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The impact of artificial intelligence on adventure education and outdoor learning: international perspectives

Chris North[a], David Hills[b], Pat Maher[c], Jelena Farkić[d], Vinicius Zeilmann[e], Sue Waite[f], Takako Takano[g], Heather Prince[h], Kirsti Pedersen Gurholt[i], Nkatha Muthomi[j], Daniel Njenga[j], Te Hurinui Karaka-Clarke[a], Susan Houge Mackenzie[k] and Graham French[l]

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ABSTRACT
This is a composite article which brings together the international perspectives of the editorial board of the Journal of Adventure Education and Outdoor Learning to explore the impacts of artificial intelligence (AI) on the field of adventure education and outdoor learning (AE/OL). Building on the AE/OL profession's response to the impacts of COVID-19 on outdoor and environmental education in 2020, this article includes authors from 10 countries including Australia, Brazil, Canada, England, Japan, Kenya, the Netherlands, New Zealand, Norway, and Wales. The statements discuss the impacts and opportunities of AI for the AE/OL professions, researchers, the nature of being in and with the outdoors, and Indigenous knowledges. The intention of this article is not to present a definitive summary of the state of the profession, but to provide examples of the ways in which diverse people are responding to the challenges and opportunities of AI. By sharing these views, and identifying some commonalities, we hope that AE/OL educators, practitioners, researchers and managers can creatively and cautiously seize the opportunities of this technological revolution.

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Artificial intelligence; technological revolution; learning; nature; human

1. Introduction

1.1. Chris North, Aotearoa New Zealand and David Hills, Australia

The rise of consumer-accessible, high-quality Artificial Intelligence (AI, e.g. ChatGPT) has the potential to disrupt many taken-for-granted aspects of modern society (Hills & North, 2023). Some commentators have likened the emergence of AI to the 'fourth industrial revolution' (Chiang, 2023) and the transformative potential of AI has started heated debates about whether AI presents a threat, opportunity or both. Many quantum leaps in technology have resulted in a moral panic. For example, the printing press and cheap paper democratised literature by making books economical enough for almost anyone to afford. The proliferation of the 'penny dreadfuls' (cheap fiction books) led to fears that young people were being led into lives of depravity and crime. With the benefit of

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hindsight, we can see that penny dreadfuls did not result in the downfall of society and may even have enhanced literacy rates.

Closer to our time and field, similar fears arose when GPS units became widely available prompting concerns that people would lose fundamental skills of map reading and compass use (Hills & Thomas, 2020). New technologies can significantly reshape society, and simultaneously society shapes the development and application of new technologies (Dwivedi et al., 2023). This mutual evolution of societies and technologies results in complex relationships and the implications are difficult to predict in advance. The emergent nature of technological shifts is not an argument against planning, thinking and critical reflection. Indeed, much academic effort goes into fostering critical thinking and stimulating our thinking so that we can better understand and be better prepared for the opportunities and challenges of new disruptions.

For some, AI will interrupt the link between the process of writing and the act of thinking. In adventure education and outdoor learning (AE/OL) written work is used to prompt planning and reflection (Boyes et al., 2018). White (1993) goes further arguing that 'writing as an advanced skill becomes both the means and the expression of critical thinking and problem-solving' (p.106) and 'the writing process itself is an important, probably the single most important, way to learn' (p. 109). For White (1993), writing, critical thinking and problem-solving are intimately related, and for Boyes et al. (2018) writing prompts quality planning. In both cases, the capacity of AI to generate plausible text potentially short-circuits the thinking and planning processes that are at the heart of learning and the preparation for AE/OL. Furthermore, the algorithms underpinning AI can easily propagate biased, incorrect or fictitious text, images and video, raising serious ethical concerns. The advent of AI presents a variety of challenges for society as a whole and for the field of AE/OL.

This article builds on the work of Quay et al. (2020) which brought together 20 statements from the editorial board of the Journal of Outdoor and Environmental Education to illustrate the impacts of COVID19. Quay et al.'s sharing of insights from leading academics proved influential and widely cited (Quay et al., 2020). COVID19 resulted in millions of deaths and in many cases lockdowns and inability to meet face to face for months on end. In a wide range of institutions, outdoor programmes had to be completely reconceptualised. While not a tragedy like COVID19, AI will yield another transformative shift, and is therefore also worthy of exploration. The rapid rise of AI particularly in the field of education, presents another global phenomenon. This article therefore also draws on a composite approach with 14 authors from 10 different countries highlighting the international impact of AI (Table 1).

Table 1. The international contributions to this composite article listed in reverse alphabetical order by surname.

No.	Author	Title	Country
1	Vinicius Zeilmann	Artificial intelligence in lifestyle and action sports learning	Brazil
2	Sue Waite	Beyond intelligence	UK
3	Takano Takako	Engaging with AI from the Japanese context	Japan
4	Heather Prince	Adventurous journeys with AI	UK
5	Kirsti Pedersen Gurholt	Generative AI technology assisting non-native English-speaking masters students' learning and research in AE/OL and friluftsliv	Norway
6	Chris North	Reflective writing as AI-proof: smugness undermined.	Aotearoa New Zealand
7	Nkatha Muthomi & Gaita Njenga	AI and adventure education and outdoor learning: insights from an African setting	Kenya
8	Pat Maher	Don't be afraid of the future: stumble, fumble and tumble	Canada
9	Te Hurinui Karaka-Clarke	AI, Indigenous knowledges and data sovereignty	Aotearoa New Zealand
10	Susan Houge Mackenzie	Your move chief: What can Good Will Hunting teach us about AI and outdoor adventure?	Aotearoa New Zealand
11	David Hills	AI image generation and an evolving outdoor education profession.	Australia
12	Graham French	Generative AI and outdoor education teacher education	UK
13	Jelena Farkić	AI-dventuring in the forests: A short posthumanist note	The Netherlands

The authors above, responded to the prompt *'In the context of adventure education and outdoor learning, how do we optimise, manage and/or engage with AI, e.g. ChatGPT?'* and were given a word range of 300–500 words. Authors were encouraged to write using first person voice and to highlight their own perspectives and context. The intention was to deepen our understandings of the intersection of AI and AE/OL with the goal of improving our work as educators, researchers, and leaders. Authors are listed in *reverse* alphabetical order by family name (see Table 1).

2. Artificial intelligence in lifestyle and action sports learning

2.1. Vinicius Zeilmann, Brazil

The increasing popularity of action and lifestyle sports (e.g. skateboarding, parkour, BMX, mountain biking, surfing, and snowboarding) has been recognized as an important trend in youth lifestyles (Wheaton & Townsend, 2022). Artificial Intelligence (AI) technologies are increasingly being integrated into the sports landscape. In lifestyle and action sports, AI presents the potential to influence to enhance performance, learning, safety, and overall experiences. Practitioners' and athletes' learning in lifestyle sports, which on the whole is informal and self-regulated, with peer-to-peer learning dominating and digital technologies playing a central role (Ellmer et al., 2020), is being affected by AI systems and tools which are revolutionizing the way individuals learn, their training, and development of action and lifestyle sports.

One significant area where AI is making an impact on sports training and learning is motion analysis and feedback. AI algorithms can process video recordings of practitioners' performances and provide detailed insights into technique, body positioning, and movement patterns (Chmait & Westerbeek, 2021). Another way that AI is being used is in the development of virtual platforms that combine computer simulations, AI algorithms, and motion-tracking technologies to create realistic and immersive learning experiences (Dindorf et al., 2022). In lifestyle and action sports, practitioners can practice new manoeuvres, tricks, or techniques in a controlled digital environment, allowing them to build an experienced background before endeavouring them in real-world settings.

AI can facilitate knowledge sharing and community engagement. Online platforms and mobile applications powered by AI algorithms enable practitioners to access a vast array of tutorials, instructional videos, and expert insights, considering practitioners' skill levels, preferences, and goals. Social interactions can be facilitated by connecting community members with similar interests, fostering collaboration, and providing opportunities for peer feedback and support (Ellmer et al., 2020). Moreover, AI technologies are promoting innovation in sports equipment and gear that can be applied to the lifestyle and action sports field. An example is the embedding of sensors in equipment that can collect data on distance, speed, force, and balance. This data enhances the learning process, allowing practitioners to better understand their strengths and weaknesses and optimize training strategies.

AI has not yet taken a leading role in sports science but has been gaining more and more importance recently in the sports field (Chmait & Westerbeek, 2021). AI can transform the way that individuals learn and improve skills in sports like skateboarding, surfing, snowboarding, and parkour. However, it's essential to consider ethical implications when applying AI to sports, including lifestyle and action sports. Privacy concerns, data security, and the potential for technology to disrupt the authenticity and spontaneity of these sports should be carefully addressed.

3. Beyond intelligence

3.1. Sue Waite, UK

My first instinct on being invited to contribute to this article was that I don't know enough about Artificial Intelligence, but on reflection, I think perhaps gaps in knowledge are at the heart of the matter regarding humanity's engagement with AI (Kleinmann, 2023). My feeling is that like social media and the internet before it and indeed many advances in science, AI comes with unforeseen side effects and not all of these will be beneficial.

As in the industrial revolution (and we know what devastating unintended impacts that has had for our planet), the idea is that AI will free us from tasks that do not need a human. AI in a sense replicates the firing of neurons in our brain and has grown more sophisticated as our knowledge of how the nervous system operates increases, enabling AI to learn from prior operations. Dr Henry Hinton, an early pioneer of AI, cautions that AI is already outstripping us in terms of breadth and depth of knowledge as, like the Borg in Star Trek, AI 'minds' could be combined so each AI system's learning could potentially be multiplied and augmented by features of other AI development (Kelinmann, 2023; Kleinmann & Vallance, 2023). AI's capability of reasoning is also rapidly increasing through experience over time as it gathers and uses knowledge from prior examples.

However, what is the 'experience' that AI is learning from? It is bounded by the interactions that happen in the 'mind.' How different that is to the experience we mean when we talk of 'experiential' in outdoor learning: the visceral experience of being in and of nature and engaging physically and socially with others. I can think of many examples in my research where thinking and knowledge have been transformed through hands-on material engagement in outdoor contexts, where, importantly, the impact is usually via the affective realm. The rounded whole of what it is to be human is not accounted for in AI. We are biological, material, a part of nature. Yet without further understanding of how feelings and biology interact with thinking as consciousness, it is possible that AI might develop alternative motivations or misinterpret what knowledge or wisdom is.

Used in support of writing for those with limited experience in this, AI might offer an apparent 'leg up;' but writing should not be formulaic and successful writing is infused with consciousness of feelings, values and positioning, experienced in the material world. There is a risk that these important motivating forces are distorted by AI. My sense is that the field of outdoor learning needs to be cautious about the contribution that AI can make and should recognise that there is currently a yawning gap in awareness of how AI is going to shape the future even amongst its experts and proponents.

4. Engaging with AI from the Japanese context

4.1. Takako Takano, Japan

The COVID-19 pandemic highlighted the lack of digitalization in Japanese society. According to the 2022 World Digital Competitiveness Ranking (International Institute for Management Development, 2022) Japan positions 29th among 63 nations. Among Asia-Pacific regions, Singapore is the top and Japan is 8th following China and New Zealand. Despite this, the pandemic has pushed the society to make progress in areas such as remote work, electronic payments, and remote schooling. Even experiential learning has been forced to go online, leading to the exploration of creative solutions.

Although Japan faces challenges in digitalization, there is a willingness to engage with AI and ChatGPT, albeit with some apprehension. Several local authorities have officially introduced ChatGPT in their work, and the central government plans to publish guidelines for its usage in schools to enhance students' information and technology literacy. As of April 2023, Japan ranks third in traffic share to OpenAI.com, the platform running ChatGPT, following the United States and India. Additionally, the average stay time of users from Japan exceeds that of the US and India (Mori & Hayashi, 2023). ChatGPT also operates in Japanese. Being asked why its Japanese is so natural, it pointed several factors such as a large training dataset including a substantial amount of Japanese content, a natural language generation algorithm, and fine-tuning based on user feedback.

A survey conducted with 4,000 university students (Kyodo News, 2023) between late May and early June 2023 revealed that 32% of the respondents have used ChatGPT. Among them, 14% utilized it for report and essay writing, with 92% stating that they checked the accuracy of the content and made modifications accordingly. However, approximately 57% of those who used ChatGPT did not employ it for report writing, citing concerns that it wouldn't be considered their own work (28%) or due to occasional inaccuracies in the generated content (25%).

In the Kanto Region, Mori and Hayashi (2023) found that 12.1% of the 3,204 respondents aged 15–69 had used ChatGPT. Students and teachers/educational institution employees had a higher usage rate compared to other occupations (21.6% and 20.5% respectively), and 88.7% of the respondents expressed a desire to continue using it. Some individuals who expressed unwillingness to continue using ChatGPT mentioned reasons such as it being unnecessary, hindering their ability to think independently, difficulty of use, and concerns about its implications. These data indicate a generally positive acceptance of ChatGPT among the Japanese population, while the usage is still experimental, and there may be unforeseen issues to address.

The discussion surrounding the handling of AI in outdoor education has already commenced, building upon earlier works on digital technologies in outdoor education (e.g. Hamagin Research Institute, 2023). The 26th conference of the Japan Outdoor Education Society in July included a session titled 'Thinking about the next generation of outdoor education: How will digital technology, AI, and WEB3 intersect with outdoor education?' After explaining WEB3, the presenters suggested that the framework could transform our society, including education. They also introduced examples of OE using Kahoot! and Canva, in addition to STEPN, a WEB3 application, to explore the possibilities of effectively utilizing in the context of AE/OL.

Similar to other educational contexts, I believe that ChatGPT, when used skillfully, has the potential to enhance student motivation and deepen learning during preparation, reflection, summary compilation, and other forms of output in outdoor education. It can also support and assist providers and instructors in generating ideas for activities, menus, and necessary project documents. However, it is important to acknowledge that ChatGPT and other digital technologies cannot replace the real-life experiences of outdoor education, which involve physical communication with others and engage all senses. Each individual's outdoor experiences are unique, and AI cannot fully replicate the sensations of smell, touch, light, wind, and more.

Outdoor education encompasses various goals, such as social and communication skills, life skills, personal growth, compassion, and appreciation of life, where concepts like 'efficiency' or 'convenience' - where ChatGPT may play a role—may not hold the same significance. We must continue to prioritize generating authentic experiences for humans to retain their humanity in a society influenced by AI.

5. Adventurous journeys with AI

5.1. Heather Prince, UK

AI might be re-framing the 'more-than-human' into realms beyond corporeality and is beginning to balance and challenge notions of human exceptionalism. It will continue to develop faster than the human mind can keep pace with and will no doubt transform the landscape of education and learning. There is uncertainty of outcome at the time of writing—where have I heard that before? It's another adventure or so it seems now to experience something 'out of the ordinary' (Simmel, 1919, p. 2) before it becomes the ordinary. We need to develop AI literacy ourselves and embrace and integrate it in our work and everyday lives (Southworth et al., 2023). We will do this because, as those engaged in adventure education and outdoor learning, we embrace risk and challenge . . .

Database searches for 'AI' and 'adventure' or 'outdoor learning' bring up few results, or perhaps I am not using the right search terms? Chatbots (and there are now a range of them including ChatGPT and Bard) produce no relevant results. AE/OL educators and academics must do the research and not challenge our students for lack of referencing the specifics. From a study into the adventures of matter and trans-cranial thinking with environments (Irving, 2022), this year we have research on the capability of AI to plan adventurous journeys (Williams, 2023).

Williams (2023) explored the ability of AI to plan one-day, accessible micro-adventures for the ordinary person using ChatGPT to design journeys in rural, coastal and urban environments and tested them themself. AI was found to be able to start the journey and produce fun adventures in a variety of locations. However, it did not provide information as to how to get there, how long it

might take, the weather and tides or whether facilities it suggested such as bike hire and cafes would actually be open. It had no regard to safety in outdoor environments. However, it could produce an interesting range of tasks in a matter of seconds and not surprisingly was better at 'experimental' or 'coin flip' adventures. Positives included encouraging the participant to 'notice' affordances (such as artwork) and introduced some different approaches ('ask the counter assistant in the café to suggest your lunch'). Itineraries were achievable but not always logically planned.

Whether AI has application for psychogeography is yet to be determined. Could the use of AI for adventurous journeys be improved through feedback from place-responsive literature, for example? AI has the facility to offer 'cognitive anchors' providing you ask the right questions and 'levers technology to extend thinking' (Thesis Whisperer, 2023). Can we conceptualise AI in AE/OL through 'living mind meets living mind' a rejuvenated premise for learning today derived from the educational reformer Charlotte Mason (1842–1923)? She believed that learning often outdoors is foundational on the relationships an individual has with all kinds of abstract and concrete knowledge. Currently, using AI, living minds have to work with AI chatbots; serendipity might be in its lexicon but is spurious in practice.

6. Generative AI technology assisting non-native english-speaking masters students learning and researching in AE/OL and Friluftsliv

6.1. Kirsti Pedersen Gurholt, Norway

Whether and how generative AI technologies can and should assist non-native English-speaking master students and researchers in developing academic English writing skills and generating texts are highly relevant questions. Undoubtedly the technology may support them in communicating their learning and research concerning AE/OL and friluftsliv in contexts worldwide where English is the hegemonic language. This issue was provoked again by the invitation to contribute to this article stating, 'For some, AI will interrupt the link between the writing process and the act of thinking.' As a non-native English speaker, working as an academic with multicultural and multi-linguistic groups of students over the last 10 years—where few are native in English (Gurholt et al., 2018; Loynes & Gurholt, 2017)—it has felt like a relief to be assisted in the daily work by AI translation software. Programmes like Grammarly (https://www.grammarly.com) and Google Translate (https://translate.google.com) have acted like 'critical friends', fixing grammar and misspellings and suggesting alternative expressions whenever I stumbled.

Colleagues across the academic sector express a broad consensus that AI translation software provides personalised support to non-natives in academic English. Immediate feedback, for example, suggesting simplifying sentences of complex meanings, how to vary the writing style, and broadening vocabulary augment the writer's linguistic sense of academic writing (White, 1993). At best, generative AI technology enhances the writer's language skills, freedom of expression, and better communication of ideas and research perspectives. Disseminating their results to outdoor educators and researchers worldwide supports cultural diversity and democracy (Dwivedi et al., 2023).

With AI language learning support and knowledgeable discernment, non-native writers can control the writing process, from initial concepts to final manuscripts. The writers must critically evaluate the automatically produced suggestions and continuously search for precise and nuanced expressions corresponding to their ideas. It may be akin to a process of writing in your native mother tongue (other than English) and then engaging a professional human translator with limited subject-specific knowledge but proficiency in English. In this scenario, the manuscript may return so differently, it could be as if you had not written it!

There are pitfalls. For example, generative AI technology assisting academic writing constantly suggests turning critical expressions into positive comments. If writers uncritically accept the machine-made recommendations, AI technology will diminish essential ideas or sometimes even turn expressions into contrasting thoughts. Such transformations materialise because AI technology is trained to handle large language models automatically according to predefined algorithms. Evidence is provided that

generative AI technology, exemplified by ChatGPT, deliver biased outputs (Dwivedi et al., 2023). Due to a lack of transparency, these biases are difficult to identify (Strümke, 2023).

From a multicultural perspective, a serious concern is that generative AI is systematically fed by texts representing hegemonic cultural values and worldviews whilst minority perspectives are omitted. Thus, generative AI will neglect cultural diversity and stimulate cultural homogenisation processes favouring Anglo-centric research and semantics at the cost of cultural diversity and under-represented groups.

These concerns may become more challenging and ethically demanding if writers ask generative AI and ChatGPT to write entire texts. Consequently, developing students' knowledge of generative AI, and the critical thinking and reflection capabilities needed to assess AI outputs, becomes highly needed and relevant. Primarily, this type of education needed to develop the student's knowledge and awareness of the cultural and social differentiation processes of current societies. Next, we must enhance their capability for critical pedagogical thinking and praxis development that can meet the current complex multicultural societal conditions under which (young) people live.

7. Reflective writing as AI-proof: smugness undermined

7.1. Chris North, Aotearoa New Zealand

The emergence of AI prompted anxious discussions by colleagues who were concerned about the impact on the current assessments they were using. Their worries centred on the ability of AI to provide an acceptable assignment in place of a student's own work. This situation would potentially mean that students would be able to pass courses without meeting the learning outcomes.

I looked at my colleagues' assessments and noticed that there was little or no expectation of reflective work. Given that much of my educational focus is on exploring the impact and relevance of outdoor experiences for my students, my assessments always include reflections on personal experiences. I was heartened by this observation and felt that my assessments were secure from the intrusion of AI.

Out of curiosity, I asked ChatGPT to write a reflective piece on a wilderness experience. The text that appeared on my screen included a disclaimer that AI could not directly experience anything. After that statement, the text rolling over the screen was interesting and well-written. The text discussed a sense of awe from being in nature and fostering a deep respect for the natural world, and in turn, this respect led to desires to protect and preserve nature. Also included were feelings of spiritual connection and of well-being. I was shocked, as much of this seemed so plausible and I had read many student reflections which were very similar to what the AI generated.

AI was able to capture the themes from reflections available online. According to Goodson (2011), our lives are not endlessly divergent, but tend to cluster around certain patterns. Goodson argues that there is a mediation between the personal voice and wider society. After further consideration of what this meant for my students and my assessments, I looked more deeply at the generated text. The AI text reflected strong romantic underpinnings, a lack of Indigenous connections, and emphasised individual freedoms over societal benefits. Importantly, there were also no context-rich details.

I have since thought a great deal about how I might use these insights to help students provide improved reflections. My advice to students is now to provide greater levels of context in their reflections. I expect to see their own stories, linked to their life experiences and how these experiences have helped reveal assumptions or provide new insights and opportunities. I am enthusiastic about privileging the particular over the generic, and the transformative over the shoring-up of existing beliefs. I am aware that there are generic ways of representing transformation and that many students are skilled in meeting the expectations of the educators, regardless of the transformative-ness (or not) of the experience. The ability of AI to generate text has made me think more deeply about what it means to have experiences as a human, and the connections between reflection, assignments and learning.

8. AI and adventure education and outdoor learning: insights from an African setting

8.1. Nkatha Muthomi, & Gaita Njenga, Kenya

Kenya has a 53.4% prevalence on use of smartphones and a reported 42% internet connectivity which is among the highest in Africa (Communication Authority, 2021). This connectivity has grown rapidly in recent years resulting in a generational divide with older Kenyans feeling out of depth with even more basic aspects of digital technology, let alone AI. This level of connectivity exposes outdoor educators to the use of AI technologies, albeit, like in other nations, with ignorance occasioned by dearth of research on use of AI, and particularly with regard to AE/OL. Here we explore positive AI outcomes in Kenya which might be hindered by data deficiencies, lack of skills for AI and lack of a regulatory framework (Akello, 2022).

Artificial intelligence presents opportunities for AE/OL in Kenya especially in enhancing delivery of education and for expeditions. Clients on adventure would navigate with AI-powered maps (Zhang & Liu, 2020) and receive real-time weather, routes and terrain information. This could enhance their experiences and also be a preventative intervention against risks associated with expeditions. AI could also help support search and rescue strategies for lost individuals or groups. Kenya's AE/OL spaces have registered significant rises in accidents during expeditions (Muthomi et al., 2023). We see the potential of using AI-powered expedition gadgets applicable in diagnosing and treating injuries and medical conditions. In addition, AI could be a tool for democratising AE/OL and availing its benefits for individuals who would otherwise be locked-out for reasons such as disabilities, age or finances. They would benefit from AI-based virtual reality (VR) and immersive technologies to simulate AE/OL environments.

The opportunity in AI notwithstanding, we are cautious on outcomes for AE/OL. Experiences in AE/OL traditionally require the physical presence of an individual in the natural environment dealing with natural elements. Will our youths who are enjoying AI-enabled VR mountaineering on a campus or in shopping malls be considered to have had an adventure? Outdoor elements such as cold, wind, storms, and changing terrain needs an individual to be physically in the natural environment. Whilst the orthodox AE/OL needs real-world elements (Miner & Boldt, 1981) and therefore does not consider AI experiences as AE or OL, we suggest that AI may necessitate a rethinking of the conceptualisation of adventure. Further, experiences as AI-enabled VR expeditions could decrease the appetite and excitement of being involved in a real-world expedition among our youth. With AI and VR, the possibilities of truly adaptive and immersive experiences might soon make it difficult to distinguish actual reality from VR. For our students in class, will the use of AI in AE/OL be the way of cheating or the way of the future?

Given that AI technologies are permeating literally all aspects of modern life, it will be imperative that we integrate AI into AE/OL (Hills & North, 2023). In Africa, we must position ourselves to take advantage of its value cautiously enough to keep the fundamentals of AE/OL. The influence of AI on AE/OL is emerging with continuously new aspects concomitant to innovation. Thus, we cannot aptly predict the future. Therefore, we as academics and educators will need to be simultaneously pragmatic and responsive through AI research and skill acquisition.

9. Don't be afraid of the future: stumble, fumble and tumble

9.1. Pat Maher, Canada

Outdoor and adventure educators aren't technophobic when it comes to new fabrics such as Gore-Tex, or better design lines on a whitewater canoe; but in the learning sphere—they can sometimes be considered pretty luddite. I don't mean this in a bad way, except over the last 25 years I've often heard things like Satellite phones will mean no one worries about getting lost anymore, GPS will be the death of map and compass work. And just two years ago, when many outdoor educators were required to move courses online, I heard a lot of groaning about it not being possible—even though I'd personally taught online OE courses as early as 2003.

So generative AI—it's going to be the death of us, right? No; we just need to learn to use it in positive ways where it can augment or supplement the exceptional hands-on/experiential modalities that AE/OL is known for. In practical courses it may have no effect—it won't take over knowing where to move your body or place your gear when climbing. However, in lecture-based seminar/content courses it can assist our students write—and I might even argue, think—better.

Many K-12 and higher education instructors have learned to use it effectively as a writing tool, a space to take prompts and then write better. When used to flesh out ideas or build draft upon draft (mastery, which is something we like in AE/OL) it can be positive. Sure it can contribute to outright plagiarism and other concerns around academic integrity; but those issues are as old as time—they didn't begin in November 2022 when ChatGPT exploded.

In fact, there are many institutions where they've comprehensively thought out the 'what ifs' not just for AE/OL, but for any/all disciplines (see Anselmo et al., 2023; University College London, 2023; University of Toronto, 2023). To be honest, I am actually more concerned with the visual possibilities than the text-based generative AI. How mid-journey (https://www.midjourney.com) or DALL-E (https://openai.com) can mask reality. A landscape or a species they see in a post may not be real. And we already know today's students are better able to identify brands (Nike, McDonald's, Under Armour) than they are actual flora and fauna. The visual is the more scary one as it's possible to be more 'fake news.' At least texts in text-based platforms such as ChatGPT start in reality (someone else typed something similar in, for it to build from, even if it's poorly or flat out incorrectly cited).

What I would encourage any AE/OL educator to do is try it out. Figure out for yourself what the Generative AI tools can do, where are their limitations, and where the opportunities lie. We can't shy away and hide in the 20th century—this sort of digital tech (versus material/design tech) is here to stay. Either we adapt and advance, or AE/OL becomes a dinosaur and dies out.

10. AI, Indigenous knowledges and data sovereignty

10.1. Te Hurinui Karaka-Clarke, Aotearoa New Zealand

Outdoor learning has a growing focus on emphasising the importance of places as more than just a backdrop, and, in many parts of the world, highlighting Indigenous histories (Kinch et al., 2022; Spillman, 2017). Traditionally, knowledge of these histories was gained through direct contact with local Indigenous people, however with the advent of digital information and more recently AI, there are new ways to acquire this information. This has given rise to concerns regarding data sovereignty, ownership, and control, particularly among Indigenous communities who have historically faced marginalisation and exploitation (Taiuru, 2023). In the era of increasing digitisation, data has become a valuable asset for governments, organisations, and individuals alike; but what are the implications of having easy access to any information on the internet, and importantly, the ability of AI to collate and integrate this information into plausible narratives?

One of the issues surrounding the use of AI and Māori knowledges is that AI has unsolicited access to knowledge that is available in both public and private domains. This access creates a tension for Māori iwi and hapu (tribes and sub-tribes) to whom the knowledge belongs but have no way of controlling how their knowledges are used. When groups to whom the knowledge belongs are unable to exercise data sovereignty and control its use, that knowledge could be used out of context and for purposes not originally intended, and in these ways corrupted. Unauthorised use jeopardises the authenticity and integrity of Māori knowledge. AI is a digitised form of cultural appropriation.

Cultural appropriation is the unacknowledged adoption of some or all aspects of another's culture or identity. It is especially contentious when a dominant culture misappropriates that of a minority. AI is a consumer and regurgitator of knowledge. Unless otherwise programmed, it knows no boundaries and wilfully harvests knowledge from all sources including Indigenous knowledges and thus Māori. Advocates for Māori data sovereignty want to protect the data by restricting the access use of Māori knowledges.

The main concern I have is that outdoor leaders, students, and educators will end up being time poor, and because of this, use AI to generate local histories to share with others. This will mix and match different histories from different Indigenous groups, potentially even from around the world to create a narrative of a place that is fictitious. This narrative is then spread through a cascade effect from educators to students, and outdoor leaders to a wider group. Knowledge is precious and must be treated with respect, particularly in these days of alternative facts. One way to combat this cultural appropriation is for Indigenous people to create access to their verified histories either through personal encounters or online resources (see Pae Kōrako, 2023). It is critical for outdoor folk to ensure that they and their students are aware of the risks that AI poses, and how these are heightened in the areas of Indigenous knowledge and histories. This awareness will allow outdoor educators to support Indigenous knowledge sovereignty and avoid another wave of colonisation.

Māori have always had safeguards in place to protect some traditional knowledge. The philosophy that not all Māori knowledge is for everyone was widely practiced by the guardians of that knowledge. Those guardians identified people who bore the attributes necessary to become holders of that knowledge, and to preserve its sanctity they decided who had access to it. Retaining control over knowledge in a digitised world is no different. There is some knowledge that is not for the consumption by the populace and there is other knowledge that with the agreement of its owners may satisfy an AI appetite.

11. Your move chief: what can Good will Hunting teach us about AI and outdoor adventure?

11.1. Susan Houge Mackenzie, Aotearoa New Zealand

In the film Good Will Hunting, Robin Williams' therapist character Sean is troubled by challenges posed to him by a young mathematics genius from an abusive background (Will Hunting, played by Matt Damon). Will has managed to find the Achilles heel of every prior therapist and he looks poised to do the same to Sean after dissecting one of his paintings and disrespecting his late wife. However, in the subsequent scene, Sean delivers a poignant, insightful monologue on the value of education versus experience (if you haven't seen it, experience it for yourself here; Van Sant, 1997). Sean concludes that, for all Will's encyclopedic intelligence, 'you don't have the faintest idea what you're talking about,' and proceeds to illustrate this through a series of examples. 'If I ask you about war, you'd probably throw Shakespeare at me . . . but you've never been near one . . . I ask you about love, you'd probably quote me a Sonnet, but you've never looked at a woman and been totally vulnerable.'

If you are still wondering if you've stumbled on a decidedly average movie review instead of an academic commentary on AI and outdoor adventure, let me be clear. As a researcher and erstwhile practitioner of adventure tourism and education, this scene epitomises why outdoor adventure will never be supplanted, only augmented, by AI. AI can certainly enhance informational, logistical, and administrative aspects of outdoor adventure, as explored in depth by other authors herein. But AI cannot replicate the sensory, meaning-making, or psychologically transformational experiences that outdoor adventure, done well, can engender. When I ask ChatGPT about the benefits of adventure, it 'writes' about a sense of awe, connection to nature, and broader perspectives of our place in larger ecosystems. ChatGPT also 'knows' that adventure can strengthen connections to others through shared challenges, and to ourselves through mindfulness and reflection. However, reading this regurgitation of human inputs does little to encapsulate the true value of adventure education, which relies on immersive experiences in place to produce deep learning and change.

AI, used appropriately and judiciously with a sufficiently critical lens, presents a vast range of possibilities to enhance our efficiency—and creativity!—in outdoor adventure contexts. We should embrace these opportunities in order to devote more energy towards what many of us in the field most value and love about outdoor adventure: immersion in the experience itself. AI allows us to redirect finite time and attentional resources towards the most 'human' elements of these experiences, such as creative experience design, deepening our connection to people and places, and fostering a sense of

purpose—for our students, clients, and ourselves. Adventure experiences are continually evolving, becoming safer and more accessible and, arguably, improving due to diverse technological advances. AI is simply another new tool at our disposal. How we each choose to use it will dictate whether it enhances or detracts from our adventure experiences and learning. As Sean concludes in his contemplation, looks like it's 'your move, chief.'

12. AI image generation and an evolving outdoor education profession

12.1. David Hills, Australia

AI will not replace outdoor educators, but it may lead to replacement of those who do not use it. At the core of what we value in outdoor education is learning *in* and *for* the outdoors and it is often the disconnection from technology and simplicity that we seek when we teach with nature (Megret, 2023). However outdoor education is a flexible space, and now, in 2023, there are many diverse applications of AE/OL that need to respond to, manage and engage with technological developments such as AI.

Digital media is one of the most common applications of technology in AE/OL and advances in AI will mean that in future, most of the images and video may be generated purely by AI without any capture in the field. AI images are generated by 'prompts' that are written into the generator and the more specific the prompt, the more specific the image. Examples of this can be seen alongside the 'prompts' (Figures 1, 2 and 3).

Figure 1. An AI image generated from 'Mid-journey' using the prompt 'outdoor education participants, engaging in a variety of adventure activities, in different environments, photo realistic.'.

Figure 2. An AI image generated from 'Mid-journey' using the prompt 'an adventure education and outdoor learning instructor, photo realistic.'.

As can be seen in figures one, two and three, these images are entirely fictional and none of these people exist in real life. Fully unpacking these images in terms of biases and stereotypes is beyond the scope of this short statement, but the images highlight ongoing issues in our profession. The prompt 'photo realistic' tells the AI to generate a photo as opposed to an animation and as this software is in its early phases of development, the resolution will improve every year. What does this mean for the AE/OL profession? On the one hand, these new images are of people that do not exist in real life so there are no restrictions on when and how they can be used to promote the benefits of outdoor learning. It may also be that these photos are so good that participants of AE/OL programs do not feel the need to record as much digital media in the field, which may make them more 'present' in the experience as opposed to focused on recording it. On the other hand, these images are holding a mirror back to society on what the internet looks like. I think that the issues about biases that these pictures raise, speak for themselves. Furthermore, AI tools could be used to mis-represent AE/OL as being an unsafe and irresponsible activity and may not disclose that the media is AI generated. What is perhaps the most alarming is that that this is the least sophisticated that this technology will ever be. Soon an AI generated image or video will be in-distinguishable from one taken in the field.

Figure 3. An AI image generated from 'Mid-journey' using the prompt 'an outdoor education instructor, outdoor education lecturer, and an outdoor education participant, photo realistic.'.

As a profession we must ensure that any use of AI to generate media is fully cited and disclosed at every opportunity including the promotion of our outdoor education courses and the benefits of AE/OL. In 2024, it is predicted that AI will *generate* reflective movies of participants on outdoor education experiences where no camera was ever used. I look forward to the affordances of that discussion.

13. Generative AI and outdoor education teacher education

13.1. Graham French, UK

A significant amount of time in teacher education concentrates on methods and modes of assessment, as teachers in most educational systems are required to assess the attainment of children and young people with whom they work. Effective teacher education requires pedagogical knowledge and the ability to apply that knowledge in a variety of contexts, one of which involves providing feedback in an appropriate and accessible format (Hattie & Clarke, 2018). Generative AI can be used to produce exemplar assessment materials which can then be assessed by student-teachers, in many cases with the AI output being used in

place of real young people's work. For example, a generative AI application can be asked to produce an expedition plan which can then be critiqued and improved upon by student-teachers to assess their understanding of both the process and pedagogy of providing effective feedback to the young people they will teach (represented by the AI in this scenario). This can be done collaboratively to improve the actual plan, (modelling peer-assessment used in schools) and individually as a feedback practice task (modelling self-assessment, also used in schools) or alternately with tutor feedback. There is scope to operate this type of learning activity as an iterative process where the AI produces the initial draft and the student-teacher's role is to improve the draft based on peer or tutor feedback. The student-teachers are awarded credit for how they respond to the feedback over the cycles of review and feedback, rather than the actual content (as this is created by the AI). This can be done in person, or through a VLE depending on the mode of delivery of the particular programme.

An iterative feedback-response process can be applied when asking student-teachers to reflect on their teaching, which is a common component of teacher education courses and often a focus of adventure education programmes with aims of personal and social development (Leberman & Martin, 2004). AI has proven to be able to provide coherent reflections given sufficient data about the sessions it is asked to write reflectively about (whether this is true reflection is questionable), but a process of iterative improvement based on feedback develops skills student-teachers require, and equally often find challenging to master as they change their perspective from university student-teacher to teacher.

Student-teachers of today are likely to be teaching in a post-plagiarism world (Eaton, 2021) and it is therefore incumbent upon teacher educators to prepare student-teachers for this. This means that as well as working in an AI informed environment themselves, they need to explicitly study the application and impact of AI on the prospective young people with whom they will work. Consideration of the role played by AI in assessment provides student-teachers with opportunities to improve both the authenticity of assessment tasks and the quality and effectiveness of feedback (Carless, 2023). Guidelines, such as those produced by Monash University (2023), may support engagement amongst student-teachers with how to manage AI in assessment situations and understand the opportunities presented to develop the feedback literacy of the young people they are working with. These student-teachers are more likely to be effective teachers of the future with the appropriate critical skills to move both assessment and feedback from information to action (Winstone & Carless, 2019).

14. AI-dventuring in the forests: a short posthumanist note

14.1. Jelena Farkić, the Netherlands

Various technologies assist me, a neophyte multispecies ethnographer, in reaching the nearby forest; I put on my hiking shoes, I drop my notebook, pen and micro-shot camera in my bag, my phone is in my pocket, and I set off on my bicycle. Now I'm off to explore the world of plants, insects, fungi, slime and lichen, while trying to understand the world as material, partial, multi-cultured and multi-natured, and emergent through the relations of multiple beings and things (Ogden et al., 2013). Microbes, fungi and lichens have long challenged our well-worn concepts of identity and individuality—but so have those ubiquitous technologies.

We are now becoming cyborgs, Donna Haraway (1991) says, humans equipped with a piece of technology with which we are intimately and intricately entangled. The notion of cybernetic organisms explains the hybrid nature of humans as both biological and technological beings (Gilbert et al., 2012). Posthumanism in particular emphasizes this idea of hybridity, blurring the boundaries between human and non-human, organic and artificial.

Haraway's work has played a significant role in shaping posthumanist discourses in multiple disciplinary fields. In outdoor education, we have embraced symbiotic life and unsettled the essentialist ideas of self, individuality and ways of learning (Jukes et al., 2023). I have long been an embodied knower, interacting with and learning from mosses, mosquitos, woodlice, phytoncides, rain or breeze on my hikes through the forest, and I am now welcoming posthumanist and new materialist ideas whilst at the same time cautiously becoming an AI-powered outdoor learner.

Posthumanists advocate for embracing cyborg identities, while the increasing integration of technology into different spheres of our lives gives rise to new forms of subjectivity. These posthuman subjectivities may at the same time be mesmerising and scary, because of their hybridity and transcendentality; but how our complex entanglements with natural and artificial intelligences shape our being, I find truly fascinating. When I hang out in the forest, I observe fungi through ID apps, and I immediately google stuff or ask an AI chatbot about, for example, mycelial networks or their fruiting bodies or their adaptive behavior. It is amazing how technologies mediate our way of experiencing the world and offer a space for engagement of my consciousness, fungi and AI . . . this relational conversation opens radical possibilities for creative knowing and challenges our thinking about how on earth we are worlded as a species.

15. Conclusion and future directions

15.1. Chris North, Aotearoa New Zealand and David Hills, Australia

The authors above, responded to the prompt *'In the context of adventure education and outdoor learning, how do we optimise, manage and/or engage with AI, e.g. ChatGPT?.'* The statements included in this article represent the experiences of 14 authors from 10 different countries which discuss the challenges and opportunities of AI in AE/OL. Reading through these statements, we (the first two authors) see the following broad commonalities including:

- Bias and equity
- Explorations of AI
- Pedagogy and safety
- Place and experience
- More- or less-than-human relationships

For both better and worse, AI has emerged, is soon likely to be omnipresent and can never be reversed. To adapt a phrase from Kurt Hahn, the emergence of AI therefore impels society into responding. Some of the statements included in this article highlight worries about new, untested ways of working and living. An amount of caution is important as we are guardians of the body of AE/OL knowledge and practices. Some contributors express these concerns about the impact of AI on the field of AE/OL. Other statements highlight excitement at the new opportunities that continue to be revealed. Many of these perspectives see the transformative potential of AI that can improve skill learning, safety or reduce inequity. For others, AI reveals new ways to interact with students and with outdoor spaces.

This snapshot of perspectives from around the world should be viewed as one moment in time. Those who work in the dynamic and emergent field that is AE/OL will be well acquainted with reading the conditions, the group and adapting decisions based on the best information available. The AE/OL field has leaders who are adaptable and experienced with sound decision-making in the outdoors which will stand the field in good stead as we engage with the growth of AI.

Similar to any previous technological revolution, it is essential that the AE/OL profession is proactive and not just re-active to the impacts and opportunities of new technologies. Whilst many outdoor experiential pedagogies are based on a 'break from the norm' and 'learning directly through the outdoors and not mediated by technology,' AI will continue to grow in influence. In future, advances in AI may fully generate video as well as complete administrative tasks in the outdoor education profession supporting the in-field operations. The statements presented in this article emphasise the need for research into the relationship between AI and pedagogy, assessment, equity, cultural bias and job security in AE/OL. There are many possible directions to build on this foundation and we hope this article will serve as a stimulus.

The intent of the JAEOL editorial board is to contribute to a conversation with those in the AE/OL field from around the world, and to prompt further discussions and reflection at this time of rapid change. We hope that academics, educators and leaders can have intentional, systematic and evidence-based discussions around the challenges and opportunities that AI presents to our profession. We also hope these statements and their commonalities inspire future research so that adventure education and outdoor learning can continue to grow and respond proactively to inevitable future technological disruptions.

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