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The Integration of Standardized Digital Bedside Manner Training into Undergraduate Medical Curricula for Enhanced Telehealth Competency

Sayyora Babadjanova [a*], Ezozxon Qobilova [b], Shavkatjon Turdiyev [c], Mamirjon Atadjanov [d], Roxila Atamurodova [e], Uktam Dusnazarov [f], Adila Tadjibayeva [g]

[a] Lecturer, Urgench State University named after Abu Rayhan Beruni, Urgench, Khorezm, Uzbekistan. E-mail: sayyora1504@mail.ru, Orcid: https://orcid.org/0009-0003-0596-2161
[b] Associate Professor, Kokand State University, Kokand, Fergana Region, Uzbekistan. E-mail: qobilovaezoza00@gmail.com, Orcid: https://orcid.org/0009-0001-1275-3080
[c] Assistant Professor, Kokand State University, Kokand, Fergana Region, Uzbekistan. E-mail: turdiyevshovkatjon@gmail.com, Orcid: https://orcid.org/0009-0005-0606-574X
[d] Fergana State University, Fergana, Uzbekistan. E-mail: mamurjon9697@mail.ru, Orcid: https://orcid.org/0009-0001-0938-2696
[e] Associate Professor, Faculty of Pedagogy, Department of Pedagogy, Psychology and Inclusive Education Jizzakh State Pedagogical University, Jizzakh, Uzbekistan. E-mail: atamuradovarohila661@gmail.com, Orcid: https://orcid.org/0000-0003-0030-3725
[f] Lecturer, Gulistan State Pedagogical Institute, Gulistan, Uzbekistan. E-mail: oktamdostnazarov@gmail.com, Orcid: https://orcid.org/0009-0006-8045-9373
[g] Lecturer, Department of Uzbek Language and Language Teaching, Fergana State Technical University, Fergana, Uzbekistan. E-mail: adilaxon1966@gmail.com, Orcid: https://orcid.org/0009-0006-3203-5947

Abstract

Telehealth technology has brought about a revolution in the way healthcare is delivered, highlighting the significance of developing effective interpersonal communication skills in a digital environment by healthcare practitioners. Interpersonal skills in a digital environment include good communication skills, empathy, and engagement, which are essential in establishing an enabling environment in which to deliver high-quality care to patients through telehealth means. Regrettably, existing undergraduate medical training programs lack competence-based training on how to develop digital bedside manner skills, leaving future health professionals poorly prepared for such environments. In this study, a digital bedside manner training program is developed and included in the undergraduate medical training curriculum. The program includes web-based learning modules, simulation practice, teleOSCEs, and feedback systems. Sixty third-year medical students participated in the study for six weeks. The results reveal that significant gains have been made in all dimensions of competencies: communication clarity (43.1 ± 7.5 pre-test, 66.2 ± 6.1 post-test), empathy and rapport (41.7 ± 8.0 to 64.5 ± 6.8), and patient engagement (42.8 ± 7.9 to 65.2 ± 6.3), all with $p<0.001$. System indicators show that participants engaged well in the process. Furthermore, 92% of the participants indicated that they had experienced an improvement in terms of their confidence levels and satisfaction. It is clear that there can be immense potential in the application of technology-assisted training in medical education.

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Introduction

The rapid rise in telehealth services has changed the dynamics of health-care delivery, allowing patients to interact remotely while overcoming barriers that affect access. This development has underscored the importance of having good digital interpersonal skills among health professionals, who have been expected all along to be able to show empathy and professionalism in person. Bedside manner, which has been an important aspect of health-care education since time immemorial, needs to be adapted to the digital environment (Deepika, 2025; Sarumathiy, 2025).

By definition, digital bedside manner refers to the competencies required of healthcare practitioners to establish a connection with their patients in order to understand them and provide appropriate care through telehealth channels (Madugalla & Perera, 2025; James et al., 2025). These competencies include the ability to communicate clearly verbally, listen actively, empathize and use digital technology effectively in order to make patients feel understood, listened to and informed.

Despite its increasing significance, current undergraduate medical education curriculums do not offer any specific form of training that will help improve the communication skills required for conducting telehealth (Mukti, 2025). The existing medical training curriculums mainly focus on face-to-face consultations. Thereby, current medical students might not be ready to handle such situations when they become actual doctors because of patient safety, patient satisfaction, and the adoption of innovations in telehealth practices.

This study explores the integration of training in digital bedside manner within undergraduate medical education curriculums through the implementation and evaluation process of technology-based medical training program. This research project aims to improve telehealth competency, educational practice, and the development of a telehealth-related curriculum.

This paper is structured as follows: Section 1: Introduction; Section 2: Background and Literature Review; Section 3: Implementation; Section 4: Evaluation and Results; Section 5: Discussion; Section 6: Conclusion; and Section 7: References.

Background & Literature Review

Telehealth services have been integral to modern health-care delivery, facilitating access and continuity of care for all kinds of patients (Adams & Ecker, 2021). With health-care service delivery becoming increasingly dependent on telehealth, the need to equip future physicians with telehealth competencies has become inevitable. The importance of telehealth competencies, such as those described by, lies in communication competencies, ethics in telehealth, patient engagement, and digital literacy as critical aspects of successful teleconsultations (Bajra et al., 2023; Noronha et al., 2022). However, these are yet not included in medical school education, which continues to be fragmented and optional at best (Chike-Harris et al., 2021; Waseh & Dicker, 2019).

There is evidence of the use of digital technologies for training and learning in other sectors, which has proven effective in increasing competency. E-learning, simulations, and digital training with the aid of AI create an environment where the user gains competencies through engagement (Jones & Cominos, 2025; Glinkowski et al., 2026). Simulations such as teleOSCEs and digital patient encounters have proved to be effective in improving communication, examinations, and decision-making competencies (Mulcare et al., 2020; Dzhumatovich & Salimrouhi, 2025).

Some studies have indicated the effectiveness of the use of digital learning technologies for telehealth bedside manner training. The inclusion of telemedicine in undergraduate learning programs improves student competencies in reasoning and communication (Mahabamunuge et al., 2021; Jumreornvong et al., 2020; Newnham et al., 2025). Culturally and contextually relevant simulations improve learning experiences (Harerimana et al., 2026; Aydin et al., 2026).

While these are promising steps, a coherent strategy involving digital bedside manner training and integration into the curriculum has yet to be explored fully (Wisniewski et al., 2020). Interventions currently developed tend to lack scalability, competency alignment, and a systematic assessment of their effect on the improvement of telehealth skills acquisition (Wibberly, 2024; Fronczek et al., 2017; Sahan et al., 2024). Besides, incorporating digital tools into the

curriculum raises questions about instruction and assessment methodology, as well as technological challenges (Zainal et al., 2023; Paplham et al., 2024).

The current project is based precisely on this interplay between education and telehealth and aims to develop a scalable and competency-aligned standardized framework for digital bedside manner training among undergraduate medical students.

Implementation

Integration of the training system into the undergraduate medical education program took place as part of its pilot testing in an interactive simulated learning environment. The experiment spanned six weeks during one academic semester and was conducted using both virtual and hybrid formats in order to increase accessibility and engagement.

A total of 60 undergraduate medical students were involved in this research project; all were third-year students, aged 20–24 years old, consisting of 32 males and 28 females. Students participated in the study on a voluntary basis; prior to beginning the training, they gave their informed consent.

Tools and Platforms: The online learning tool used a web-based learning management system (accessed from a laptop and mobile devices). Role-playing was accomplished through interactive simulation software involving a human-avatar interaction with AI-patient avatars. Assessment of participant performance was done through competency tests before and after training, data tracking via automatic learning analytics dashboard, self-assessment quizzes, and structured feedback surveys.

Training Process Flow: The students were first taken through a brief orientation on the learning platform, which included how to navigate through the platform and the course objectives and competency standards expected of the learners. They were also required to undertake four main modules on communication skills, empathic communication skills, patient interaction, and telehealth etiquette.

Feedback and Assessment: Feedback on how well each skill was developed was instantaneous, achieved through AI-assisted assessments, faculty members feedback, and peer assessments. TeleOSCE was done to evaluate the application of the skills acquired in real life. Students had to undertake reflective tasks and self-assessments.

Data Collection Instruments: Quantitative data was gathered by assessing the competency of learners before and after the training, analyzing the system logs, and teleOSCE performance levels. Qualitative data included students' journals, feedbacks from students, and observations of the faculty members, indicating their impressions regarding the development of skills and satisfaction with the process of digital training.

This systematic approach enabled the scientific evaluation of the effectiveness of the training program and served as an outline for the integration of the standardized digital bed-side manner training into medical education.

Fig. 1 The diagram shows an example of digital training for med students that includes competencies of med students, such as communicative, empathic and interacting with patients, training modules, simulations, technology assistance, and desired results such as telehealth skills.

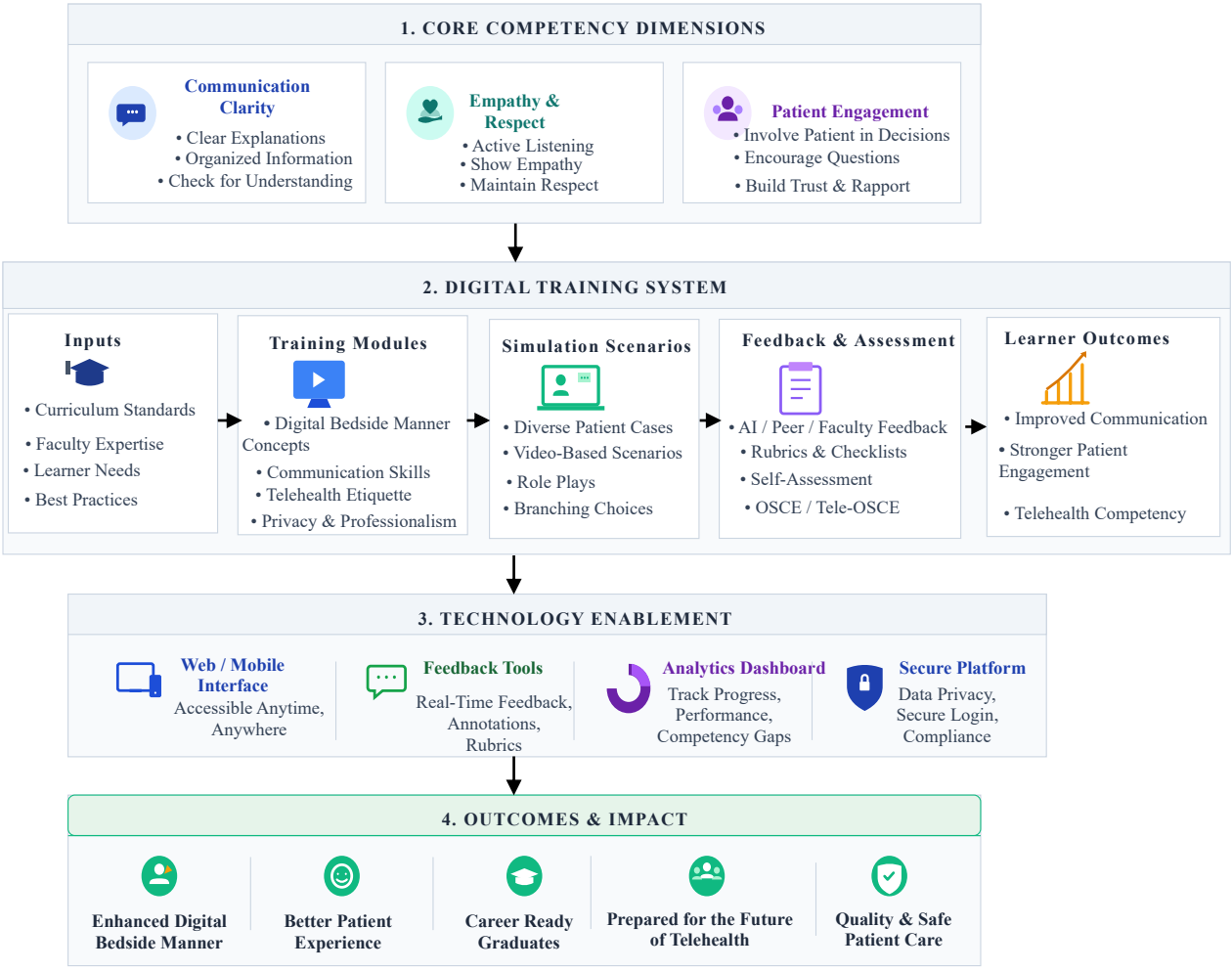


Fig. 1: Digital Bedside Manner Training Framework

Evaluation & Results

Training was conducted based on pre- and post-training assessment tests to identify progress in the development of digital bedside manner competencies. Students' progress was measured based on the three competencies mentioned above—communication clarity, empathy, and engagement—and the results proved quite promising. Specifically, students improved in all three dimensions, and the average scores improved across all dimensions: Communication Clarity rose from 43.1 (SD 7.5) to 66.2 (SD 6.1, $t = 12.05$); Empathy & Rapport rose from 41.7 (SD 8.0) to 64.5 (SD 6.8, $t = 11.62$); and Patient Engagement rose from 42.8 (7.9) to 65.2 (6.3, $t = 12.21$), all with $p < 0.001$.

The usage of the digital tool was also tracked by collecting interaction data from the learning platform, such as login statistics, completion rate for each core module, and the amount of time required to complete a module. It was found that students used the system at least 14 times within six weeks of the training program, while all core modules were completed at a rate above 95%.

Learner feedback was gathered using the 5-point Likert Scale Questionnaire. An astounding 92% of participants indicated very high levels of satisfaction and effectiveness with the training because of their improved skills on virtual communication, patient interaction, and readiness to perform telehealth consultations. The quantitative distribution of student responses from the feedback survey is presented below:

Table 1: Learner Feedback Survey Using 5-Point Likert Scale

Survey Item	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
The training improved my communication clarity in telehealth settings	0	1	4	18	37
The training enhanced my empathy & rapport skills	0	0	5	22	33
The training increased my ability to engage patients effectively	0	0	3	20	37
The simulation scenarios were realistic and helpful	0	2	6	24	28
Overall, I am confident in applying telehealth skills after the training	0	1	4	18	37

The results of the survey done by the students based on the 5-point Likert Scale are presented in table 1 above. This survey was done to determine if the students had experienced any improvement in their communication skills, empathy levels, engagement, realism in the simulations, and confidence in using telemedicine. From the results, it can be seen that the students highly agreed on these aspects.

Table 2: Pre- and Post-Training Competency Scores

Competency Dimension	Pre-Test Mean (SD)	Post-Test Mean (SD)	t-value	p-value
Communication Clarity	43.1 (7.5)	66.2 (6.1)	12.05	<0.001
Empathy & Rapport	41.7 (8.0)	64.5 (6.8)	11.62	<0.001
Patient Engagement	42.8 (7.9)	65.2 (6.3)	12.21	<0.001

It is very clear from the results in table 2 that all the three mentioned competencies such as clarity of communication, empathy, rapport, and the skill to connect with the patient improved considerably following the online training on bedside manner. The average score before the intervention varied between 41.7 and 43.1, whereas after the training it reached 64.5-66.2, which was statistically significant (t=11.62-12.21, p<0.001).



Fig. 2: Pre- and Post-Training Competency Scores

Fig. 2 is indicative of the extent of improvement made by students in improving their digital bedside manner skills in terms of a particular graph. Improvement made in their performance before and after undergoing the training program in relation to their three main dimensions such as clarity of communication, empathy, and patient engagement is depicted here.

In summary, it can be said that the above discussions reveal the extent to which technology-based training sessions contributed towards the development of telehealth skills in students.

Discussion

These findings indicate that the inclusion of digital bedside manner training in standardized form results in significant enhancements in the skills of medical undergraduates practicing telemedicine. Communication, empathy, and engagement skills indicate how the use of technological means of education can be helpful in overcoming the limitations associated with current medical education practices, forming adequate skills for interaction with patients in virtual space. The efficiency of technological learning methods is proved by the accomplishments of the learners documented in the course of the research. The research aligns with practical and interdisciplinary approaches to scientific investigation and emphasizes the significance of combining medical education, instruction design, and technology. The implementation of technology in skills development makes it possible to provide a workable solution for telehealth preparedness that is both beneficial and effective in the educational and healthcare sectors. The radar chart illustrates the effectiveness of the process through which improvement can be made by applying data analysis in improving the curriculum at schools. The strengths of computerized standardization training include flexibility, instantaneous feedback, and different scenarios, making experience-based learning effective. Digital education can be further improved by personalizing the content and integrating intercultural and interdisciplinary interactions into the content.

Conclusion

The integration of digital standards in teaching bedside manner skills in the undergraduate education program affected the students' telehealth abilities positively. Students improved their skills in all the three areas examined. Concerning the aspect of communication, there was an increase in marks from 43.1 ± 7.5 to 66.2 ± 6.1 after the students were trained ($t = 12.05$, $p < 0.001$). There was also an improvement in empathy & rapport from 41.7 ± 8.0 to 64.5 ± 6.8 ($t = 11.62$, $p < 0.001$). Finally, patient engagement improved from 42.8 ± 7.9 to 65.2 ± 6.3 ($t = 12.21$, $p < 0.001$). The significance shown in the above statistical results shows how effective the framework is for acquiring skills in telehealth. The high percentage of engagement seen in terms of the logins into the system and a completion rate of more than 95% in addition to the learner ratings showing a high effectiveness of training (92%) show the importance of user experience design in facilitating skills acquisition. The use of simulations, AI assessment technology, and interactive modules in the proposed framework helps fill the gaps within the traditional methods of curriculum design to facilitate skills acquisition that are vital in engaging patients using telecommunication tools in healthcare.

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