RESEARCH ARTICLE

Comparison of traditional methods versus digital learning methods among undergraduate medical students in Pakistan

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Abstract

Objective: To explore and compare the use of traditional and digital learning methods among undergraduate medical students.

Method: The cross-sectional, qualitative, descriptive study conducted at the Bahria University of Health Sciences, Karachi, from June to December 2023, and comprised undergraduate medical, dental and allied health sciences students. Sample size was calculated using open epi and keeping confidence interval at 95%. Data was collected using in-depth interviews, and focus group discussions. Data was analysed using SPSS 22.

Results: Of the 203 subjects, 48 were from the MBBS final year, 46 each from the fourth and third years, 30 from the second year, and 22 from the first year. Rest of them were from allied BDS, DPharm, DPT. Overall, N110 (54%) students favoured mixed methods of learning, N23 (12%) favoured digital alone, and N70 (34%) favoured the traditional methods. A total of 6 focus group discussions were held; N 146 (71.92%) medical students in five groups, and one group of N 57 (28.07%) dental, pharmacy and physical therapy students. The 3 main themes identified were digital methods, traditional methods and mixed methods of learning.

Conclusion: The mixed method of learning was favoured by the majority of students. Digital platforms offer a variety of benefits that improve learning, while traditional methods remain valuable for comprehensive study and for building concepts.

Key Words: Innovative digital platforms, digital learning, e-learning, traditional learning, medical studies, online learning.

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Introduction

Computer-based self-learning platforms have an increasing effect on medical education and how students access information for learning.[1] Furthermore, there is a lack of research on the use of learning media by the present generation of students. This new generation of students born in the late 1980s and 1990s was termed the "internet generation" due to their assumed dependence on computer-based technologies.[2] It was presumed that this generation differs from previous generations of students in using technology to acquire knowledge and that these differences were reflected in the learning styles and habits of the "digital natives" compared to their antecedents.

The digital natives are experiential learners, experts in multitasking, easily adaptable to computerised learning environments, and use the internet to interact with each other and the educators. This led to the postulation that the current educational system may not be fully prepared to deal with the needs of the current generation of students.[2] Although, A study done in the United Kingdom by Boudains et al, in 2013, showed that the medical students who rotated in the Department of Primary Care and Public Health, Imperial College London prefer books over the internet.[2]

A study by A.J. Rockinson, showed that compared to students in the United States, textbooks are still the most popular resource for those in the UK. [3] Further research could assist in developing educational resources that would be shaped according to the needs of the learners and provide evidence to develop a modified curriculum for the students.

The number of digital resources available to medical students is escalating considerably. Along with using traditional learning resources, mainly lectures, notes and textbooks, the students are distinctly using e-learning tools, including commercially available question banks, to assist their learning. The expanding use of digital question banks leads to the need for alignment with the curriculum of medical schools. These multiple-choice

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question (MCQ) banks have self-explainable answers with references, and with the benefits of exam technique, practice exams, and time management, their demand will most likely grow. These platforms can be integrated into the curricula and provide unbiased access to all students.[4]

Subjects and Methods

The cross-sectional, qualitative, descriptive study was conducted at the Bahria University of Health Sciences, Karachi, from June to December 2023. Sample size was calculated using open epi[5] and keeping confidence interval at 90%. Responses recorded till saturation was reached.

After approval from the institutional ethics review board, the sample was raised using purposeful, random sampling technique, and participants were enrolled till data saturation. Those included were undergraduate medical, dental and allied health sciences students who had access to the internet and digital learning resources. Students not part of the umbrella of health sciences and to not having access to the internet were excluded.

Data was collected after informed consent, using in-depth interviews regarding their lived experiences and perception of the use of innovative digital learning platforms. Besides, focus group discussions (FGDs) were also held, exploring the students' preferences regarding digital learning and traditional methods, and the reasons for their choices. The students were also asked if they felt that the new learning techniques might save time once they get used to them, and if they had ever felt improvement in academic performance after using the preferred study tools. The FGDs were audio-recorded.

After the data was transcribed, it was sent to 2 members of each FGD for member validation. Subsequently, the data was subjected to thematic analysis, and codes, themes and subthemes were generated.

Data was analysed using SPSS 22.

Results

Of the 203 subjects, 48 were from the MBBS final year, 46 each from the fourth and third years, 30 from the second year, and 22 from the first year. Rest of them were from allied BDS, DPharm, DPT. Overall, N110 (54%) students favoured mixed methods of learning, N23 (12%) favoured digital alone, and N70 (34%) favoured the traditional methods. A total of 6 focus group discussions were held; N 146 (71.92%) medical students in five groups, and one group of N 57 (28.07%) dental, pharmacy and physical therapy students.

The 3 main themes identified were digital methods, traditional methods, and mixed methods of learning.

The first theme had 4 sub-themes: digital methods give easy access; the digital method is always available; digital method is convenient with aesthetic highlighting and colour coding options; and digital information builds a better consolidation of memory.

The second theme had 4 sub-themes: book reading has been habitual since school age; traditional is more customised; physical strain and tactile approach; and reliable source.

The third theme had 1 sub-theme: pros and cons.

These themes and subthemes represented the distinct aspects of digital, traditional and mixed approaches, capturing the benefits and drawbacks of each while acknowledging the functional utility of combining them.

Digital study methods offered a variety of benefits, like providing easy access to a wide range of study topics, saving time, and reducing the hassle of manual note-taking. "***Digital saves the time of copying the lecture into my notebook, and my notes are just one click away.***" The convenience of digital tools allows students to type faster and generate flashcards quickly. "***I use RemNote, which lets me create flashcards right out of my notes. I type faster than I write, so it is much quicker."***

Digital notes are also easier to manage. One can search them with simple commands, making it easier to find specific content compared to the hassle of flipping through traditional notebooks. "***I can Ctrl+F and find the content of my notes very quickly instead of flipping through my pages.***" The ability to store everything in one place is another significant advantage, as it simplifies organisation and access. "***Everything is stored in one place. I can annotate PDF [portable document format] books and add diagrams and screenshots to my notes***."

Portability is another key aspect of digital methods. Digital notes are lightweight, and there is less risk of losing them since they are subjected to cloud storage. "***They are easy to carry around and safe to keep." "You cannot lose them easily, as they are usually saved on the internet.***"

Customisation and aesthetics are additional benefits of digital tools. Digital platforms offer a variety of options for highlighting and colour coding. "***Digital notes are more organised and neat. I do not have to carry multiple registers or notebooks and a pencil case with 20 different colour highlighters."***

Digital methods can also support better memory

consolidation. Online resources often provide interactive content and self-explanatory MCQs, aiding in concept clarity and revision. "***I prefer using resources online that help me practise and apply my knowledge. For example, I solve MCQs from review books and online resources that provide explanations for answers***."

As for the traditional study methods, they remain a popular choice for many. There is a comfort and familiarity in reading physical books, especially for those who have used them since school age. "***It is just my mode of studying; I am used to it***." Others find traditional methods less distracting: "***Books in my hands increase my concentration.***" The tactile sensation of holding a book or writing notes by hand provides a sense of focus and engagement.

Traditional methods allow for a personalised approach to note-taking. Handwritten notes enable creativity and flexibility in how concepts are explained. "***It gives you conceptual ways to write in your own language and patterns."***

Another reason for preferring traditional methods is to avoid eye strain from prolonged screen use. "***There will be too much strain on my already strained eyes."*** The tactile experience of holding a book or writing notes provides a sense of comfort and satisfaction to many people.

Traditional books are also seen as reliable sources of information. They contain comprehensive details on various topics, providing a sense of security. "***Textbooks are more reliable and contain all the detailed and relevant information."***

Many students found a mixed approach to be the most effective, combining the best of both digital and traditional methods. This approach allows for flexibility and adaptability. Using both methods can reduce boredom and enhance motivation. "***A good balance of both. "Only digital or traditional can get boring.***"

Mixed methods allow for versatility in how one studies. Digital notes are great for quick overviews, while traditional methods are better for in-depth understanding. "***Traditional notes help me understand the topic, whereas digital is my go-to resource whenever I want to revise."*** The combination provides a broader range of resources and can improve learning efficiency. ***"A combo of digital and traditional methods enhances the memory and speeds up the learning process more efficiently."***

Discussion

Digital learning environments are gaining popularity, and students frequently use such platforms to prepare for exams. In the current study, 54% students favoured mixed methods of learning, 12% favoured digital alone, and 34% favoured the traditional methods.

A similar 2018 study in Australia investigated the learning habits of final-year medical students during their clinical paediatric rotation using mixed methods. The students who used digital tools for learning were 76%, while 30% of the students said that they never read the course textbook.[6]

The current findings showed that digital methods were more convenient and easy to carry instead of the heavy burden of books. Also, the aesthetics of the digital method was also acknowledged by the students, and they preferred the colour coding and highlighting utilities compared to hard-copy notes.

A study at the King Saud Medical University regarding the reading habits of medical students reported that the students were unlikely to read medical textbooks about the management of patients, and they relied mainly on internet resources.[7]

A 2022 study in Ukraine showed that the color-coding system proved to be the most significant learning tool for the students. The impact of the colour system and other innovative technologies enhances the cognitive learning process.[8]

The current study also showed that the students perceived that the digital use of reviewing MCQs online helped them retain knowledge, and helped them read the explanation for conceptual reasoning.

An earlier study showed that online learning platforms were helpful as students were involved in detailed and conceptual learning by reading explanations after answering the MCQs and taking notes.[9]

The current study also highlighted the issues students faced in terms of getting used to e-learning methods and newer learning techniques. It has been shown that book-reading is often a habit since childhood and school age, and it is not easily abandoned, making it essential for the students to adjust to the latest, more innovative techniques proven for enhanced learning.[10]

Screen time is now becoming common even in toddlers and babies, although, as pointed out by some of the current students, they feel physical effects, especially eye strain, with increased screen time. Hence, getting used to the latest online learning techniques takes time. Many studies have been done regarding the excessive eye strain caused by the use of computers and their

solutions.[11-13]

In the current study, the majority of students preferred a mixture of both digital and traditional methods of learning. Many studies have shown the pros and cons of both digital and traditional methods of learning. The students take time using digital sources on the internet, but once they get used to it, they start preferring it. However, the traditional methods of books and hard-copy notes are still preferred, as they have been used since school age.[14]

In recent times, studies have been conducted to explore the benefits and shortcomings of e-learning, especially during the coronavirus disease-2019 (COVID-19) pandemic.[15]

In the current study, the students preferred generating MCQs from a reliable source of books and lecture notes made by themselves or their institution. A 2018 study in New Zealand showed that MCQs made by oneself and reliable sources were more readily accepted. MCQs are commonly used in medical education, although creating MCQs requires both in-depth content knowledge and analytical thinking.[15]

A 2022 study in Germany showed that it was useful for students to link external learning resources in alignment with their own curriculum.[16] Students facing high-stakes exams need appropriate study resources with direct and proper guidance.[17]

The use of innovative digital learning resources independently by students is increasing where there is no provision by the university.[18] Recent trends in digital teaching and learning are providing interactive, mobile and personalised platforms, further enhancing the relevance and appropriateness of these learning platforms.[19] To ascertain the full potential of these resources, a more holistic approach is needed to rethink and restructure these online learning platforms as more of a knowledge-building environment. Extensive research and rethinking could identify the critical variables educators and designers need to transition into a more comprehensive understanding of online learning.

Future research can focus on converting the present experiential approach into a broader, deeper effort to prepare teachers and designers to validate and accept the student-centred online learning environment.[20]

A similar study supported the use of online learning in medical and dental institutions, highlighting its various advantages.[21] Online learning modalities encouraged student-centred learning, and they were easily manageable during a lockdown situation.[22]

However, the current findings favoured a mixed method of learning as having more benefits and the potential to enhance the learning process. A meta-analysis in 2020 showed blended learning had better effects on knowledge outcomes when compared with traditional learning in health education.[23]

In contrast, a study in Iran proved that different characteristics regarding blended learning might have benefits as well as weaknesses and dangers involved, which requires further research. While retaining the strengths and enjoying the opportunities, the weaknesses should be recognised, threats faced and addressed.[24]

The strengths of digital learning include accessibility, interactivity, customisation, availability of latest information, and cost-effectiveness. The weaknesses include technical issues, distractions, screen time, eye strain, and dependency on infrastructure.

Traditional learning has its own strengths, including tangibility, reduced screen time, less dependency on technology, and minimal distractions. The weaknesses include limited interactivity, outdated information, and environmental impact.

The benefits of a mixed method include combination of strengths, flexibility, individualised learning, and preparation for the digital age.[25,26]

The final choice of the learning method depends on various factors, including individual preferences, available resources, and the nature of the content.

The current study has limitations, including a small sample size and single-centre data. Besides, the possibility of selection bias cannot be ruled out, and there was no comparative group or intervention to make the results more authentic and reliable. Owing to these limitations, the findings cannot be generalised.

Further research is needed to understand how digital study tools can be better customised and integrated to meet the students' needs.

Conclusion

A combination of digital and traditional learning methods seemed to be the way forward. Digital platforms offer a variety of benefits that improve learning, while traditional methods remain valuable for comprehensive study and for building concepts. The final choice between digital and traditional learning —or a combination of both — depends on individual preferences, available resources, and the nature of the content. To optimise learning, the

students should find a balance that clubs the strengths of both the methods.

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Ethical approval: Bahria University Health Sciences, ERC was obtained ERC 01/2022.

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Limitations: Single institute study, cannot be generalized. Main groups from MBBS.

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