Prediction of Academic Skills in Ph.D. Students based on Mentoring at Medical Sciences Universities in Iran

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Abstract

Introduction: Mentoring as a social and an interactive strategy for student development has attracted attention in recent decades. Despite the confirmation of the positive role of mentoring, the application of the obtained results from such studies in Islamic societies requires paying attention especially in regards to its socio-cultural context.
In this regard, the present study aimed to investigate the predictability of developing academic skills in Ph.D. students at medical sciences universities based on Islamic mentoring.
Method: In this correlational study, samples were selected among the Ph.D. students of Baqiyatallah University of Medical Sciences and also Tehran University of Medical Sciences. A total of 213 students were randomly selected using "the ratio of sample size to number of variables" calculation method. Academic skills and mentoring were assessed by professional development and Islamic mentoring questionnaires (IMQ), respectively.
Results: Total Islamic mentoring and academic skills values averaged 3.74 and 3.65, respectively, for the studied universities indicating the proper situation of the students. Results of correlation test showed significant relationships among all nine components of Islamic mentoring with academic skills. Regression analysis results revealed the model significance suggesting that about 8.8% of changes in academic skills are explained by the "care and reverence" dimension of Islamic mentoring.
Conclusion: Compatible with existing literature, mentoring has the ability to predict the academic skills of students. Such interactions provide the students with the opportunity to continuously observe scientific and professional behaviors, which facilitate learning, moderation, and modification. This is because it is expected to provide students with the development of scientific and cognitive skills and positive identities through provision of psychological, scientific and emotional relaxation supports.

Keywords: Mentoring, Academic skills, Medical education, Islam, Islamic Republic of Iran

Introduction

The Ph.D. degree generally reflects one's knowledge learning process, and also represents the fact that a successful graduate must leave the university with transferable specialized knowledge and general skills [1]. Actually, Ph.D. education at both national and international levels is far from optimal degrees, with unsuccessful preparation of students in responding to varied and diverse community demands [2, 3, 4].

Specifically, there are many structural issues in the field of medical education, including ambiguity in the application of appropriate education methods [5] and insufficient attention to education fundamentals in medical sciences [6], as well as psychological, emotional, and social issues [7] and future career of medical students [8], along with inadequate per capita educational costs [7]. There are also areas for participation in scientific communities, and

ineffective and inadequate interaction of educational and non-educational staff with students [8], which are partly related to educational programs and, consequently, insufficient preparation of universities and authorities of medical science universities in playing academic roles.

In the act of comprehensive scientific map of I.R. of Iran in the field of health, major orientations for achieving macro and strategic goals have been announced within nine policies, including policy development, facilitating research, increasing the capacity of research conduction, and development of knowledge publishing and sharing. Despite the post-revolutionary rapid advances in medical sciences and increased number of medical universities, learners, and faculty members [9], the expected qualitative status has not yet been achieved. For example, the minister of Health and Medical Education [10] at the second scientific authority conference – in Baqiyatallah University of Medical Sciences 2015- stated that "although we had a good ranking in science production by publishing papers in the past, our number of citations is not equal to that of our articles, and our rankings in patents and technology are far much lower".

Meanwhile, the highest officials of the country have specifically emphasized the realization of such goals, in particular, the "acquisition of scientific authority". In the meeting of university elites, the Leader of Islamic Republic of Iran (28th of October 2002) stated that "I expect the scientific community of the country to be the world's leading exporter of science in the coming fifty years, which is not impossible."

Regarding the differences of the Ph.D. level compared to previous levels in emphasizing new science production through original research [11], the realization of presumed goals of this academic level depends on the appropriateness of knowledge and skills defined to students with the goals, acquisition of those competencies, and their application by students. Despite many formal learning features, Ph.D. students also learn many issues through informal interactions with supervisors, advisors, and other students, or through feedback received by their lecturers [12]. Therefore, proper explanation of students' skills development requires an approach that can move beyond systematic frameworks by taking social interactions into consideration.

Interaction-based approaches have emerged as a result of focusing on social interactions to explain professional development. Instead of focusing on formal professional development, such approaches focus on "development of professional identity" and explain the development of professional identity and professional skills through such structures as mentoring. Mentoring is defined as relationships between unexperienced and experienced people, who help learn the characteristics and nature of the experienced world and the world of work [13]. A review on studies from 1983 indicates that reflection, coaching, counseling, assessment, role modeling, colleague/fellow learner, parenting mediating, making friends, and finally teaching can be considered as the most significant components of mentoring [14,15].

Furthermore, challenging, acceptance, confirmation, exposure and visibility [13, 16], interaction with the application of relational skills [17], and active listening [18] are other components that have been mentioned in a number of studies.

The effects of mentoring components on professional outputs have been confirmed since global pioneering studies were carried out in the 80's. The meta-analyses by Sambunjak et al., Zhang et al. [19, 20, 21], and other studies such as Ghosh [22] are examples from a large body of literature which show that mentoring positively affects professional outputs. In the "Mentoring in Nursing" book, Grossman [14] confirms the positive impacts of mentoring on nurses' professional development.

To generalize the above research results, the "contextual factors" should be taken into consideration. More precisely, acquisition of a right perspective on student education, and basically about all educational decisions, requires the accumulation of experience, data, information, and knowledge resources gathered according to the conditions, context, and cultural factors. Thereby, it can 1) direct us towards objectivity from a merely mental atmosphere [23], and 2) reflect the contextual factors.

Additionally, the field of human sciences is a social product from the perspective of science sociologists. In educational research, it should also be noticed that educational systems mainly aim to teach and educate "highly-educated" people, who deal with the values of society [24], a significant part of which is Islam-based originating from the Islamic culture in our society.

An academic and educational policy seems to be inevitable due to its basic Islamic culture. This issue has been frequently addressed by the highest executive authorities, including the Supreme Leader of the I.R. of Iran [25].

Obviously, a religion that has specific goals and all-inclusive rules, with the so-called legal, economic, and political systems, cannot be deprived of a specific education system [26]. There are also obvious indications of Islam's attention to the important issue of mentoring as a specific theme, as identified by Shahid Thani [27], Mulla Sadra [28], Motahhari [26], and other Islamic education precursors [29, 30]. In line with this, a mentoring model has been used that represents the development-oriented relationship between PhD students and supervisors, and its status is measured by components obtained from literature review and Islamic sources. It is compatible with a set of thoughts, beliefs, values, traditions, patterns, methods, and practical manners, which is derived from the Holy Quran and the Islamic traditions. This Islamic mentoring model includes nine components of: role modeling, challenging, coaching, encouragement, counseling, protection, care & reverence, facilitation, and scientific networking.

Considering this important topic, the role of students is emphasized in the scientific development of medical sciences, particularly in the acquisition of Islamic scientific authority [31]. This raises the question of whether or not Islamic based mentoring interactions- that have nine

components, as mentioned above- can explain the development of the academic skills of Ph.D. students.

Methods

In this correlational study, the statistical population comprised two groups of Ph.D. students from Baqiyatallah University of Medical Sciences and also Tehran University of Medical Sciences in Iran. The participants consisted of students who were closely in contact with at least one professor (supervisor or advisor). The research proposals of these students had been approved by their departments, and they worked on their Ph.D. dissertations in association with their supervisors and advisors.

Sample size was determined by calculating the "sample size to the number of variables ratio", with a proposed ratio ranging from 2 to 10 per variable [32]. In this study, 300 questionnaires were randomly distributed among contributors (in collaboration with the questioner) with a completion rate of circa 85%. Data of 32 questionnaires were screened before introduction to the employed software. After detailed examination, the data introduced to the software were rescreened and a final number of 213 questionnaires were used for the final analysis. Accordingly, the final ratio was equal to 213/9 = 23 given 9 independent variables (Islamic mentoring components were analyzed as predictor variables), which meets the criteria set for the sample size in regression and factor analyses. A random stratified sampling method with relative allocation was used as the study was conducted at two different universities. The Ph.D. students (with the above qualifications) were randomly selected from Baqiyatallah and Tehran universities of medical sciences.

This research was approved (coded 1395.61 IR.BMSU.REC.) by the Ethics Committee of the Baqiyatallah University of Medical Sciences, with the observance of all terms related to informed consent, optional participation, and confidentiality of participants' information. Table 1 shows the distribution of participating students in terms of some demographic characteristics including the data of the universities.

The contributing students were selected from 32 fields of study with the largest number from those matriculated in 2013 and 2014, comprising 23% and 27% of the participants, respectively. The students' GPAs varied between 15.26 and 19.99, with an average of 19.19 ± 0.92.

Survey data were collected by two questionnaires. Academic skills were measured by the modified version of a questionnaire for student professional development [23]. The questionnaire measures 10 skills of communication, entrepreneurship and creativity, individual efficiency, ethical behavior, teaching and training, social accountability, team leadership, research conduct and management, interpretation and transfer of knowledge, and management of professional career. A total of 56 items in this questionnaire were selected and implemented in accordance with the studied population. The developers evaluated the reliability of this questionnaire with an alpha coefficient of 0.76. In this study, the reliability of the questionnaire was calculated using a similar method with values of 0.44 and 0.870 obtained for the components, with a total factor of 0.95 for student development.

A questionnaire was designed to collect data on Islamic mentoring in five phases using a combination of two qualitative and quantitative methods. These steps included defining the features and attributes of Islamic mentoring (300 initial codes), exploring the main themes (classifying 25 categories within 9 main themes), designing the materials and phrases of the questionnaire (from the question bank, 168 were extracted in the first stage and 113 items at the final stage), ordering and determining the method of grading, evaluating the content validity of the designed questionnaire, and evaluating the reliability and factor validity of the IMQ.

According to the survey technique, content validity was assessed by 10 experts in the field of Islamic education. Based on the results, about 26 out of 113 questions were deleted as they scored 1 or 2 by less than 62% of the respondents. The rest of questions were reconsidered and revised, especially those scored 3 by a percentage of the participants, or items that were directly recommended to be modified.

After evaluating content validity, the IMQ was finalized with 85 items. To determine the suitability of designed IMQ for measuring Islamic mentoring indices, factor validity was calculated as a form of construct validity obtained through factor analysis. Estimates of standardized parameters for factor loads, coefficients of determination, and t values in the confirmed factor analysis showed that, except in 15 items, the other model parameters were all significant with a significant estimated amount of variance (R^2 values of 0.44 - 1).

The reliability of IMQ was also calculated by the previous approach yielding coefficients of 0.79 and 0.91 for IMQ components, and 0.97 for the whole questionnaire.

After data screening and replacing missing values, quantitative data were analyzed in three main stages: 1) descriptive analysis of data, 2) multivariate correlation analysis, and 3) multiple regression analysis to examine the relationship between Islamic mentoring and developing academic skills of students based on mentoring predictability.

Table 1. Statistical population and sample number of quantitative research

Selected universities		Sample	Gender		Age (year)		
			Male	Female	< 28	28-33	> 33
Tehran	No	157	37	111	15	62	68
	%	73.7	25	75	10.3	42.8	46.9
Baqiyatallah	No	56	25	31	2	24	30
	%	26.3	44.6	55.4	3.6	42.9	53.6
	Total	213	62	142	17	86	98
	Missing	0	9		12		

Results

To assess the status of Islamic mentoring in the selected universities, mean scores were calculated and were compared between the universities using t-test.

According to Table 2, mean score of 3.88 of the whole IMQ for the students at Baqiyatallah University of Medical Sciences was higher than that (3.69) for students at Tehran University of Medical Sciences. In the other components of Islamic mentoring, average scores were greater for Baqiyatallah University students, except in goodness and facilitation component. Also, a total mean of 3.74 was obtained for mentoring in the students of the studied universities, indicating the proper status of the selected universities in terms of Islamic mentoring. Moreover, no significant differences were observed between the mean values of the two universities based on the significance difference test. Student development status was also examined as above (Table 3).

Table 3 shows average academic skills obtained for students of Baqiyatallah (3.60) and Tehran (3.71) universities of medical sciences, suggesting a higher mean score in this variable for students from Tehran University of Medical Sciences. A total average of 3.68 of academic skills in the students of both universities reveals a good status of students in this regard. In addition, t-test showed no significant differences in academic skills between the students from these two universities.

The predictability of academic development in Ph.D. students based on the components of Islamic mentoring was examined by correlation test and multiple regression analysis in step-by-step method (Table 4).

The results (Table 4) show significant correlations (0.155-0.297) between the nine components of Islamic mentoring and academic skills in Ph.D. students. The total factor (0.278) of Islamic mentoring was significantly correlated with the academic skills of Ph.D. students in the two medical sciences universities (P < 0.01), implying a synchronous relationship between the two variables. The results of the analysis and multiple correlation statistics, coefficient of determination, and the variations are presented in Table 5.

Table 5 presents the correlation coefficient (29.07) between the predictor variables included in the model and the criterion variable, and also the coefficient of determination (0.088). Accordingly, around 8.8% of variations in academic skills are altogether explained by the nine components of mentoring. The remaining variance related to the academic skills of students is explained by the other variables, which according to the research literature, can include variables such as the curriculum quality, the length and duration of familiarity, mentor-student compatibility, personality traits of mentor/student, or other situational and environmental variables. To review the significance of regression model, the results of ANOVA are presented in Table 6.

Table 2. Islamic mentoring status

Components	Tehran University (n=157)	Baqiyatallah University (n=56)	Total (n=213)
Role modeling	3.95 (0.63)	3.95 (0.52)	3.95 (0.60)
Challenging	3.45 (0.88)	3.80 (0.68)	3.54 (0.85)
Coaching	3.47 (0.92)	3.89 (0.68)	3.58 (0.88)
Encouragement	3.53 (0.98)	3.85 (0.66)	3.62 (0.91)
Counseling	3.78 (0.78)	3.95 (0.68)	3.82 (0.76)
Protection	3.66 (0.91)	3.76 (0.72)	3.66 (0.91)
Care& Reverence	3.68 (0.79)	3.75 (0.65)	3.70 (0.75)
Facilitation	4.01 (0.69)	3.89 (0.57)	3.98 (0.66)
Scientific networking	3.71 (0.93)	4.08 (0.80)	3.81 (0.91)
Islamic mentoring	3.69 (0.70)	3.88 (0.55)	3.74 (0.67)
Difference (mentoring at the universities)	t-value	df	Sig.
0.18	1.74	211	0.083

Table 3. Status of students' academic skills

Components	Tehran University (n=157)	Baqiyatallah University (n=56)	Total (n=213)
Interpersonal communication	3.83 (0.60)	3.68 (0.54)	3.79 (0.59)
Entrepreneurship and creativity	3.53 (0.61)	3.59 (0.61)	3.55 (0.61)
Efficacy	3.76 (0.57)	3.64 (0.54)	3.73 (0.57)
Morality	4.17 (0.66)	3.98 (0.83)	4.07 (0.73)
Teaching and teaching	3.63 (0.68)	3.40 (0.62)	3.57 (0.67)
Civil accountability	3.48 (0.74)	3.27 (0.8)	3.42 (0.73)
Leadership	3.59 (0.71)	3.51 (0.58)	3.57 (0.68)
Research and investigation	3.74 (0.69)	3.69 (0.69)	3.72 (0.69)
Knowledge interpretation and transfer	3.83 (0.70)	3.78 (0.68)	3.82 (0.69)
Route management	3.70 (0.67)	3.76 (0.64)	3.71 (0.66)
Academic Skills	3.71 (0.50)	3.60 (0.47)	3.68 (0.49)
Difference (academic skills in students)	t-value	df	Sig.
0.11	1.303	211	0.194

Results of ANOVA show that the resultant F (20.36) was significant at 0.01 level, which indicates the significance of the regression equation. Therefore, at least one of the mentoring components is effective in predicting the academic skills of Ph.D. students. The t-statistic and standardized coefficients of Beta were examined to determine the relative importance of each independent variable in the model and the significance of its effect. The values of these statistics are presented in Table 7.

Among the nine dimensions of Islamic mentoring incorporated in the model, the seventh dimension, i.e.

care and reverence, was effective in predicting the criterion variable. The level of "t" (4.51) for the variable "care and reverence" was significant at a level of 0.01. The value of non-standardized beta coefficients (0.196) for the "care and reverence" component of Islamic mentoring means that an increase in standard deviation of this component raises the academic skills in Ph.D. students at a standard deviation of 0.196. It can, therefore, be concluded that the independent variable (care and reverence) significantly affects the dependent variable at a level of < 0.01.

Table 4. Correlations between mentoring and academic skills

Scale	1	2	3	4	5	6	7	8	9	10
1. IMQscale										
2. Role modelling	0.79**									
3. Challenging	0.82**	0.67**								
4.Coaching	0.91**	0.71**	0.80**							
5. Encouragement	0.87**	0.61**	0.68**	0.76**						
6. Counselling	0.86**	0.59**	0.58**	0.70**	0.76**					
7. Protection	0.83**	0.54**	0.59**	0.68**	0.76**	0.78**				
8.Care and reverence	0.90**	0.66**	0.68**	0.77**	0.79**	0.73**	0.78**			
9. Facilitation	0.74**	0.66**	0.40**	0.56**	0.59**	0.68**	0.59**	0.65**		
10.Scientific networking	0.83**	0.59**	0.68**	0.76**	0.68**	0.73**	0.67**	0.83**	0.53**	
11.Academic skills	0.28**	0.15*	0.17**	0.24**	0.27**	0.23**	0.28**	0.29**	0.21**	0.26**

Table 5. Summary of regression model based on the variables

Model	R	R²	Adjusted R²	SE
Care & reverence	297	0.088	0.084	0.476

Table 6. Results of ANOVA for predictor variables

Source of variance	SS	d.f	MS	F	Sig.
Regression	4.620	1	4.623	20.364	0.01
Error	47.898	211	0.227		
Total	52.521	212			

Table 7. The coefficients of the prediction model for the criterion variable based on predictor variables

Predictor variables	Non-standardized coefficients	SE	Standardized coefficients	t-value	Sig.
Constant	2.95	0.164	--	18.061	0.01
Care & reverence	0.196	0.043	0.297	4.51	0.01

Discussion

The ultimate goal of this study was to investigate the effectiveness of Islamic culture-based mentoring components in explaining the development of academic skills in Ph.D. students of medical sciences universities. A proper explanation of students' skills requires an approach that can move beyond the systematic frameworks of development by considering social interactions, and by explaining the formation of professional identity and skills among them through such strategies as mentoring. In fact, the impacts of such interactions on the development of students have been demonstrated in international studies. Thus, the interactions at the level of theorization and application cannot be utilized merely based on the credibility of these findings irrespective of the underlying socio-cultural factors as the issue of education is particularly a "value-oriented" phenomenon in essence.

Educational policies and decisions seem to be inevitable given the Islamic cultural foundations and its flowing values in an Islamic country; especially if policy-makers have announced the realization of scientific authority in such areas as medicine. From this viewpoint, the present study was designed to provide evidence of the current mentoring and academic development status in medical Ph.D. students as the current and future educational and research agents in the field of medicine, and also to explain students' skills based on Islamic mentoring.

Analysis of data from 213 Ph.D. students firstly indicates their appropriate status regarding the development of academic skills and mentoring by faculty members. Secondly, significant relationships were found between the components of role modeling, challenging, coaching, encouragement, counseling, protection, care and reverence, facilitation, and scientific-professional networking with the academic skills of Ph.D. students. The results of regression analysis also showed that almost

8.8% of academic skill variations is altogether explained by Islamic mentoring (specifically the care and reverence dimension). These results are in line with existing theoretical approaches in the field of mentoring and its relationship with the development of students.

Social learning approaches explain the development of learners by emphasizing the assumption that human learning takes place through interacting, observing, and modeling other people [33]. Mentoring is one of the social strategies for developing competencies [13, 22, 16], essentially aiming at helping students and their development. Mentoring provides students with the development of scientific and cognitive skills as well as positive identities through the provision of psychological, scientific, and emotional calmness support [13, 14, 16]. Student development leads to a sense of professional competence and self-esteem, which in turn results in students' professional success. Bani Hashemi [30] believes that the trust, affection, and acceptability arising from coaching relationships result in the master's attention, respect to his/her opinions by students, and intellectual self-sufficiency among students. The above mentioned research also refers to two elements of trainee independence and its positive relationships with Islamic education.

These interactions provide an opportunity for continuous observation of the student's scientific and professional behaviors, giving rise to the adaptation and modification of the learner. Scientific and psychological support will also enhance the learner's knowledge and help students manage the challenges.

In addition to the current development of students, the presence of coaching relations directly influences students' future and can help them develop their professional career. Ashby et al., [34] believe that a successful entry into the adulthood world and the world of work, reducing sense of isolation, and increasing trust and self-esteem, professional development, self-reflection, and problem-solving competencies are directly connected with mentoring. These are the capabilities that can also play a substantial role in job placement and career promotion in the future.

Results presented by Masters [35] suggest that helping in clarification and defining a problem, translating and adapting thinking tools in learning position, dealing with different beneficiaries, and supporting in data analysis, project preparation, and presentation are all the outcomes of mentoring for students. Other outcomes of such relationships include helping students in maintaining the course of progress and increasing the likelihood of completing ongoing projects. The close association between mentoring and research competence has also been emphasized frequently by medical academicians such as Grossman [14].

In the field of medicine, such results have been similarly confirmed both internationally and nationally in recent years. Hosseinabadi et al. [36] and Bagheriyye et al. [37], for instance, have presented evidence of positive relationships between mentoring and education and participation, nursing planning and care, interpersonal communication, and clinical competencies of nurses. Mentoring-related positive results have further been demonstrated in the meta-analyses of Zhang et al. [21], and Sambunjak et al. [19, 20]. A meta-analysis carried out by Sambunjak et al, [19] concerning a 10-year qualitative research on mentoring in the field of medicine shows that outputs identified for students in qualitative studies includes scientific growth and personal growth. These studies have also discovered obstacles to mentoring caused by mentoring/student individual characteristics, communication problems, and sometimes institutional and organizational problems (e.g., formal communication), which draws our attention towards the issues implicated in student mentoring.

Such relationships are most commonly used for postgraduate students, particularly when they are superintended by supervisors. Mentoring is specifically the most effective strategy to overcome the formal aspects of student supervision [38]. Probably because of this, and given that the groups studied herein consisted of supervised students, the dimensions of mentoring showed a significant relationship with academic skills development in Ph.D. students. Considering the role of such factors in scientific interactions and student development, it is necessary to investigate both individual and organizational factors such as relationship duration and quality, characteristics, expectations and adaptation of the partners, educational level, type of organization, and the culture ruling these relationships and their mediating roles in influencing the development of students.

Ashby et al. [34], and Hall and Burns [38] state that the use of mentoring is associated with challenging issues such as student exploitation by the mentor, the problem of relationship termination, a feeling of unfulfilled mentor's expectations, dependence of relationships to mentor's personality traits, forced participation in unpleasant and unwanted activities to maintain relationships, and continuity from the mentor's behalf. These issues ultimately lead to reduced potency, lack of experienced psychological and social support, and renunciation of students in establishing coaching relationships. Additionally, mentors in turn may be negatively influenced by these relationships. In Ashby et al.'s study [34], excessive workloads, imbalanced working life, and isolation are enumerated as some of the possible negative effects of mentoring on mentors.

Some other researchers have evaluated such mentoring-related issues to be caused by imperfect and incorrect application of mentoring strategies rather than the nature of mentoring. Application of mentoring strategies through trial and error, distrust of students, overemphasis on supervisory role, insufficient time, poor preparation and inadequate training of mentors, psychological and personality mismatch between mentors and students and inadequate understanding of each other, different expectations of the two parties, high workload of students, and inadequate independence of students [34, 38] are denoted among the factors that threaten mentoring. Focusing on negative and unwanted

consequences observed in such relationships requires conducting separate investigations. This is because collecting credible evidence about issues, identifying the aspects of issues, and the influencing factors underpin any intervention, including mentoring processes that cannot be excluded from this rule. From this perspective, students' experiences, in particular their collective experiences, in interacting with other students and faculty members, and their interpretations of doctoral curricula can be scrutinized as an issue.

In addition to mentoring-related issues mentioned above, despite a significant consistency between the current research and other international research outcomes, some points should be taken into account in the interpretation and application of the present results.

The components of mentoring studied herein as predictors of academic development in students are consistent with Islamic cultural and structural status, and also with the information obtained from literature review. The essential difference between the Islamic paradigm and international paradigm in the academic field, in spite of formal similarities, creates the fundamental discrepancies between these two in terms of answering basic questions about the nature and recognition of mankind. Fundamentalism, centrality and accountability, intrinsic dignity, and perfectionism in Islamic education versus the materialist, individualist, instrumentalist, humanism, and liberalistic attitude in Western education [39] distinguish between educational nature, purpose, and principles in these two paradigms.

In Islamic paradigm, the ultimate goal of any education is to potentialize talents for living and prosperity in this world instead of focusing solely on overcoming natural forces, material development, self-preservation, and citizenship. Kaviani [40] also noted such goals as tranquility, worldly and afterlife prosperity, perfectionism, seeking justice, pure life, obedience and servitude of Allah, virtue, and nearness to Allah. These goals are realized through the application of principles compliant with the nature of Islam, namely theonomy, Godliness, trainee-orientation, life-orientation, individualism, pragmatism, morality, effort-orientation, equalitarianism, affectionism, supervision, fear and hope, death thinking, afterlife thinking, and idealism [29]. These dimensions and components are considered as the pillars of education in the Islamic culture, which underpin all training and educational strategies at all levels.

Conclusion

Based on the findings, it can be concluded that there are positive relationships between the nine components of Islamic-based mentoring and the development of students' academic skills. Increased mentoring interactions have been associated with further development of students. Thus, mentoring is able to predict the development variance of Ph.D. students in medical sciences. Accordingly, mentoring is expected to provide students with the development of technical and cognitive skills and positive identities through furnishing psychological, scientific, and emotional security support.

In such interactions, which are consistent with a social approach to learning, students will have valid models and the opportunity to constantly observe the master's academic and professional behaviors. They also learn, moderate, and modify instructions and professional norms by receiving support, motivation, and necessary feedback.

It should be noted that in the present study, mentoring was considered in a vertical type. As Kram [13] remarked years ago, considering two important elements in mentoring (i.e. developmental relationships and the presence of experience) can occur horizontally between peers or within a group position. It is, therefore, recommended to carry out studies that can reveal the components of such relationships according to the Islamic culture. A review of international studies indicates that identifying the dimensions of this kind of mentoring accounts for an important step given its widespread application at international institutes and higher medical and non-medical education centers; however, it will be regarded as the first step.

In addition to the above, student surveys were conducted to measure their academic skills. Accordingly, methods such as interviews that provide in-depth knowledge of the student's conditions are recommended as well as aforementioned tools to collect the required data in addition to the introduced tools. It is also recommended to apply methods such as interviews that provide in-depth knowledge of the student's conditions. Using such tools can help to discover other important factors influencing education of postgraduate students. Also, these tools can help to develop new models for explanation of student preparation.

To explain the academic development of Ph.D. students, it should be stated that not only the university itself and academic factors are involved in preparing students, but also attention should be paid on the conditions, backgrounds, experiences, and tendencies of the students. It is also necessary to address the major factors, such as the social, economic, and political factors of the society, in order to achieve this goal to fulfill this objective. These conditions, which indirectly affect the way students participate in university activities, require further research. The nature of the university, the differences in the institutionalized culture, the variations of students' backgrounds and experiences, the academic and individual backgrounds, as well as the students' views of their own abilities (e.g. the entry of students to Tehran University of Medical Sciences with good academic backgrounds) are among the factors which were not assessed in this study. Future studies can investigate the modulating role of such factors.

Future research can include the following topics:

-Challenges and issues of mentoring interactions between faculty members and students in finding mentor and mentee as well as starting, continuing, and terminating relationships.

-Evaluation of the quality of guidance interactions simultaneous with the survey from of faculty members using the criteria developed in the present study. Also,

integration of this evaluation with the qualitative data extracted from the examination of issues such as the compatibility of faculty members and students.

-The roles of individual, interpersonal, and organizational factors (such as demographic characteristics, common experiences, the way and the duration of familiarity, the type of university, etc.) as the intermediaries in influencing guidance on student development.

-Evaluation of mentoring the benefits for faculty members as mentors and its role in their professional development.

-Identification and validation of causal, contextual, and interventional circumstances as well as results of horizontal mentoring.

Acknowledgements

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