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Evaluation of the Transfer of Training of Medical Educators after Attending a Competency Based Education Faculty Development Program

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Abstract

Background

Continuous training of academic faculty is important to both individual and organizational performance. Faculty development programs (FDPs) are applied to prepare highly skilled faculty. Positive transfer of training to the workplace is the main factor judging the effectiveness of the training.

The aim was to evaluate the transfer of training achieved by Tanta medical faculty after attending the FDPs in competency-based education in order to assess their impact and explore areas for improvement in the upcoming programs.

Methods

This cross-sectional descriptive study was performed at the Faculty of Medicine, Tanta University. Data were collected quantitatively and qualitatively. Quantitative data were gathered via responses to a researcher-made questionnaire from 177 of the trained faculty. It evaluated self-development, improvement in teaching capabilities and upgrading in teaching and assessment methods. Qualitative data were gathered from eight focus group discussions with students and nine interviews with the courses' coordinators to evaluate the actual effect of the training in the real educational process. Transfer of training was evaluated according to Kirkpatrick's Four Levels of Training Evaluation Model. Descriptive statistics and thematic analysis were used to analyze the collected data.

Results

Out of 177 participants, 87% reported an increase in their self-confidence as medical teachers, 87% adopted new teaching methods and 88.4% reported new assessment methods. Students noted effective class management but a weak student-teacher bond, while coordinator interviews clarified that FDPs improved the overall teaching quality.

Conclusion

A positive transfer of training after these FDPs was obvious and a satisfactory impact on the performance of faculty as well as the overall performance of the faculty were detected. Continuing training of the faculty is recommended as an essential need to guarantee a fruitful learning environment

Keywords

Transfer of Training; Faculty development programs; Competency-based medical education.

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Introduction

Over the last two decades, medical schools have adopted competency-based medical education to align the teaching and the assessment with the society needs [1]. This shift necessitated the emergence of faculty development programs (FDPs) to prepare highly skilled efficient medical faculty [2,3] and to rearrange work roles and positions [4]. These programs aim to enhance teachers' educational quality, improve teaching/learning strategies, strengthen teacher/student relationship and create a positive teaching/learning environment. They consider many topics such as, curriculum development, teaching strategies, assessment tools, reflection, communication skills [5,6,7]. These topics are delivered via coaching, mentoring, workshops and seminars by a variety of competent skilled coaches [3].

The positive transfer of training to the workplace is considered the main factor judging the training's success and impact on improvement of both individual and organizational performance [8, 9]. Training transfer to the workplace is referred to as the continuous and effective generalized application of the newly gained knowledge, skills and attitudes on the educational environment over time [10]. This transfer is influenced by the personal variations of the trainee, the design of the development programs, and the work environment. However, concerns about dissociation between training and workplace practice have been raised [10,11]. Therefore, this study was designed to evaluate the transfer of training achieved by Tanta medical faculty after attending the FDPs in competency-based education organized at Faculty of Medicine –Tanta University in order to assess their impact and explore areas for improvement in the upcoming programs.

Materials and methods

Study design and sampling

This descriptive cross-sectional study was carried out on 177 of faculty members at Faculty of Medicine, Tanta University. It was conducted over the period between the beginning of August to the end of October 2023. A written informed consent was taken from participants. Confidentiality and anonymity of the data were observed by making code number for every participant.

The sample size was calculated using this formula n = N * [Z2 * p * (1-p)/e2] / [N – 1 + (Z2 * p * (1-p)/e2] [1], in which N = Population size (500 faculty members), Z = Critical value of the normal distribution at the required confidence level (90%), p = Sample proportion (50%) and e =Margin of error (5%). The systematic sampling technique was used by allocating numbers to all participants. The first individual was picked using a random number, and then subsequent subjects were selected using a fixed sampling interval, as follows: numbers to participants from 1 to 500, and then the sampling interval was calculated by dividing all the population by the sample size (500/177 = 2.8), so the first individual is picked randomly from 1 to 3, and the subsequent individuals will be selected every third person [12].

A faculty member who completed at least 20 training hours of one of the FDPs about competency-based medical education implemented at the Faculty of Medicine, Tanta University, in the period from 2017 to 2022 was included in the study. However, those who did not finish their FDP, or did not participate in teaching medical students following the program, or did not fully answer the questionnaire in addition to those who attend other FDPs were excluded from the study.

Data collection and analysis

Data were collected by quantitative and qualitative methods as shown in fig.1 Quantitative data were gathered by a questionnaire that was designed by the research team then validity and reliability were guaranteed. The validity of the study questionnaire was ensured by revision of two experts in medical education then pilot testing. The reliability of the study questionnaire was verified by Cronbach's Alpha coefficient, and the results showed the Cronbach Alpha coefficient was (0.961) which is a statistically acceptable level as long as it is greater than (0.7) [13]. The study questionnaire consisted of five sections as follow; (section 1) contained demographic data, (section 2) contained 7 items to assess self-development after attending the FDPs, (section 3) included 7 items to evaluate the improvement in teaching capabilities and (section 4) included 7 items to measure the development in teaching and assessment methods. Finally, (section 5) included 4 open-ended questions about the overall opinion about the FDPs, points of strength, points of weakness, and suggestions for improvement. Responses to all items of sections 2,3 and 4 were detected by five points Likert scale for each statement which ranges from (5) strongly agree, (4) agree, (3) neutral, (2) disagree to (1) strongly disagree. The study questionnaire was created using Google Forms, and the link was sent to the participants through the official email or WhatsApp application.

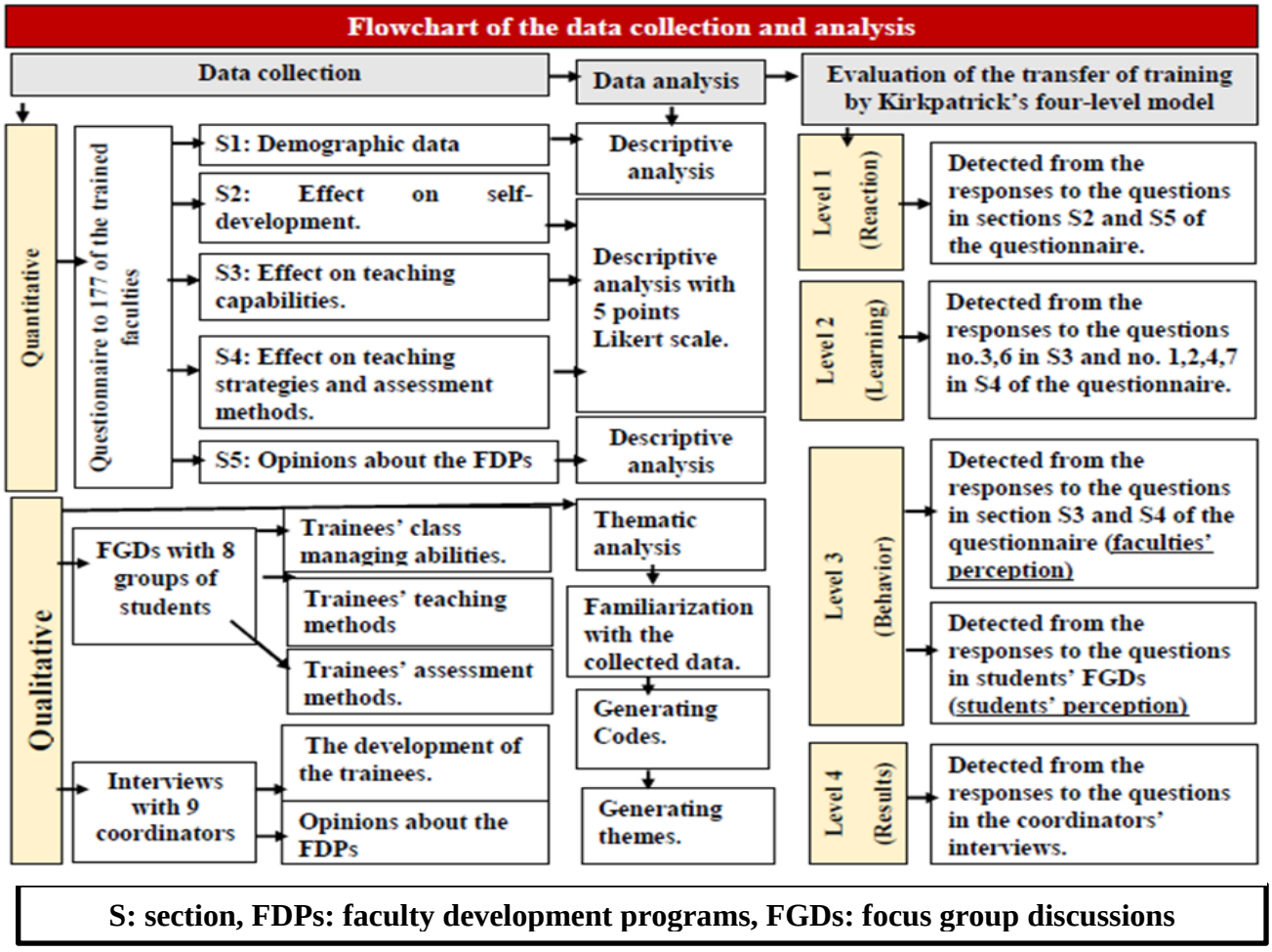

Fig.1. Flowchart of the data collection methods, data analysis and evaluation of the transfer of training by Kirkpatrick's four-level model.

Qualitative data were gathered from eight focus group discussions (FGDs) with undergraduate students from various academic levels who attended lectures or practical sessions with the trained faculty. Any of these discussions was conducted with 5-10 students per group and lasted from half to one hour in which one of research team' members attended as an observer. Moreover, interviews were conducted with nine coordinators of the different modules in Competency Based-Medical Bachelor Program who dealt with different trained faculty to measure the benefit and effectiveness of their training on the learning process and the organization at all. The interviews were one to one either face to face, telephone call or virtual via skype or messenger. All FGDs or interviews were recorded after the permission from the participants and confidentiality was secured. At the beginning, the aim of the study and the sequence of the meeting were clarified.

The transfer of training was assessed according to Kirkpatrick's four-level training evaluation model [14]. The first (reaction) and second (learning) levels were estimated by a questionnaire answered by the recruited faculty. The third (behavior) level was evaluated from trainees' perceptions through the questionnaire and from students' perceptions through FGDs. The fourth level (results) was evaluated by coordinators' interviews.

Data analysis (Statistical analysis and qualitative data theme extraction)

Calculation of Cronbach's Alpha coefficient was done using SPSS version 27.0 (IBM Microsoft). Quantitative data were descriptively analyzed in the form of numbers and percentages then median and interquartile ranges using Microsoft excel version 2021.

Qualitative data were analyzed by thematic analysis to identify recurring patterns or themes within the collected data. This was done by the following steps; the first was familiarization with the collected data by thorough

reading of the notes. The second was initial coding of the data by allocating labels or tags to segments of text that represent important concepts, ideas, or patterns. The third step was creating a list of codes based on the identified patterns. The fourth step was identification of the main themes by reviewing and analyzing the coded segments of data, (Themes are broader categories that include the shared items across the codes). Some themes were merged and others were split to accurately reflect the data as shown in tables (4 and 5).Finally, data was plotted to different themes, analyzing and interpreting the findings.

Results

Demographic data

A total of 177 participants showed that 28.8%, 26.6%, and 24.3% were lecturers, professors, and assistant lecturers, respectively while demonstrators represented at only 3.4%. Regarding departmental affiliation, 68.9% were associated with the academic departments, while 31.1% were related to clinical ones.

Level 1 (Reaction; focuses on participants' satisfaction with the training program)

The findings in Table.1 showed satisfaction of the trained faculty about the FDP. For instance, 87% reported an increase in their self-confidence as medical teachers and improvement communication with their students and colleagues, 85.3% reported an increase in their interest in teaching, and 84.2% used feedback to improve their performance (Median = 4 and IQR=4:5).

Table (1): The effect of this faculty development program on self-development of the trainees.

How far did this faculty development program affect your self-development?							
It helped you to …..	Strongly agree(5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)	Median	IQR
1. Reach your professional development goals.	45 (25.4%)	104 (58.8%)	21 (11.9%)	7 (4%)	0 (0%)	4	4:5
2. Increase your interest in teaching.	59 (33.3%)	92 (52%)	20 (11.3%)	2 (1.1%)	4 (2.3%)	4	4:5
3. Increase your self-confidence as a medical teacher.	65 (36.7%)	89 (50.3%)	19 (10.7%)	4 (2.3%)	0	4	4:5
4. Enhance communication with your students and/or colleagues.	63 (35.6%)	91 (51.4%)	16 (9%)	7 (4%)	0	4	4:5
5. Improve your performance depending on reflection and feedback from students and colleagues.	63 (35.6%)	86 (48.6%)	24 (13.6%0	3 (1.7%)	1 (.6%)	4	4:5
6. Be involved in designing or modifying any educational courses.	48 (27.1%)	89 (50.3%)	27 (15.3%)	11 (6.2%)	2 (1.1%)	4	4:5
7. Share your gained knowledge with others via seminars, journal clubs or publications.	45 (25.4%)	93 (52.5%)	33 (18.6%)	0	6 (3.4%)	4	4:5

Furthermore, the open-ended questions at the end of the questionnaire revealed that 65.5% of participants showed positive perception about the program such as, “it was an essential course, it is recommended, or it’s the most valuable experience in my academic life “. The most mentioned points of strength were learning new methods of teaching, engagement and interaction with the trainees, and encouragement of self-learning. Contrary, the most mentioned points of weakness were concerns related to time and cost, repetition of some contents in different sessions, lack of suitable infrastructure, and insufficient coverage of some topics.

Level 2 (Learning; focuses on the extent to which participants have acquired knowledge and skills from the training program)

The results in Table.2 revealed that the participants effectively communicated with students with different learning styles (Median = 4 and IQR=4:5).

Table (2): The effect of this faculty development program on trainees' teaching capabilities.

How far did this faculty development program affect your teaching capabilities?							
It helped you to …..	**Strongly agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly disagree (1)**	**Median**	**IQR**
1. Use sessions' ground rules.	58 (32.8%)	91 (51.4%)	25 (14.1%)	3 (1.7%)	0	4	4:5
2. Clarify the learning objectives to your students.	85 (48%)	80 (45.2%)	9 (5.1%)	3 (1.7%)	0	4	4:5
3. Deal with different students' learning styles.	61 (34.5%)	98 (55.4%)	11 (6.2%)	7 (4%)	0	4	4:5
4. Engage all students during the sessions.	65 (36.7%)	86 (48.6%)	22 (12.4%)	4 (2.3%)	0	4	4:5
5. Check students' understanding by conducting exercises.	57 (32.2%)	96 (54.2%)	21 (11.9%)	3 (1.7%)	0	4	4:5
6. Gather students' feedback at the end of every session.	45 (25.4%)	93 (52.5%)	34 (19.2%)	5 (2.8%)	0	4	4:5
7. Encourage your students on reflection and feedback.	49 (27.7%)	89 (50.3%)	27 (15.3%)	12 (6.8%)	0	4	4:5

The participants also acquired knowledge about new teaching (87%) and assessment tools (88.7%) as well as 71.8% understood item analysis reports as shown in Table.3.

Table (3): The effect of this faculty development program on teaching strategies and assessment methods of the trainees.

How far did this faculty development program affect your teaching strategies and assessment methods?							
It helped you to …..	**Strongly agree (5)**	**Agree (4)**	**Neutral (3)**	**Disagree (2)**	**Strongly disagree (1)**	**Median**	**IQR**
1. Adopt new teaching methods e.g. TBL, flipped lectures…etc	55 (31.1%)	99 (55.9%)	18 (10.2%)	5 (2.8%)	0	4	4:5
2. Improve your small and/or large group teaching performance.	64 (36.2%)	92 (52%)	18 (10.2%)	3 (1.7%)	0	4	4:5
3. Use digital books and WhatsApp groups to make subjects more accessible to the students.	65 (36.7%)	78 (44.1%)	23 (13%)	8 (4.5%)	3 (1.7%)	4	4:5
4. Adopt new assessment tools e.g. OSPE, OSCE, DOPS, etc	66 (37.3%)	91 (51.4%)	14 (7.9%)	6 (3.4%)	0	4	4:5
5. Achieve your learning goals through assessment tasks.	52 (29.4%)	100 (56.5%)	22 (12.4%)	3 (1.7%)	0	4	4:5
6. Use portfolio as a valuable method of assessment.	50 (28.2%)	73 (41.2%)	41 (23.2%)	10 (5.6%)	3 (1.7%)	4	3:5
7. Understand and interpret item analysis report.	35 (19.8%)	92 (52%)	38 (21.5%)	5 (2.8%)	7 (4%)	4	3:4

Level 3 (behavior; focuses on the application of acquired knowledge and skills on the workplace)

From the trainees' perception, Table.2 revealed a remarkable improvement in their teaching capabilities. Using ground rules by 84.2% of participants and 93.2 % clarified the learning objectives at the beginning of their sessions (Median = 4 and IQR=4:5). Furthermore, 85.3% and 86.4% involved all students during sessions and checking their understanding, respectively.

Table.3 shows that 88.2% improved their teaching performance, 87% adopted new teaching methodologies, 88.7% adopted new assessment methods, 69.4% found portfolios to be a valuable assessment tool, and 71.8% of participants were able to understand and interpret item analysis report.

Analysis of the qualitative data of FGDs and interviews was done by thematic analysis. Codes and themes were determined as shown in tables (4, 5).

Table (4): Codes and themes used in the thematic analysis of the collected data from focus group discussions with students.

Themes	**Codes**
1. Classroom management:	– Encouraging student participation. – Responding to questions during the session. – Dealing with different learning styles.
2. Teacher-student bond/mentorship:	– Strong bond and positive relationship. – Limited bond or lack of connection
3. Liked aspects of the session:	– Engaging teaching style. – Interactive activities. – Clear explanations. – Relevant and interesting content.
4. Disliked aspects of the session:	– Monotonous delivery – Lack of student engagement – Poor organization. – Inadequate time management.
5. Preferred teaching methodologies:	– Interactive lecture-based teaching. – Team- based leaning. – Problem-based learning – Case-based learning. – Small group sessions.
6. Opinion on self-directed learning:	– Attitude towards self-directed learning. – Challenges with its application.
7. Opinion on online teaching:	– Perception of online teaching. – Challenges with interaction and engagement.
8. Opinion on assessment tools:	– The most common used assessment method. – Attitude towards portfolio.
9. Recommendations to enhance session effectiveness:	– Incorporating more interactive activities. – Providing clear learning objectives. – Improving communication and feedback channels. – Enhancing technology integration.

Table (5): Codes and themes used in the thematic analysis of the collected data from the interviews with modules or courses' coordinators

Themes	**Codes**
1. Development in teaching performance:	– Improvement based on student feedback. – Adjustments to instructional guidelines. – The most common used teaching methodology. – Self-directed learning.
2. Development in assessment methods:	– Changes in practical or written exams – Alignment with learning outcomes – Incorporation of innovative assessment approaches. – Portfolio as assessment tool.
3. Common positive and negative feedback:	– Consistent positive feedback (e.g., clarity, accessibility,…etc) – Common negative feedback (e.g., disorganized, time constrain, …etc)
4. Transfer of knowledge to colleagues:	– Sharing knowledge through seminars or workshops.
5. Contribution to organizational goals:	– Alignment with institutional objectives – Improved teaching quality

6.	Recommendation of the faculty development program:	– Positive recommendation for other staff members – Perceived benefits of the program
7.	Suggestions for program modifications:	– Topics to add or omit in the program – Areas for improvement or enhancement

While investigating the performance of the trained faculties from students' perception, the majority of students revealed that the most of medical teachers managed the classroom effectively and encouraged their participation as shown in theme of effective classroom management. However, weak bonds were detected between most students and their teachers except the course coordinators.

Moreover, most students showed a negative attitude towards self-directed learning as reveled in theme of attitude towards self-directed learning, unlike online learning; the majority preferred it, but with some concerns such as technical problems and poor communication. Although using electronic portfolio was preferable, most students were annoyed to fulfill it.

Level 4 (results; focuses on the impact of the training program on organizational goals)

The majority of the coordinators recorded minor improvement in teaching performance of the trained faculty in some modules. They also reported that the most common used teaching methodology was interactive lectures and small group sessions in the form of labs or media. Self-directed learning was also involved but not effectively implemented in most modules.

They also illustrated that improvement in the practical exams were in the application of OSPE (Objective Structured Practical Examination) and OSCE (Objective Structured Clinical Examination). However, the most observed development in assessment was making constructive multiple choice questions aligned to learning outcomes but this was enforced by the instant instructional guidelines. On the other hand, most coordinators revealed the importance of using portfolio for continuous assessment and improvement of students' performance. Consistent positive feedback about the trained faculties included clarity, and mastery of the scientific content.

All interviews clarified that these FDPs contributed to the institutional objectives with improvement of the teaching quality. All coordinators perceived the benefits of these FDPs, recommended the necessity of joining them, and rejected the omission of any topic in these programs. Additionally, some suggested the addition of more hands-on clinical applications, more technology-enhanced tools, and more stress about item analysis and blueprints.

Discussion

The cornerstone of a fruitful career in academic medicine is continuing professional development by applying FDPs that should be provided in an organized manner then their impact should be evaluated in the workplace [15, 16].

This study aimed to evaluate transfer of training of the medical educators after attending one of FDPs about competency-based education and to formulate recommendations for the coming programs. From the results of the present study, the evaluated FDPs were successful at the first (reaction), second (learning), third (behavior), and fourth (results) levels of Kirkpatrick's model.

Regarding the first level (reaction), the trainees showed high satisfaction about the program and their self-development as regards self-confidence, communication and interactivity with students and colleagues. These findings aligned with another study which reported high satisfaction and enhanced adult learning of the trained faculties [17]. Moreover, other researchers found that clinical educators who self-reported high clinical supervision and education reflected higher self-confidence as medical educators than those who did not get or complete their teaching, learning and clinical education qualifications [18].

Additionally, the current study reported high interest in teaching and use of reflection and feedback among the trainees. Iqbal and her colleagues illustrated that the change and development of the teachers' practices require openness to change, great intrinsic and/or extrinsic motivation to learn and to transfer this learning [15]. Similarly, other studies found that doing reflection and receiving feedback greatly enhanced teaching effectiveness [19], self-motivation [20, 23] and educational quality [18, 21].

Furthermore, the trainees in the current study reached their professional developmental goals and became involved in designing or modifying educational courses. They also shared their newly-gained knowledge with their colleagues. These findings came in agreement with other researchers who reported involvement of the trained faculties in new leadership positions at their organizations after attending the FDPs. They added that the trained faculties held meetings and peer discussions with other faculties and provided them with coaching and support that eventually led to successful collaborations in between them. However, those researchers also recorded some points of weakness, similar to those detected in the current study such as time shortage, funding and difficult scheduling [22].

Regarding the second level (learning), most of the trainees revealed progression in their retained knowledge after the FDPs as regards conducting effective communication skills, creating an effective learning environment and dealing with different student' learning styles.

This finding agreed with other researchers who highlighted that universities should always consider the students' learning styles and approaches and then adjust their educational strategies and practices to support different learning approaches [23].

Regarding the third level (behavior), the trained faculty gained the real benefits of training through application of their acquired new knowledge in their classes such as using sessions' ground rules, clarifying the learning objectives as well as engaging the students and checking their understanding. Likewise, another study revealed that classroom management and clearness of the objectives are considered among the features of a good teacher [24]. In addition, engaging the students helps the medical teachers to adequately understand the individual learning needs of the students and follow up their progress. Asking closed and open questions during the sessions also establishes a learner-centered educational environment, promotes students' problem solving and critical thinking skills and stimulates discussion and self-reflection. [21].

The trainees also used technology to make the subjects more accessible to the students. Other researchers showed that students usually prefer the easily accessible medical teachers [24] and that FDPs help educators learn how to use technology and available digital tools effectively [25]. In contrast, another work listed multiple barriers that could limit applying technology in teaching at colleges and universities, such as; lack of time, workload and complex proliferating digital applications [26].

In the current work, the FDPs helped the trainees to adopt new teaching methods and enhance their performance in small/large groups' teaching. This came in line with the findings of other studies [27, 28]. Another study considered the development of the trainees' teaching methods to be one of the most important impacts of the FDPs [24].

In addition, the trainees applied new assessment tools, as was documented in another study in Turkey [29]. Furthermore, the trainees reported using portfolio as an assessment method as revealed in a similar study that showed the valuable usage of e-portfolio in assessment [30].

The findings of FGDs with the students came in line with others who reported higher students' evaluation for trained faculties than untrained ones [31]. In contrast, another study showed no association between attending FDPs and good teachers' evaluation by the students [18]. Additionally, most students declared weak bonds with their medical teachers despite the presence of strong bonds with the course coordinators. This could be due to limited interference with the same teachers during the course, being restricted to a small number of sessions while interfering with the course coordinators during the whole course.

Regarding the fourth level (results), the impact of the FDPs on the organizational level were identified by interviews with the course coordinators. The dissociation between the coordinators' opinions and the trainees' self-evaluations coincided with the findings of others who reported disconnection between the trainees' intrinsic and extrinsic evaluation. This disconnection is common and could be attributed it to either different perceptions of teaching quality between the trainees and others or the ineffectiveness of the questionnaire as a self-assessment method. This could be relieved by gathering effective feedback that could help educators improve their teaching quality and performance [18, 32-34].

Conclusion

In conclusion, the trained faculty at Tanta University's Faculty of Medicine expressed satisfaction with their professional development and improved teaching and assessment skills through FDPs. The FDPs help the trained faculties create an effective positive learning environment by adopting learner-centered teaching strategies, setting clear learning objectives, dealing with different learning preferences, promoting student participation, assessing comprehension, and encouraging reflection and feedback. Despite the presence of some limitations, there was a positive transfer of the training to the workplace that aligned with the intended outcomes of the FDPs.

Recommendations

This study recommends continuing investment in the training of the faculty via FDPs, further real considerations to students' feedback, more focusing on mentorship and coaching with faculty in a trial to fortify the student-teacher bond. Although building a strong bond can be challenging, assign certain faculty for the same group of students throughout the course could enhance this bond. Moreover, effective usage of technology in education can help to overcome infrequent face-to-face meetings with students and to build stronger bonds with them through staying connected with them via emails, virtual meetings, or online platforms to answer questions, provide clarification, or gather feedback. Finally, the current study also recommends putting more stress on certain topics, such as item analysis and blueprints, adding more hands-on clinical applications, and using more technology-enhanced tools in both teaching and assessment.

Limitation

This study had limitations to be considered. First, a pre- and post-training questionnaires would have been preferable to measure actual differences before and after the training, but only a post-training questionnaire was used. Second, immediate responses after the FDPs were not recorded for all participants due to recruitment taking place over a five-year period. Although this study showed positive transfer of training, there is still a possibility of overestimating the satisfaction about these FDPs.

Statements and declarations

Ethics approval and consent

It was obtained from the Medical Research Ethical Committee of Faculty of Medicine at Tanta University (IRP number was 36264PR2780/7/23).

Availability of data and material

The questionnaire used is available via this link: https://drive.google.com/file/d/1I2lbGS-4DA6V7gZ2FedcsDl_Ji-t6cem/view?usp=sharing

The designed questions for focus group discussions and interviews are available via this link : https://drive.google.com/file/d/1a0vh7RwUuwxYgFJbGdlqcgAp-znEFB62/view?usp=sharing

Conflict of interests

The authors declare that they have no conflict of interests

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Author's contribution

All authors conceived and designed the study. BM & MT designed the questionnaire. BM formulated the questions of interviews and focus group discussions.BM, MT, WS, NM &EE contributed to data collection. NM &EE analyzed the quantitative data while BM & MT analyzed the qualitative data. All authors contributed to data interpretation. BM & MT wrote the first draft of manuscript. All authors contributed to revisions of manuscript. All authors read and approved the final manuscript.

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