Int. j. adv. multidisc. res. stud. 2025; 5(2):239-244

Received: 17-01-2025
Accepted: 27-02-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Learning Styles, Preferences and Needs of Generation Z Medical Students

[1] Mehnaz Kabir, [2] Muhib Muhammed Kabir, [3] MM Faniqul Islam, [4] Ramisa Haque

[1] MBBS, MPH, Assistant Professor (CC) Department of Community Medicine, Bangladesh Medical College & Hospital, Dhaka, Bangladesh

[2] MBBS, MRCP, Medical officer, Department of Nephrology, Bangladesh Medical College & Hospital, Dhaka, Bangladesh

[3] MBBS, PGDip, MSc, MRes, Lecturer, MSc Healthcare Leadership, BPP University, Lecturer (part time), Regent College London, England

[4] BDS, MPH (Thesis part), Department of Epidemiology, North South University, Dhaka, Bangladesh

DOI: https://doi.org/10.62225/2583049X.2025.5.2.3833

Corresponding Author: **Mehnaz Kabir**

Abstract

Background: Generation Z individuals have been described as being technologically sophisticated, dependent on gadgets and devices, have short attention spans, dislike reading printed material, prefer collaborative activities and learning in teams. It is of paramount importance to integrate their educational preferences with the medical curriculum for their better academic performances and enhanced learning. **Objective:** The study was a formal attempt to assess the learning needs, styles and preferences of the Gen Z medical students.

Methods: This was a descriptive, cross-sectional study. A sum of 120 MBBS students of 2nd year studying in Bangladesh Medical College and Hospital, Dhaka, Bangladesh were enrolled in this study by purposive method. A structured questionnaire was administered to them and data was collected by face-to-face interview. Findings were presented in tables and figures in the forms of means, frequencies and percentages.

Results: Regarding gender, 70.8% were females. According to VARK inventory, 74.2% students preferred multimodal method of learning; among which 53.9% preferred bimodal approach. Highest mean score for individual VARK components was for auditory modality [8.59 (± 3.08)]; followed by kinesthetic [6.35 (± 4.26)]. Gender preferences of sensory modality reported no major differences; both genders preferred auditory followed by kinesthetic modality. Besides, 76.8% students said they chose mixed habits of learning meaning studying both alone and in groups. In addition, maximum students, meaning 100.0% and 95.8% mentioned that, interactive classes and in-hands training were the best educational tools and methods. It was also revealed that, 62.5% students thought that 60 minutes were the ideal duration for each lecture class. Lastly, they suggested that increased hands-on training (96.6%) and more practical-based tests (91.6%) were the most important factors which could improve the medical educational system. **Conclusion:** The study findings can guide the authorities on how the educational patterns and curriculum should be designed and adjusted which will impact the students' learning process for better outcomes. Learning can only be effective if it is in alignment to the needs and preferences of the students.

Keywords: E-learning, Medical Education, Medical Students, Multimedia, Technology, Digital World, Gen Z, Perspectives, Educational Needs, Academic Preferences, Learning Styles

Introduction

Generation Z refers to the demographic cohort born between 1997 and 2012, to which most of medical students today belong [1]. Generation Z consists of active problem solvers, independent learners and advocates for social justice, fairness, equality, and the environment [1]. They are the first to have access to the Internet and social networking sites using widespread technology [1, 2]. In addition, they live and function differently than earlier generations [2]. Knowing how this new generation of students engage in learning, it is critical to promote their education means [2, 3]. Therefore, medical faculty must be aware about this new group better in order to offer medical education based on their learning preferences [3].

As digital natives, iGen or post-millennials as they say, the generation Z tends to prefer more personalized, flexible modes of learning along with surroundings that they can participate actively and pick up [4]. This generation has shorter attention spans; as a result, minute, lively, and visually engaging education materials are more likely to engage their attention [5]. Besides, Generation Z's proficiency in navigating the digital universe is far more superior than previous generations [2]. Yet, it should be mentioned that, they tend to lack information literacy in determining the credibility of their information sources [6].

For medical students, it is certainly more difficult to rely on device-based education solely for learning [7]. Practical and clinical components of the curriculum such as basic clinical exposure (like history taking), field visits, anatomy laboratory, small group discussions and library time are reported to be deleteriously impacted if e-learning is the only resource [8]. Some studies have been conducted globally to understand Generation Z medical students' perceptions of e-learning. A study [9] conducted on Pakistani medical and dental students regarding their experiences with e-learning revealed that 77% of the students had negative perceptions of e-learning methods. Another study [10] on Indonesian medical students found location flexibility as supporting and signal dependence as inhibitory factors in terms of distant learning. Furthermore, relevant study [11] performed in Telangana, India mentioned that, the comfort of staying at home, studying at one's own pace, and saving the transport cost were more feasible to the students; lack of communication between the patients and teachers and network issues were detected as problem areas. In addition, certain problems that have emerged on the grounds of e-learning include challenges with time management, lack of interaction and student evaluation [12]. Moreover, many teachers are found to struggle with using computers and devices or troubleshooting systems during online classes [13]. Delungahawatta et al. [14] systematically reviewed studies on the scope and impact of e-learning on medical students. The authors found that multimedia, case-based learning, question banks, and quizzes were the most common e-learning resources incorporated in clinical medicine. In another study, [15] medical students reported animated videos and simultaneous drawings as the most effective learning resources for retaining information [2]. It is worth mentioning that, device-based education has been reported to have a positive effect, leading to broad acceptance of technology-enabled education [13]. Additionally, transitioning to online education requires significant support from the respective institutions by providing necessary tools and devices to the teachers [13].

Educators should consider creative ways to incorporate technology into off-site learning. Hopkins et al. [16] suggested the use of podcasts, websites, simulations, interactive tutorials on YouTube, and Internet-based educational games. Teachers could also make use of social media sites, such as Twitter and Tumblr, for recruitment, communication and distribution of learning "pearls." [16] Besides, Facebook can be used to promote academic sessions or post schedule and activities updates [17]. This may represent a major diversion from traditional methods of teaching and communication [16, 17].

It is essential to update the educational framework and pedagogy to meet each generation's distinct learning styles and preferences. The aim of this investigation was to assess the preferences, needs and styles of education of Generation Z medical students currently. Having a greater understanding in this regard will allow medical colleges to improve their delivery of education which will enhance the students' learning process.

Methods

This descriptive, cross-sectional study was conducted in Bangladesh Medical College and Hospital. Duration of the study was 15 days; from the 1st to 15th of December, 2024. We enrolled 120 students who are studying in the 2nd year of their MBBS course for our research. Sampling method used was purposive technique of sampling. The eligibility criteria consisted of all the students currently attending the 2nd year of MBBS, those who belonged to birth cohort of Generation Z and willingly agreed to participate in this study. A pre-tested, structured questionnaire including VARK (visual, auditory, read/write and kinesthetic) version 7.3 was used. Fleming and Miles' VARK assessment questionnaire were used because it is a recognized, well- tested and validated tool to assess students' learning styles. It consists of 16 questions with 4 options each. Students could choose more than one option of each question for identifying their learning styles. The purpose of each question is also to identify their preferred learning styles. For easy understanding, these 16 questions were customized and translated into Bangla considering the country context [18]. Other questions were based on the students' choices and preferences about learning needs. The responses from the students were collected; then compiled and analyzed using Statistical Package for Social Sciences, (SPSS) v.25.0 (IBM Corp). The data were presented in the forms of tables and figures where relevant.

Ethical consideration

The type and purpose of the study, issues of anonymity, confidentiality, voluntary participation and freedom to discontinue the participation at any stage; and absence any known risk or benefit for participating in the study have been explained to the participants before involving them in the research through written, informed consent. Anonymity and confidentiality of the respondents have been maintained in all stages of the investigation.

Result

Figure below illustrates a pie chart regarding gender of the respondents. It is clearly evident that, out of 120 medical students of 2nd year MBBS course, 85 (70.8%) were females. [Fig 1]

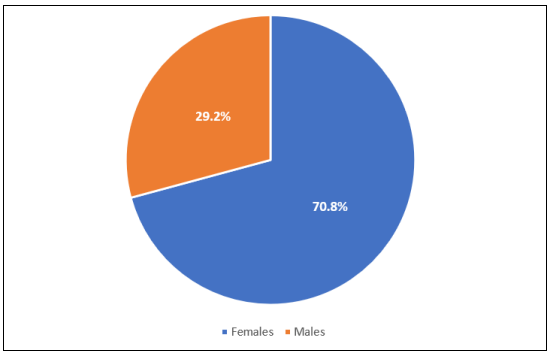


Fig 1: Pie chart showing the gender distribution of the respondents (n=120). Values expressed as percentages

Table 1: Learning preferences according to VARK questionnaire. Values expressed as number and percentages

Learning preference (n=120)	Frequency/Percentage (n/%)
Multimodal	89 (74.2)
Unimodal	31 (25.8)
Multimodal preference (n=89)	
Bimodal	48 (53.9)
Trimodal	29 (32.6)
Quadrimodal	12 (13.5)

Table above highlights the learning preferences based on the VARK scale. It was found that, 89 (74.2%) students preferred the multimodal way of learning. Among the multimodal category, 48 (53.9%) chose the bimodal criteria; followed by 29 (32.6%) who wanted the trimodal approach. [Table 1]

Table 2: Mean scores of individual VARK components. Values expressed as mean score (± standard deviation). (n=120)

VARK components	Mean score (± Standard Deviation)
Visual	5.68 (± 2.47)
Auditory	8.59 (± 3.08)
Read and write	5.76 (± 2.16)
Kinesthetic	6.35 (± 4.26)

Table above depicts the mean score of the individual VARK segments; which means the preference of a particular sensory modality. It can be seen that, the mean score of the auditory component [8.59 (± 3.08)] was the highest; followed by kinesthetic component [6.35 (± 4.26)]. [Table 2]

Figure below shows a bar chart illustrating the sensory modality preferences of students based on gender. It was reported that, both male and female students preferred the auditory format (50.7% females and 45.4% males) followed by kinesthetic one (35.3% males and 27.8% females). [Fig 2]

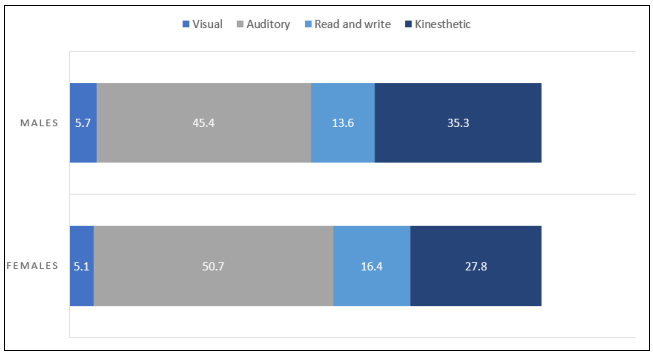


Fig 2: Bar chart depicting the sensory modality preferences of respondents according to gender. Values expressed as percentages. (n=120)

Figure below shows a column bar which describes the preferred learning habits of students based on whether they wanted to learn alone, mixed meaning both alone and groups and group study. It was clearly visible that, majority of the students preferred mixed way of learning (76.8%). [Fig 3]

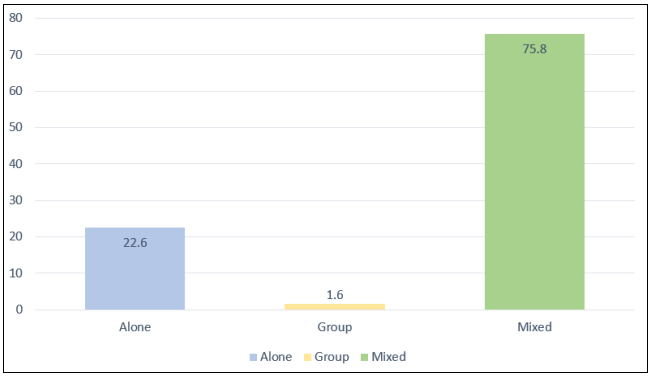


Fig 3: Column bar showing the preferred habits of learning. Values expressed as percentages. (n=120)

Table 3: Most effective learning aids and tools suggested by the respondents. Values expressed as frequency and percentage

Learning tools and materials	Number/Percentage (n/%)
Interactive classes and problem-solving discussions	120 (100.0)
Practical sessions and in-hands training	115 (95.8)
Audio recordings of lectures	112 (93.3)
Textbooks	102 (85.0)
Guidebooks and notes	98 (81.6)
Social networking sites and learning with peers	85 (70.8)
Internet search engines, encyclopedias and online educational clips	71 (59.2)
Subject-specific mobile apps	51 (42.5)
E-books (online version of textbooks)	29 (5.8)

*Multiple response

Table above describes the types of learning tools and aids that the participants chose as their preferred materials and ways. All the students [120 (100.0%)] mentioned that interactive classes and problem-solving discussions meaning two-way classes were the most useful educational means. In addition, majority students said that practical classes and in-hands training [115 (95.8%)] and audio recordings of lectures given by the teachers [112 (93.3%)] were also very helpful for their learning. [Table 3]

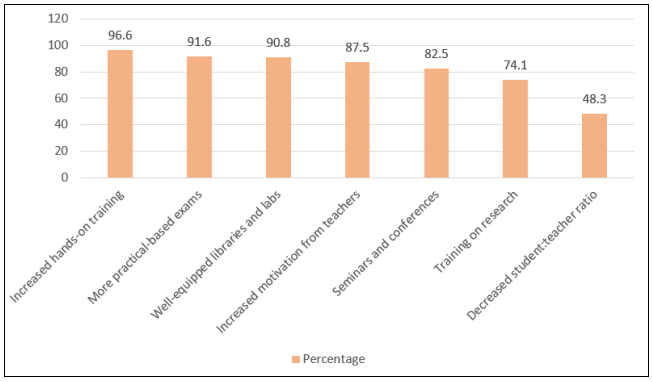
Table 4: Preferred duration for each lecture according to the participants. Values expressed as frequency and percentage. (n=120)

Preferred duration of each lecture class (in minutes)	Frequency/Percentage (n/%)
90	39 (32.5)
60	75 (62.5)
45	6 (5.0)

Table above reports about the preferred duration of each lecture class as mentioned by the 2nd year medical college students. Majority of the students [75 (62.5%)] said that they would prefer a 1 hour or 60 minutes lecture class for each subject each day. [Table 4]

Figure below shows a bar chart highlighting the factors which were suggested by the Gen Z medical students for improvement of curriculum and learning environment. It

was clear that, majority of the students said that, increased hands-on training (96.6%), more practical-based tests (91.6%) and well-equipped labs and libraries with modern utilities and facilities (90.8%) were the main suggested factors. Some students (48.3%) thought that decreasing the student and teacher ratio was also important to improve the learning experience. [Fig 4]



*Multiple response

Fig 4: Bar column describing the suggested factors for improvement of medical curriculum

Discussion

Medical profession usually requires several skills involving sensory components such as visual (i.e., deciphering graphic content in research articles), auditory (i.e., listening to patients or guardians), read/write (i.e., reading journal articles and keeping records), and kinesthetic (i.e., learning or performing physical examinations and procedures). In order to improve their academic performance, the knowledge of learning preferences may create awareness among the Gen Z students and promote their learning to acquire lifelong professional skills. Efficient learning strategies and resource utilization are critical in medical education. Student learning styles and preferences have been an area of interest for educational research. This study aims to throw light on educational needs and preferences of 2nd year MBBS medical students.

We found the majority of students being females. Similar findings were reported in studies [19-20] performed in Jeddah, Saudi Arabia and in Sharjah, UAE where 64.6% and 67.7% students were females respectively.

Regarding learning preferences, maximum students chose multimodal way and among that category, bimodal was the most preferred one. Another study [21] done in different medical colleges in Bangladesh revealed that, out of 1004 medical students, 64.2% preferred multimodal learning styles and rest 35.8% preferred unimodal learning styles. Among the multimodal preferences, 32.5% bimodal, 21.4% trimodal and only 10.4% were quadrimodal of VARK learning styles.

When the sensory modality was concerned, we detected the highest mean score for auditory modality followed by kinesthetic one. Similar findings were found in another study [22] in Karnataka, India where the mean score was highest for auditory learning (7.11 ± 2.72) followed by kinesthetic learning (6.94 ± 4.15). However, systematic review [23] performed in Iran found that, among the learning preferences, kinesthetic (69.2%) and auditory (55.9%) were the most preferred. Besides, a study [24] done in India in 2017 highlighted that, 53.8% students were unimodal learners and 46.2% were multimodal learners. Among the unimodal learners, predominant were visual learners (24.1%). The variations can be explained by changes in secular trends.

In addition, the study revealed that both male and female students preferred the auditory modality followed by kinesthetic one. Previous study [25] performed in Tamil Nadu, India revealed that, the preference of VARK model is same within each group between the male and female students, which means, 55% males and 33% females preferred aural mode of learning; visual mode was more or less equally preferred between males and females (20% vs 18%); 15% males preferred read/write style compared to 28% females; and lastly kinesthetic mode of learning was preferred by 10% males compared to 21% females.

Furthermore, we found that, most of the students preferred to study in mixed ways, means both alone and in groups. Relevant paper [26] in Trinidad & Tobago, West Indies, found that, the percentage of students who preferred studying alone was 86.5%; those who preferred group study totally or partially (i.e., both alone and in groups) was 13.5%. The differences can be owed to geographical and cultural differences.

The study revealed that, interactive classes, problem-solving discussions, practical sessions and in-hands training were the most helpful learning aids and tools according to the participants. A phenomenological study [27] in Indonesia performed about learning of Gen Z medical students revealed that, according to the students, the application of blended learning was very vital; learning should be unobtrusive, full of motivation and not monotonous. They added that, ideal learning must be adapted to conditions, changing times and technological advances. GenerationZ's combination of learning using technology and face-to-face systems is just as important. They also mentioned that, other findings state that ideal learning always pays attention to a balanced portion between the presentation of theory and practice. Based on the expectations of generation Z students, ideal learning is defined as a learning process that provides equal portions between theory and practice.

The paper revealed that, majority of the students that each lecture class for each subject each day should be of 60 minutes duration. Previous study [28] conducted in multiple medical colleges in Bangladesh found major preference of 45 minutes by Dhaka Medical College (53.5%) and Bangladesh Medical College (51.7%), 60 minutes by Monno Medical College, Manikganj (61.5%) and Sher-e-Bangla Medical College, Barishal (52.4%). The differences could be due to variations in type of overall environment and teachers in the medical colleges.

Lastly, increased hands-on training, more practical-based tests were the factors which were suggested by the students for betterment of curriculum. Previous study [28] showed that, the majority (18.3%) responses were for increased motivation followed by 16.4% for better teachers; 16.3% for well-equipped libraries/labs and 16.1% for hands on skill training as factors for improving curriculum. As the referred study included both private and public medical colleges, the results can vary from our findings.

Conclusion

If the learners identify their learning preferences, needs and styles, it will be beneficial in the integration of appropriate learning strategies which will enhance them to become lifelong and self-directed learners, thus maximizing their

potential. The findings recommend more diverse studies that adopt the mixed-methods or qualitative designs are required to capture deeper insights regarding Generation Z medical students.

Funding
No financial support was received for this study.

Conflicts of interest
No potential conflict of interest relevant to this article was reported.

References
1. Seemiller C, Grace M. Generation Z goes to college. John Wiley & Sons, Jan 19, 2016.
2. Kim KJ. Medical student needs for e-learning: perspectives of the generation Z. Korean Journal of Medical Education. 2024; 36(4):389.
3. Eckleberry-Hunt J, Lick D, Hunt R. Is medical education ready for generation Z? Journal of graduate medical education. 2018; 10(4):378-381.
4. Shorey S, Chan V, Rajendran P, Ang E. Learning styles, preferences and needs of generation Z healthcare students: Scoping review. Nurse education in practice. 2021; 57:103247.
5. Lerchenfeldt S, Attardi SM, Pratt RL, Sawarynski KE, Taylor TA. Twelve tips for interfacing with the new generation of medical students: iGen. Medical teacher. 2021; 43(11):1249-1254.
6. Seemiller C, Grace M. Generation Z: Educating and engaging the next generation of students. About campus. 2017; 22(3):21-26.
7. Habib O, Qureshi MA, Latif Z, Javed M, Mahmood K, Hotiana UA. Medical Students' Perception of Online Learning–A Mixed Method Study. Journal of Sharif Medical and Dental College Lahore, Pakistan. 2021;7(2):90-97.
8. Dergham P, Saudagar FN, Jones-Nazar CC, Hashim SA, Saleh K, Mohammedhussain AA, et al. Medical students' perceptions towards online teaching during the COVID-19 pandemic: A cross-sectional study from Saudi Arabia. Advances in Medical Education and Practice, 2023, 407-419.
9. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding E-learning during Covid-19 at a private medical college. Pakistan journal of medical sciences. 2020; 36(COVID19-S4):S57.
10. Daroedono E, Siagian FE, Alfarabi M, Cing JM, Arodes ES, Sirait RH, *et al*. The impact of COVID-19 on medical education: our students perception on the practice of long distance learning. International Journal of Community Medicine and Public Health. 2020; 7(7):2790-2796.
11. Emmadisetty S, Jogi S, Yerra AK, Bala S. Perception of Undergraduate Medical Students in the Online OG Learning During COVID-19 Pandemic-A Cross Sectional Study at a Tertiary Care Medical College. Journal of Pioneering Medical Sciences. 2024; 13:6-11.
12. Rajab MH, Gazal AM, Alkawi M, Kuhail K, Jabri F, Alshehri FA. Eligibility of medical students to serve as principal investigator: An evidence-based approach. Cureus. 2020; 12(2).
13. Montaha AI, Albaramki J, Alsoudi A, Al-Ani R, Faihaa AA, Al Najada R, *et al*. The perceptions of medical students of online teaching during the COVID-19 pandemic: A national survey from Jordan. Journal of Medicine and Life. 2024; 17(4):412.
14. Delungahawatta T, Dunne SS, Hyde S, Halpenny L, McGrath DE, O'Regan A, Dunne CP. Advances in e-learning in undergraduate clinical medicine: A systematic review. BMC Medical Education. 2022; 22(1):711.
15. Wong K, Kapoor V, Tso A, OConnor M, Convissar D, Kothari N, Traba C. Environments, processes, and outcomes-using the LEPO framework to examine medical student learning preferences with traditional and electronic resources. Medical Education Online. 2021; 26(1):1876316.
16. Hopkins L, Hampton BS, Abbott JF, Buery-Joyner SD, Craig LB, Dalrymple JL, *et al*. To the point: Medical education, technology, and the millennial learner. American Journal of Obstetrics and Gynecology. 2018; 218(2):188-192.
17. Eckleberry-Hunt J, Lick D, Hunt R. Is medical education ready for generation Z? Journal of graduate medical education. 2018; 10(4):378-381.
18. Leite WL, Svinicki M, Shi Y. Attempted validation of the scores of the VARK: Learning styles inventory with multitrait–multimethod confirmatory factor analysis models. Educational and psychological measurement. 2010; 70(2):323-339.
19. Jameel T, Gazzaz ZJ, Baig M, Tashkandi JM, Alharenth NS, Butt NS, *et al*. Medical students' preferences towards learning resources and their study habits at King Abdulaziz University, Jeddah, Saudi Arabia. BMC research notes. 2019; 12:1-6.
20. Al Shmanee M, Issa M, Alkholy H, Alnaqbi A, Awadallah A, Hassan H, Hussein A. Medical Students' Preferences of Study Resources: Physical vs Digital Resources. Cureus. 2024; 16(3).
21. Karim MR, Asaduzzaman AK, Talukder MH, Alam KK, Haque F, Khan SJ. Learning style preferences among undergraduate medical students: An experience from different medical colleges of Bangladesh. Bangladesh Journal of Medical Education. 2019; 10(2):26-30.
22. Urval RP, Kamath A, Ullal S, Shenoy AK, Shenoy N, Udupa LA. Assessment of learning styles of undergraduate medical students using the VARK questionnaire and the influence of sex and academic performance. Advances in physiology education. 2014; 38(3):216-220.
23. Shakeri F, Ghazanfarpour M, MalaKoti N, Soleimani Houni M, Rajabzadeh Z, Saadat S. Learning styles of medical students: A systematic review. Medical Education Bulletin. 2022; 3(2):441-456.
24. Soundariya K, Deepika V, Kalaiselvan G. A study on the learning styles and learning approaches among medical students. National Journal of Physiology, Pharmacy and Pharmacology. 2017; 7(10):1020.
25. Ramanathan R, Mohan Jayabal, Selvaraj V, Shanmugam J. Analysis of gender differences in learning style preferences among medical students. 2022; 10(1):32-39.
26. Addae J, Ettarh R, Crowley J. Study Preferences of Generation Z Students Admitted to Medical School. The FASEB Journal. 2020; 34(S1):1.

27. Fitriyyah DA, Rante SV, Tulak H, Ulfah M, Wijaya H. Gen Z Students Perception of Ideal Learning in Post-Pandemic: A Phenomenological Study from Indonesia. International Journal of Educational Methodology. 2023; 9(2):423-34.
28. Ahmed TS, Rashid TJ, Huda S, Sultana N, Billah AM. Perception of Medical Students on Current Medical Education in Bangladesh. Bangladesh Journal of Medical Education. 2022; 13(2):13-25.