

The Process of Designing, Implementing, and Evaluating an Educational Program Based on the Learning Preferences of Generation Z Students to Improve Teaching-Learning Strategies at Khoy University of Medical Sciences

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Abstract

Introduction: Generation Z students possess distinctive characteristics that necessitate a fundamental reconsideration of educational strategies. This study aimed to design, implement, and evaluate an educational program tailored to the learning preferences of this generation at Khoy University of Medical Sciences.

Methods: This scholarship study was conducted in four steps during the 2025–2026 academic year. Step 1 involved faculty interviews, a literature review, and development of a researcher-made questionnaire comprising three domains: preferred learning methods (19 items), preferred tools for improving learning (8 items), and preferred study resources (15 items). In Step 2, the questionnaire was administered to 249 Generation Z students using convenience sampling, and the data were analyzed using descriptive statistics in SPSS version 22. In Step 3, an intervention was designed based on the needs assessment, reviewed by the educational scholarship committee, and assigned to a volunteer faculty member for pilot implementation. In Step 4, the program was implemented over one academic semester in four courses and compared with one course taught by the same instructor using the traditional approach. Evaluation was conducted at the first three levels of the Kirkpatrick model: reaction, learning, and behavior.

Results: More than 80% of students preferred a combination of instructional activities (short lectures, group work, discussion, and problem-solving) to lecture-only instruction, and 78% considered real-case analysis and group work valuable. Only 57% preferred lectures as the primary instructional format. Only 12.9% reported always purchasing printed textbooks, whereas more than 62% sought electronic book files. The most frequently used resources were Google (80%), Wikipedia (73%), and social media applications (67%). The mean satisfaction score was 86.90 out of 100. Mean final examination scores in intervention courses ranged from 16.85 to 17.67 out of 20, compared with 15.24 in the control course. Reduced absenteeism and increased active participation were observed in intervention classes.

Conclusion: Designing educational programs in accordance with Generation Z students' learning preferences can enhance student satisfaction, academic performance, and positive classroom behaviors, while transforming instruction from a predominantly one-way process into a dynamic and interactive learning experience. Fundamental curriculum revision and systematic faculty development are warranted.

INTRODUCTION

The quality of key curricular elements, including objectives, content, teaching-learning strategies, and assessment, is a major determinant of the success of educational programs in promoting competent and developmental learning (1). Teaching-learning strategies are particularly important because they constitute the primary channel through which interaction and reciprocal influence occur between educators and learners (2). These strategies should be formulated in accordance with available resources, learners' needs and skills, and, particularly, generational preferences (3). Alignment between

instructional approaches and the generational characteristics of learners is therefore a fundamental prerequisite for effective teaching and learning (4).

Given advances in educational technologies and the distinctive needs, capabilities, and interests of contemporary learners, the need for learner-centered teaching-learning strategies is greater than ever. Learning styles encompass the beliefs, preferences, and behaviors that individuals employ in learning situations to facilitate their own learning (5). Although individuals use different learning styles in accordance with individual differences, these styles are largely acquired through experience and education (6).

Universities derive their meaning primarily from the students they serve; consequently, the academic vision of education and learning development must continually be updated (7). Faculty members commonly rely on lectures, assigned tasks, and final examinations, whereas the choice of teaching style and the manner in which instructors respond to students can produce substantial differences in learning outcomes (8). Faculty members should therefore identify factors that facilitate or hinder learning and seek ways to improve instructional effectiveness (9).

One social factor influencing student learning is the generation gap, first introduced into the social sciences by Mannheim (10). Each generation develops distinctive characteristics in response to the economic, social, and cultural conditions of its formative period (11). The Silent Generation (born 1925–1945) tended to prefer teacher-centered, structured, and predictable classrooms (12). Baby Boomers (born 1946–1965) preferred collectivist and democratic learning environments while also showing an interest in independently acquiring new skills (13). Generation X students (born 1965–1980) were described as independent, self-directed, intelligent, empowered, and comfort-oriented learners (14). Millennials, or Generation Y (born 1980–1995), preferred personal computers, group participation, and activity-based learning; consequently, classrooms gradually moved away from a predominantly one-speaker format (6). Thus, no single learning style is appropriate for students across all generations, and educational frameworks should be updated to address the needs of each generation (15,16).

Generation Z (born 1995–2012) is the youngest generation of students to enter higher education (17). Like the preceding generation, this cohort has grown up in a technology-rich environment; however, intergenerational differences have been reported in learning styles, preferences, communication patterns, technology use, online social interaction, and risk-taking compared with Millennials (18). Generation Z is commonly described as a cohort of digital natives who favor independent and relatively passive learning and prefer visual and kinesthetic learning over auditory learning (19). They tend to feel comfortable in the classroom and value honest feedback (20). Their extensive reliance on technology has also been associated with weaker face-to-face communication skills. This generation has been characterized as risk-averse, precise, pragmatic, and entrepreneurial (21). These characteristics create a need for changes in instructors' teaching practices to establish an optimal and inclusive learning environment.

Generation Z students seek practical information relevant to their future professional fields and want to access it quickly. They prefer to learn scientific material through visual technologies and contemporary digital tools (10,16,17). Images, videos, animations, digital storytelling, and online learning activities may therefore be attractive to these students (22). They seek rapid access to information, and the learning process may be less important to them than the final outcome (23). Previous studies have reported substantial use of YouTube, smartboards, online videos, social media, podcasts, Google, Wikipedia, and other digital resources among Generation Z students (10,14,25). Case analysis, case studies, and real-world examples have also become increasingly prominent, whereas long articles have a lower priority (25).

The present study was designed in response to the limited evidence on learning preferences of Generation Z students and teaching strategies compatible with these preferences. Accordingly, the study aimed to design, implement, and evaluate an educational program based on Generation Z students' learning preferences to improve teaching-learning strategies among faculty members at Khoy University of Medical Sciences.

METHODS

This applied study was conducted using an educational scholarship approach. Action research enables researchers to identify a real problem in an educational setting, design and implement an appropriate solution, and subsequently evaluate its effectiveness. The study was conducted in four operational steps at Khoy University of Medical Sciences, affiliated with the Ministry of Health and Medical Education, during the 2025–2026 academic year.

Population and sample: The study population comprised all undergraduate students enrolled at Khoy University of Medical Sciences during the study period. Based on the Morgan sample-size table, 242 students were estimated for a population of 650. Considering a potential 10% attrition and sample loss, 249 students were ultimately assessed in Step 2. Convenience sampling was used. Eligibility criteria were being a Generation Z student (born 1995–2012) and willingness to participate.

Data collection instrument: The primary checklist used was adapted from Nicholas's study on the learning preferences of Generation Z. This checklist comprises three sections: preferred learning methods (19 five-point Likert items), preferred tools for enhancing learning (8 four-point items), and preferred study resources (15 four-point items)(25). The face and content validity of the Persian version were confirmed by five faculty members specializing in educational sciences and psychology. Cronbach's alpha was 0.85 for the entire questionnaire and exceeded 0.70 for each domain, indicating acceptable reliability.

Step 1—Needs assessment: To examine students' personality traits, attention, motivation, and academic status, semi-structured interviews consisting of seven questions were conducted with ten faculty members who had over five years of teaching experience. The interview protocol was specifically designed for this study.

Step 2—Data collection and analysis: Questionnaires were distributed to 249 Generation Z students in classroom settings. Data were entered into SPSS version 25 and analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. Findings were compared with similar international studies.

Step 3—Intervention design: Required changes in teaching practices were developed based on the needs assessment. These changes included restructuring class time, technology use, storytelling, group work, and practical activities. The proposed program was reviewed for feasibility by the educational scholarship committee, comprising five faculty members. One volunteer psychology instructor was selected to pilot the program in four courses, while one course was retained as a traditional control.

Step 4—Implementation and evaluation: The intervention was implemented for one academic semester in four psychology courses: Mental Health and Addiction, Psychology and Mental Health, General Psychology, and Health Psychology. Individual and Social Psychology, taught by the same instructor, served as the control course without curricular modification.

Intervention components included restructuring the 90-minute class into three segments of 45, 20, and 25 minutes; reviewing previous material with flashcards and notes; using engaging visual formats; presenting a topic-related film or clip; conducting small-group discussions; collecting in-class assignments through a virtual platform; sharing course-related online materials; using memories, proverbs, and metaphors to enhance positive emotional engagement; involving students in attendance and assignment choices; and emphasizing brief, activity-based group work.

Program evaluation followed the first three levels of the Kirkpatrick model. At Level 1 (reaction), anonymous student satisfaction was assessed using a standardized 12-item, three-point Likert questionnaire, and formal instructor-evaluation scores recorded in the HamAva system were compared. At Level 2 (learning), mean final examination scores were compared between intervention and control courses and with the overall faculty mean. At Level 3 (behavior), absenteeism, active classroom participation based on the instructor's report, and complaints or recorded dissatisfaction were assessed.

RESULTS

The results were evaluated in four main areas.

1. Students' learning preferences: More than 80% of students favored combining lectures, group work, discussion, and problem-solving. Only 57% preferred lectures as the primary instructional format. More than 80% favored small-group work and analysis of relevant examples. Only 31% favored frequent examinations and multiple assessment methods. More than 70% considered studying before and after class useful(see Table 1).

Table 1
Selected learning preferences of Generation Z students (n = 249)

No.	Item	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
1	PowerPoint presentations accompanied by the instructor's lecture	37.0	52.2	8.7	2.2
2	Learning from news, videos, YouTube clips, and online materials	33.7	46.7	17.4	2.2
3	Combining lecture, group work, discussion, and problem-solving	40.2	42.4	13.0	4.3
4	Solving different problems in class helps learning	39.1	50.0	5.4	5.4
7	Preference for lecture as the classroom teaching format	7.6	50.0	30.5	8.7
8	Small-group classroom discussion is valuable	33.7	47.8	12.0	6.5
10	Group work is a valuable learning method	28.3	55.4	14.1	1.1
12	Analyzing relevant examples helps learning	30.4	47.8	15.2	4.3

2. Preferred tools for improving learning: Students identified working and practicing on real cases as the most important tool, with 86% rating it as important or very important. Long articles and take-home examinations were among the least important tools(see Table 2).

Table 2
Preferred tools for improving learning (n = 249)

No.	Tool	Unimportant (%)	Sometimes important (%)	Important (%)	Very important (%)
1	Case analysis of relevant material	3.3	18.5	41.1	29.0
2	Take-home examinations	21.5	45.7	28.3	4.5
3	In-class examinations	8.2	40.4	37.6	13.9
4	Short articles	27.5	32.8	27.1	12.6
5	Long articles	26.5	33.9	30.6	9.0
6	Individual research report	15.9	33.3	35.0	15.9
7	Group research report	13.3	31.5	37.5	17.7
8	Practice on real cases	2.0	11.7	37.9	48.4

3. Preferred study resources: Only 12.9% always purchased printed books, while 35.2% never purchased books. More than 62% searched for electronic book files on different websites. The most frequently used electronic resources were Google (80%), Wikipedia (73%), and social media applications (67%)(see Table 3).

Table 3
Printed and electronic study resources (n = 249)

No.	Resource	Never (%)	Sometimes (%)	Often (%)	Always (%)
1	Purchasing printed books	9.2	44.2	33.7	12.9
2	Borrowing from the library	7.3	39.3	38.9	14.6
3	Borrowing from others	26.1	45.8	22.5	5.6
4	Finding book files on websites	8.6	28.6	37.1	25.7
6	Using electronic books	10.8	32.9	39.4	16.9
7	Electronic scientific journals	22.5	39.9	26.6	10.9
9	Audiobooks	36.1	33.7	20.9	9.2
11	Professional and educational websites	10.4	32.9	34.9	20.9
13	Google	4.0	15.7	29.7	50.6
14	Wikipedia	10.7	16.0	35.7	37.3
15	Social media applications	10.4	22.5	37.8	29.3

4. Program evaluation: At the reaction level, the mean student evaluation score for the control course was 90.23, compared with 97.41, 94.45, 94.80, and 96.03 for the intervention courses. These means exceeded the overall faculty mean of 86.90. At the learning level, the mean score was 15.24 in the control course and 17.67, 17.44, 17.39, and 16.85 in the intervention courses. At the behavior level, reduced absenteeism and increased active participation were observed in intervention classes.

DISCUSSION AND CONCLUSION

The findings clearly demonstrated that Generation Z students have distinctive learning preferences that differ substantially from traditional educational approaches in medical sciences universities. The results are consistent with the growing literature on Generation Z and underscore the need to reconsider curricula and teaching methods.

More than 80% of students preferred a combination of short lectures, group work, discussion, and problem-solving, consistent with Chicca and Shellenbarger's emphasis on active and experiential learning (10). The preference for educational videos and clips is also consistent with previous reports indicating that Generation Z students favor video-based content and online resources (13,24).

Students' preference for real-world examples and case analysis (more than 78% agreement) and practice with real cases (more than 86% rating these as important) is consistent with previous evidence that Generation Z students favor case-based and practical learning over lengthy texts (11). The lower priority

assigned to long and short articles suggests a shift toward practical and applicable content, potentially reflecting the accessibility of concise digital information (25).

The strong orientation toward digital resources was another important finding. Only 12.9% always purchased printed books, whereas more than 62% searched for electronic book files and more than 80% used Google as a primary information source. These findings are consistent with Purcell et al., who reported extensive use of Google and comparatively low use of printed books (14), and with studies emphasizing Generation Z's preference for Internet-based information retrieval (26).

In Iran, limited research has addressed Generation Z learning preferences. Parvazi Moghadam et al. identified components related to learning activity and experience, curriculum orientation, and digital learning tools and resources (15). The present findings provide practical support for activity-based, participatory, and digitally supported curricula. Hedayat also emphasized immersive and diverse classroom environments, consistent with the present use of storytelling, emotion-oriented teaching, and varied classroom activities (16).

The program evaluation suggested that the intervention was educationally beneficial. Student satisfaction increased from approximately 80 in the control course to above 94 in the intervention courses. This improvement was accompanied by greater classroom participation and interaction. Final examination scores also increased from approximately 15 to 17–17.5, suggesting that alignment between teaching methods and students' learning preferences may positively influence academic performance. Reduced absenteeism and increased participation further indicated positive behavioral change.

These findings may be interpreted through Mannheim's generation-gap theory (10). Students who have grown up in a digital environment may respond more favorably to approaches compatible with their everyday technologies and lifestyles. Rational Choice Theory may provide an additional explanation: learners may prefer methods that provide greater educational returns at lower temporal and cognitive cost. Accordingly, active, rapid, and technology-supported approaches may be more compatible with this generation than prolonged passive engagement with large volumes of text.

The practical implications for medical education are substantial. Curricula should be reconsidered in light of generational characteristics, faculty members should receive systematic training in contemporary teaching and digital tools, active learning methods should be expanded, and assessment should be diversified beyond exclusive reliance on essay examinations and lengthy written assignments. These findings may inform the development of educational guidelines for medical universities.

CONCLUSION

This study empirically demonstrated that Generation Z students have distinctive learning preferences and require educational approaches adapted to their characteristics. They favor active classes,

technology use, group work, problem-solving, real-world case analysis, and practical exercises, while showing less enthusiasm for lecture-only instruction, essay examinations, and lengthy articles.

Implementation of an intervention based on these preferences resulted in increased student satisfaction, improved academic scores, and positive behavioral changes, including greater participation and reduced absenteeism. Thus, incorporating generational characteristics into educational design represents not only a theoretical consideration but also a practical strategy for improving the quality of higher education.

Because Generation Z constitutes a substantial and growing proportion of the student population, fundamental revision of medical education systems is warranted. Such revision should address curriculum content, teaching methods, educational environments, and assessment practices and may ultimately foster motivated students with deeper learning and stronger preparation for future professional roles.

LIMITATIONS

The study was conducted at a single medical sciences faculty and focused on selected psychology courses, limiting generalizability to other disciplines. The intervention lasted only one semester and therefore cannot establish long-term sustainability. Implementation depended on a single volunteer instructor, making it difficult to separate intervention effects from instructor-specific characteristics. Behavioral outcomes were based mainly on the implementing instructor's observations and reports and may therefore be subject to bias. The self-report questionnaire may also be affected by socially desirable responding and may not fully correspond to actual behavior. Finally, potential confounders such as initial motivation, socioeconomic status, previous educational experiences, and concurrent environmental influences were not controlled, indicating the need for more controlled studies.

RECOMMENDATIONS

Replication at other medical sciences universities and across medicine, nursing, pharmacy, and public health is recommended. Longitudinal studies with one- to two-year follow-up periods could determine the durability of effects on academic performance, information retention, and behavioral change. Mixed-methods studies using semi-structured interviews and focus groups could provide deeper insight into Generation Z students' needs and motivations. Future research should also evaluate emerging technologies, including virtual reality, augmented reality, gamification, and artificial intelligence, in medical education. At the policy level, curricula should place greater emphasis on case studies, problem-solving, practical application, active learning, and digital resources. Continuous faculty development, modern classroom infrastructure, and diversified assessment methods—including continuous assessment, group projects, electronic portfolios, oral presentations, and peer assessment—are also recommended.

Declarations

Adherence to Research Ethics

The study was conducted in accordance with research ethics principles. Informed consent, confidentiality of information, and protection of participants from harm were ensured. Ethical approval was obtained from the Ethics Committee of Khoy University of Medical Sciences under code IR.KHOY.REC.1404.019.

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AUTHOR CONTRIBUTIONS

Conceptualization and study design: Vahid Sabri, Abdollah Khorrami Marekani; Data collection: Vahid Sabri, Moslem Beyrami, Arezoo Ghasemkhanloo; Data analysis: Vahid Sabri, Hosseini Motaarefi; Manuscript drafting: Vahid Sabri, Moslem Beyrami; Manuscript review: Vahid Sabri, Arezoo Ghasemkhanloo.

CONFLICT OF INTEREST

The authors declare no financial, scientific, or personal conflicts of interest that could have influenced the results of this study.

Informed consent

Informed consent was obtained from participants to participate in the study.

Consent for Publication

Not Applicable

ADM statement request

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request. Also, all data generated or analysed during this study are included in this published article.

USE OF ARTIFICIAL INTELLIGENCE

The authors declare that the artificial intelligence technology used by Grammarly software was solely to improve the editorial and linguistic quality of the article and was not used to produce scientific content..

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