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Evaluation of the Relationship between Curriculum Elements and Medical Students' Disposition Toward Critical Thinking (Case Study: Medical Students)

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Abstract

Background & Objective: Curriculum plays an effective and determining role in realizing higher education goals and missions both qualitatively and quantitatively. Therefore, special attention paid to this area can be recognized as one of the factors effective in the improvement of efficiency and education system. Therefore, this study aimed to evaluate the relationship between curriculum elements and disposition toward critical thinking (CT).

Materials and Methods: This descriptive-correlational study was performed on 270 BSc students at Gonabad University of Medical Sciences in the academic year of 2016-2017. The subjects were selected by random stratified sampling, and two questionnaires, namely Tatar Curriculum Elements Questionnaire (2017) and Ricketts' CT Disposition Questionnaire (2003). Data analysis was performed in SPSS version 22 using Pearson's correlation coefficient and analysis of regression.

Results: In this study, there was a significant, direct correlation between curriculum elements and disposition toward CT, and strengthening each of the curriculum elements of content (0.231), goal (0.148), method (0.307), and assessment (0.203) would be associated with the higher disposition of students toward CT. According to t-test results, no significant difference was observed between the mean score of male and female students in terms of disposition to CT (sig=0.880; t=0.151) and curriculum elements (sig=0.921, t=0.099). In addition, analysis of the regression results revealed that the sub-components of goal, content, and assessment were not significant predictors and only the variable of the method (β=0.225) made a significant prediction.

Conclusion: According to the results of the study, the curriculum elements played an essential role in strengthening students' disposition toward CT. Therefore, it is recommended that the curriculum and its components be revised in the field of the teaching method.

Introduction

As one of the pillars of educational science, curriculum plays an effective and determining role in realizing the higher education goals and missions both qualitatively and quantitatively (1). In fact, a large part of higher education goals cannot be achieved without paying attention to this area (2). Despite the importance of curriculum, it is adequately emphasized in higher education institutions, and the necessary measures are not taken in these centers to assess, evaluate, correct and change the curriculum (3). In general, curriculum experts have considered different elements for them; Tyler, Zeiss, and Beauchamp considered four elements for curriculum, whereas Klein, Ash, and Eisner considered nine, eight, and seven components, respectively (4). Since the primary mission and purpose of education is to educate those who can think and not be content with the thinking of others (5), the educational institution should review goals, content, teaching materials, teaching-learning methods and everything related to the curriculum area in order to fulfill its mission (6).

In fact, one of the valuable intellectual abilities students must gain in school and university is to evaluate, hear, read, and think about the various beliefs they face in life and make logical decisions about them. This valuable ability is known as critical thinking (CT), for which different definitions have been proposed. By examining these definitions, one can summarize the element of logical and analytical decision-making about the affairs and what to do. In this regard, Eggen and Kauchak pointed out the ability and tendency of individuals to evaluate issues and make decisions based on evidence, whereas Slavin and Ennis mentioned the ability to make rational decisions about affairs and logical thinking and decisions and judgments about beliefs and practices, respectively (7).

Overall, CT can be defined as the skill and disposition toward critical inclinations. In other

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words, CT is a set of mental habits and the disposition to think critically, which includes seven components of truth-seeking, open-mindedness, analyticity, systematicity, CT self-confidence, inquisitiveness, and maturity of judgment (8). Evidently, CT cannot be flourished easily and without planning. Therefore, including CT in the curriculum is of paramount importance (9). In addition, CT must be considered as a key factor in all curriculum components of the academic system, especially at high academic levels (10). Accordingly, a curriculum must be organized in such a way that students would learn how to judge society and think about life (1). This is realized by focusing on thinking in curriculum, selecting effective ways to foster CT, applying thought outcomes to different learning situations, optimizing conditions, and incorporating opportunities in the curriculum to create learning with understanding and CT (12).

Furthermore, CT is important since its direct audience is the student society. Therefore, society will suffer from inefficiency in the process of sustainable development if it overlooks training critic, decision-making, analytical youth. In fact, training such people will not only lead to development but also will result in the correction of the education system of the country. Given the importance of CT in development and with regard to the weakness of traditional education in fostering this kind of thinking, education experts agree that CT should not only be one of the goals of education but should also be considered as an integral part of education at all times (13). Therefore, this area has been evaluated in different studies from various aspects, some of which are presented below:

In a study, Ahmadian & Sobhaninejad evaluated the relationship between the latent curriculum components and dimensions of students' disposition toward CT, finding a significant correlation in this regard (14). In addition, Pakmehr et al. assessed the role of faculty teaching quality and its four components in CT of students, identifying a significant association between teaching quality and students' CT (19). In another study by Hashemiannejad entitled providing a theoretical framework regarding a CT-based curriculum, eight skills were considered for CT, including: 1) question, 2) analysis, 3) assessment, 4) linking, 5) reasoning, 6) organizing related scientific concepts, 7) using vocabulary, and 8) metacognition for CT (15). In a research, Alipour et al. qualitatively and quantitatively evaluated barriers to CT in high school curriculum from the perspective of curriculum experts. According to these scholars, categories such as policies and missions of the education system and conditions in terms of teacher training, content, goals and teaching methods were among the barriers to CT. In addition, their results demonstrated that lack of attention to developing analytical, composition, evaluation and judgment skills are obstacles to CT (9).

Tsui and Gao assessed the relationship between seminar teaching method and improving students' CT, marking that the seminar method was effective in improving CT (16). In a study, Mangena and Chabeli evaluated strategies to eliminate barriers to CT in training nurses in North Africa, which led to the identification of the barriers of inadequate knowledge level of teachers, using a teaching and assessment method that would not facilitate the CT of students, negative attitude of teachers to change and their resistance to change, inadequate socialization, culture, and language learning disabilities. These results were indicative of the nursing trainers' need for a CT model in all educational aspects (17). In a study by Bell, six processes were focused on group learning strategies designed to teach how to deepen, analyze, and apply CT to nursing students in dealing with what they encountered in clinical situations. In the end, the experimental and theoretical knowledge of students was strengthened after training (18).

Meanwhile, the evaluation of studies performed in this area demonstrated the importance of curriculum in strengthening CT in students. With this background in mind, this study aimed to determine the most important aspects of the curriculum in creating CT in students in addition to assessing the relationship between these variables. Therefore, the present study aimed to determine the effect of curriculum components on students' disposition toward CT and prioritization of the most important factors among medical students.

Materials and Methods

This descriptive, correlational study was performed on all BSc students of Gonabad University of Medical Sciences in all fields of study in the academic year of 2016-2017. The sample was estimated at 270 (total population=888) based on Morgan's table and the total volume of the population. Subjects were selected by random relative sampling. In fact, the sample members were selected at random according to the number of individuals in the subgroups of the statistical population. In this sampling, gender proportionality along with the field of study was used to better distribute sample members. Finally, considering the size of the statistical population and the volume share of both genders (278 males and 610 females) 85 male and 185 female students were selected as the sample of the study.

The following questionnaires were used to collect data:

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A) Ricketts' Critical Thinking Disposition Questionnaire (19), which comprises 33 items and three subscales of innovation (11 items), maturity (nine items), and engagement (13 items). The questionnaire's items are scored based on a five-point Likert scale (from completely disagree=1 to completely agree=5). However, items 2, 12, 15, 19, 23, 30, and 33 are scored reversely. To obtain the score of each subscale, the scores of the items of the relevant subscale must be summed up and divided by the number of items. The items related to each subscale include:

Innovation: items 1, 5, 7, 11, 14, 17, 24, 25, 26, 28, and 29; maturity: items 2, 12, 15, 19, 23, 30, 31-33; and engagement: items 3, 4, 6, 8, 9, 10, 13, 16, 18, 20, 21, 22, and 27. In the present study, the reliability of the questionnaire was estimated at Cronbach's alpha of 0.832. In addition, the validity and reliability of the questionnaire were measured by Pakmehr (20) using different methods. This scholar used content, construct and factor validity to measure the tool's validity while applying the Cronbach's alpha and split-half methods to measure its reliability. According to the results, the tool had a relative internal consistency and its alpha was estimated at 0.68, which was lower, compared to the current research. Moreover, the scores 165 and 33 are indicative of the highest and lowest amount of disposition toward CT, respectively.

B) Tatari's questionnaire for students' viewpoints on the curriculum components (21), which encompasses 40 items scored based on a five-point Likert scale (from completely agree to completely disagree). Nonetheless, items 1, 3, 4, 5, 7, 8, 10, 18, 20, 33, 34, and 36 are scored reversely. In this questionnaire, items 1-5 are related to the goal subscale, whereas items 6-13, 14-27, and 28-40 are related to the subscales of the method, content, and assessment, respectively. In his research, Tatari provided the tool for eight curriculum experts to assess its validity. In addition, the questionnaire was distributed among 30 members of the statistical population to determine its reliability by estimating the Cronbach's alpha, which was above 0.6 for all subscales. In the present study, the Cronbach's alpha was estimated at 0.856 after collecting the data to determine the questionnaire's reliability. In addition, the scores of 200 and 40 are indicative of the highest and lowest amount of students' positive perspective toward the curriculum components, respectively.

Furthermore, face validity was applied to evaluate the validity of the tool, for which was obtained the confirmation of experts in the field. In addition, data analysis was performed in SPSS version 22 using descriptive (frequency, percentage, mean and standard deviation) and inferential (Kolmogorov-Smirnov test) statistics. The data had a normal distribution since the significance level was above 0.05. Moreover, the independent t-test was used to evaluate the difference in mean scores of subjects while Pearson's correlation coefficient was applied to assess the relationship between the variables. Finally, the regression test was exploited to predict changes in the dependent variable based on the independent variable.

Results

Descriptive Results

According to the results, 31.1% of the subjects were male and the rest were female (68.9%). In addition, 90% of the participants were single. The mean age of the subjects was 24.33 years and the age range of the students was 19-35 years. In terms of field of study, the highest frequency was related to the fields of nursing and laboratory sciences (31.1% and 11.1%, respectively), whereas the lowest frequency was related to the fields of occupational health and radiology (8.1% and 5.9%, respectively). Regarding GPA, the mean GPA of the students was equal to 16.21.

Table 1: Frequency of respondents by field of study

field of study	Frequency	percent
Nursing	74	27.4
Midwifery	28	10.4
surgery room	27	10
Anesthesia	25	9.3
Lab	30	11.1
Environmental Health	25	9.3
Occupational Health	22	8.1
General Hygiene	23	8.5
Radiology	16	5.9
Total	270	100

According to descriptive statistics, the mean CT in students was equal to 143.57, which showed a high disposition ward CT among students. In addition, the highest and lowest means were related to engagement (58.65) and innovation (47.20), respectively.

Table 2: Variable descriptive findings of the toward critical thinking and its dimensions

Dimensions of Critical Thinking	Number of items	Crude average	Percentage average	Mean± SD
Innovation	11	47.20	82.27	5.54 ±47.20
Maturity	9	38.88	83	4.34 ±38.88
Engagement	13	58.65	87.78	7.41 ±58.65
Total of CT	33	143.57	83.76	23.59 ±143.57

Moreover, the mean dimensions of curriculum components for students were equal to 165.35, where the highest and lowest means were related to the method (37.44) and goal (17.37) dimensions, respectively.

Table 3: Variable Descriptive Findings of the Curriculum Elements and Its Dimensions

Curriculum Elements	Number of items	Crude average	Percentage average	Mean± SD
Goal	**5**	**17.37**	**61.85**	**4.75 ±17.37**
Method	**8**	**37.44**	**92**	**5.87 ±37.44**
Content	**14**	**56.93**	**76.66**	**6.76 ±56.93**
Assessment	**13**	**55.10**	**80.96**	**8.31 ±55.10**
Total of Curriculum Elements	**40**	**165.35**	**78.34**	**18.41 ±165.35**

Inferential Results

The results of the correlation analysis of the variables of students' view of curriculum components and disposition toward CT as well as the dimensions of this variable are presented in Table (4). According to the results, there was a significant and direct correlation between curriculum components and the variable of students' disposition toward CT. In other words, any improvement in each component of the curriculum would help improve the level of students' disposition toward CT. In addition, analysis of the correlation related to curriculum elements with variable dimensions of CT indicated that there was a significant and positive relationship between the two variables of curriculum components and students' disposition toward CT. The results of this section are also presented in Table (4).

Table 4: Pearson correlation coefficient test results with independent variables and dimensions of CT

Independent variables	CT Elements Innovation		Maturity		Engagement		CT	
	r	Sig	r	Sig	r	Sig	r	Sig
Goal	0.161**	0.007	0.184**	0.004	0.172**	0.005	0.148**	0.034
Method	0.430**	0.000	0.337**	0.000	0.429**	0.000	0.307**	0.000
Content	0.219**	0.001	0.281**	0.000	0.358**	0.000	0.231**	0.001
Assessment	0.296**	0.000	0.219**	0.001	0.297**	0.000	0.203**	0.001

** Significant at the 0.01 level
* Significant at the 0.05 level

In the present study, attempts were made to measure the level of effectiveness of curriculum elements on the variable of disposition toward CT, and the share of this variable was determined in the specification of changes in the dependent variable. To this end, we applied the multivariate regression analysis to achieve this goal.

Table 5: Results of Multivariate Regression Analysis for Predicting CT through Curriculum Elements

Predictive variables	SE	B	T	p-Value
Goal	0.351	0.069	1.014	0.312
Method	0.330	0.225	2.735	0.007*
Content	0.271	0.086	1.123	0.263
assessment	0.215	0.053	0.703	0.483
F(4,209) = 6.464 , P value= 0.000 , R2= 0.093				

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As observed in Table 5, the amount of F statistic was significant, which showed that the CT in students can be predicted from the curriculum subscales. The results also demonstrated that despite a correlation between research variables, the subscales of goal, content, and assessment were not able to significantly predict students' disposition toward CT. Nonetheless, the variable of the predictive method was significant. In addition, beta was estimated at 0.225 for the variable, and the results indicated that 9.3% of the variance of disposition toward CT was determined by curriculum components. According to t-test results, no significant difference was observed between male and female students in terms of disposition toward CT. Therefore, the mean obtained for the two groups was equal (sig=0.880; t=0.151). Similar results were obtained for curriculum components, and no significant difference was observed between male and female students regarding the mean curriculum components (sig=0.921; t=0.099).

Discussion

The present study aimed to determine the effect of curriculum elements on students' disposition toward CT. To this end, we applied three tools by Ricketts (19), Tatari (21), and Pakmehr (20). According to the results of the current research, there was a significant correlation between curriculum elements and students' disposition toward CT, in a way that strengthening each of the curriculum elements (content, goal, method, and assessment) could be associated with an improved disposition toward CT among students. Evaluation of results conducted on the association between curriculum components and disposition toward CT demonstrated that the published results are in accordance with our findings. For instance, in a study by Monavarifard, curriculum components led to a significant improvement in students' level of CT (1). In addition, Pakmehr et al. indicated a significant relationship between teaching quality and students' disposition toward CT (10). The results of other studies are also indicative of the effectiveness of curriculum elements on students' disposition toward CT (14, 16, 18). However, Mangna and Chabli showed that a CT model is required in all educational dimensions. These scholars introduced inadequate knowledge of the faculty, the application of an education and assessment method that does not facilitate students' CT, professors' negative attitude to change and their resistance to change, inadequate socialization, and culture and language learning disabilities as barriers to the formation of CT (17).

However, the results of regression analysis for predicting disposition toward CT through curriculum subscales demonstrated that the sub-elements of goals, content, and assessment were not significant predictors, with the exception of the method subscale. In addition, the learning-teaching method component's effect on CT more showed the importance of the type of teaching in educational institutions, where a direct association is established between instructors and students (4). Without a doubt, the component of learning-teaching methods has a significant relationship with other curriculum elements. Therefore, any deliberate effort to improve the quality of teaching methods should take into account other elements. In this context and with regard to the results of Pakmehr et al, which demonstrated a relationship between the quality of teaching method and students' CT (10), experts' attention to this element will be effective in having a more capable human resource in the future. Furthermore, the independent t-test results were indicative of a lack of a significant difference between male and female students regarding attitude toward curriculum elements. As such, it seems that gender does not significantly determine changes in attitude toward curriculum elements and CT, and female and male students obtained equal means in this field owing to receiving a similar education.

One of the major drawbacks of the present study was selecting students only from Gonabad University of Medical Sciences. Therefore, it is recommended that a broader statistical population be selected from various medical universities of the country to have a more accurate analysis. In addition, it is suggested that qualitative methods and semi-structured interviews with elites be applied in future studies to provide more accurate and complete results.

Conclusion

Given the significant, positive relationship between curriculum elements and students' disposition toward CT, there is a need to revise the curriculum and its elements, especially in the area of teaching-learning methods. A curriculum must be organized in a way that it could teach the way students judge and think about their life, which is possible by defining a curriculum proportional to our educational systems. One should not easily neglect the cost and time spent by learners in the educational system. Spending this time and money as well as the nation's need for efficient and thought-provoking forces is so important that it should make experts and authorities more sensitive about reforming curriculum elements to train a capable force. Therefore, it is recommended that special attention be paid to curriculum elements in the educational system, especially in the field of teaching methods of professors. Students' personality is shaped by

professors and teachers, and they will be a stagnant force without creative thinking power in the future if the critical aspects of student personality are suppressed. This can be done by launching curricula from curriculum specialists to train teachers and lecturers at different times. In addition, the emphasis will be on the importance of developing critical thinking. Ultimately, it is suggested that teaching methods that emphasize various aspects of a curriculum be used by university professors. This issue should not be overlooked by professors due to its fundamental role in student training.

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