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Qualitative development scenario planning for medical sciences education in Iran

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Abstract

Background: Futures study is a science that, given changes in society, identifies future trends for making appropriate and practical decisions. Universities benefit from futures study research to improve their efficiency and make effective decisions. This is increasingly seen in medical sciences universities, which are responsible for public and specialized health education, and their quality development should be addressed. The purpose of this study was to identify components and key indicators of the qualitative development of medical sciences education and writing scenarios based on these.

Methods: The present study is a mixed methods study carried out in the medical universities of Iran in 2018-2019. In this qualitative approach, the components and indicators of qualitative development of medical sciences education were identified by the classical Delphi method according to targeted sampling from 10 experts with content analysis that was identified and coded. Following the qualitative portion, a quantitative approach using Scenario Wizards software was used to design robust scenarios.

Results: In all, 13 components and 48 indicators were identified in the qualitative development of medical sciences education from which robust scenarios can be considered for futures study, including optimistic, intermediary, and pessimistic scenarios.

Conclusion: These results indicate how using each of the medical sciences education's qualitative development components and indicators can lead medical sciences universities to consider favorable and unfavorable futures for planning and direction. Recognizing correct components and drawing scenarios for desired futures is essential.

Introduction

It is a feature of humanity to worry about the future, since it is unknown, and special properties are required to recognize the future and plan how to deal with it.[1] Regarding continuity and integrity from the past to the future, futures study is useful and feasible. On the other hand, given the very rapid transformation in our current society and the nature of the future as obscure and abstract for the majority of people, futures study has become a matter of urgency.[2,3] Futures study, or futurology, is a novel area of exploration that includes explicit and systematic thinking about alternative futures.[4] The plural form "Futures" is used because several conceived futures can emerge from the process.[5,6] Scenario planning is one of the main study methods of futures study. Scenarios planning does not, however, mean forecasting the future since many possible futures are portrayed, some of which may never be realized.[7] In recent decades, universities have undergone serious changes and the evidence indicates that these changes will continue to grow wider and deeper in the future.[8] Therefore, futures study is in demand by universities.[9] The methods have been employed by researchers in other countries; for instance, Ithnin et al applied implemented scenarios for long-term university planning to achieve progress in 2020.[10] Over the past decade, Blass et al depicted the future of higher education perspective in the United Kingdom through 2035 and identified five major scenarios, including

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leading knowledge creation, no government funding, and total government funding.[11] Being forward-looking and thus prepared for confronting a risky future is essential for both the health system and for medical education due to rapid changes in various areas of society.[12] Few studies have been performed on the subject of "Futures Study" or foresight in the medical sciences education area. Only the Kerman University of Medical Sciences has a prospective study center for futures studies. Since there is no consensus in defining qualitative components and their characteristics in the field of medical sciences education in this area, it has been necessary to identify such components and key indicators at the outset. In identifying these components and indicators, the tools and methods of futures study and foresighting were used to develop comprehensive scenarios and to examine the current and future possible situations in the qualitative development of medical education. Three levels (regional, national and international) are of interest based on the geographical segmentation of foresight; thus, this research is studying foresight at the national level in Iran. Broader studies are indicated in this area. Guiding questions are (1) What are the qualitative development components of medical sciences education in Iran? And (2) What is the best way to present foresighting scenarios based on these components in advancing research goals to boost the quality of medical sciences education?

Materials and Methods

In the current study, mixed methods, including qualitative and quantitative, were applied with a successive exploratory design. This study was carried out in the medical universities of Iran in 2018-2019. Archival documents of medical sciences education, including the qualitative development strategy,[13] medical universities' educational ranking (RAD)[14] and a comprehensive academic map of the country[15] were examined and the components presented in these documents were identified. Subsequently, in order to better understand the problem from a qualitative approach via the classical Delphi method, experts were consulted according to targeted sampling, consisting of ten medical sciences education and higher education experts, working at Mazandaran, Tehran, Shahid Beheshti, Gilan, Golestan, Babol, Tabriz and Kurdistan University of Medical Sciences. These experts included three PhDs of Higher Education, one PhD of Medical Education, four MS of Medical Education and two heads of medical education research centers. They answered questions in order to identify the main components of medical sciences education from their perspective. In an email correspondence, the type of study method was outlined and they were asked to study documents while expressing their views on the components and key indicators of quality development. Following determination of the main components, coding was accomplished through open-ended, axial and selective encoding of the documents and

the experts' views of the extracted material . Then the documents and the Delphi-study-derived material were sent to five authorities and the final components were identified following saturation. Based on these results, measures were then taken to outline various futures-based scenarios. Three experts were solicited to help define three optimistic, intermediary and pessimistic states for each of the identified components, after which a checklist, including a matrix of probable situations and scenarios, was created and brainstorming sessions were held in order to analyze and respond to the crossover effects of the probable situations. The brainstorming sessions consisted of three sessions with seven experts. The experts worked through the checklist by posing a question as to how other situations' occurrence or non- occurrence would be affected if each of the probable situations of the key factors took place. Based on three features (promoting/ empowering, ineffective and restricting), the checklist was completed. In this checklist, the situations also revealed negative influences with scores varying from +3 to -3 (from powerful restricting to powerful promoting effect). Finally, the responses were analyzed using Scenario Wizard software. A quantitative study was performed to extract favorable scenarios from probable ones. Since this study was of a successive exploratory mixed method type, the data were collected in two stages, first through the Delphi technique, collecting qualitative data by asking experts through an open-ended questionnaire, and then using the quantitative methods with the checklist and a group of experts. The initial qualitative exploration was modified through quantitative results and has led to some precise and generalized quantitative results. In this study, the components were identified in the qualitative portion; the crossover and paired effects were addressed in the quantitative portion to address different states of the identified components. As a result, qualitative validation addresses the validity of the quantitative portion. Thus, review by experts has been applied to assure study validity and precision of findings with the following measures:

Review by Delphi group

Five experts were assigned to analyze the final report and to identify the components and the probable situations of each of the components; their views and recommendations have been applied.

Peer review

Through the assistance of four medical education authorities and two futures study experts, paradigms and probable situations for each component were addressed and their attitudes and perspectives were taken into account.

Doing participatory research

Concurrently, the individuals informed about the futures study have been recruited as assistants and fellows in the

analysis and interpretation. The validity of qualitative research is highly questioned by positivists because it cannot be measured by concepts in quantitative research such as validity and reliability. However, this study observed the four principles of GABA accreditation. Reliability is achieved in this research by documenting all stages of the readers' confidence in the research process. Verification is achieved by reducing the bias of the researcher towards the environment and the subject. Dependability of the researcher in the present study is addressed by enhancing the feedback from the participants as well as studying the research findings by individuals outside the research, which, to some extent, enhances the credibility of the data and findings. Last, transferability can be provided by applying research conditions and theoretical underpinnings of the transferability conditions, which are equivalent to the generalizability of quantitative studies but not meaningful in qualitative studies.

Results

Qualitative section: Delphi method and content analysis to identify components and indicators

The study derived information on archival documentation in medical sciences education and discussions among the medical education and higher education authorities working in medical education development centers around the country with answers to the study questions analyzed in terms of their content. Generally speaking, 84 open-ended codes, 37 axial codes, and 13 selective codes were extracted. The findings identified 13 main codes as major components of medical education qualitative development: (1) Educational Leadership in Medical Education Research and Development Centers of Universities, (2) Knowledge-building and Educational Empowerment of Faculty Members, (3) Curriculum Qualitative Development, (4) Hidden Curriculum, 5) Educational Scholarship, (6) Qualitative Development of Research in Education, (7) Comprehensive Evaluation of Faculty Members, (8) Accreditation, (9) Macro Policy Making, (10) Facilitation of Entrepreneurship, (11) Education with a Health Socializing Approach, (12) Accountable Medical Education, and (13) Educational Conventions and Festivals.

From these codes, medical education qualitative development key indicators were identified that are criteria that can be used to measure those components; in other words, these indicate what cases should be acquired in order to achieve the goal behind that specific component. Overall, 48 indicators were identified in medical sciences education's qualitative development, depicted in Table 1.

Quantitative section (scenario planning)

The quantitative part of the present research applies to scenario planning and use of Scenario Wizard software. In order to codify the scenario, as stated, three states (optimistic, intermediary and pessimistic) were identified

for the 13 main components of the medical education development such that 38 various states have been designated, including a range encompassing favorable to unfavorable conditions. The number of the situations of each factor varied proportionate to its importance and influence level, ranging from 2 to 3 probable situations. In order to measure the judgments and different situations' effect on each other, a 38 * 38 cross matrix was designed as a detailed checklist, with seven experts participating in the brainstorming session. Possible scenarios were prepared out of 38 probable situations related to 13 key factors; 1444 mixed probable scenarios were extracted from these probable situations covering all upcoming future states. Each scenario was a combination of the probable situations related to key factors. After constructing the analysis structure of the crossover effects, extracted scenarios were scored using the crossover effect matrix of three various states of compatibility: powerful compatibility (the maximum score related to the key factors' effect balance), poor compatibility (one positive effect score or zero, resulting in selecting a larger set of selected scenarios with lower intensity), and incompatible (no probable situation exists with a distance larger than that between its own effect score and the maximum effect score relative to the eigenvalues). In medical sciences education's qualitative development foresighting, the current study resulted in three scenarios with powerful compatibility, 4097 scenarios with poor compatibility, and 21 incompatible scenarios.

First scenario: optimistic state and spring of medical education's qualitative development

The realization of the qualitative spring scenario as the optimal scenario of medical education's qualitative development is the result of the educational leaders adopting more strategic management decisions for the qualitative development of medical sciences education, increasing the faculty members' empowerment educational programs, codifying novel curriculum consistent with community requirements and professional standards and SPICES strategy, paying attention to professional ethics subjects in curriculum planning, increasing educational processes and innovative research activities, increasing research activities and financial supports compared with the previous years, focusing on and utilizing 360° evaluation system in the incentive structure, recruiting, promoting, allocating budget and resources, providing positive feedback and increasing student satisfaction with teaching quality and curricula subsequent to conducting periodic internal and external evaluations, raising policy makers' attention to compiling documents, medical sciences education's qualitative development, an evaluation system and accreditation of educational departments, allocating facilities and building science and technology parks and establishing funds for supporting small businesses and firms in health areas,

Table 1. Qualitative Development Indicators and Components of Medical Sciences Education (MSE)

MSE's Development Components	MSE's Development Indicators
Educational leadership of medical education research & development centers of universities	1-Long-term plan-based annual performance report 2-The number of the educational council sessions and councils as the universities' substitutes 3-Universities' educational budget allocation level 4-Educational qualitative dimensions application level in recruiting faculty members 5-Management stability
Knowledge Building and Educational Empowerment of the Faculty Members	1-The extent of knowledge-building program of occupational duties' role and analysis compatibility 2-Educational knowledge-building programs' content level from the perspective of important subjects in humanities (communicative skills and professional ethics) 3-The number of educational programs at the beginning of service and continuous on-service training hours 4-The amount of feedback received and the faculty members' educational course evaluation .
Curriculum Qualitative Development	1-The level of curriculum matching the real needs of the community 2- The level of curriculum matching the program codified standards 3-Curricular coverage level of SPICES 4- The level of new curriculum matching expected professional competencies 5- The level of new developed and revised curricula
Hidden Curriculum	1-The level of attention drawn to professional ethics and related subjects in curriculum designing 2-Existence database of effective mentors
Educational Scholarship	1-Faculty members' attention to innovative research activities 2-The number of approved and implemented educational processes 3-The presence of educational scholarship committees in universities and the number of sessions
Qualitative Development of Research in Education	1-Outlining research priorities in the education area 2-The number of financial and non-financial consultation and supports 3-Allocated budget for research in education 4-The number of developed educational guides 5- The level of application of Best Practices in Medical Education
Comprehensive Evaluation of the Faculty Members	1-Availability of 360° evaluation system for the university teachers' performance as network and user-friendly. 2- Documenting and presenting the survey feedback results and periodic evaluation. 3-Relationship between university teachers' evaluation system and incentive structure of recruitment, promotion, budget and resources allocation
Accreditation	1-Internal and external periodic assessment 2-The extent of goals an achievement in each course, and program evaluated periodically and presenting its feedback to the authorities 3-Students' satisfaction with teaching quality in each course, and program Under accreditation processes
Macro Policy Making	1-Avaliable comprehensive structure and policy-making impediment in order to allocate resources and integrate monitoring, evaluating and accrediting processes 2-Long term sciences & technology development program codification and implementation and 5, 10, and 20-year development documents preparation in health system sciences & technology priorities 3-Networking in the layer of knowledge and research creation and development 4-Codifying educational departments' accreditation, evaluation and ranking system
Facilitation of Entrepreneurship	1-Building a city of health knowledge with the goal behind tourism medicine 2-Orienting funds to small and medium sized businesses in health area 3-Constructing sciences & technology parks in health area 4-Presenting facilities for private and productive upstarts in health area
Education with Health Socializing Approach	1-Available self-care pattern education 2-Empowering individuals in identifying health problems (health promotion) 3-Health literacy of the community
Accountable Medical Education	1-Real community needs' identification and evaluation system in the countrywide health area 2-Educational curriculum development consistent with satisfying the real needs of the community 3-Survey system of the revised educational curriculum
Educational Conventions and Festivals	1-Determining subject matter priorities in annual intervals based on the countrywide educational challenges 2-Festivals and conventions holding manner in university (scoring the informing manner and the officials' attendance) 3-Acquiring ranking and registering novel activities at national festivals by faculty members.

Note. SPICES stands for S: student-centered, P: problem-based, I: integrated, C: community-based, E, elective-driven and S: systematic.

increasing health promotion strategies and raising the level of community health literacy, codifying educational curricula in line with meeting real community needs, and acquiring ranks and innovative activities in countrywide festivals by the faculty members.

Second scenario: intermediary state and welcoming spring of medical education's qualitative development

The scenario known as "welcoming the spring" has been considered the intermediary scenario of the medical sciences education's qualitative development. The scenario results from continuing the current trend and implementing the previous approvals, keeping the process of the past years' programs in order to empower the faculty members, revising the current curricula based on the professional competencies and SPICES strategy, paying attention to professional ethics in curriculum planning, continuing the prior years' trend in paying attention to the innovative process and activities, keeping research activities on a consistent trend and allocating budgets pursuant to previous years, merely conducting a 360° evaluation system without using it in the incentive structure, recruiting, budget and resources allocation, performing internal and external evaluations without providing feedback and assessing student satisfaction with programs' quality, revising the current policies in the medical sciences education's qualitative development in the educational departments, going on with the established companies businesses' activities in health, pursuant to the past years, paying attention to the previous approaches in the community health literacy area, revising a number of the existing curricula in line with satisfying the community requirements, and holding and participating in conventions and festivals.

Third scenario: unfavorable state and fall of medical education's qualitative development

The scenario "fall of qualitative development" is viewed as the least favorable scenario of medical sciences education's qualitative development. This scenario is the result of overlooking qualitative development in medical sciences throughout the country, reducing faculty members' empowerment programs and workshops compared with previous years, ignoring the community requirements of the professional competencies in the curricula, not paying attention to the professional ethics debates in curriculum planning, decreasing educational processes and overlooking the innovative activities compared with past, downsizing research activities and lowering their budget allocation, not focusing on 360° evaluation system in universities, ignoring regular and periodic internal and external evaluation, policy makers overlooking the quality of medical sciences education and not making decisions in this regard, taking entrepreneurship in the area of health for granted, overlooking health socialization issues and education, not paying attention to community needs in

educational curricula, and not stressing the need to hold and take part in conventions and festivals.

Discussion

As perceived so far, the researcher has made efforts to deal with the scenario planning for the qualitative development of medical sciences education through various research techniques. These results could open a new window to the qualitative development of medical sciences education, especially with the foresighting approach. Until now, no study has been performed regarding foresighting the qualitative development of medical sciences education in Iran. Thus, it is imperative to identify the components of qualitative development, then address the scenario planning of qualitative development of medical sciences education using these components. It has been previously stated through analyzing upper hand documents using experts' perspectives, 13 main and key components were identified, including: educational leadership of the universities' medical education's research and development centers, knowledge-building and educational empowerment of faculty, curricular qualitative development, hidden curriculum, educational research, qualitative development of research in education, comprehensive evaluation of faculty, accreditation, macro policy making, facilitation of entrepreneurship, training with a health socialization approach, accountable medical education, and educational conventions and festivals. The components stated in the research done by other researchers have also been taken into consideration. Inayatullah and Milojević conducted research on leadership and governance in higher education through 2025, which concluded that more universities should be established through 2025 but as non-political and with less interference on the government's side.[16] About empowering faculty members, LaVelle and Donaldson mentioned the sensitivity of assessing the educational needs of instructors in every educational institution and stated that recognizing and analyzing these educational demands is the prerequisite of any educational system.[17] Regarding curricular equality, Daryazadeh et al stated that providing educational curriculum congruent with educational goals along with systematic assessment and evaluation is necessary and developing a curriculum has to be done through identifying and weighing students' needs; it is necessary as well to compile an accurate evaluation system to improve the quality of educational programs.[18] Concerning hidden curriculum, Khaghanizadeh et al focused on hidden curriculum and viewed professional ethics as an essential part of medical sciences' curriculum.[19] Jouybari et al mentioned attention to educational scholarship as significant and an outstanding activity in problem solving, expanding the boundaries of knowledge and exploring into not-yet-examined areas.[4] Regarding research in education, Nemati et al pointed out cooperation and support as an effective step to promote the quality of

education at national and international levels.[20] Regarding the assessment of university faculty performance, Vahabi et al, in the Kurdistan-based Medical Sciences University, stated the teachers' educational evaluation is a critical task of medical sciences universities and expressed that they should informed of its results in order to employ these for promoting their teaching and education.[21] Regarding accreditation, Vakili et al pointed out that evaluation of the current situation and identification of the weak points as a strategy to promote medical education quality.[22] In research regarding strategies for promoting medical education in specialized and fellowship departments, Tabatabai et al viewed policy making and determination of the macro-directions of the higher education system as the first step in upgrading medical higher education.[23] Regarding entrepreneurship, Ghanaati et al proposed the idea of including a course in entrepreneurship in the medical sciences curriculum.[24] Izadirad and Zareban mentioned health literacy skills as necessities of society so that by improving health literacy, the harm of low health literacy level is reduced.[25] Considering accountable medical education, Tatari et al stated that individuals should be trained so that in addition to being professionally capable, they should be able to respond to challenges and problems induced by changing needs of society and health care.[26] Rakhshani et al. suggested holding medical sciences educational festivals in order to develop qualitative promotional grounds of all applicable media in the health system.[27] Geraei, in its foresighting study about educating information science and knowledge in Iran, considered key effective promoting forces for the future of each discipline as revising the structure of research and education in humanities and social science areas, establishing accreditation and quality assurance systems, the employment status of higher education graduates in the country, the position of the discipline in the public mindset along with people's attitudes, the supply and demand equation and the student selection system in higher education, information- and knowledge-oriented new job opportunities, expanding the main parallel disciplines, specialization in curriculum planning, including entrepreneurship elements in training, the influence of information technology on information science and knowledge work environments, information science and knowledge groups' interaction and communication with the educational industry and enhancement and development of faculty, all of which are consistent with the present study.[28] In another study, Zamani stressed components of teaching methods, educational content organization, facilities and equipment of the faculty, students' status, teachers' professional competency (educational and research) and novel technologies as factors that influence educational quality in higher education. Montazer and Falahati in a study of future scenario planning of higher education in Iran, considered demographic changes, globalization, and technological development as the most significant promoting and propelling forces in higher education for Iran, leading higher education institutes toward adopting collaborative styles and communication networking as principal tools for solving problems and achieving educational goals.[30]

As stated in the findings, using key components of probable scenarios and probable situations and through brainstorming, the influence of each of the situations were identified using Scenario Wizard. Through this method, three scenarios with powerful compatibility, 4097 scenarios with poor compatibility and 21 incompatible scenarios were obtained. These three scenarios express the influence of paying attention to the medical sciences development components in the future. Each has dealt with scenario codification in terms of their own extracted components. For example, Blass et al in depicting the future perspective of higher education in England through 2035, recognized their several main scenarios, including leading knowledge creation, no government funding, and total government funding.[11] As observed in the current study, these cases focused on the components and continuation. The Center for Educational Research and Innovation in France proposed four scenarios in its research in 2005 for the future of higher education, which encompassed free networking, providing service to local communities, new public responsibilities, and the need for higher education institutions. The research center's study stressed the necessity for international networks and being equipped with flexible management, increasing students' learning, building relationship between the university and the local community, building relation between local industry and businesses, being responsive to the market's demands and international ranking, which is congruent with the present research.[31]

Conclusion

Such studies always have some limitations. From the researcher's perspective in this study, finding a study sample from medical education and higher education experts and practitioners working in medical education development is one of the current study limitations because most of the practitioners of the educational development centers as experts in their job possess non-educational degrees and are members of the clinical group. Another significant limitation of this research is the deficiency of futures study research centers in the medical sciences universities in this country, such that only the Kerman University of Medical Sciences possesses a futures study research center in health, resulting in a lack of sufficient information and knowledge on the part of the authorities regarding futures study and the study goals.

Finally, according to the results and the importance of doing futures study cases ahead of making macro decisions as well as the significance of national medical sciences education quality, whose graduates affect people's lives

and health, it is proposed to present the current study's favorable scenarios to the Ministry of Health and Medical Education's affiliated Research and Development Center so that these results can be applied in their macro decisions, for revising the education quality codes (promotion and assessment, etc.), revising medical sciences universities' educational development centers' job description, modifying upper-hand documents, and paying more attention to futures study. It is also recommended for other educational centers to use methods such as focus groups or in-depth interviews to identify educational components and indicators and to design other scenarios in this area or to use other futures research methods.

Ethical approval
Authorities were allowed to begin the investigation. Expert specifications were preserved. The nature of the project provided no ethical obstacles to the study.

Competing interests
The authors declare that there is no conflict of interest.

Authors' contributions
Designing concept by ESO. Collecting information by NG. Data analysis and interpretation by SM. Manuscript consulting research by SI. Preparing research by NG.

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