

Online and Offline Learning Process: Students Satisfaction and OSCE Grades in Pharmacy Education

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Abstract

Introduction: Indonesian pharmacists are required to pass a competence exam, consisting of computer-based tests and objective structured clinical examinations (OSCEs) prior to certification. Universitas Islam Indonesia's pharmacist program has integrated a practicum and OSCEs into the pharmacy science and industry subject. This study evaluated student perceptions and OSCE grades across online, hybrid, and offline learning methods, reflecting a shift from predominantly online learning during the COVID-19 pandemic to a new normal.

Methods: A total of 212 students completed the online survey in different batches, consisting of online (75 students), hybrid (68 students), and offline (69 students) methods. Questionnaire forms were analyzed in satisfaction percentage. OSCE was analyzed based on the mean score. Statistical data were analyzed using SPSS 16.

Results: The percentage of student satisfaction increased after offline learning intervention. Generally, all parameters of student's expectations showed an increase in "strongly agree" scores of each following method: practical timeliness (62.32%), material suitability with the blueprint (69.57%), clear practicum instruction (50.72%), practicum sufficient time (37.68%), equipment and materials availability (63.77%), literature availability (68.12%), and practicum method accuracy (72.46%). OSCE grades resulted in 61.20, 72.0, and 65.04 in online, hybrid, and offline learning.

Conclusion: The offline practicum and OSCE were ideal learning for pharmacist students. However, the findings did reveal a correlation between the learning method and OSCE grades, suggesting variation capability in individuals and batches. Further research should explore the underlying factors contributing to variations in OSCE performance.

Keywords: Education, OSCE, Offline learning, Online learning, Pharmacy science and industry

Introduction

In Indonesia, pharmacy education comprises two tiers: a four-year undergraduate program centered on knowledge-based learning and a subsequent one-year professional program focused on skills development and experiential learning, leading to pharmacist qualification (Mohamed *et al.*, 2021).

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The Indonesian pharmacy curricula have evolved substantially in response to the implementation of rigorous national examinations. The integration of standardized patients holds the potential to influence the pharmacy profession, especially considering the current national emphasis on reform within pharmaceutical education (Monaghan *et al.*, 1995). Students must now attain scores above the National Minimum Standard (NMS) in Computer-Based Tests (CBT) for theoretical knowledge and Objective Structured Clinical Examinations (OSCEs) for practical skills to qualify as pharmacists. Universitas Islam



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Indonesia (UII) has aligned its curricula with these new standards, integrating CBT and OSCE formats into the evaluation of each course.

OSCE is used for competence evaluation in health professions education worldwide (Awaisu *et al.*, 2010). Initially developed in 1975 to evaluate medical student clinical competence, OSCE has since been adopted across a spectrum of health professions (Harden *et al.*, 1975). Pharmacy education institutions have adopted OSCE for formative and summative evaluations at individual course and program levels, with a more recent application being the assessment of students' preparedness for advanced pharmacy practice experiences (Martin *et al.*, 2020). Notably, the Science and Industry subject, a core course in the pharmacist program, utilizes OSCE to assess students' practical competencies in scientific and industrial applications. The OSCE-based approach could bridge gaps between knowledge and practice in pharmacy education, especially in communication skills (Farahani *et al.*, 2021). The Practicum and OSCE are integral components of the pharmacy science and industry curricula, designed to bridge the gap between theoretical knowledge and real-world industry application for pharmacist students.

The COVID-19 pandemic necessitated a rapid paradigm shift in pedagogical approaches for course administrators, compelling the transition of skill-based training from traditional in-person modalities to virtual platforms such as Zoom (Crawford *et al.*, 2020). The use of e-learning increased during the pandemic, and use of internet based teaching modalities, including the implementation of online OSCE was perceived as feasible by pharmacy students (Pires, 2022). To facilitate remote learning, subject team managers implemented a strategy involving asynchronous video instruction, supplemented by embedded quizzes designed to mitigate student acceleration and ensure active engagement with the material. Students then completed OSCE simulation, employing case-based scenarios presented as questions to evaluate their practical competency in the acquired skills. An Indonesian research showed that

professional pharmacy students demonstrate a greater preparedness for in-person learning modalities compared to their undergraduate counterparts, especially in practical field settings (Suprpti *et al.*, 2024). This study aims to evaluate training approaches by comparing OSCE scores among students receiving exclusively online, exclusively offline, or hybrid training, and to assess student satisfaction across these distinct learning modalities.

Methods

A total of 212 students from 3 batches of the pharmacist profession study UII program of the year 2021-2022 were included in online, hybrid and offline groups. Students during COVID pandemic were classified as an online group and got the online course both in the skills lab and OSCE practicum. The hybrid group (68 students) experienced the skills lab online and OSCE practicum as an offline method. The offline group (69 students) received offline learning in both the skills lab and OSCE practicum components. They were given questionnaires using Google Forms after the skills lab practicum and the OSCE exam model as part of the Pharmacy Science and Industry Subject. The satisfaction type questionnaires included close-ended questions with five ratings: very dissatisfied, dissatisfied, neutral, satisfied, and very satisfied. Meanwhile, several statement parameters in the learning process were measured by the response options strongly disagree, disagree, agree, and strongly agree. The questionnaire was divided into 7 sections i.e timeliness of practical activities, the suitability of the practicum material with the Indonesian pharmacist competency exam blueprint, the clear practicum instruction, sufficient time for practicum, equipment and materials availability, literature availability, and the practicum method accuracy. Questionnaire forms were analyzed in satisfaction index percentage. In addition, the OSCE score was analyzed based on the maximum, minimum, and average of each learning method. Statistic data were analyzed using the Mann-Whitney U test (p -value <0.05) and Pearson Correlation (p -value <0.05) with SPSS 16 software.

Results

Learning process in Pharmacy Science and Industry subject

The questionnaire results showed that the students expressed satisfaction with the offline

practicum processes, especially after the pandemic (Table 1, Figure 1). Among the students' satisfaction in online, hybrid, and offline learning with values of 72%, 81.18%, and 91.31%, respectively.

Table 1: Satisfaction responses (n=212)

	Online n=75 (%)	Hybrid n=68 (%)	Offline n=69 (%)
Very Dissatisfied	0 (0.00)	0 (0.00)	0 (0.00)
Dissatisfied	1 (1.33)	1 (1.47)	0 (0.00)
Neutral	20 (26.67)	5 (7.35)	6 (8.70)
Satisfied	49 (65.33)	45 (66.18)	47 (68.12)
Very Satisfied	5 (6.67)	17 (25.00)	16 (23.19)

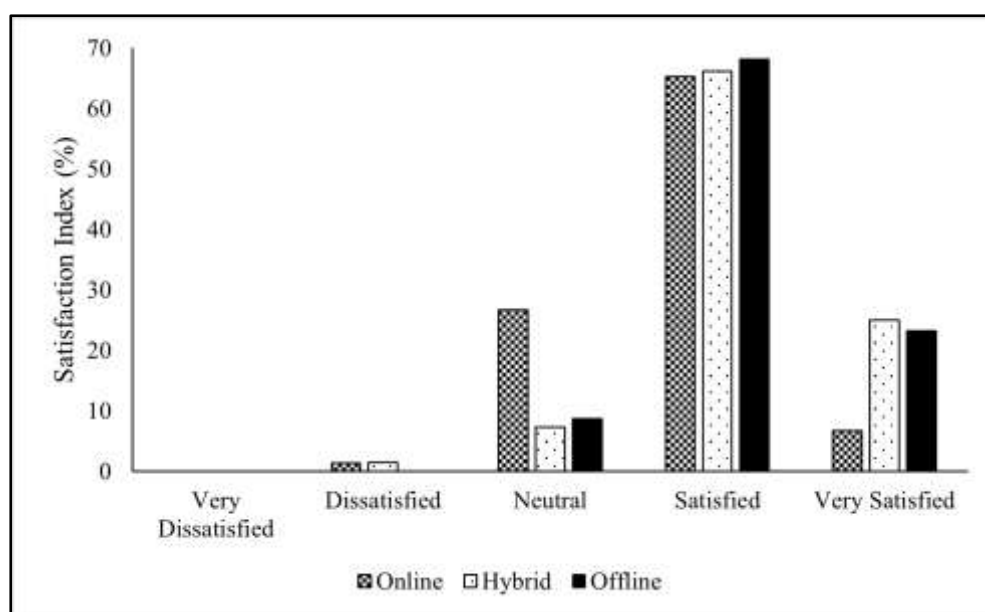


Figure 1: Satisfaction index of pharmacy science and industry subject

A total of 212 students completed the online survey in different batches, consisting of exclusively online, exclusively offline and a combination of the two methods. The efficacy of pedagogical approaches within the Science and Industry Subject was evaluated through student questionnaires on learning satisfaction. These surveys aimed to quantify student perceptions of the learning process, thereby enabling course managers to refine the instructional model based on empirical

feedback. Recognizing the heterogeneity of learning modalities, practical skill training was integrated to reinforce and reactivate competencies acquired during undergraduate studies. The questionnaire result showed in Table 2 indicating that the parameters showed the increasing of the strongly agreed score of each method. Overall, students prefer to be satisfied and accepted by the offline OSCE as an assessment tool.

Table 2: Online survey results (n=212)

Item	Online n=75 (%)	Hybrid n=68 (%)	Offline n=69 (%)
Timeliness of practical activities			
Strongly Disagree	0 (0.00)	0 (0.00)	0 (0.00)
Disagree	1 (1.33)	3 (4.41)	2 (2.90)
Agree	44 (58.67)	25 (35.76)	24 (34.78)
Strongly Agree	30 (40.00)	40 (58.82)	43 (62.32)
The suitability of the practicum material with the Indonesian pharmacist competency exam blueprint			
Strongly Disagree	0 (0.00)	0 (0.00)	0 (0.00)
Disagree	1 (1.33)	2 (2.94)	0 (0.00)
Agree	38 (50.67)	27 (39.71)	21 (30.43)
Strongly Agree	36 (48.00)	39 (57.35)	48 (69.57)
The explicit instruction of the practicum			
Strongly Disagree	2 (2.67)	1 (1.47)	0 (0.00)
Disagree	6 (8.00)	6 (8.82)	2 (2.90)
Agree	45 (60.00)	29 (42.65)	32 (46.38)
Strongly Agree	22 (29.33)	32 (47.06)	35 (50.72)
Sufficient time for each practicum			
Strongly Disagree	3 (4.00)	0 (0.00)	1 (1.45)
Disagree	12 (16.00)	5 (7.35)	6 (8.70)
Agree	44 (58.67)	33 (48.53)	36 (52.17)
Strongly Agree	16 (21.33)	30 (44.12)	26 (37.68)
Availability of equipment and materials			
Strongly Disagree	0 (0.00)	1 (1.47)	0 (0.00)
Disagree	8 (10.67)	1 (1.47)	1 (1.45)
Agree	45 (60.00)	31 (45.59)	24 (34.78)
Strongly Agree	22 (29.33)	35 (51.47)	44 (63.77)
Availability of literature			
Strongly Disagree	0 (0.00)	1 (1.47)	0 (0.00)
Disagree	3 (4.00)	3 (4.41)	2 (2.90)
Agree	41 (54.67)	24 (35.29)	20 (28.99)
Strongly Agree	31 (41.33)	41 (60.29)	47 (68.12)
The accuracy of the practicum method			
Strongly Disagree	0 (0.00)	1 (1.47)	0 (0.00)
Disagree	5 (6.67)	2 (2.94)	1 (1.45)
Agree	44 (58.67)	26 (38.24)	18 (26.09)
Strongly Agree	26 (34.67)	39 (57.35)	50 (72.46)

The correlation between learning methods and OSCE grades

OSCE scenarios including instructions for students, instructions for the examiner, instructions for the technician, list of tools and materials, rubric, worksheet, and reference attachment (optional) were developed. A scoring rubric served as a guide for examiners to evaluate student competency areas. The

resulting scores for each competency were recorded in a provided Excel-based scoring form. Here, the study used a similar scenario in the OSCE of Pharmacy Science and Industry subjects. Table 3 and Figure 2 describe the OSCE grades based on different learning models. The hybrid method produced the highest OSCE scores than online and offline methods. Data was analyzed using the Mann-Whitney U test (* $p < 0.05$).

Table 3: OSCE grades of different learning model (n=212)

OSCE Grades	Online (n=75)	Hybrid (n=68)	Offline (n=69)
Max	87	94.33	81.33
Min	41	57.00	46.2
Mean	61.20 $\pm$ 10.05 ^a	72.03 $\pm$ 8.63 ^b	65.04 $\pm$ 8.32 ^c

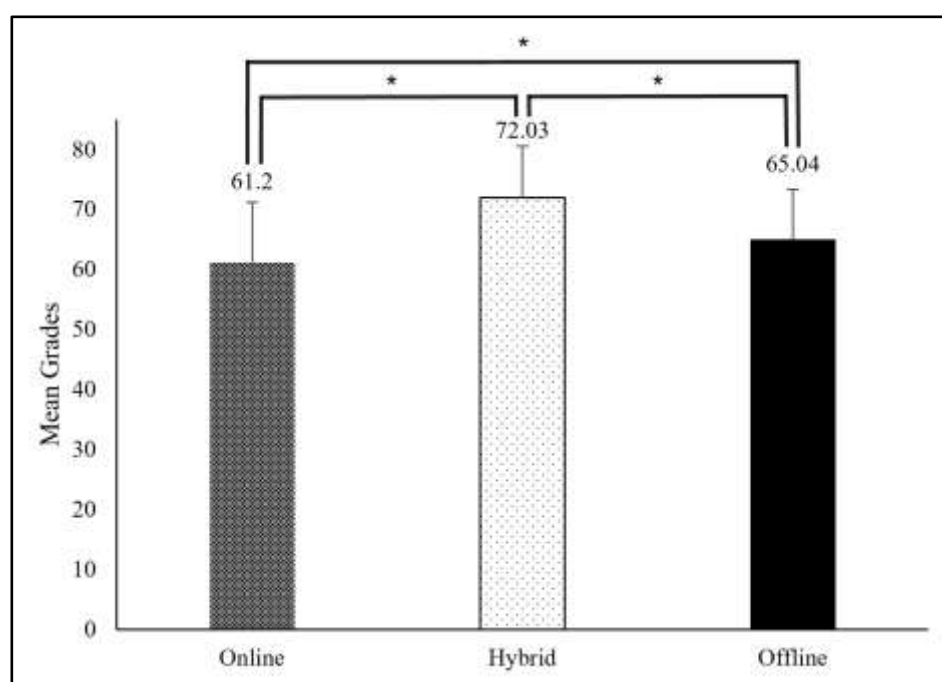


Figure 2: OSCE mean grades in different learning method

Discussion

The subject of Pharmacy Science and Industry is a critical component of pharmacy education, providing students with hands-on experience in various aspects of the pharmaceutical field. Understanding students' satisfaction and expectations regarding this subject is essential

for improving the quality of pharmacy education and ensuring that graduates are well-prepared for their future careers. The satisfaction index indicated that student's expectations for the practicum in the pharmacy science and industry subject were met.

When the first fully offline practicum was held, there were no reports of student dissatisfaction. Students in the online learning group reported a higher degree of flexibility and convenience, citing the ability to access course materials and participate in activities at their own pace. However, they also expressed concerns about a lack of social interaction and isolation. Conversely, students in the offline learning group valued the in-person connection with instructors and peers, facilitating deeper engagement and understanding.

In the pharmacist profession program in UII, students prefer to be satisfied and accepted by the offline OSCE as an assessment tool (Table 2). Similar studies among pharmacy students agreed that the OSCE scenario to real-world practice, the significant learning achieved, and expressed concerns regarding the insufficient time (10 minutes) for each station (Kristina *et al.*, 2018). Therefore, the offline practicum and OSCE were the ideal learning process for pharmacist students.

The first virtual OSCE for second-year pharmacy students was conducted at Monash University during the COVID-19 pandemic showed positive aspects, including a decrease in the anxiety level, time flexibility, and accessibility. However, face-to-face OSCE was still irreplaceable (Mak *et al.*, 2022). The final-year pharmacy students at Monash University in Australia and Malaysia use Monash OSCE Virtual Experience (MOVE) as an online case scenario module for OSCE preparation but the online OSCE is still preferred (Lim *et al.*, 2020). Chinese teaching hospitals implemented offline and online education during the COVID-19 pandemic, and the results indicated that understanding of theory and evaluating the online method was decreased (Wang *et al.*, 2023). In the offline section batch, students access the video as a virtual learning experience before the practicum. The video was a helpful and flexible study tool for their practicum and OSCE preparation.

The study found correlation between learning method and OSCE grades, suggesting

variation capability in individuals and batches. It may be due to non-cognitive factors such as exam familiarity, performance anxiety, and confidence. In a similar study, the pharmacy perception in Malaysia and Australia Monash University showed no correlation between online practice and students' OSCE grades (Lim *et al.*, 2020). The comparison of virtual pharmacy practice and OSCE applied in pharmacy students of the University of Tabuk, Saudi Arabia, showed a significant increase in the average test score of the virtual exam compared to physical OSCE. However, the result also revealed a significant difference in performance in both exam models. Additionally, the virtual exam cannot replace the physical OSCE but can have potential to improve the quality of simulation (Amirthalingam *et al.*, 2022). Although the limitations of OSCE are high cost, resource utilization, and human resources as examiner, technician, and faculty members workloads, most students have learned a lot from the OSCE exam model, which is still used as a final exam in Indonesia.

Conclusion

The experiences of pharmacist students with practicum and OSCE assessments have positive and negative aspects and potential areas for improvement. However, the offline practicum and OSCE as an exam model were the ideal learning process for pharmacist students. In our expectation, OSCE results serve as a valuable tool for curriculum evaluation and national system exams, possibly leading to its improvement.

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