

Integrating Microsoft Teams in Medical Program for Virtual Pharmacology Simulations and Prescription Roleplay

I Gede Gita Sastrawan¹, Muhammad Zulfiqah Sadikan^{2,3*},
Suprava Das^{2,3}, Rusdiah Ruzanna Jusoh⁴, Haryati Ahmad Hairi⁴,
Siti Fairuz Nurr Sadikan⁵

Article accepted: 24-12-2024

Corresponding Author:
Muhammad Zulfiqah Sadikan

Email: mzsadikan@yahoo.com

¹Faculty of Medicine, Udayana University, 80361 Bali, Indonesia

²Department of Pharmacology, Faculty of Medicine, Manipal University College Malaysia, Bukit Baru, 75150 Melaka, Malaysia

³Centre of Transformative Learning, Manipal University College Malaysia, Bukit Baru, 75150 Melaka, Malaysia

⁴Department of Biochemistry, Faculty of Medicine, Manipal University College Malaysia, Bukit Baru, 75150 Melaka, Malaysia

⁵Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA, 77300 Merlimau, Melaka, Malaysia

ABSTRACT

Medical education is being transformed by digital technology, using platforms such as Microsoft Teams to develop alternative ways of performing clinical simulations and pharmacology roleplay. A literature review was conducted, using Google Scholar and PubMed, targeting articles from 2010 to 2024. The Microsoft Teams platform enables collaboration, such as problem-based learning and critical thinking, while practising real-world scenarios. Role-playing exercises enhance the pharmacological knowledge and communication abilities needed for interprofessional cooperation and patient encounters. The learning experience in this platform can also be enhanced with external applications. Despite the absence of hands-on, tactile practice, Microsoft Teams offers an adaptable platform for clinical skills development by fostering structured feedback and reflective learning. Microsoft Teams is an effective modern learning tool as virtual education is becoming one of the major parts of medical training. This tool will help prepare healthcare professionals towards effective patient care and pharmaceutical management.

Keywords:

Microsoft Teams, Pharmacology Education, Virtual Simulation, Prescription Roleplay, Digital Learning

INTRODUCTION

Medical education is undergoing an ongoing digital transformation that has transformed traditional learning and has adopted a hybrid model (Sandars et al. 2020). With more digital tools available, medical schools are increasingly incorporating virtual platforms for didactic and experiential learning (Gaur et al. 2020). This is due to the collaborative, user-friendly, simulation of clinical settings remotely,

Microsoft Teams (<https://teams.microsoft.com/>, Redmond, Washington, US) has become a popular tool (Henderson et al. 2020).

Pharmacology education is a component of medical education where students must learn to compare medications, write prescriptions, and interact with patients (Wittich et al. 2014). However, the COVID-19 pandemic accelerated the adoption of virtual learning, forcing educators to experiment with digital alternatives to hands-on clinical training (Fogg et al. 2020, Anthony Jnr and Noel 2021). In Microsoft Teams, students can practice pharmacology in roleplay exercises that take place in a structured environment. So, it is important to elaborate on how Microsoft Teams supports the conduct of virtual clinical roleplay, with a particular focus on the use of the platform with students for pharmacology education.

LITERATURE SEARCH STRATEGY

To ensure a thorough analysis of the topic, a structured literature search was conducted using the Google Scholar search engine and PubMed database. Search terms included "Microsoft Teams," "pharmacology education," "virtual simulation", "medical roleplay", and "digital learning tools". Articles published between 2010 and 2024 were targeted because they are most relevant to modern medical education practices. Articles and studies written in a language other than English were excluded with filters.

VIRTUAL SIMULATION AND PRESCRIPTION ROLEPLAY

Clinical simulations fill the gap between theoretical knowledge and practical skills (Nestel et al. 2011). Students have right platforms to practice clinical decision-making, diagnostic reasoning, and patient management. However, traditional clinical simulations often rely on physical resources such as standardized patients or high-fidelity mannequins. Nevertheless, virtual platforms, for example, Microsoft Teams, extend these opportunities to allow students to participate in simulations remotely (Henderson et al. 2020).

Problem-based learning (PBL) can be done with Microsoft Teams, which enables students to work together in real-time through video conferencing, screen sharing, and breaking out into smaller groups (Johari and Jamil 2022). While many of these features mimic real clinical settings, which promote teamwork and critical thinking, they also encourage learners to engage in discussion by creating a space where questions can be directly asked of the teaching team members. However, virtual simulations are especially useful for pharmacology education as students must evaluate complicated cases involving multiple drugs and their possible interactions (Dubovi et al. 2017). Cases can be designed by instructors for rare medical conditions or complex medical regimens, allowing students to manage situations in clinical rotations (Sandars et al. 2020).

Patient safety and optimal therapeutic outcomes depend on effective prescribing. Pharmacology role-play exercises also help students learn to safely select a drug, calculate a dose, and give counselling on medication intake (Wittich et al. 2014). In this type of role-play session on Microsoft Teams, students have different roles described as prescribing physicians, pharmacists and patients. Through this setup, students would have different views within the system and employ interprofessional collaboration (Jeffries et al. 2022). As an example, a pharmacist can indicate potential drug interactions, the physician addresses the patient's concerns and changes the prescription accordingly.

Additionally, through role-playing activities, students can prepare critical communication skills like discussing possible side effects and describing drug schedules to patients (Denvir and Briceland 2023).

Microsoft Teams offers features that students are familiar with like chat and file-sharing features which allow students to document their decisions and share resources in real-time.

Figure 1 illustrates how Microsoft Teams can support pharmacology simulations and roleplay. It highlights features such as collaboration, real-time feedback, and interprofessional learning.

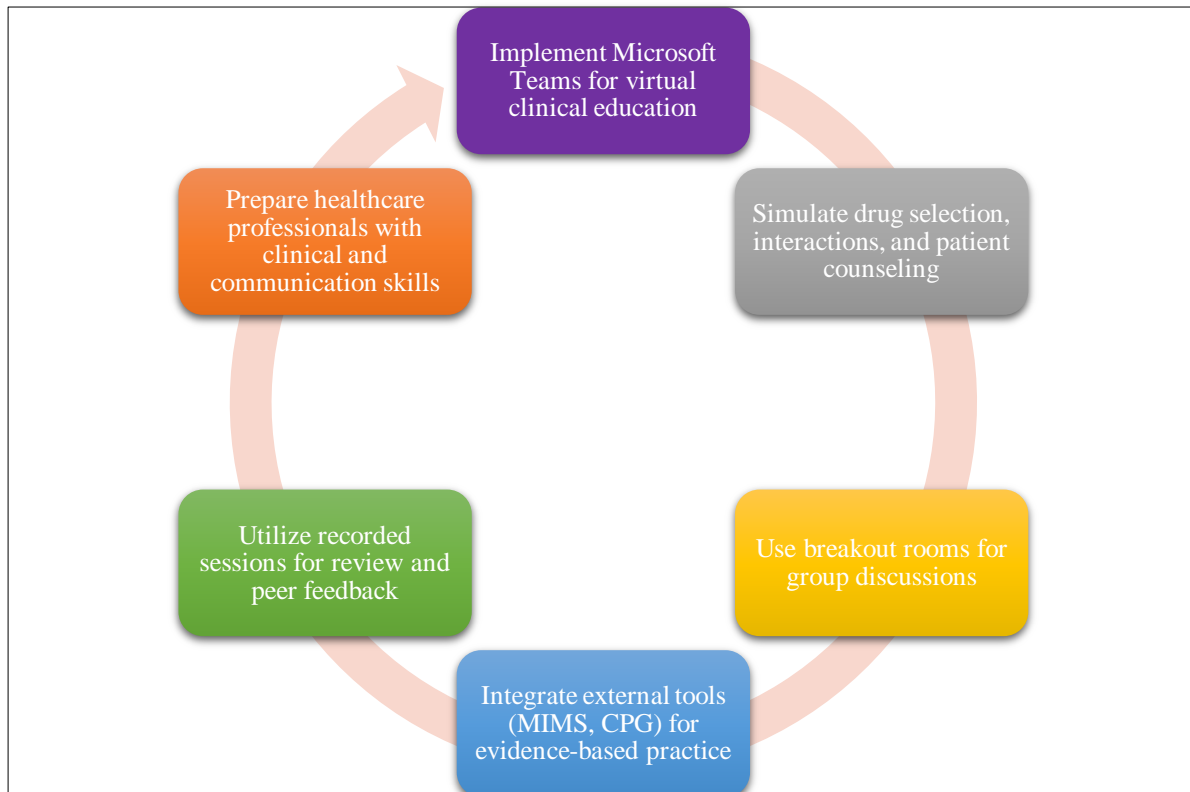


Figure 1: Microsoft Teams for virtual pharmacology simulations and roleplay.

ADVANTAGES OVER CONVENTIONAL SIMULATIONS

Patient care in quality healthcare requires collaboration from multiple healthcare providers. Interprofessional education is highly beneficial for medical students as it fosters teamwork, communication, and collaborative skills essential for delivering effective patient-centred care (Sadikan and Ariffin 2024). Clinical simulations are an opportunity for interprofessional learning, and Microsoft Teams make it possible for students of various disciplines to take part (Sandars et al. 2020). In this software, breakout rooms allow group discussions that students can use to debate treatment options, develop care plans and much more (Nestel et al., 2014).

In Malaysia context, students also can work with external tools like Clinical Practice Guidelines (CPG) (<https://www.moh.gov.my/index.php/pages/view/3962>) and the Monthly Index of Medical Specialties (MIMS) (<https://www.mims.com/malaysia>). This helps students learn to practise evidence-based medicine by checking relevant resources while role-playing. The collaborative exercises of these exercises allow students to feel more confident when prescribing medications and dealing with drug interactions.

Traditional simulations have tactile learning experience but these virtual simulations in Microsoft Teams come with several advantages. Students are more accessible since they can participate from any

location (Coyne et al. 2018). This flexibility is of particular benefit given disruptions, such as the COVID-19 pandemic where physical attendance may not be possible. Additionally, virtual simulations can assimilate more students than can be accommodated by the physical resources. One tool in Microsoft Teams that enables students to review their performance and consider their learning is the ability to record (Al-Shboul 2024). These recordings can also be used by instructors to provide detailed feedback based on continuous improvement (Brunner et al. 2020).

Microsoft Teams also offers opportunities for formative assessment. Instructors can evaluate student decision-making and provide targeted feedback through recorded sessions, making it a valuable tool for continuous student assessment in pharmacology education. Microsoft Teams facilitates both asynchronous and real-time feedback during roleplay sessions. Also, chat functions can be used by instructors to give immediate feedback or schedule follow-up discussions about areas for improvement (Nestel et al. 2011). This collaborative learning environment fosters a collaborative learning environment between students. It urges reflective learning and enables the students to locate their skills and what they could work on (Lerchenfeldt et al. 2023).

Table 1 summarizes key insights on Microsoft Teams for virtual simulations, including digital adoption, collaborative learning, and reflective practices.

Table 1: Key insights on Microsoft Teams for virtual simulations in medical education

Concepts	Highlights	References
1. Digital adoption in medical education	<ul style="list-style-type: none"> Microsoft Teams allows remote and collaborative learning post-COVID-19, transforming clinical and pharmacological education. 	(Henderson et al. 2020, Alsayed et al. 2022)
2. Pharmacology roleplay for clinical decision-making	<ul style="list-style-type: none"> Role-specific exercises develop pharmacological decision-making, including drug selection, interaction management, and patient counselling. 	(Nakamura et al. 2021, Gotardelo et al. 2017)
3. Collaborative learning via Microsoft Teams	<ul style="list-style-type: none"> The use of breakout rooms and real-time collaboration fosters interprofessional teamwork and evidence-based practice. 	(Engle et al. 2023, Jaiprakash 2022)
4. Reflective learning	<ul style="list-style-type: none"> Teams' recordings allow students to review sessions, receive feedback, and engage in peer collaboration for continuous improvement. 	(Du Plessis et al. 2021)

LIMITATIONS AND FUTURE CONSIDERATIONS

Despite its advantages, Microsoft Teams virtual learning has some limitations. Technical concerns like software bugs and poor internet access might interfere with learning. Furthermore, there are no tactile learning chances for students to gain hands-on clinical skills (Brunner et al. 2020). On top of that, instructors who are also using virtual simulations need to prepare a lot, designing scenarios, setting up channels, and coordinating schedules. When using virtual environments, teachers must also ensure that students are paying attention throughout the class because this might occasionally result in lower engagement (Besche et al. 2022). To overcome these challenges, virtual simulations should be added rather than supplanted by traditional training methods. It may be possible to improve clinical abilities in a well-rounded fashion by using blended learning models that include online and in-person activities (Green 2023).

During the reflective learning process, it is crucial to take into account reactions from the student side. Assimilating structured feedback could have offered significant insights. This communication may be incorporated into future research to bring out the field's areas that require enhancement and provide a greater educational experience.

ACKNOWLEDGEMENTS

None.

CONCLUSION

Virtual clinical simulations and pharmacology roleplay can be powered through Microsoft Teams, which gives students the chance to hone important clinical and communication skills. Integrating external tools, being flexible, and having collaborative features is a very valuable addition to medical education. Technical aspects and the requirement for practical expertise should be taken into consideration while designing virtual learning environments. While healthcare education is changing, Microsoft Teams will play a critical role in preparing upcoming healthcare professionals for practice.

REFERENCES

- Al-Shboul, M., 2024. The Effect of Using Microsoft Teams on the Achievement and Self-Learning Skills among Undergraduate Students in the School of Educational Sciences at the University of Jordan. *International Journal of Interactive Mobile Technologies*, 18(6).
- Alsayed, A. R., Hasoun, L., Al-Dulaimi, A., AbuAwad, A., Basheti, I., Khader, H. A. and Al Maqbali, M. (2022) 'Evaluation of the effectiveness of educational medical informatics tutorial on improving pharmacy students' knowledge and skills about the clinical problem-solving process', *Pharmacy Practice*, 20(2), 1-15.
- Anthony Jnr, B. and Noel, S. (2021) 'Examining the adoption of emergency remote teaching and virtual learning during and after COVID-19 pandemic', *International Journal of Educational Management*, 35(6), 1136-1150.
- Besche, H. C., Onorato, S., Pelletier, S., Ashrafzadeh, S., Joshi, A., Nelsen, B., Yoon, J., Zhou, J., Schwartz, A. and Cockrill, B. A. (2022) 'A hierarchy of needs for remote undergraduate medical education: lessons from the medical student experience', *BMC Medical Education*, 22(1), 423.
- Brunner, M., Vogelman, B. and Smith, J. (2020) 'Rapid development of an outpatient-to-inpatient crash curriculum for COVID-19 providers', *Medical Education*, 54(10), 953-954.
- Coyne, L., Takemoto, J. K., Parmentier, B. L., Merritt, T. and Sharpton, R. A. (2018) 'Exploring virtual reality as a platform for distance team-based learning', *Currents in Pharmacy Teaching and Learning*, 10(10), 1384-1390.
- Denvir, P. and Briceland, L. L. (2023) 'Exploring the impact of an innovative peer role-play simulation to cultivate student pharmacists' motivational interviewing skills', *Pharmacy*, 11(4), 122.
- Du Plessis, S. S., Otaki, F., Zaher, S., Zary, N., Inuwa, I. and Lakhtakia, R. (2021) 'Taking a leap of faith: a study of abruptly transitioning an undergraduate medical education program to distance-learning owing to the COVID-19 pandemic', *JMIR Medical Education*, 7(3), e27010.
- Dubovi, I., Levy, S.T. and Dagan, E., 2017. Now I know how! The learning process of medication administration among nursing students with non-immersive desktop virtual reality simulation. *Computers & Education*, 113, pp.16-27.
- Ellaway, R. and Masters, K. (2008) 'AMEE Guide 32: e-Learning in medical education Part 1: Learning, teaching and assessment', *Medical teacher*, 30(5), 455-473.

- Engle, A., Cleary, J. and Cabral, C. L. (2023) 'Interprofessional opioid and addiction teaching day for third year medical and pharmacy students', *Journal of Interprofessional Education & Practice*, 30, 100585.
- Fogg, N., Wilson, C., Trinka, M., Campbell, R., Thomson, A., Merritt, L., Tietze, M. and Prior, M. (2020) 'Transitioning from direct care to virtual clinical experiences during the COVID-19 pandemic', *Journal of Professional Nursing*, 36(6), 685-691.
- Gaur, U., Majumder, M. A. A., Sa, B., Sarkar, S., Williams, A. and Singh, K. (2020) 'Challenges and opportunities of preclinical medical education: COVID-19 crisis and beyond', *SN comprehensive clinical medicine*, 2(11), 1992-1997.
- Gotardelo, D. R., Bollela, V. R., Souza, A. P. G., Barros, D. d. P., Balbino, J. M. V. and Ballester, D. (2017) 'Role-play preceded by fieldwork in the teaching of pharmacology: From “raw sap” to “elaborated sap”', *Revista Brasileira de Educação Médica*, 41(3), 372-378.
- Green, K., 2023. Nurses' Experiences in a Blended Learning Course for Nurse Preceptor Development (Doctoral dissertation, The University of North Carolina at Charlotte).
- Henderson, D., Woodcock, H., Mehta, J., Khan, N., Shivji, V., Richardson, C., Aya, H., Ziser, S., Pollara, G. and Burns, A. (2020) 'Keep calm and carry on learning: using Microsoft teams to deliver a medical education programme during the COVID-19 pandemic', *Future healthcare journal*, 7(3), e67-e70.
- Jaiprakash, H. (2022) 'Flipped Classroom for Pharmacology Teaching in a Malaysian Medical School using Online Tools during the COVID-19 Pandemic: Knowledge Gained and Student Perception', *International Journal of Online & Biomedical Engineering*, 18(8).
- Jeffries, P. R., Bushardt, R. L., DuBose-Morris, R., Hood, C., Kardong-Edgren, S., Pintz, C., Posey, L. and Sikka, N. (2022) 'The role of technology in health professions education during the COVID-19 pandemic', *Academic Medicine*, 97(3S), S104-S109.
- Johari, M. K. and Jamil, N. Z. (2022) Problem-Based Learning (PBL) during Online Teaching, translated by MDPI, 92.
- Lerchenfeldt, S., Kamel-ElSayed, S., Patino, G., Loftus, S. and Thomas, D. M. (2023) 'A qualitative analysis on the effectiveness of peer feedback in team-based learning', *Medical Science Educator*, 33(4), 893-902.
- Nakamura, T., Yoshikawa, T., Yanagita, T., Okamura, N. and Yanai, K. (2021) 'The development of online role-play for pharmacological education', *Folia Pharmacologica Japonica*, 156(6).
- Nestel, D., Groom, J., Eikeland-Husebø, S. and O'Donnell, J. M. (2011) 'Simulation for learning and teaching procedural skills: the state of the science', *Simulation in healthcare*, 6(7), S10-S13.
- Sadikan, M. Z. and Ariffin, I. A. (2024) 'Breaking Barriers, Building Bridges: A Review of Interprofessional Collaboration in Medical Education', *International Journal of Transformative Health Professions Education*, 2(1), 21-36.
- Sandars, J., Correia, R., Dankbaar, M., de Jong, P., Goh, P. S., Hege, I., Masters, K., Oh, S.-Y., Patel, R. and Premkumar, K. (2020) 'Twelve tips for rapidly migrating to online learning during the COVID-19 pandemic', *MedEdPublish*, 9.
- Wittich, C. M., Burkle, C. M. and Lanier, W. L. (2014) Medication errors: an overview for clinicians, translated by Elsevier, 1116-1125.