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Exploring the Generational Gap in Medical Education and Identifying Generation Z–Related Challenges and Opportunities from the Perspectives of Students and Faculty Members: A Qualitative Study

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Abstract

Background

Generational shifts in recent years have substantially influenced medical education, learning styles, communication patterns, and students' educational expectations. Members of Generation Z, who have grown up in an era characterized by digital technology and constant connectivity, demonstrate needs, preferences, and attitudes that differ from those of previous generations. This study aimed to explore the generational gap in medical education and identify Generation Z–related challenges and opportunities from the perspectives of medical students and faculty members.

Methods

This qualitative study was conducted in 2025 at Mazandaran University of Medical Sciences, Iran, using a conventional content analysis approach based on the methodology of Graneheim and Lundman. Participants included Generation Z medical students and faculty members with experience teaching this generation. They were selected through purposive sampling with maximum variation. Data were collected through in-depth semi-structured interviews and continued until data saturation was achieved. Data analysis was performed concurrently with data collection. To ensure the trustworthiness of the findings, the criteria of credibility, dependability, confirmability, and transferability were applied.

Results

A total of 18 participants, including 10 students and 8 faculty members, were enrolled in the study. Data analysis resulted in the emergence of five main themes and fifteen subthemes. The main themes included: mismatch between traditional teaching methods and Generation Z learning preferences; transformation of the teacher–student relationship; technology as both an opportunity and a threat; changing attitudes toward work–life balance; and the need for managerial and curricular reforms. Participants emphasized the importance of interactive learning, timely feedback, purposeful integration of technology, attention to mental well-being, and greater flexibility within educational systems.

Conclusions

The generational gap in medical education is a multidimensional and dynamic phenomenon shaped by technological, cultural, and organizational changes. Although these differences may create challenges in communication and educational processes, they also provide opportunities for innovation and transformation in medical education. Revising teaching approaches, empowering faculty members, and reforming educational policies may help reduce this gap and enhance the quality of learning environments.

Introduction

Medical education, as a strategic pillar of health systems, plays a crucial role in training a competent, responsible, and skilled workforce capable of responding to the evolving health needs of society [1, 2]. Unlike many other fields of higher education, it is not limited to the transmission of theoretical knowledge but is also responsible for shaping clinical competencies, professional attitudes, ethical values, and professional identity among students [3, 4]. Therefore, any social, cultural, or technological transformation that alters the characteristics and expectations of new generations of learners can have profound implications for the structure and functioning of medical education [5, 7].

In recent decades, one of the most significant developments influencing educational systems has been generational change within student populations [8]. In sociological literature, a “generation” refers to a group of individuals born within a specific time period who share similar attitudes and behaviors shaped by common historical, social, and cultural experiences [9]. Within this framework, following Baby Boomers, Generation X, and Millennials, Generation Z has now entered universities, particularly medical schools [10].

Generation Z, generally defined as individuals born after 1997, represents the first cohort to have fully grown up in the digital era, being continuously exposed to the internet, smartphones, social media, and communication technologies from early childhood [11, 12]. This characteristic has led to their description as “digital natives,” for whom technology is not an auxiliary tool but an integral part of daily life [13]. International evidence suggests that this generation prefers interactive, multimedia-based, short-duration, and problem-oriented learning and favors receiving immediate, personalized, and continuous feedback [14]. Additionally, they demonstrate greater independence in learning, active information seeking, and engagement in educational processes [15].

In contrast, traditional medical education systems in many universities remain largely dependent on lecture-based teaching, hierarchical educational relationships, and memorization-oriented assessments [16]. This mismatch between Generation Z learning preferences and conventional teaching approaches has contributed to the emergence of a “generational gap” in educational environments [17]. In this context, the generational gap refers to differences in attitudes, expectations, values, and interaction styles between students of the new generation and faculty members from older generations, which may lead to communication misunderstandings, reduced educational satisfaction, and decreased academic motivation [18]. The dimensions of this gap extend beyond education alone. In the communication domain, Generation Z expects more horizontal, dialogue-based, and feedback-oriented interactions with instructors, whereas some faculty members still adhere to authoritative and formal educational models [19]. In the technological domain, extensive use of online resources and digital tools has raised concerns regarding superficial learning, reduced attention span, and diminished face-to-face interaction. In addition, differences in attitudes toward work–life balance, stress management, meaning in learning, and professional commitment have also been reported [20].

However, perspectives on the consequences of these generational differences remain divided. Some scholars consider the generational gap a threat to the quality of medical education, potentially undermining educational discipline and professional commitment. In contrast, others view these differences as an opportunity to reconsider traditional educational models, promote active learning, integrate new technologies, and enhance faculty communication skills [21]. From this perspective, Generation Z may serve as a catalyst for transforming medical education from traditional approaches toward more innovative and learner-centered paradigms [18]. A review of the literature indicates that existing studies have primarily focused on the individual characteristics or learning preferences of Generation Z, with limited attention to the reciprocal interactions between students and faculty in real educational contexts [16]. Moreover, most available evidence originates from Western settings, and its direct generalizability to other cultural and educational contexts, including Iran, should be approached with caution [15]. Given differences in cultural, managerial, and educational structures within the Iranian medical education system, a localized understanding of the generational gap appears necessary.

In Iran, although Generation Z has been discussed in social and cultural contexts, systematic qualitative studies comprehensively exploring its dimensions in medical education from both students' and faculty members' perspectives remain limited. The lack of such evidence may challenge educational planning and policy-making, as effective decision-making requires an accurate understanding of contextual realities. Given the complex and context-dependent nature of generational interactions, a qualitative approach is well suited to exploring the perspectives of key stakeholders. Therefore, this study aimed to explore the generational gap in medical education and identify the challenges and opportunities associated with Generation Z from the perspectives of students and faculty members at Mazandaran University of Medical Sciences.

Materials and Methods

Study Design

This qualitative study was conducted to explore the generational gap in medical education and identify the challenges and opportunities associated with Generation Z. Given the complex, contextual, and multidimensional nature of the phenomenon, a conventional qualitative content analysis approach based on the methodology of Graneheim and Lundman was employed. This approach allows categories and themes to emerge inductively from participants' experiences without imposing predetermined theoretical frameworks. The study was reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines.

Setting and Participants

The study was conducted in 2025 at Mazandaran University of Medical Sciences, Iran. Participants were recruited from two stakeholder groups: (1) Generation Z medical sciences students, defined as

individuals born in 1997 or later and enrolled in one of the university's health-related programs, and (2) faculty members with experience teaching Generation Z students.

Eligible students were required to belong to Generation Z, be enrolled at the university, and be willing to participate. Faculty members were required to have at least three years of teaching experience and direct educational interaction with Generation Z students. Individuals who declined participation or withdrew during the interview process were excluded from the study.

Purposive sampling with maximum variation was used to capture diverse perspectives regarding gender, field of study, academic level, and teaching experience. Recruitment was facilitated through faculty referrals and direct contact by the research team. Sampling continued until data saturation was achieved, defined as the point at which no new concepts or categories emerged from subsequent interviews. A total of 18 participants, including 10 students and 8 faculty members, were interviewed. Data saturation was reached after the seventeenth interview, and one additional interview was conducted to confirm saturation.

Data Collection

Data were collected through in-depth semi-structured interviews conducted by the first author, who had prior experience in qualitative research and familiarity with the medical education environment. Before each interview, participants received information regarding the study objectives and procedures and provided written informed consent.

An interview guide was developed based on the study objectives and a review of the relevant literature. The guide included open-ended questions exploring experiences of medical education, perceived generational differences in learning and teaching styles, faculty–student interactions, the role of technology in education, attitudes toward educational authority, work–life balance, and organizational challenges. Follow-up and probing questions were used to encourage participants to elaborate on their experiences and perspectives. The interview guides for students and faculty members are provided in Supplementary File 1.

Interviews were conducted in a private and quiet setting selected by the participants and lasted between 30 and 60 minutes. All interviews were audio-recorded with participants' permission and transcribed verbatim immediately after completion. Field notes were recorded throughout the data collection process to capture contextual information and nonverbal observations.

Data Analysis

Data collection and analysis were conducted concurrently. Interview transcripts were read repeatedly to achieve immersion in the data and gain an overall understanding of participants' experiences. Meaning units relevant to the generational gap in medical education were identified, condensed, and assigned initial codes. Through constant comparison, codes with similar meanings were grouped into

subcategories and categories. Finally, latent themes were generated through abstraction and interpretation of the relationships among categories.

Particular attention was paid to comparing the perspectives of students and faculty members to identify areas of convergence and divergence. Data management and organization were facilitated using MAXQDA 2024 software.

Trustworthiness

The trustworthiness of the findings was established using the criteria proposed by Lincoln and Guba: credibility, dependability, confirmability, and transferability.

Credibility was enhanced through prolonged engagement with the data, member checking, and peer debriefing. Preliminary interpretations were returned to selected participants to verify the accuracy of the researchers' understanding. In addition, coding and emerging themes were discussed with an experienced qualitative researcher throughout the analytical process.

Dependability and confirmability were supported by maintaining an audit trail documenting all stages of data collection, coding, categorization, and theme development. Interview recordings, transcripts, field notes, and analytic memos were retained to ensure transparency and allow external review of the research process.

Transferability was strengthened through the use of maximum variation sampling and the provision of rich descriptions of the study context, participant characteristics, and analytical procedures, enabling readers to assess the applicability of the findings to similar settings.

Result

Participant Characteristics

A total of 18 participants, including 10 Generation Z students and 8 faculty members, participated in this study. The student group comprised six females and four males with a mean age of 22.4 ± 1.8 years. Participants were recruited from different disciplines and educational levels to ensure maximum variation in experiences and perspectives. Faculty members included five males and three females, with a mean age of 46.2 ± 5.7 years and a mean teaching experience of 15.3 ± 4.6 years. Data collection continued until data saturation was achieved. No new codes or categories emerged after the seventeenth interview, and one additional interview was conducted to confirm saturation. Participant characteristics are presented in Table 1.

Table 1
Demographic and Professional Characteristics of the Participants (N = 18)

Characteristic	Category	Students (n = 10)	Faculty Members (n = 8)
Gender, n	Female	6	3
	Male	4	5
Age (years)	Mean ± SD	22.4 ± 1.8	46.2 ± 5.7
Field of study / discipline, n	Medicine / Clinical Medicine	4	4
	Nursing	2	2
	Dentistry	2	–
	Medical Laboratory Sciences	1	–
	Public Health	1	1
	Basic Medical Sciences	–	1
Academic level / rank, n	Basic Sciences Phase	3	–
	Clinical Clerkship/Internship	5	–
	Bachelor's Degree	2	–
	Assistant Professor	–	4
	Associate Professor	–	3
	Professor	–	1
Teaching experience (years)	Mean ± SD	–	15.3 ± 4.6
Participant group	Total	10	8

Data analysis of the interview transcripts resulted in the identification of 48 initial codes, which were subsequently organized into 15 subthemes and five overarching themes. The extracted themes reflected different dimensions of the generational gap in medical education as perceived by Generation Z students and faculty members. These themes encompassed educational, interpersonal, technological, psychological, and organizational aspects of the educational environment. Table 2 presents the themes, subthemes, and representative codes derived from the analysis.

Table 2
Themes, Subthemes, and Representative Codes Derived from the Data Analysis

Theme	Subtheme	Representative Codes
Mismatch between traditional teaching methods and Generation Z learning preferences	Preference for interactive and problem-based learning	Active participation in learning; case-based discussions; collaborative learning; learning through real-world scenarios
	Preference for concise and multimedia-based learning	Short educational content; visual learning resources; educational videos; rapid access to information
	Dissatisfaction with lecture-based teaching	Passive learning experiences; limited engagement; lack of interaction during classes
Transformation of faculty–student relationships and communication expectations	Expectation of more egalitarian and approachable interactions	Friendly communication; reduced hierarchy; accessibility of instructors
	Challenges in perceptions of educational authority	Different interpretations of respect and authority; resistance to hierarchical relationships
	Need for timely and continuous feedback	Immediate feedback; ongoing guidance; constructive communication
Technology: Opportunity or threat?	Digital competence and broad access to information	Use of online resources; self-directed learning; rapid information retrieval
	Concerns about superficial learning and distraction	Reduced concentration; information overload; dependence on digital tools
	Need for purposeful integration of technology into education	Blended learning; educational technologies; structured use of digital platforms
Changing attitudes toward work–life balance and educational pressure	Importance of mental well-being and work–life balance	Stress management; self-care; balancing academic and personal life
	Different perceptions of resilience	Lower tolerance for prolonged pressure; seeking support when facing challenges
	Search for meaning and personal relevance in learning	Goal-oriented learning; relevance to future career; personal fulfillment
Need for managerial and curricular reform	Need for curriculum redesign	Student-centered curricula; updated educational content; competency-based learning

Theme	Subtheme	Representative Codes
	Faculty development and capacity building	Training in new teaching approaches; communication skills; digital literacy
	Greater flexibility in educational policies	Flexible learning pathways; adaptive regulations; responsiveness to student needs

Theme 1: Mismatch Between Traditional Teaching Methods and Generation Z Learning Preferences

Participants consistently highlighted a discrepancy between conventional teaching approaches and the learning preferences of Generation Z students. Students described a preference for active engagement, participation, and experiential learning, while lengthy lecture-based sessions were often perceived as ineffective and disengaging. Faculty members similarly acknowledged that evolving student learning styles require substantial modifications to traditional teaching practices.

Preference for Interactive and Problem-Based Learning

Students emphasized that active involvement in the learning process enhanced their concentration, motivation, and depth of understanding. Case-based learning, group discussions, and problem-solving activities were perceived as more effective than passive memorization-oriented approaches.

“We learn much better when teaching is case-based and connected to real clinical situations.” (P3, Medical Student)

A faculty member similarly noted:

“The new generation prefers to play an active role in learning rather than simply receiving information.” (F2, Faculty Member)

Preference for Concise and Multimedia-Based Learning

Many students reported that short, visually engaging, and multimedia-rich educational materials were more compatible with their learning styles and helped maintain their attention.

“Short educational videos are often more effective for us than attending a two-hour lecture.” (P6, Nursing Student)

Dissatisfaction with Lecture-Based Teaching

Participants frequently described traditional lecture-based classes as limiting engagement and reducing motivation to learn.

“Long lectures make it difficult to stay focused.” (P8, Dentistry Student)

“When an instructor simply reads slides, there is little motivation to participate.” (P1, Medical Student)

Theme 2: Transformation of Faculty–Student Relationships and Communication Expectations

A major theme emerging from the interviews was the changing nature of faculty–student relationships. Generation Z students expected more interactive, approachable, and dialogue-based relationships with instructors, whereas some faculty members continued to value traditional hierarchical structures.

Expectation of More Egalitarian and Approachable Interactions

Students expressed a desire for faculty members to be more accessible and for educational interactions to extend beyond formal classroom settings.

“We expect instructors to be more approachable and available when we need guidance.” (P10, Medical Laboratory Sciences Student)

Challenges in Perceptions of Educational Authority

Students reported that questioning or expressing alternative viewpoints was sometimes interpreted as disrespectful, whereas they viewed such behaviors as part of active learning and critical thinking.

“Sometimes asking questions is perceived as a sign of disrespect rather than engagement.” (P4, Medical Student)

Faculty members also observed a shift in students’ attitudes toward authority.

“Today’s students are less willing to accept purely hierarchical relationships.” (F5, Faculty Member)

Need for Timely and Continuous Feedback

Participants emphasized the importance of receiving prompt and constructive feedback as a means of maintaining motivation and improving performance.

“When feedback is provided quickly, it motivates us to improve.” (P9, Public Health Student)

Theme 3: Technology: Opportunity or Threat?

Technology emerged as one of the most frequently discussed topics during the interviews. Participants acknowledged its substantial benefits for accessing information and facilitating learning while simultaneously expressing concerns regarding its unintended consequences.

Digital Competence and Broad Access to Information

Students viewed online resources, educational platforms, and digital content as integral components of their learning experiences.

“Online resources are much easier and faster to access than traditional notes.” (P2, Medical Student)

Faculty members similarly recognized the high level of digital literacy among Generation Z students.

“Today’s students possess strong digital skills and are highly comfortable with technology.” (F7, Faculty Member)

Concerns About Superficial Learning and Distraction

Both students and faculty members raised concerns regarding excessive reliance on smartphones and social media, which were perceived as potential sources of distraction and superficial learning.

“Sometimes excessive use of mobile phones reduces our ability to concentrate.” (P7, Dentistry Student)

“Technology can be beneficial, but without proper management it may become harmful.” (F1, Faculty Member)

Need for Purposeful Integration of Technology Into Education

Participants emphasized that technology should be integrated into medical education in a structured and pedagogically meaningful manner.

“Clinical education could be much more effective if simulation technologies and educational software were used appropriately.” (P5, Nursing Student)

Theme 4: Changing Attitudes Toward Work–Life Balance and Educational Pressure

Participants described noticeable differences in attitudes toward mental well-being, educational stress, and work–life balance. These differences occasionally contributed to misunderstandings between students and faculty members.

Importance of Mental Well-Being and Work–Life Balance

Students consistently highlighted the importance of maintaining a balance between academic responsibilities and personal life.

“Having a balance between studying and personal life is very important to us.” (P1, Medical Student)

“Mental well-being is a priority for our generation.” (P6, Nursing Student)

Different Perceptions of Resilience

Faculty members often interpreted students’ attitudes as reflecting lower tolerance for pressure, whereas students viewed them as a conscious effort to preserve quality of life and psychological well-

being.

“Some faculty members think we are less resilient, but we simply value our well-being more.” (P8, Dentistry Student)

“The new generation is less willing to accept unnecessary pressure.” (F4, Faculty Member)

Search for Meaning and Personal Relevance in Learning

Several students emphasized that understanding the purpose and practical relevance of educational content increased their motivation to learn.

“When we understand why a topic matters, we become much more motivated to learn it.” (P3, Medical Student)

Theme 5: Need for Managerial and Curricular Reform

The final theme reflected participants’ perceptions that many educational policies, curricula, and assessment strategies remain aligned with the expectations of previous generations and are insufficiently responsive to the needs of contemporary learners.

Need for Curriculum Redesign

Participants emphasized the importance of updating curricula and adopting modern educational approaches.

“The curriculum needs to be redesigned to align with the characteristics of today’s students.” (F8, Faculty Member)

Faculty Development and Capacity Building

Both students and faculty members highlighted the need for faculty development initiatives focused on technology-enhanced teaching and communication with contemporary learners.

“Faculty members need more training on how to use technology effectively in education.” (P2, Medical Student)

Greater Flexibility in Educational Policies

Participants advocated for increased flexibility in assessment methods, educational regulations, and institutional practices.

“Many assessments still focus on memorization rather than practical competence.” (P6, Nursing Student)

“The educational system was largely designed for previous generations and has not fully adapted to current realities.” (F3, Faculty Member)

Overall, the findings demonstrated that the generational gap in medical education is a multidimensional phenomenon encompassing educational, interpersonal, technological, psychological, and organizational dimensions. Generation Z students exhibit distinct learning preferences, communication expectations, and value orientations that require educational institutions to reconsider existing teaching practices, policies, and learning environments (Fig. 1).

Discussion

The present study explored the generational gap in medical education and identified challenges and opportunities associated with Generation Z from the perspectives of students and faculty members. The findings demonstrated that the generational gap is a multidimensional phenomenon encompassing educational, interpersonal, technological, cultural, and organizational dimensions. Differences between generations extended beyond learning preferences and included communication expectations, perceptions of educational authority, attitudes toward technology, views on resilience and work–life balance, and expectations of the educational system. Collectively, the findings suggest that medical education is undergoing a transition from traditional, hierarchical, and teacher-centered models toward more interactive, learner-centered, and technology-enhanced approaches.

Mismatch between traditional teaching methods and Generation Z learning preferences

One of the most prominent findings of this study was students' dissatisfaction with traditional teaching approaches and their preference for active, interactive, and problem-based learning. Participants reported that lengthy lecture-based sessions characterized by one-way transmission of information were often incompatible with the cognitive characteristics and learning preferences of Generation Z learners. These findings are consistent with previous studies indicating that Generation Z students favor collaborative, technology-supported, and multimedia-based learning environments and demonstrate greater engagement in flexible and interactive educational settings [22–24].

Evidence from medical education research further supports these findings. A review of clinical education for Generation Z learners highlighted the effectiveness of team-based learning, microlearning, simulation, and scenario-based approaches in enhancing educational outcomes among contemporary students [25]. Similarly, previous studies have shown that active learning strategies and simulation-based education improve students' understanding of clinical concepts and increase participation in the learning process [26].

Nevertheless, some scholars have cautioned against overemphasizing generational differences. Taylor and Hamdy argued that fundamental principles of adult learning, including motivation, self-direction, and deep learning, remain relevant across generations and that not all educational differences can be attributed solely to generational characteristics [27–29]. Furthermore, the concept of "digital natives" has been challenged by researchers who suggest that familiarity with technology does not necessarily

translate into effective learning [30]. From this perspective, some aspects of the perceived generational gap may reflect broader technological, cultural, and societal changes rather than intrinsic generational traits.

Despite these differing interpretations, the present findings indicate that ignoring shifts in learners' preferences may contribute to reduced engagement, lower motivation, and increased disconnection between students and educational systems. Consequently, adopting more learner-centered instructional approaches appears increasingly important in contemporary medical education.

Transformation of faculty–student relationships and communication expectations

Another important finding concerned changing patterns of communication between students and faculty members. Generation Z students expressed a preference for more approachable, interactive, and responsive relationships with instructors and were generally less accepting of strictly hierarchical educational relationships. These findings align with previous research demonstrating that contemporary learners value reciprocal communication and active participation in educational processes [31, 32]. Studies conducted in clinical education settings have similarly reported that students increasingly negotiate traditional authority structures and seek more collaborative learning relationships [33].

Conversely, some scholars have argued that changing communication expectations may create cultural tensions within medical education and that reduced hierarchical distance could potentially undermine professional identity formation and role clarity [34]. Similar concerns were expressed by some faculty members in the present study, who interpreted certain student behaviors as diminished respect for educational authority.

However, the findings suggest that these tensions may arise less from declining professionalism and more from differing perceptions of authority itself. For many Generation Z students, authority is grounded in expertise, mentorship, accessibility, and supportive interactions rather than distance and control. In this context, redefining the educator's role from knowledge transmitter to learning facilitator may help bridge intergenerational differences. Strengthening communication skills, fostering constructive feedback, and promoting educational dialogue may further enhance faculty–student relationships.

Technology: opportunity or threat?

Technology emerged as a central theme throughout the interviews, with participants simultaneously describing it as both an opportunity and a challenge. Generation Z students demonstrated high levels of digital competence and regarded rapid access to online resources, educational videos, and digital learning platforms as essential components of their learning experience. These findings are consistent with previous literature portraying Generation Z as a digitally immersed generation whose educational experiences are strongly influenced by technology [35].

Recent studies have shown that virtual patients, digital simulations, online learning environments, and mobile learning technologies can enhance clinical education and create more flexible learning opportunities [32]. The growing use of virtual reality, mobile-based learning, and microlearning strategies further illustrates the expanding role of technology in medical education.

At the same time, concerns regarding excessive technology use were evident. Previous research has suggested that constant exposure to digital media may contribute to reduced attention spans, superficial learning, and diminished reflective thinking [28]. Similar concerns were expressed by both students and faculty members in the present study, particularly regarding distraction associated with smartphones and overreliance on online resources.

These findings suggest that the key issue is not whether technology should be used, but rather how it should be integrated into educational practice. Technology is most effective when employed purposefully to support educational objectives, promote deeper learning, and strengthen clinical competencies. Consequently, educational policies should focus on structured technology integration and the development of digital literacy among both students and faculty members.

Changing attitudes toward work–life balance and educational pressure

The findings also revealed substantial differences in attitudes toward mental well-being, educational pressure, and work–life balance. Generation Z students placed considerable value on psychological well-being and expected educational environments to support not only academic achievement but also personal well-being and quality of life. These findings are consistent with previous studies describing Generation Z as particularly attentive to issues related to stress, mental health, and burnout prevention [16].

Some faculty members, however, interpreted these attitudes as reflecting lower resilience and reduced tolerance for the demands of medical training. Similar perceptions have been reported in the literature, where concerns have been raised regarding contemporary learners' ability to cope with the rigors of medical education and professional practice.

An alternative interpretation, however, views these attitudes as a response to longstanding concerns regarding burnout, depression, and psychological distress among healthcare professionals. In recent years, increasing evidence has highlighted the substantial mental health burden experienced by medical students and physicians. Within this context, Generation Z's emphasis on well-being may represent an opportunity to reconsider educational cultures that have historically normalized excessive stress and workload.

Rather than interpreting these attitudes as a weakness, they may be understood as reflecting changing professional values that prioritize sustainability, well-being, and long-term career satisfaction. Future

medical education systems may therefore need to balance professional rigor with supportive learning environments that protect student well-being.

Need for managerial and curricular reform

The final theme emphasized the need for curricular, organizational, and policy-level reforms within medical education. Participants perceived that many educational policies, curricula, and assessment practices remain rooted in traditional models that may not adequately address the needs and expectations of contemporary learners. These findings are consistent with Harden's perspective on the necessity of continuous transformation within medical education [36].

Similarly, Frenk and colleagues argued that health professions education must evolve toward greater flexibility, competency-based learning, and lifelong learning in order to meet emerging societal and professional demands [37]. Such recommendations are particularly relevant in the context of rapid technological advancement and shifting learner expectations.

At the same time, some scholars caution that educational reforms driven solely by perceived generational differences may risk compromising established academic and professional standards [38]. Therefore, educational change should be evidence-informed, balanced, and implemented thoughtfully rather than reactively.

Taken together, the findings suggest that narrowing the generational gap requires coordinated changes at multiple levels of medical education, including teaching methods, assessment systems, faculty development initiatives, communication practices, and technology integration. Importantly, the generational gap should not be viewed merely as a characteristic of individuals but rather as a reflection of broader social, cultural, and technological transformations influencing contemporary educational environments.

Strengths, Limitations, and Implications

A major strength of this study was the inclusion of both Generation Z students and faculty members, which enabled a comprehensive exploration of the generational gap from multiple perspectives. The use of maximum variation sampling and in-depth interviews further enhanced the richness of the findings. However, the study was conducted within a single medical university, and the transferability of findings to other institutional and cultural contexts should be considered cautiously. As with all qualitative research, the emphasis was on obtaining depth of understanding rather than statistical generalizability. Future multicenter and mixed-methods studies are warranted to examine how generational differences influence educational outcomes, learner satisfaction, and professional development across diverse educational settings.

Conclusion

The findings indicate that the generational gap in medical education reflects broader technological, cultural, and organizational changes rather than merely differences between age groups. While Generation Z students bring distinct expectations regarding learning, communication, technology use, and well-being, these differences also create opportunities for innovation in medical education. Educational institutions may benefit from adopting more learner-centered teaching approaches, strengthening faculty development, and integrating technology and supportive learning practices in ways that preserve academic rigor while responding to the evolving needs of contemporary learners.

Declarations

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Availability of data and materials

The data set is available upon request from the corresponding author.

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Authors' contributions

All authors were the main study designer. M Sh, Z A, SA S and J Y surveyed selected countries. M Sh and Z A supported the interview development. SA S collected qualitative data and prepared it for analysis. SA S, . M Sh, Z A and J Y analyzed the data. SA S drafted the manuscript. All authors have provided critical comments on the manuscript. M Sh, Z A, and J Y approved the final manuscript. All authors have an agreement to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare that they have no conflict of interest.

Ethics approval and consent to participate

The study was approved by the Ethics Committee of Mazandaran University of Medical Sciences. All participants received verbal and written information regarding the study and provided written informed consent before participation. Participants were assured that their responses would remain confidential, their identities would not be disclosed in any reports or publications, and their participation was entirely

voluntary. They were informed of their right to withdraw from the study at any time without consequences. the principles of the Declaration of Helsinki for secondary data analysis.

Consent for publication

Not applicable.

Conflict of interest

The authors declare that there is no conflict of interest, whether financial, professional, or organizational, that could influence the results or interpretation of the findings of this study.

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Figures

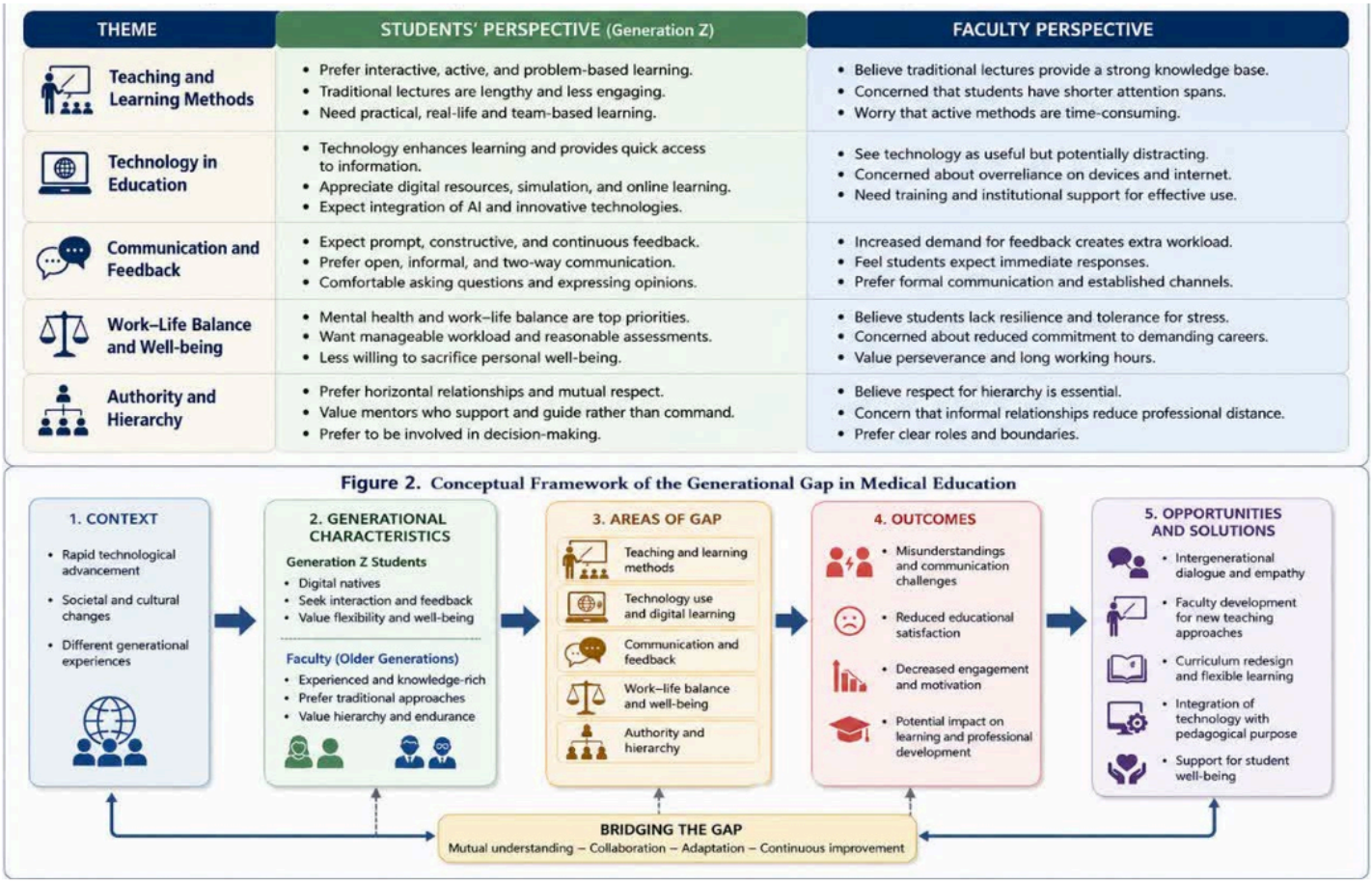


Figure 1

Conceptual Framework of the generational gap in medical education from the perspectives of Generation Z students and faculty members.

Supplementary Files

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