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Journal of Ecophysiology and Occupational Health, *Vol 22(2), DOI: 10.18311/jeoh/2022/29812, 67-76, June 2022*
ISSN (Print): 0972-4397
ISSN (Online): 0974-0805

Implementation and Evaluation of a Faculty Development Program: an Essential Step for Curricular Change

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Abstract

Introduction: Faculty Development Program (FDP) is principally vital in adapting staff members to their changing roles in medical education. The research objectives were to design, implement and evaluate FDP to help basic sciences staff members to develop the competencies necessary to adopt new curricular changes based on their needs assessment. **Subjects and Methods:** A quasi-experimental, pre/post-design was applied. It passed through three stages; firstly, the planning and design stage where needs assessment survey was conducted to identify priority themes to be targeted. Also, we used "Approaches to Teaching Inventory (ATI)" to identify participants' perceptions, knowledge and beliefs about teaching. Secondly, implementation stage a quasi-experimental pre/post-program design was used to execute the Faculty Development Program activities. Thirdly, the Evaluation stage, Kirkpatrick's model of evaluating educational outcomes was used. A convenience sample of 137 staff members was drawn from integrated pre-clerkship basic medical sciences. **Results:** The Approaches to Teaching Inventory revealed that staff uses Information Transfer/ Teacher Focused Approach. Staff suggested National Academic Reference Standards "NARS 2017", Competency-based medical education and Integrated basic sciences teaching and assessment for training. The overall satisfaction for all workshops ranged from 4.2 to 4.5 which indicate high satisfaction. Also, there was a significant improvement of post-test scores from their baseline scores in all workshops ($p < 0.001$). At baseline (pre-test) mean scores ranged from 4.77 ± 2.49 to 6.57 ± 1.97, whereas post-test mean scores ranged from 9.55 ± 1.92 to 12.08 ± 1.94. **Conclusion:** We concluded that the FDP is a crucial step for any curricular change. The FDP led to positive changes in the participants' attitudes towards an innovative medical education and increased their knowledge about integrated teaching/learning and assessment methods. The participants emphasized the high demand for a more student-centered, problem-based, integrated medical education curriculum.

Keywords: Faculty Development Program, Kirkpatrick's Model, Program Evaluation, SPICES Model, Teaching Approaches

1. Introduction

For any curricular change, faculty members need to adapt their performance to cope with this change. Hence, Faculty Development Program (FDP) is an essential step to equip faculty staff with the necessary competencies to adopt the new change. Evaluation of FDP focuses mainly on measuring staff satisfaction and acquisition of knowledge. However, this does not guarantee a change in faculty attitude and mindset. We aimed to evaluate the effectiveness of FDP in changing staff attitude and mindset during a time of curricular change. Faculty members' interests and expertise affect organizational performance and are essential for academic vitality. Faculty Development Program (FDP) has a critical role to play in promoting academic excellence and innovation[1]. FDPs are vital to support faculty members during curriculum change. In addition, it helps faculty members to succeed in multiple roles of the medical teachers[2].

As a continuum for innovation in medical education, SPICES model has been created by Harden (1984). The key

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elements promoted in this model, student-centered learning, problem-based learning, integrated or inter-professional teaching, community based education, elective studies and a systematic or planned approach, are now widely used. This model reflects the paradigm shift from traditional approaches for curriculum to more innovative approaches[3].

Faculty Development as defined by Steinert (2014) is the broad range of activities that institutions use to renew or assist staff members in their multiple different roles[4]. Faculty development in Health Professions Education (HPE) encompass a group of programs and activities that are designed to enhance the expertise of educators in various domains including, but not limited to, teaching, assessment, educational research and scholarly activity, curriculum design, mentorship, leadership and accreditation[5]. Another programs targeted faculty affairs including faculty recruitment, advancement, retention, and vitality as explained by Steiner *et al.* (2011)[6].

FDP is principally vital in adapting staff members to their changing roles in initiating and setting the directions for curricular changes Frank, J *et al.* (2010)[7]. These programs can be a powerful tool to constitute a positive institutional climate and can range from basic orientation programs for new staff members to postgraduate medical education programs for health professionals[5]. Overall, the aim of all these training programs is to support medical teachers in adapting to changing missions of teaching and to enhance the efficiency and performance of their teaching skills which in turn will improve work satisfaction and teaching confidence by developing good teachers[8].

The Medical Sector Committee of the Supreme Council of Universities in Egypt made a proposal to change undergraduate educational programs' bylaws and shift to a five-year bachelor's degree in medicine (MBBCh) instead of a six-year program as explained in NARS (2017)[9]. New curricular changes must be done to our current curriculum in response to the new proposal made by the Supreme Council of Universities. These changes included decreasing curriculum load, focusing on self-directed learning skills, professionalism, communication skills, early introduction of clinical skills in the pre-clinical phase and a paradigm shift towards a more holistic and integrated approach to education[9]. Starting FDP can be challenging for health professions educators. Curricular change is a perfect time to initiate a new FDP as there are more opportunities for new interactions, connections, and collaborations. At the same time, funding for resources is more often available Rubeck and Witzke (1998)[10]. Conducting program evaluation is mandatory to assess the effectiveness of the FDP. Program evaluation is defined as the "use of scientific methods to measure the implementation and outcomes of programs, for decision-making purposes". It could be a formative and summative process. It could be used to upgrade and update the program. In addition, it provides recommendations for the elimination or maintenance of a program as recommended by Rutman and Mowbray (1983)[11].

As explained by Weiss (1972), there are six key uses of program evaluation that show the formative and summative nature of the evaluation. Program evaluation can be used to 1. Maintain or discontinue a program, 2. Enhance its activities and procedures, 3. Add or remove specific program training methods, 4. Introduce similar programs elsewhere, 5. Gain resources among competing programs, and 6. Accept or reject a program approach[12].

Kirkpatrick's four-level approach is a popular and commonly used model for the evaluation of participants' outcomes in training programs. This model is characterized by its simplicity as it focuses on program outcomes. This model recommends collecting data to assess four levels of program outcomes: 1. Participants' reaction to the program; 2. Measures of learning attributed to the program (e.g., knowledge, skills and attitudes); 3. Changes in participants' behavior in the context for which they were trained; and 4. The program's results in its greater context Kirkpatrick (2006)[13].

The aim of our research work was to design, implement and evaluate FDP to help basic sciences staff members in the basic sciences departments at Alexandria Faculty of Medicine in Egypt and the development of necessary competencies to adopt new curricular changes based on their needs assessment.

2. Subjects and Methods

2.1 Research Design

A quasi experimental, pre-/post-program design was applied in this study. The study passed through three stages: Planning and Design, Implementation and Evaluation. In stage I (Planning and Design) FDP needs assessment study was completed to identify priority themes to be targeted in the FDP for integrated pre-clerkship phase. In stage II (Implementation of the FDP) a quasi-experimental Pre-program/post-program design was completed; the Faculty Development Program activities were executed by members of Medical Education Department at Alexandria Faculty of Medicine. The FDP was designed for faculty members in basic sciences departments. While in the last stage III (Evaluation of the FDP activities), the first two levels of the Kirkpatrick's model of evaluating educational outcomes was used l Kirkpatrick (2006)[13].

2.2 Sample/Participants

A convenience sample was used where participants voluntarily decided to share in this FDP and the target population included 137 faculty members in the basic medical sciences departments some of them granted degrees in medical education like JMHPE[14] and DHPE[15].

The sample size was estimated according to the following equation (Dupont, 1997)[16]**:**

$$n = (\frac{r+1}{r}) \frac{S^2 (Z_b + Z_{\alpha 2})^2}{(d\text{ifference})^2}$$

Where,

n is the sample size.

r is the ratio of controls to cases (in our case = 1, since the controls are the cases before the intervention (program).

Z_β represents the desired power (typically 0.84 for 80% power).

Z^2 represents the desired level of statistical significance (typically 1.96).

σ^2 is the standard deviation of the outcome variable.

Difference is the effect size (the difference in means pre- and post-intervention).

Therefore, n = (2) $(\mathbf{0.78})^2$ $(0.84+1.96)^2$ $(4.05 - 3.71)^2$,

Thus, n = 83

2.3 Data Collection tools

We conducted a needs assessment of the targeted population as a starting point of this study. Needs assessment is considered a valuable tool to help educational institutions focus efforts to meet the most relevant needs to the institutional mission as explained Milloy and Brooke (2004)[17].

- Needs assessment survey was designed and distributed to faculty members in basics sciences departments, to prioritize their needs for training. This needs assessment study was organized in two main stages: First, conducting modified Delphi technique that was used as a method for deciding the items to be included in the needs assessment and to confirm content validity of the needs assessment survey from the experts' viewpoints. It uses a series of experts from Medical Education Department, in order to determine important topics for inclusion in the FDP. Here, ten experts were included in the Modified Delphi technique. It took two rounds. The first round was through an online survey to rank the most important topics to be included in the program and consensus was defined as 51% agreement among respondents Markmann *et al.* (2013)[18]. The second round was face to face meeting to choose the subtopics and structure of workshops to be implemented. This list of topics chosen by Delphi experts was used to prepare was used to prepare the needs assessment online survey which was sent to 250 staff members of the basic medical sciences departments. The FDP contents were chosen based on literature review and priorities important topics adapted from NARS 2017 and the proposal of supreme council of universities, then topics were validated by Delphi experts. Topics basically belong to three major areas: curriculum design, teaching and learning and student's assessment.
- The Approaches to Teaching Inventory (ATI) was used to identify participants' perceptions about teaching practices, beliefs about their own teaching and to document the faculty members' knowledge and experience with student-centered teaching strategies. The ATI is composed of 22 items which are divided into two main scales of teaching; Conceptual Change/Student Focused (CCSF) and Information Transmission/Teacher Focused (ITTF). Results from the ATI were scored on a CCSF and an ITTF scales. The maximum score for each scale is 55 as each scale was composed of 11 items. Each scale was composed of 2 sub-scales intention and strategy. Each item was scored from 1 to 5, considering 1 means this item is rarely or never true and 5 means this item is almost always or always true Trigwell, *et al.* (2005)[19].
- Pretest-posttest: Written test consisting of Multiple-Choice Questions was designed for the study by the researcher, reviewed by the Medical Education Department members, administered before and after the implementation of the workshop to assess the knowledge of the faculty members in FDP topics. The post-test included the same items as the pre-test. It aimed at assessing the outcomes of the program (change in knowledge).
- SPICES continuum: A ten-point rating scale was used, to evaluate the current and anticipated situation of undergraduate educational program, we measured the change of attitude towards either both sides of the continuum before and after the implementation of the FDP, where 1 indicated totally traditional curriculum and 10 indicated totally applying innovative strategies[3].
- Workshop Evaluation Form was designed to assess the first level of Kirkpatrick's model, reaction of the participants of the workshops towards the training. They included questions about the workshops sessions they received, including both content and instructor (performance). It included questions about the relevance of the themes of the workshops to their practice, and the clarity and quality of the tasks they discussed in small groups, as well as the effectiveness of the visual aids and learning materials. Evaluation forms were administered after each workshop. At the end of each workshop, participants rated whether they were satisfied with the workshop using a 5-point Likert scale, where 1 = very unsatisfied and 5 = very

satisfied. Satisfaction scores were calculated for each construct and overall workshop by adding up the sum of all scores and dividing the sum by the number of respondents. Level of satisfactions of completely dissatisfied is from 1 to 1.79, dissatisfied is from 1.80 to 2.59, neutral from 2.60 to 3.39, satisfied from 3.40 to 4.19 and very satisfied 4.20 to 5.00 Norman G (2010)[20]. For the second Kirkpatrick level, attendants answered paper based MCQs test of workshop related cognitive skills as a posttest. These MCQs based on workshops objectives and Medical Education experts reviewed the test.

2.4 Statistical Analysis

Both descriptive statistics and inferential statistics were used. Descriptive statistics were used to identify central tendency and variability of data (e.g., numbers, percentages, mean and standard deviation). Inferential statistics Student t-test was used as a significance test for comparing means of the pre and post-tests for each workshop. The p-value was statistically significant at confidence level 95% ($p<0.05$).

2.5 Ethical Issues

Authors declare no conflict of interest to this work, also this is the first time to publish this work. The study participants were informed by a written informed consent about the aim of the study and were kept updated with any changes in the research. The study got ethical approval from the Ethics committee at Alexandria Faculty of Medicine.

3. Results

3.1 Results of Needs Assessment Study

The response rate was 34% (85 out of 250). Non response rate varies from 10% to 90% as explained by Fraenkel, Wallen, and Hyun (2012)[21], however, we calculated the sample size and it was n = 83 according to Dupont and Plummer(1997)[16]. For each item, staff members were asked to indicate their opinion on a four-point Likert scale, where 1 (very unimportant) to 4 (very important). Topic inclusion was achieved, if ratings (4-point Likert scale) for the items fell within the range of mean ±1.64 standard deviation as explained by Markmann *et al.* (2013)[18]. The mean score was 2.925 ± 1.08. All topics that obtained a mean score 2.925 ± 1.64 were selected for inclusion in the FDPs. A modified Delphi technique is done by Medical Education experts before the conduction of the needs assessment. The priority topics as suggested by experts (Consensus ≥ 51%) were categorized into three main categories which were curriculum design, teaching methods and assessment methods (Table 1). A Workshop was chosen as the most appropriate approach for the delivery of FDPs by 60% of experts. Also, experts were asked to suggest procedures to motivate staff members for participation (Table 2).

The Delphi experts suggested some procedures to motivate staff members for active participation in this FDP were through establishment of reward structure for faculty participation in the FDP and considering faculty participation in the FDP to be a criterion for promotion/awarding a scholarship or grants/ faculty evaluation.

Table 1. The priority topics for faculty development as suggested by Delphi experts (n = 10) (Consensus ≥ 51%)

A. Curriculum design	– National Academic Reference Standards NARS 2017 – Competency based medical education – Simulation-based medical education – Write measurable educational objectives (domains, levels and how to write) – Module/course design
B. Teaching methods	– Integrated basic sciences teaching – Interactive Lecture – Innovative teaching/learning methods – Providing constructive feedback – Use of technology in Medical Education – Integrated Learning Activities (ILA)
C. Assessment methods	– Assessment methods in integrated curriculum – Classroom Assessment Techniques (CATs)/informal, formative assessment – Integrated OSPE (Objective Structured Practical Exam) – Constructing objective written exams – MCQ item analysis – Constructing Modified Essay Exams – Integrated scenario based MCQ – Portfolio in UG integrated curriculum – Work place Based Assessment (WPBA)

Table 2. Faculty development approaches as suggested by Delphi experts (n = 10)

FD approach	Suggested duration-Hours/day	No. of Delphi experts (%) N = 10
Workshops	Two days–4 hrs/day One day-6 hrs/day	6 (60%)
Seminar series	2 to 4weeks–2 hrs/day	2 (20%)
Short course	4 to 6 weeks	1(10%)
Web-based courses	4 to 6 weeks	1(10%)
A blended or hybrid approach	4 to 6 weeks	0

Table 3. Approaches to Teaching Inventory (ATI) Scores (n = 89)

ATIN=89	ITTF Mean±SD	CCSF Mean±SD	t–value	df	P-value
	42.87 ± 6.32	**36.43 ± 7.68**	**5.703**	**88**	**<0.001***

*The difference was statistically significance (p<0.001)

3.2 Results of Approaches to Teaching Inventory (ATI)

The Approaches to Teaching Inventory (ATI) was used as a starting point to identify the different conceptions of teaching and approaches to teaching as experienced by faculty members in basic medical sciences departments. Faculty members who use a Conceptual Change/Student-Focused (CCSF) approach aim to change students' way of thinking about the topic studied, with an emphasis on ways to challenge the students' existing views so that students construct their knowledge. Faculty members use an Information Transfer/ Teacher Focused (ITTF) approach to perceive their main role as to transmit information to the students. The two scales are independent rather than poles of a continuum. The following table shows the mean scores and standard deviations obtained by 89 attendants. It is obvious that faculty members endorsed an intention to transmit information to students as the mean score of ITTF dimension was 42.87 ± 6.32 while the mean score of CCSF dimension 36.43 ± 7.68 (Table 3).

3.3 Evaluation Results of Attendants' Satisfaction

Table 4 shows that the values for overall satisfaction of 89 participants for all workshops ranged from 4.2 to 4.5. The highest mean value for the overall satisfaction was that of teaching and learning methods which was 4.50 ± 0.286 indicating highly satisfied attendants. While in the other two workshops, attendants were very satisfied as the mean of satisfaction level was 4.231 ± 0.503 for NARS 2017 awareness and curriculum design workshop and 4.2 ± 0.445 for student assessment workshop.

3.4 Results of the Pre-test and Post-test regarding the Gained Knowledge

For the second Kirk Patrick level, attendants were asked to answer paper based MCQs test related cognitive skills. These MCQs were on workshops contents and reviewed by Medical Education experts. At base line (pre-test) mean scores ranged from 4.77 ± 2.49 to 6.57± 1.97, whereas post-test mean scores ranged from 9.55 ± 1.92 to 12.08 ± 1.94, showing a significant improvement of post-test scores from their baseline scores in all workshops (p<0.001) (Table 5).

The effect size for the three workshops was > 0.5 which indicated large effect and suggesting that the program led to a meaningful increase in attendants' knowledge Cohen, (1988)[22].

3.5 Attendants' Rating of SPICES Continuum to Evaluate the Anticipated Situation of Undergraduate Medical Education Program

Attendants' ratings for the anticipated new curriculum were very promising (Table 6). There was obvious inclination towards SPICES model. They emphasized the need for more student-centered, problem-based, and integrated curriculum. This was considered as a healthy trend towards the evolution of medical education curriculum that strives to meet the needs of the national standards in EGYPT and cater for the ever-

Table 4. Evaluation of Level 1(Reaction) of the Kirkpatrick Model (n = 89)

Satisfaction items	**WS 1: NARS2017 Awareness and Curriculum Design	**WS 2: Teaching and Learning Methods	**WS 3: Student Assessment
Evaluation of General workshop	4.026 ± 0.688	4.587 ± 0.274	4.09 ± 0.614
Evaluation of Instructor	4.451 ± 0.531	4.484 ± 0.359	4.35 ± 0.50
Evaluation of Workshop Implementation	4.174 ± 0.642	4.449 ± 0.445	4.13 ± 0.658
Total satisfaction	4.231 ± 0.503	4.50 ± 0.286	4.2 ± 0.445

*As per Norman G, (2010), level of satisfactions of completely dissatisfied is from 1 to 1.79, dissatisfied is from1.80 to 2.59, neutral from 2.60 to 3.39, satisfied from 3.40 to 4.19 and very satisfied 4.20 to 5.00
**WS: Workshop

Table 5. Mean scores obtained by the attendants in pre-test and post-test (n = 40-47)

Workshop	Pre-test score Mean±SD (Out of 15)	post-test score Mean±SD (Out of 15)	P-value	df	t -value	Effect size(r)
NARS 2017 and Curriculum Design (n = 47)	5.8 ± 2.06	12.08 ± 1.94	<0.001*	92	-15.19	0.845**
Teaching and LearningMethods (n = 40)	4.77 ± 2.49	11.97 ± 2.24	<0.001*	78	-13.55	0.837**
Student Assessment (n = 40)	6.57 ± 1.97	9.55 ± 1.92	<0.001*	78	-6.833	0.611**
*The difference between groups was statistically significant (p<0.001).						
$r = \sqrt{\frac{t^2}{t^2 + df}}$ **Effect sizes ≥0.5 represent large effect (Cohen, 1988). To convert a *t*-value into a *r*-value; we used the following equation Rosenthal (1991)						

Table 6. Attendants' rating of SPICES continuum for the anticipated undergraduate medical education program at Alexandria Faculty of Medicine (n = 42)

Anticipated curriculum											
Traditional	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**SPICES model**
Teacher-centered					11.9%	14.9%	16.5%	**25.4%**	23.8%	7.5%	**Student centered**
Information gathering					13.4%	14.9%	19.5%	19.5%	**20.8%**	11.9%	**Problem based**
Discipline-based					7.5%	4.5%	19.5%	22.7%	**25%**	20.8%	**Integrated**
Hospital based					14.9%	14.9%	**19.5%**	17.7%	16.5%	16.5%	**Community based**
Standard					14.9%	14.9%	13.5%	**22.5%**	**22.5%**	11.9%	**Electives**
Opportunistic					7.5%	13.5%	17.9%	17.9%	20.7%	**22.5%**	**Systematic**

demanding globalization of medical education and health care[23].

4. Discussion

Faculty Development Program (FDP) is one of the challenges that present during the curriculum reform. Based on the results of this study we found that conducting FDP as described in this study can be a good opportunity for the staff members to identify and apply new innovative educational strategies and curriculum reforms. The results showed that this FDP led to positive changes in the attendants' attitudes towards curriculum reforms and increased their knowledge about educational principles and strategies and acquisition of basic educational skills[24].

Steinert, *et al.* (2016), concluded that the success of FDP was dependent on the accurate and scientific design of programs based on the needs of staff members, with attention to the principles of adult learning, interactive and collaborative learning methods[25].

The highest-rated topics by respondents were integrated curriculum design and implementation, writing measurable educational objectives and the integrated assessment. We included these topics in the design of workshops.

It was a big challenge to design FDP in a time of curriculum change or reform. We aimed to facilitate a change in staff attitudes, such as supporting buy-in to a new curriculum map, trying to encourage more student-centered and integrated teaching methods. Dath and Iobst (2010) have indicated the impact of faculty development in the transition to Competency-

based Medical Education (CBME)[26]. At the individual level, staff members working within a CBME curriculum need FDP to enhance their knowledge of CBME and the competencies being acquired, their capability in teaching within this curriculum, and their ability to use new ways to assess learners. The authors also stressed the need for front-line staff members to understand, accept, teach and evaluate domains of practice (i.e., content areas and competencies) beyond medical expertise and noted the utility of FDP to address resistance to change.

At the institutional level, faculty development activities can enhance understanding of, and confidence in, CBME principles, to pave the way for new accreditation processes. Frank and Danoff (2007) described an example of institutional-level engagement, synchronized with the introduction of the CanMEDS framework in Canada in 1996, where FDP was included as one of the requirements of implementation[27].

In the present study, the design of FDP workshops was focusing on attitudinal change rather than skills acquisition. Carraccio *et al.* (2002) have concluded that, when implementing curriculum change, staff members may need to become more enthusiastic about the change or be more motivated to move away from what may firmly entrench teaching or assessment approaches or curriculum models. Faculty development activities must therefore not only address skills acquisition needed for new curricula but also tackle a change in the staff attitudes and organizational educational culture[28].

In the current study, workshops were the main approach to faculty development activities. Also, we used reflective exercises and practical sessions to enrich the learning process. The most commonly used faculty development approaches in previous studies were workshops, short courses and experiential activities like OSTEs (Objective Structured Teaching Activities) as explained by Boillat *et al.* (2012)[29].

The Approaches to Teaching Inventory (ATI) was used as a starting point for the FDP to gain a better understanding of the approaches to teaching reported by staff members in basic medical sciences departments. Overall, a view of teaching as information transmission was associated with an Information Transmission/Teacher Focused (ITTF) approach, whereas viewing instruction as a means of promoting conceptual change was associated with a Conceptual Change/Student-Focused (CCSF) approach as presented in study by Trigwell *et al.* (2005)[19].

In our study, staff members in basic medical sciences departments were more oriented toward information transmission than conceptual change. These results were used as a rationale for the need for changing teaching methods and practices provided by the staff members.

The FDP design should be directed by learning principles; additionally, involvement of staff members in the program should be facilitated as explained in study by Hewson *et al.* (2001)[30]. In the implementation of FDP, it is essential to use a variety of training methods in a flexible manner, depending on the circumstances of the attendants as explained in study conducted by Ramalanjaona (2003)[31].

A review of the literature, a review is done by McLeod *et al.* (1997)[32], a systematic review by Steinert *et al.* (2006)[2], a research study by Sorinola and Thistlethwaite (2013)[33], a systematic review by Leslie *et al.* (2013)[34], and a review study by Steinert *et al.* (2016)[25], indicated remarkable positive changes in FDPs over the previous years. However, despite the improvement in the quantity and quality of these programs, inadequate efforts have been made to evaluate their effects.

Accordingly, in the present study, we evaluated the effects of the FDP, using the Kirkpatrick model for program evaluation regarding its educational outcomes[13]. Results of the present study indicated the attendants' satisfaction with the FDP, positive changes in their knowledge and attitude and self-reported mindset changes after participation in the program.

Regarding first level Kirkpatrick's model, the attendants showed high levels of satisfaction for the workshops provided in the FDP. In a study held by Baroffio *et al.* (2006)[35], the participants agreed that the workshop advanced their comprehension of the tutorial group functioning process, this is consistent with the results of the study held by Kim *et al.* (2015)[36], and the study indicated that the reaction was generally positive throughout the program and there was a significant correlation between satisfaction and relevance to participants' roles or needs.

Although high satisfaction itself did not guarantee to learn, this is essential because participation might decrease unless the staff members recognize that the time and effort, they invested was meaningful. Thus, as we anticipated, it is important to consider the personal and professional needs of attendants to encourage and increase their motivation to participate in any FDP activities as explained by Steinert *et al.* (2009)[37] and Steinert *et al.* (2010)[38].

Regarding the second level of Kirkpatrick's model, Steinert *et al.* (2016) stated that where formal tests of knowledge were used; comparing pre-post scores should show significant gains[25]. Many participants reported that they gained knowledge and skills related to the educational principles and innovative teaching methods, with an emphasis on providing feedback, goal setting and promotion of self-reflection. The pretest and posttest indicated a large effect and proved that the FDP led to a meaningful increase in attendants' knowledge.

This improvement is similar to the findings reported in previous studies, like results shown in the different studies held by El Naggar *et al.* (2013)[39] and Abdel Nasser *et al.* (2018)[24], where pre-test and post-test showed a statistically significant difference between the results of the pre- and post-test score ($p \leq 0.05$). Similar results were documented in another study

held by Dehghani MR *et al.* (2019) to measure the second level of the Kirkpatrick model, they defined and compared the knowledge of faculty members in the pre-test and post-test. The results showed a significant increase in the participants' knowledge from the pre-test (mean score, 9.9 out of 20) to post-test (mean score, 13.9 out of 20), based on the results of the t-test; this finding confirms the positive effects of the FDP on participants' acquisition of knowledge[40].

The SPICES continuum seems to be a useful tool for obtaining quantitative staff members' views about the medical education programs of different schools as explained by Khan *et al.* (2015)[41]. We developed FDP based on the assumption that changes in mindset come first Joyce *et al.* (1976)[42]. These FDPs were typically designed to change medical staff's mindset and to ensure their acceptance, commitment, and enthusiasm before the implementation of new curricular reforms.

In our study, the results of attendants' rating of the SPICES continuum related to the anticipated situation of the undergraduate curriculum in Alexandria Faculty of Medicine revealed a tendency towards an integrated and systematic curriculum. Attendants' ratings for the anticipated curriculum were very promising and reflected the change in the staff mindset in response to FDP. There was an obvious inclination towards the SPICES model[3]. They recommended the need for a more student-centered, problem-based, and integrated medical education curriculum. This was considered as a healthy trend towards the evolution of the undergraduate medical education curriculum that strives to meet the needs of the national standards and cater for the ever-demanding globalization of medical education and health care.

5. Conclusion

In this research work we concluded that the FDP is a crucial step for any curricular change. The FDP started early to ensure smooth implementation of any curricular enhancement. FDP is an art that needs a degree of flexibility within the range of ensuring continuous quality improvement and ongoing staff professional development. Most of the staff members were satisfied with the FDP conducted in this study. We suppose that the quality factors of any FDP in terms of interactive lectures, small group discussions, educational materials, reflective practices and the use of timely and constructive feedback for the participated staff members of highly importance.

6. Limitations

This study has some limitations, as sampling was a convenient one. In addition, it would be better to measure the impact of this design longitudinally on faculty performance.

7. Acknowledgment

The research team acknowledges the support and facilitation of the faculty administration during the study conduction and we appreciate the active participation of faculty members in this study. All authors shared in manuscript preparation, reviewing, and approval.

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