paradox where higher education institutions significantly contributed to AI development yet were unprepared for its practical application. This underscores the siloed nature of universities, where breakthroughs in one discipline do not permeate others, leaving some faculties in the dark. Similarly, Petro critiques the persistence of vintage technologies and curriculum theories, drawing a parallel to outdated curriculum approaches like Tyler's Rationale. She argues that these theories, much like obsolete technologies, no longer meet contemporary educational needs due to their static and rigid nature. These two aspects made me think how important it is to not prioritise learning only when playing with the idea of learning-centred assemblages, but also to embrace transdisciplinary thinking and renewed curriculum theories that are adaptive, experimental, and responsive to contemporary societal and technological changes.

Parting thoughts

By interrogating AI as a transformative enabler rather than a mere technological advancement, we uncovered entanglements of AI with research, curriculum work, and pedagogy. Through a thought experiment and diffractive reading exercise, we generated new insights, resulting in a richer understanding of the complex intra-actions between human and non-human actors in higher education. Our intention was not to devise any airtight arguments about AI and higher education, but to generate alternative insights to further complicate conversations about the topic. Our posthuman critique of the affordances of AI provided a platform to critique, and provide practical insights into, the ethical and ecological implications of the application of AI in higher education. What became evident is that posthumanist ways of doing, thinking, and becoming are a useful way to stay with the trouble and work through (by writing and diffractively reading, for example) the complexities of the entanglements of AI and higher education as it pertains to research, curriculum work, and pedagogy. We see this work as an ethical project in the posthuman condition that breaks with outmoded, evidence-based validation of the positivist mould.

Acknowledgement

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