Jordan Journal of Dentistry

www.jjd.just.edu.jo

Dental Education at a Crossroad: Questioning Institutionalized Education and Embracing the Liberating Potentials of Artificial Intelligence

Abubaker Qutieshat [1, 2]

1 Head of Postgraduate Education, Research & Innovation, Restorative Dentistry, Oman Dental College, Muscat, Oman.
2 Associate Member of Staff & Honorary Researcher, Restorative Dentistry, Dundee Dental Hospital & School, University of Dundee, UK.

ARTICLE INFO

ABSTRACT

This manuscript criticizes the ways institutionalized, profit-driven models in dental education prioritize revenue, standardized credentials, and bureaucratic norms over the cultivation of ethical care, collaboration, and critical thinking. Grounded in William J. Gies's vision of dentistry as a transformative force in healthcare, it also resonates with Ivan Illich's call for learner-centred structures and Thomas Sergiovanni's emphasis on community. The discussion delves into how financial barriers and rigid hierarchies exclude many aspiring clinicians from specialized opportunities, undermining dentistry's broader social mission. Against this backdrop, the manuscript positions AI as a potential agent of democratization, capable of delivering personalized, cost-effective learning experiences. It stresses, however, that AI must be approached with ethical oversight, transparency and a commitment to inclusivity rather than to commercialization. By reframing AI as a tool that can empower both students and faculty, this work imagines a future where technology complements rather than eclipses the essential human elements of empathy, mentorship and artistry, all in service of a more equitable and community-oriented model of dental education.

Keywords: Artificial intelligence, Autonomy, Dental education, Equity, Institutionalization.

1. Introduction

Drawing from the insights of William J Gies on the transformative potential of dental education, dentistry emerges as a discipline uniquely positioned at the intersection of medicine, mechanics and art (1). Gies highlighted the complex balance required to integrate these elements, ensuring that dentistry remains an essential and independent pillar of healthcare aimed at promoting both oral and systemic health. This perspective invites reflection on how technological advancements, particularly AI, might reshape this balance, offering opportunities to reimagine the field while posing questions about its alignment with broader educational and ethical goals.

"What we want is a better class of better dentists, because the world is, I believe, suffering from a lack of good dental service more than from any bodily ailment of which we have any knowledge"

~William J Gies, 1924

This discourse finds resonance in Ivan Illich's philosophy, which criticizes the institutionalization of education and advocates for more organic, learner-centred approaches (2,3). Illich emphasized the importance of fostering autonomy and creativity within educational systems, warning against structures that prioritize standardization over individual growth and

societal equity. Parallels can be drawn to the challenges facing dental education today, where the integration of AI holds both promise and peril. On one hand, AI has the potential to democratize access to resources, personalize learning and enhance clinical precision. On the other, it risks deepening commercialization, entrenching inequalities and shifting the focus from manual skill and critical thinking to automated workflows.

This work explores the intersection of these philosophies, examining how dental education can navigate the integration of AI while preserving its intrinsic values. By aligning the transformative potential of AI with the ideals of learner autonomy and ethical practice, this piece seeks to ensure that dental education evolves with technological advancements while maintaining its mission to serve both individual and societal health.

2. Institutionalized Models and Financial Barriers

In dental education, rigid institutional structures have increasingly come under scrutiny for prioritizing revenue, standardization and credentialing above the cultivation of genuine skill and critical thinking. This approach often channels students into narrowly defined paths, reinforcing systems where profit holds more value than ethical care. Learners who struggle financially may manage to complete basic dental training only to face new barriers when pursuing specialized programs, which require considerable funding and resources. This creates a growing divide, turning advanced education into an exclusive domain for those who can afford it. Such institutional dependence can discourage independent thought and experimentation, producing practitioners who meet standardized criteria, but lack the transformative potential to address inequities in healthcare.

In fact, a colleague once recounted being rejected from a postgraduate dentistry program, a setback that initially felt overwhelming. Yet, this individual has since become one of the most distinguished and influential dentists on the global stage. Reflecting on this unconventional journey, they credited not the formal hierarchy of 'higher' education, but rather their own relentless curiosity, the depth of one-on-one mentorship, and an unyielding pursuit of knowledge. This story highlights a critical truth: true learning transcends institutional walls, thriving in self-directed inquiry,

meaningful mentorship, and practical, real-world application.

At a broader level, higher education is frequently geared toward producing graduates for the most competitive roles, neglecting those whose career aspirations or resources may not align with such opportunities. In dentistry, this is apparent when programs emphasize specialized, often expensive, credentials as gateways to 'better' jobs, leaving financially constrained learners feeling inadequate or excluded. By sorting and stratifying students through relentless competition and gatekeeping exams, the system amplifies inequality and undermines the convivial ideal of a truly inclusive learning community.

A commitment to liberation in dental education calls for active participation by learners throughout their journey. Imagine a system where students shape their own paths, tapping into resources aligned with personal interests and community needs. This vision challenges the tendency to rely on formal structures that often limit innovation and perpetuate social gaps. Policies that funnel education funds directly to students, rather than to institutions, could expand access to a range of learning opportunities, inspiring creative thinking and meaningful engagement. Such an approach could also mitigate broader social challenges, including unemployment, by encouraging the development of adaptable skill sets.

Yet, any shift in this direction must be carefully designed to avoid new forms of exclusion. If formal credentials are dismantled, commercial entities and professional gatekeepers may still determine what counts as competence. This scenario underscores how institutions preserve inequities, whether intentionally or unintentionally. True liberation requires mechanisms to ensure that changes do not simply replace one gatekeeping system with another.

3. Rethinking Resources, Technology and Mentorship

Reimagining how resources and opportunities are distributed is pivotal. Accessible mentorship and clinical experiences could help bridge longstanding disparities for those who lack the financial means to pursue competitive specialization programs. An overemphasis on cutting-edge technology risks excluding learners who cannot afford the steep fees these tools demand. Such trends drive wedges between those who enjoy abundant resources and those who struggle with debt and limited

funding. The gap grows wider when specialization is viewed as a prerequisite for professional success, creating hierarchies based on purchasing power rather than on clinical competence or community impact.

Relentless industrial expansion adds another layer of complexity. Schools feel compelled to keep up with advanced materials or software, yet widespread adoption requires sizeable investments. Although innovations can enhance patient care, they must be adopted with an ethical lens. Students and faculty need to preserve foundational skills in empathy, collaboration and manual dexterity, which remain integral to competent practice. One example of this tension is the rise of digital workflows in restorative dentistry, ranging from CAD/CAM systems to 3D printing. While these tools offer precision, efficiency, and improved patient outcomes, they can simultaneously diminish the need for dentists' fine manual skills and artistic touch. As tasks like designing restorations or crafting prosthetics become more automated, the definition of a 'well-rounded clinician' shifts away from deep technical craft toward technology management. Although digital workflows represent a major leap forward, they may dilute the artistry and nuanced clinical judgment that have long been central to professional identity, underscoring the need for balanced integration. Without careful oversight, the most vulnerable learners risk being excluded from the benefits of modern dentistry, amplifying the very disparities that education should address.

Recognizing these financial hurdles and institutional pressures, it is worth asking: How might emerging technologies, including AI, offer new and more affordable opportunities for learners from diverse socio-economic backgrounds?

4. AI's Potential to Foster Equitable Learning

Within this climate, AI emerges as a possible catalyst for a more inclusive and learner-centred future in dental education. AI's capacity to adapt content, simulate clinical scenarios and offer real-time feedback could reshape the ways students learn. If used with equity in mind, AI could open up specialized training to a broader range of learners, including those previously disadvantaged by cost or geography. Personalized simulations might help students master techniques without incurring prohibitive fees for materials or lab time, while adaptive learning pathways could target individual strengths and weaknesses.

One way to visualize this potential is to think of AI as a constant 'shadow tutor' available around the clock to provide more than just answers. By engaging with such an AI companion at any time, learners have the flexibility to explore complex topics in depth, well beyond the limitations of traditional office hours. This technology can deliver on-the-spot guidance and real-time feedback, making it a powerful complement to other emerging educational tools. As these systems grow more sophisticated, the role of human educators will remain essential. Rather than being replaced, instructors will evolve to focus on teaching students how to interact effectively with AI, including the art of prompting and critically interpreting AI-generated insights.

Another transformative quality of AI lies in its ability to accommodate diverse learning styles, thereby reducing reliance on teaching methods that may not suit everyone. For instance, introverted students often find it difficult to participate in traditional classroom settings, not because they lack understanding or skill, but because these environments are rarely adapted to their natural tendencies. By offering a personalized learning journey, AI-driven platforms can help level the playing field, allowing introverted learners to engage with material on their own terms. Freed from social pressures, they may excel more readily than in settings shaped by conventional pedagogical approaches.

Despite the advancement from Information Technology to AI-powered platforms, the sentiment remains that technological quangos, modernizing politicians, and sometimes even academics are pushing a single narrative, AI as the ultimate educational enhancer. This echoes a sentiment articulated two decades ago by Donald Dewar, the Former First Minister of Scotland from 1999-2000, who was quoted in the Times Educational Supplement (4):

"Mr. Dewar's message is that these developments will need a different kind of teacher, who is not 'the sage on the stage, but the guide by the side,' helping [students] in the handling of knowledge, in learning how to learn and developing life skills"

~Munro, 1999

Today's message also hints at a similar reframing of the educator's role, this time as a guide for manoeuvring

through AI-produced or AI-filtered knowledge. It becomes urgent to challenge this updated caricature of educators for several reasons. First, there's a more complex and learner-centred pedagogy than merely serving as a navigator through an AI-augmented curriculum. Just as in the past, educators still need to do more than help students 'handle' knowledge. Second, the surge of information has not stopped, if anything, it has been amplified by AI. Educators are as essential as ever in helping students distinguish valuable information from the trivial or misleading. Third, the educator's role is pivoting yet again, raising the question of whether we are adapting ourselves to serve the design of machines or using technology to enrich human-driven learning. Confronting this dilemma highlights the need for concrete strategies to ensure that AI truly broadens educational access instead of reinforcing existing barriers.

To ensure that AI actually expands, rather than restricts, educational access, stakeholders could adopt an ethical framework that addresses cost, transparency and fairness. Institutions might create interdisciplinary oversight committees comprised of students, faculty, clinicians and community representatives. These committees would be responsible for evaluating any new AI platform or curriculum according to clear guidelines on data privacy, bias testing, financial accessibility and commercial influence. By holding AI vendors and developers accountable, dental schools could keep the focus on patient outcomes, learner autonomy and equal opportunity for advancement.

However, there are serious concerns to address. AI platforms can be shaped by commercial interests, reinforcing existing inequities instead of alleviating them. Some providers may focus on high-cost products or tailor algorithms to benefit their industry partners, compromising the integrity of clinical education. AI tools, similar to any technology, are designed by people whose biases may inadvertently become embedded in the systems themselves. These potential drawbacks underscore the importance of developing AI with robust ethical frameworks and inclusive oversight.

5. Embracing Community and Autonomy in Dental Education

Ivan Illich's (1973) critique of institutionalized education argues that true learning flourishes when stripped of rigid bureaucratic structures and placed in settings where people can engage freely in shared pursuits (3). This perspective underlines the idea that genuine expertise and understanding grow through open dialogue, self-directed inquiry and a willingness to exchange skills in collaborative environments rather than through conventional classroom mandates. Thomas Sergiovanni (1993), on the other hand, highlights the importance of nurturing community as a means of creating belonging, purpose and moral grounding among learners (5).

When combined, these views serve as a framework for reshaping dental education. Digital platforms, with their capacity to connect people across regions and income levels, can bring Illich's and Sergiovanni's principles to life. Students, especially those who cannot afford specialized or advanced programs, can collaborate virtually with mentors, peers and alumni from diverse backgrounds, strengthening a sense of academic community that transcends conventional boundaries. The focus shifts from fulfilling institutional requirements to forming relationships based on shared inquiry, mutual support and collective growth. In such an environment, learners have the freedom to explore, contribute and refine their competencies without being held back by financial status or the confines of traditional curricula.

AI's analytical power could further dismantle traditional silos, prompting conversations across departments and academic hierarchies (6). This approach respects the principle that significant learning often occurs outside formal structures. For it to succeed, faculty and administrators would need to prioritize genuine collaboration over gatekeeping. Designing AI-driven systems that encourage deeper exploration can transform dentistry into a sphere of ethical practice and collective growth, where shared values guide the advancement of the profession.

Although AI has great promise, it is far from neutral. Political or cultural biases can infiltrate these systems, potentially distorting how learners engage with both clinical data and broader societal issues (7). This reality demands vigilance. Educators, developers and students alike must confront the biases embedded in algorithms, remembering that easy access to digital tools does not guarantee objectivity. Critical examination of how AI systems are built and deployed is essential to avoid perpetuating the very disparities they aim to solve.

AI's role in higher education is not to replace

traditional structures, but rather to enrich them, offering a new layer of support and customisation. While AI can significantly aid a student's journey toward specialization, there are complex facets, such as mentorship, ethical guidance and the deep understanding that comes from focused study that machines cannot yet fully provide. Consequently, as higher education continues to evolve, AI is best viewed as a supplementary resource that empowers both the learner and the institution. This dual empowerment can foster an educational ecosystem that respects the student's need for specialized knowledge while serving society's need for well-rounded clinicians.

6. Where Do We Go from Here?

Dental education is at a pivotal juncture where institutionalized, profit-driven models have left many students on the margins, particularly those who can barely finance their basic training. Learners who aspire to specialize often face insurmountable barriers, perpetuating inequities that limit professional development and, ultimately, patient care. Although these disparities run deep, AI offers a pathway to liberation when implemented with awareness, shared governance and equity-focused policies.

AI can widen access to sophisticated learning tools, lower costs through virtual simulations and provide personalized learning experiences that transcend geographic and financial constraints. It can encourage a more collaborative and democratic ethos, fostering both autonomy and ethical accountability. To fulfil this potential, the development and deployment of AI must be guided by a commitment to justice. Rather than reinforcing commercial influences or existing hierarchies, it can help create an environment where each student, regardless of economic background, has an opportunity to learn, thrive and contribute to a vibrant dental profession.

By treating AI as a means of liberation, dental educators can champion a future in which diverse voices shape the profession and help close the gaps that institutionalized systems have allowed to endure. Ensuring that funding flows directly to students, establishing ethical frameworks for new AI tools and cultivating communities that transcend traditional boundaries are all tangible steps toward making this vision a reality.

"Most learning is not the result of instruction. It is rather the result of unhampered participation in a meaningful setting"

~Ivan Illich 1971

Conflict of Interests

The authors have no conflict of interests to declare.

Funding Information

References

1. Gies WJ. A further discussion of some problems in dental education. J Am Dent Assoc. 1924;11:1107-1124.
2. Illich I. De Schooling Society. Harmondsworth, Middlesex, England: Penguine education, A Division of Penguin Books, Ltd.; 1971.
3. Illich I. Tools for conviviality. London, England: Boyars Publishers; 1973.
4. Munro N. Equal rights require equal technology. Times Education Supplement. 1999.
5. Sergiovanni TJ. Building community in schools. San Francisco, CA: Jossey-Bass; 1993.
6. Qutieshat A. Artificial intelligence in higher education: A contemporary examination of Illich's theories. Singapore: Springer Nature; 2025.
7. Qutieshat A. Unveiling the multi-faceted public interest in ChatGPT: A study on societal implications and operational realities. J Digit Soc Res. 2024;6:112-125.