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The Future of Generative AI in Continuing Professional Development (CPD): Crowdsourcing the Alliance Community

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ABSTRACT

More than a decade ago, Dr. Curtis Olson published a futuristic commentary predicting the next era of Continuing Professional Development (CPD). While Dr. Olson considered crucial change at the forefront of CPD, the last decade has also seen a wave of technology changes that few could predict. In this mixed methods analysis, we describe a qualitative process in identifying the next decade of changes to the process of healthcare education. We sought to engage our community in a grassroots collaborative, amplifying the voices of those involved in shaping the past, pushing the current, and setting the future of CPD. This research includes quantitative and qualitative survey research, focus group facilitation, and collaborative workshops. In each setting, respondents provided commentary and unification of themes related to changes in technology and how it will shape the future of CPD. Here, we report the findings of those themes and recommendations for appropriate and thoughtful use of technology.

Introduction

The advent of Generative AI has ushered in a new era of possibilities across various sectors, including healthcare and continuing professional development (CPD) [1]. The evolution of artificial intelligence (AI), Generative AI builds upon foundational AI models to offer additional capabilities. Generative AI refers to a subset of artificial intelligence that focuses on creating new content, such as text, images, or music, based on learned patterns and rules from existing data. Unlike other types of AI that are designed for tasks like classification or prediction, Generative AI aims to generate novel and original outputs that resemble human-created content. As these powerful AI tools become more advanced, they hold the potential to continue to revolutionise the way healthcare

professionals acquire and enhance their knowledge and skills. At present, the believed adoption of Generative AI tools in CPD programmes, such as ChatGPT, Anthropic, Beautiful AI, and DALL-E, and dozens more, remains inconsistent. However, these tools have already demonstrated their ability to generate written content, images, and even code, opening up new avenues for healthcare-related CPD content creation and personalisation.

Generative AI is already making significant inroads in CPD across various applications. Today, healthcare professionals are using Generative AI tools, particularly those with large language model (LLM) capabilities, within a range of activities associated with CPD [2]. For instance, ChatGPT is being utilised to develop

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educational videos and presentations for peers, design patient education content such as blogs and social media posts, and facilitate continuous learning by generating summaries, explanations, and key points from medical literature [3]. Image generation tools like DALL-E are being explored for creating visual aids and infographics to enhance medical education materials. Furthermore, platforms are able to leverage Generative AI to create diverse and realistic patient case studies, allowing healthcare professionals to encounter a wider range of clinical scenarios than traditional methods typically offer. AI-powered adaptive learning systems, often integrating LLM technologies, are being implemented to analyse learners' performance and generate personalised study plans, potentially optimising the efficiency of continuing education [4,5]. There are also experiments with AI-assisted systems at medical conferences, using tools similar to ChatGPT to provide rapid, research-informed responses to attendees' questions, which could enhance real-time learning opportunities [2]. These examples illustrate the potential of Generative AI tools to create more engaging, personalised, and efficient CPD experiences, spanning from individual learning to peer education and patient communication.

Looking to the future, as with any emerging technology, the adoption of these particular innovations comes with ethical and regulatory considerations. Transparency and accountability in the use of these AI systems are paramount, as well as addressing potential biases and ensuring fairness in AI-generated content and assessments. Privacy and data protection concerns must also be addressed, particularly when dealing with sensitive healthcare information [6]. As the healthcare industry and CPD embrace the potential of Generative AI, it is crucial to develop robust ethical guidelines and best practices. To date, the general guidelines for use have already been released by the World Health Organization and the European Union [7–10]. A systematic review of empirical studies on medical AI ethics revealed 36 recent peer-reviewed publications related to knowledge and attitudes towards medical AI and related ethics; the creation of theoretical models of medical AI adoption; and identifying and correcting bias in medical AI [11]. Ethical concerns related to the use of AI in healthcare exist, including medical CPD, particularly related to the introduction of bias within algorithms and models, which risk further exacerbating disparities in care and access; ethical use of AI is therefore critical to reduce, rather than worsen, health equity [12].

Collaboration between AI experts, educators, medical societies, and healthcare professionals is essential to ensure the responsible and effective integration of these technologies. This work aims to show a vision that has been crowdsourced across the CPD ecosystem and can be used as a blueprint for a thoughtful and successful integration of these powerful innovations, by outlining the potential applications of Generative AI within CPD.

Methods

The authors implemented a research project in early 2023 with the aim of identifying themes that are relevant and/or important for the CPD community to consider in futuristic planning, through assessment of grassroots perspectives and stakeholders' roles in strategically evolving the future of CPD. The research methods consisted of multiple data collection and analysis steps, with continual refinement of the emerging themes and findings. (Table A1) (Figure 1)

In March 2023, the authors disseminated an online foundational, exploratory survey to a broad sample of over 300 CPD professionals via direct email and social media channels. This survey described 8 themes summarised from the 2012 publication of "twenty predictions" for the future of CPD by then-Editor in Chief of JCEHP, Curtis Olson [1]. (Table A2) Respondents were asked to rank the 8 themes by order of importance to the future of CPD and, separately, by relevance. Additional relevant and important responses were collected within open text fields. Survey respondents ($n = 70$) encompassed a range of CPD professionals, including those who reported being professionally affiliated with medical education companies, pharmaceutical manufacturers, medical schools, consulting and service organisations, and professional societies. Analysis of the survey data (SN, CP) yielded prioritised themes that were identified as relevant and important, which were corroborated by the rankings via the survey instrument [13,14].

To further explore the themes identified by the foundational survey, the authors conducted 3 separate 30-minute focus group sessions, between August – October 2023, to which the original respondents to the survey were invited. The focus group sessions were recorded and transcribed, and qualitative data from the 18 participants were analysed (CP, SN) to yield a summary of themes beyond the originally examined 8 themes, all related to the future of CPD. Following the focus groups, a survey was disseminated in January 2024 to the focus group participants, summarising themes identified across the three sessions and requesting further details and perspectives on the importance of the themes identified and summarised; open text fields in the survey offered the opportunity for additional insights to be offered. The authors (SN,

CP, DE) analysed the collected data, organising all inputs by the established themes and, where appropriate, adding themes to ensure all comments and insights shared by the focus group and survey participants were organised into categorised themes.

The top themes and related findings were presented in a facilitated workshop in February 2024, within the Alliance Annual Meeting (New Orleans, LA), in which 20 participants provided additional considerations as important to the future of CPD. Participants in the workshop included professionals associated with a variety of organisations that offer, develop, or support CME/CE, including medical education companies, pharmaceutical manufacturers, hospital and health systems, education consultants, and professional societies. Verbal and written responses were collected and annotated from all discussions and notes, including small group readouts within the workshop; additional data were collected into an online tracking tool (Padlet©) during the workshop. All responses were categorised, whether shared by participants or by authors, and then merged across similar categorised themes, resulting in a final set of core themes.

A summative analysis of the identified themes from the multiple data collection and analysis phases was developed (SN, CP). Those themes related to technology and Generative AI were extracted from the data and findings described in this paper.

Results

Quantitative Summary – Surveys and Workshop – 2023–2024

2023 Survey Data
Seventy members of the CPD community responded to the initial call to action survey, with 28% providing free text commentary on the future of CPD. Technology and the use of AI emerged as a top theme and were incorporated into focus group discussions.

2023 Focus Groups
Three focus groups were held with a total of 18 individuals participating. Member section representation of these focus groups cross-Alliance [medical education companies, pharmaceutical manufacturers, medical schools, consulting and service organisations, and professional societies]. The focus group discussion is anchored to the pre-identified themes that emerged from the survey research as well as additional, undirected feedback from participants on future themes. Without prompt from the facilitators, AI was identified

as a top priority of focus for the future of CPD. (Table A3)

2024 Alliance Annual Conference Workshop
In the 2024 Alliance Annual Conference Workshop, attended by 20+ participants across a diverse group of member sections, "Impact and Promise of Technology" was ranked as the most important theme for the future of CPD (25% of the participants), followed by "Advancement of Application of Learning Science" (18%) and "Unified Impact Story" (18%). (Table A4)

Qualitative Summary – Survey, Focus Groups, and Workshop – 2023–2024

The consistent emergence of generative AI responses throughout the survey and focus groups contributed to the rich discussion during the Alliance Annual Meeting Workshop, 2024. The following themes are the culmination of that discussion, with corresponding free text responses listed below:

Learner-Centric Approach, Engagement, and Demonstrating Impact (**60% mentioned**)

- *"Engaging learners through dialogue and understanding their needs and gaps to improve CPD offerings"*
- *"Measuring, analyzing, and demonstrating the impact of continuing education"*
- *"Showcasing the value of education through unseen or untapped areas of research, new technologies, and creative data sources"*
- *"Generating publications from the industry on the impact story and how CPD furthers medical care"*

Expansion of Educational Formats and Addressing Accessibility (**40% mentioned**)

- *"Virtual reality (VR) and augmented reality (AR) as technologies to present simulation-based education and expand CPD formats"*
- *"Efforts to expand access to educational interventions through technology, lowered barriers, and language accessibility"*
- *"Adopting a learner-centric approach, understanding how different generations consume content, and making education more accessible, affordable, and consumable"*

Figure 1. Timeline of crowdsourcing CPD community feedback on the future of CPD, 2023 to Present.

- *"Issues of costs of continuing education due to federal policy and healthcare pressures"*

Accreditation and "Collaborative Intelligence" (**20% mentioned**)

- *"Using AI to assist in joint accreditation-type processes"*
- *"Evolution of electronic reporting and credit claiming processes influencing educational access"*
- *"Leveraging AI for 'collaborative intelligence' to improve evaluation of educational interventions"*

The consistency seen in comments surrounding the evolution of technology in healthcare education showcases the forward focus of AI and emerging technology among participants in this research.

Discussion

The integration of Generative AI into CPD marks a transformative shift in healthcare education, presenting both unprecedented opportunities and significant challenges. Our research indicates that the CPD community recognises the value of Generative AI while simultaneously harbouring concerns about its implementation and impact. This duality underscores the need for a balanced approach that maximises the potential of these technologies while rigorously addressing ethical considerations and privacy issues.

One of the most promising applications of Generative AI in CPD is the automated generation of educational materials. By harnessing the vast capabilities of AI systems, educators can create highly personalised and engaging learning experiences tailored to individual learners' needs and preferences [5,15]. This includes the development of dynamic case studies, immersive simulations, and interactive learning modules that adapt in real-time to learners' progress and preferences. Furthermore, Generative AI has the potential to revolutionise learner interaction with educational content through AI-powered virtual assistants and intelligent tutoring systems. These AI-driven tools can provide real-time support, guiding learners through complex concepts and offering personalised feedback and recommendations for further education.

However, it is crucial to acknowledge the limitations and potential pitfalls of Generative AI in the context of CPD. Despite their sophistication, Generative AI models lack true understanding and can produce incorrect or inconsistent information, particularly in complex medical scenarios [7,16]. They may struggle with nuanced clinical reasoning or fail to account for the most recent medical research. Moreover, these models risk perpetuating the biases present in their training data, potentially leading to skewed educational content [8,12]. These limitations underscore the critical importance of human oversight and regular validation of AI-generated content to maintain the quality and accuracy of CPD materials.

Based on our research findings, we propose the following recommendations for the CPD community to effectively and ethically leverage Generative AI:

(1) **Invest in AI literacy and training**: Provide comprehensive training programmes to equip healthcare professionals and educators with the knowledge and skills necessary to effectively use and critically evaluate Generative AI tools in CPD.

(2) **Develop locally tailored ethical guidelines and best practices**: Establish clear, context-specific guidelines for the use of Generative AI in CPD, addressing issues such as bias, transparency, privacy, and accountability.

(3) **Foster collaboration and knowledge-sharing**: Encourage collaboration between AI experts, educators, healthcare professionals, and regulatory bodies to share insights, develop best practices, and address emerging challenges.

(4) **Embrace lifelong learning**: Promote a culture of continuous professional development that recognises the ever-evolving nature of technology and the need for ongoing skill acquisition and adaptation.

(5) **Conduct research and pilot programmes**: Invest in rigorous research and pilot programmes to explore potential applications of Generative AI in CPD, evaluate its effectiveness, and identify areas for improvement and innovation.

In applying these findings to current everyday work, CPD professionals should consider the following:

- Gradually integrating AI-generated content into existing curricula, starting with low-stakes applications and progressively expanding based on thoughtful evaluation and feedback.
- Implementing robust quality control processes that combine AI-assisted content creation with expert human review to ensure accuracy and relevance.
- Exploring the use of AI tools for personalised learning path creation, allowing for more efficient and targeted continuous professional development.
- Leveraging AI to enhance the accessibility and inclusivity of CPD programmes, potentially breaking down barriers related to language, learning styles, or geographical limitations.

The journey of integrating Generative AI into CPD is just beginning, and it promises to reshape the landscape of healthcare education in profound ways. By embracing a proactive, collaborative, and thoughtful approach, we can harness the power of these innovative technologies to enhance patient care, improve outcomes, and foster a culture of continuous learning and professional development. Future research efforts should consider the long-term impact of AI-enhanced learning, ethics and regulatory impact on Generative AI, and the use of AI in clinical decision-making. As we move forward, it remains critical to stay ahead of the curve, continually reassessing and refining our approach to ensure that Generative AI serves as a tool for empowerment and advancement in healthcare education, rather than a source of disruption or ethical concern.

The future of CPD lies in striking a delicate balance between leveraging the transformative potential of Generative AI and maintaining the irreplaceable human element that is fundamental to healthcare education. By doing so, we can work towards a future where CPD is more personalised, engaging, and impactful than ever before, ultimately leading to better healthcare outcomes and a more adaptable, knowledgeable healthcare workforce.

Disclosure Statement

Disclaimer: Various AI tools, including language models and data analysis algorithms, were utilised in the identification, analysis, and development of the content for this piece. The use of AI did not replace the use of human expertise and judgement in the design and implementation of educational initiatives.

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Appendices

Table A1. Exploratory longitudinal progression of CPD community feedback on the future of CPD, specific focus on AI-related topics: references.

Research Phase	2023 CPD Community Survey	2023 Focus Groups	2024 Focus Group Survey	2024 Alliance Session
Research Method	Emailed and social media posted online survey	Virtual focus groups	Emailed online survey to focus group participants	Live in person facilitated workshop using digital discussion boards and paper forms
Data Collection Time Period	March-April 2023	3 sessions held between August and October 2023	January 2024	February 2024
Participants	CPD professionals representing medical education companies, pharmaceutical manufacturers, medical schools, consulting and service organisations, and professional societies.	Acknowledged in this article	Acknowledged in this article	CPD professionals representing medical education companies, pharmaceutical manufacturers, medical schools, consulting and service organisations, and professional societies.

Table A2. Original 8 domains examined for relevance and importance to the future of CPD.

Significant, even radical, reorganisation of CPD units, including the impact and function of "place" and "form" in educational design

A shift from the individual to the team as the primary "unit of learning

Evolving expectations of accreditation policies to move beyond individualist models of CPD, to recognise the realities of CPD practice, including team- and system-based needs

A shift away from a narrow focus on evidence-based clinical practices towards a broader recognition of the value of other ways of knowing, including localised and peer-to-peer approaches

Increased prevalence of longitudinal, multidimensional, "deep" educational interventions, correlated with higher costs per learner in CPD

More frequent use of mixed method research and evaluation models that advance our understanding of CPD's impacts and the sociology of behaviour change

The need to develop a more nuanced understanding of the clinical contexts in which teams operate and how education can impact team change.

The adoption of evaluation frameworks that are better geared to the complexities of practice change within contemporary healthcare environments and the recognition of theory-based approaches

Table A3. Additional domains and themes identified as relevant to explore further regarding the future of CPD, generated from survey and focus groups 2023.

Impact and promise of technology	• Artificial intelligence (AI) and its influence, including the tools learning leaders use to impact and shape learning • Evolution of electronic reporting and credit claiming process and its influence on educational access
Call to close equity and disparity gaps	• Efforts to expand access of educational interventions via technology, lowered barriers to access, and language accessibility • Complexity in practice as it pertains to addressing disparities and gaps in care
Advancement of application of learning science	• Relevancy of learning theory within rapidly changing policy, healthcare, and business of medicine environments • Need for consideration of point of care, point of need, and brief interventions as critical models of learning, alongside evaluating the impact of these models
Professional development needs within CPD community	• Call for investment by the community (individual, collective) in the growth of their own methods, learning, and changing • Challenge to design CPD interventions that can successfully meet the needs of the different learners/specialists who make up specific clinical teams
Expansion of global focus	• Global impact on learning • Variation of learning, educational impact by country or region
Impact of policy and cost on CPD landscape	• Issues of the costs of continuing education, particularly in the light of factors such as federal policy and other pressures on the healthcare landscape

Table A4. Original workshop themes plus categorised comments from the 2024 alliance annual meeting workshop; "*unleashing our communities power: insights and inspiration from the field*".

Original Workshop Themes	Categorized Comments (N = 28)
Impact and promise of technology	25%
Advancement of application of learning science	18%
Unified impact story	18%
Professional development needs within CPD community	10%
Call to close equity and disparity gaps	7%
Expansion of global focus	7%
Access to HCPs	7%
Impact of policy & cost	7%