# Evaluation of the Curricula of Basic Sciences: A Study at Ilam University of Medical Sciences

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| **Article Info** | **ABSTRACT** |
| **Article type:**Research Article**Article history:** Received: 9 Aug. 2021Received in revised form: 15 Nov. 2021Accepted: 21 Dec. 2021Published online: 28 Aug. 2022🖂**Correspondence to:** Mahboubeh Arefi, Department of Psychology, Faculty of Educational Sciences and Psychology, Shahid Beheshti University, Tehran, IranEmail: Arefi6@gmail.com | **Introduction:** Curriculum management is essential for improving the quality of educational programs in healthcare. The structure of curriculum must be customized according to the scientific needs and requirements. Hence the present study aims to evaluate the Curricula of basic medical sciences from the experts point of views.**Materials and Methods:** In the study a combination of exploratory and Delphi research methods was used. At first, based on detailed studying of theoretical foundations, we extracted the first round of Delphi questions and provided them for the expert group. Using content analysis, the codes, categories, and finally, items were extracted. The items obtained were scored in a questionnaire based on the Likert scale, and then analyzed using descriptive statistics and Interquartile Range (IQR) metric.**Results:** According to the data extracted, the expert group identified the content of basic sciences curricula in Ilam University of Medical Sciences under the following categories: Content with low-level comprehensiveness, out-of-date content, content with low-level of practical application, bulky content, and content having a weak relationship with the objectives of the curriculum.**Conclusion:** Based on the research, the most significant problems of the basic sciences curricula were the low agreement of the content with educational objectives, low-level comprehensiveness, and finally, low-level practical application.**Keywords:** Evaluation, Curriculum, Basic Sciences |
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**Introduction**

Curriculum is the essence of education and, in combination with effective teaching methods, guarantees the efficiency and effectiveness of the education system. So, the structure of curriculum should be considered in the process of higher education (1, 2), and determining the optimal structure of curricula and selecting and organizing their content have been among the responsibilities of policymakers in educational systems. This is especially important in higher education because the higher education curriculum is a powerful scientific and social tool through which knowledge and scientific experiences are provided to students (3, 4).

Schools of medicine are trying to train young physicians so that they are able to face complicated medical care scenarios (4). One of the main worries of medical education policymakers is the non-functionality of basic sciences courses provided during years of clinical education (5-7).

A preview on the literature shows that, so far, the assessment of the content of the basic sciences curriculum has received less attention in medical sciences universities, including the Ilam University of Medical Sciences. So, we decided to evaluate the educational content of the basic sciences curriculum in Ilam University of Medical Sciences.

**Materials and Methods**

For evaluating the content of the basic sciences curriculum, at first, the following research question was raised: What are the weaknesses of the content of the basic sciences curriculum at Ilam University of Medical Sciences? In order to answer the above question, the Delphi method was used in three rounds. In terms of objectives, the present research was an applied study, and in terms of the data collection method, it was a mixed-method exploratory experiment. First, the researchers explored the problems of the curriculum content from the perspectives of an expert group (i.e., the qualitative phase). Based on the results of this phase, in next phases (i.e., rounds), the researchers designed questionnaires containing closed-ended questions to determine the expert’s agreement rate on each item of the questionnaires using descriptive statistics indicators. In order to address the research questions, the classical Delphi method was used. Qualitative data were collected during the first round using open-ended questions. During the subsequent rounds of Delphi, questionnaires with closed-ended questions were used to determine the level of agreement between the experts (8). In the present study, the following criteria were used to select experts: Having adequate knowledge and experience on the subject in question, willingness to participate, having enough time to participate, and having communicative and writing skills. Therefore, according to the above criteria, 10 experts were selected to participate in the Delphi process (9).

The first round of Delphi questions was prepared based on detailed studying the theoretical and experimental foundations and the conceptual framework of the research. These questions were distributed among the members of the dissertation team. After introducing minimal corrections and making sure about the validity of the questions, they were provided to the experts.

Content analysis was used to analyze the data obtained in the first round of the study (10). The words and phrases were transcribed, and initial codes were classified under main categories according to their semantic similarities. These categories were used as a basis to design questionnaire items in the subsequent rounds of the study. The items extracted during the first round were organized in the form of a new questionnaire. In order to score the items, a 6-point Likert scale was used (1= strongly disagree, 2= disagree, 3= relatively disagree, 4= relatively agree, 5= agree, and 6= strongly agree). In order to analyze the data obtained in the second round and to determine the rate of agreement between experts on each item, descriptive statistics, frequency and interquartile range (IQR) were used. Various studies have used IQR to determine agreement among the members of the expert group (4, 5, 10). Accordingly, the items given a score of 1 or less by at least 51% of the experts were considered as agreed items and were excluded from the Delphi process. Items that were given a value of higher than 1 by at least 51% of the experts were considered as non-agreed and sent back to the members of the expert panel (i.e., the round 3 questionnaire).

The round 3 questionnaire included items that were not agreed upon in round 2. In round 3 Delphi, the members of the expert panel were provided with the opportunity to change their answers. For this purpose, the round 3 questionnaire consisted of three information columns (11) as follow:

First column: This column shows the average scores given to round 2 items by the expert group. Second column: This column shows each individual’s response to round 2 items.

Third column: In this column, the individual can respond to the items for a second time according to the average scores given by the experts group.

Similar to round 2, descriptive statistics, including IQR, and the 51% threshold were used in round 3 to determine agreement between the members of the expert panel. The average descriptive index was used to sort the agreed items from "the most important" to "the least important".

**Results**

The present study used a combination of exploratory and Delphi research methods.These phases were categorized in three phases as bellow:

The First Round

In order to answer the research question, a questionnaire with open-ended questions was used in the first round, and the data were analyzed using content analysis. Overall, 41 codes were identified after the initial analysis of the qualitative data obtained in this round. After removing duplicate codes, the primary codes were classified based on their semantic similarities, resulting in five categories (Table 1).

The results of qualitative analyzing from the first round by using of the content analysis method. Five categories (subdimensions) were resulted from the content analysis.

|  |  |  |
| --- | --- | --- |
| Participants\*  | Dimensions | Subdimensions |
| 1, 4, 6, 10 | Content | Content with low-level comprehensiveness |
| 1, 2, 5, 8, 9 | Out-of-date content |
| 2, 3, 4, 5, 9, 10 | Content with low-level practical application |
| 3, 8 | Bulky content |
| 6, 10 | Content having a weak relationship with educational objectives |

\*In the study 10 experts were selected to participate in the Delphi process.

Content Problems

Qualitative data analysis showed that the basic sciences curriculum in Ilam University of Medical Sciences had several problems, which can be classified into six categories. In the following, each of these problems is explained.

Low Comprehensiveness of the Content

According to the participants, the content does not adequately cover all the topics that students need. In this regard, participant No. 3 stated that "Ethics and Medical Education curricula should be supplemented with more comprehensive content".

Out-of-date Content

The participants believed that the content of basic sciences’ courses was too old and had no innovation. Participant No.1 stated, "Unfortunately, there has been no change or innovation to the content, and it is taught using the same traditional procedure." Participant No.5 stated: "The content is old and does not fit in with the current situation. Professors are mainly teaching the same old subjects repeatedly taught in previous years".

Low-level of Practical Application

According to the participants, the contents were mainly focused on memorization and rote learning, lacking practical applications. So, these contents are not interesting for students. The participants believed that the contents should be developed in line with textual training on competence (knowledge, attitude, skills). In this regard, participant No. 10 stated, "Students are not familiar with the necessary skills in terms of content." A textual approach to competence should be developed.

Bulky Content

Participants believed that basic science courses were bulky, and that learning these courses would be challenging. In this regard, participant No. 9 stated, "The large volume of these courses has caused the students to lose real contact with these courses", and consequently, they are forgotten by the students. Participant No. 2 stated "The thickness of some books worries a number of students".

Poor Relevance of the Content to the Goals of the Program

Participant No. 4 complained that "existing topics do not match the objectives", and participant No. 6 stated: "A lot of the contents are not in line with clinical goals and are merely focused on basic sciences".

The Second Round

 In the second round, the categories identified in the first round were presented to the first-round panel of experts in the form of a questionnaire with a 6-point Likert scale to mark their agreement with each item and to specify appropriate items. Next, the agreement level of the expert panel with each item was determined using two statistical indicators; IQR and the 51% agreement threshold.

The Problems of the Content Dimension

The level of agreement of the expert panel on the problems of the content dimension was investigated and presented in Tables 2-6. These categories are classified between “low comprehensiveness of the content” to “bulky Content” variables.

According to an IQR equal or less than 1 (here 0) and the level of agreement of equal or more than 51% (here 80%), it can be said that the expert panel agreed that "the lack of comprehensiveness of the content" in the basic sciences curriculum was "to some extent an important problem".

 **Table 2.** The agreement level of the expert panel with the low comprehensiveness of the content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 0 | 0 | 0 | 3.9 |
| Less important | 1 | 10 | 0 | 3.9 |
| To some extent less important | 0 | 0 | 0 | 3.9 |
| To some extent important | 8 | 80 | 0 | 3.9 |
| Important  | 1 | 10 | 0 | 3.9 |
| Very important | 0 | 0 | 0 | 3.9 |

**Table 3.** The agreement level of the expert panel with the lack of up-to-date content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 0 | 0 | 1 | 3.6 |
| Less important | 1 | 10 | 1 | 3.6 |
| To some extent less important | 2 | 20 | 1 | 3.6 |
| To some extent important | 0 | 0 | 1 | 3.6 |
| Important  | 7 | 70 | 1 | 3.6 |
| Very important | 0 | 0 | 1 | 3.6 |

Based on the two indicators of an IQR of equal or less than 1 (here 0) and the level of agreement of equal or more than 51% (here 70%), it can be said that the panel of experts agreed that "the lack of up-to-date content" in the basic sciences curriculum was "an important" problem.

**Table 4.** The agreement level of the expert panel with the low practical application of the content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 0 | 0 | 1 | 3.7 |
| Less important | 1 | 10 | 1 | 3.7 |
| To some extent less important | 2 | 20 | 1 | 3.7 |
| To some extent important | 0 | 0 | 1 | 3.7 |
| Important  | 7 | 70 | 1 | 3.7 |
| Very important | 0 | 0 | 1 | 3.7 |

According to the two indicators of IQR of equal or less than 1 (here 0) and the level of agreement of equal or more than 51% (here 70%), it can be said that the panel of experts agreed that "the low practical application of the content" in the basic sciences curriculum was a "an important" problem.

**Table 5.** The agreement level of the expert panel with the medium bulky content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 2 | 20 | 1 | 2.7 |
| Less important | 3 | 30 | 1 | 2.7 |
| To some extent less important | 3 | 30 | 1 | 2.7 |
| To some extent important | 0 | 0 | 1 | 2.7 |
| Important  | 2 | 20 | 1 | 2.7 |
| Very important | 0 | 0 | 1 | 2.7 |

Based on Table 5, although the IQR was equal to 1, but the level of agreement of the expert panel according to the Likert scale was at no point greater than or equal to 51%. So, it can be said that the panel of experts disagreed on the importance of "medium bulky content" problem at any point.

**Table 6.** The agreement level of the expert panel with the poor relevance of the content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 0 | 0 | 1 | 4.5 |
| Less important | 1 | 10 | 1 | 4.5 |
| To some extent less important | 1 | 10 | 1 | 4.5 |
| To some extent important | 1 | 10 | 1 | 4.5 |
| Important  | 6 | 60 | 1 | 4.5 |
| Very important | 1 | 10 | 1 | 4.5 |

According to the two indicators of IQR equal or less than 1 (here 1) and the level of agreement of equal or more than 51% (here 70%), the panel of experts agreed that "the poor relevance of the content to the goals of the program” in the basic sciences curriculum was "an important" problem.

The Third Round

In the third round, the categories agreed upon in the second round were presented to a second-round panel of experts in the form of a questionnaire with a 6-point Likert scale to mark their agreement with each item and specify the appropriate item. In the following, using the two statistical indicators of IQR and the level of agreement of 51%, the rate of agreement of the expert panel with each item has been provided (Tables 7 and 8). Based on the two indicators of IQR more than 1 (here 2) and the level of agreement of less than 51%, it can be said that the panel of experts disagreed with “bulky content” in the basic sciences curriculum.

**Table 7.** The agreement level of the expert panel with the bulky content.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Frequency | Percentage | Interquartile Range | Average |
| Not important | 3 | 30 | 2 | 2.3 |
| Less important | 2 | 20 | 2 | 2.3 |
| To some extent less important | 4 | 40 | 2 | 2.3 |
| To some extent important | 1 | 10 | 2 | 2.3 |
| Important  | 0 | 0 | 2 | 2.3 |
| Very important | 0 | 0 | 2 | 2.3 |

Ranking the Problems of the Basic Sciences Curriculum

Using the Delphi method, only the categories upon which the expert panel expressed agreement were ranked from the most to the least important based on respective average values (Table 8). As it was identified in the second and third rounds, the expert panel expressed agreement on “low-level comprehensiveness”, “out-of-date content”, “low-level of practical application”, and “the weak relationship of the content with educational objectives”. However, the experts had no agreement on the problem of “bulky content”.

**Table 8*.*** Ranking the problems of the dimensions of content.

|  |  |  |  |
| --- | --- | --- | --- |
| Rank  | Problem  | Average | Level of agreement (%) |
|  1 | The weak relationship of the content with the objectives of the curriculum | 4.5 | 60 |
| 2 | Low-level comprehensiveness  | 3.9 | 80 |
| 3 | Low-level practical application  | 3.7 | 70 |
| 4 | Out-of-date content | 3.6 | 70 |

As it can be seen, the problem of “the weak relationship of the content with the objectives of the curriculum” was ranked the first, followed by “low-level comprehensiveness”, “low-level practical application”, and “out-of-date content”, respectively.

**Discussion**

From the view point of the experts, “the weak relationship of the content with the objectives of the curriculum” was the most important problem of the basic sciences curriculum, which means that there is a distance between the content of basic sciences curricula and their educational objectives. Accordingly, experts insisted on the enrichment of the content of the basic sciences curriculum. Some previous studies (12-14) have also addressed this challenge.

The second important problem was the “low-level of comprehensiveness" of the content, meaning that the curriculum fails to cover all the dimensions of basic sciences needed by students (7,9). Experts believed that the content of the basic sciences curricula should include the subjects needed by the health system. The low level of comprehensiveness of the contents can mislead the students on the importance of basic sciences subjects. This finding is in line with the previous studies (14, 15).

The third important problem was the “low-level of practical application of the content”, indicating that the content was mainly focused on memorization, while ignoring practical skills. Experts believed that educational programs should cover all learning dimensions and train qualified students (10). Consistently, dome literatures (12-14) mentioned that basic science courses were not practical and could not train students able to cope with their jobs’ real problems.

The fourth important problem, according to the views of the experts, was “out-of-date content”, reflecting the fact that the topics of basic science courses were old and lacked revisions in accordance with scientific advancements. This finding is in line with the findings of the recent findings (3, 8, 9). Out-of-date content can reflect the low-level of comprehensiveness of the objectives as well. The educational system should be able to present students with the latest scientific achievements and findings (8-13).

**Conclusion**

In this study, based on the perspectives of experts, the most significant problems of the basic sciences curriculum included low relevance to educational objectives, lack of comprehensiveness, and finally, low-level practical application. Based on the final analysis, it can be concluded that the panel of experts generally agreed with the items in the basic sciences curriculum. These results can be customized with the current needs of real medical education environments. Besides it will improve the educational processes in medical universities. In addition, improves the quality and efficiency of education process and create more added value.

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**Authors’ contribution**

All authors contributed equally to this study.

**Conflict of interest**

The authors declare that they have no conflict of interest.

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**References**

1. Shakurzadeh R, Maleki HG, Mehdi C. Quality Assessment of Postgraduate Curriculum Management and Educational Planning. J Educ Psychol. 2014;10 (34): 92-67. doi: 10.1016/j.sbspro.2011.04.363
2. Kehavarzi M, Yarmohammadian MH, Nadi MA. Curriculum Content Based on Future Studies Development in Iran's Higher Education: A Qualitative Research. J High Educ Curric Stud. 2018; 8(16): 119-38. doi: 20.1001.1.25382241.1396.8.16.5.3.
3. Salehi L, Monavarifard F, Mohamadi Y. Analysis effect of curriculum components on students’ Entrepreneurial Self-Efficacy in Alborz agricultural technical higher education centers. J Agricultur Educ Admin Res. 2017; 8(39): 16-27. doi: 10.22092/jaear.2017.109269.
4. Nouns Z, Schauber S, Witt C, Kingreen H, Schüttpelz-Brauns K. Development of knowledge in basic sciences: a comparison of two medical curricula. Med Educ. 2012;46(12):1206-14. doi: 10.1111/medu.12047.
5. Keeney S, Hasson F, McKenna H. The Delphi technique in nursing and health research. Washington: Wiley – Blackwell, 2011. doi: 10.1016/j.sbspro.2011.03.102.
6. Nizamov IG, Sadykova TI. Quality of postgraduate medical education. Int J Risk Saf Med. 2015;27 Suppl 1: S93-4. doi: 10.3233/JRS-150704.
7. Biabangardi Z, Soltani Arabshahi SK, Amini A, Shokraei R, Yadavar Nik Raveh M. Role of Basic Science Courses on Promoting the Medical Graduate's Competencies in Medical Schools of Iran. Iran J Educ Med Sci. 2005; 5 (1): 13-23.
8. Vahidshahi K., Mahmoudi M., Ranjbar M., Shahbaznejad L, Ehteshami S, Shafiei S. The Effect of Early Clinical Experience on the Attitude of Medical Students on Basic Sciences Courses, Steps in Medical Education Development. 2011; 8 (1): 94-100.
9. 9. Dion, Albright and Bennett, Neville. Discussion and Learning Forouzandeh Davarpanah Translation. Tehran: Roshd Publications, 2004. doi: [10.1111/j.1743-498X.2009. 00336.x](https://doi.org/10.1111/j.1743-498X.2009.00336.x).
10. Keeney S, Hasson F, McKenna HP. Consulting the oracle: ten lessons from using the Delphi technique in nursing research. J Advanc Nurs. 2006; 53(2):205-12. doi: [10.1097/ACM.0000000000000754](https://doi.org/10.1097/ACM.0000000000000754).
11. Keeney S, Hasson F, McKenna HP. A Critical Review of the Delphi Technique as a Research Methodology for Nursing. Int J Nurs Stud. 2001; 38(2): 195-200. doi:10.1016/S0020-7489(00)00044-4.
12. Goodman CM. The Delphi technique: a critique. J Adv Nurs. 1987;12(6):729-34. doi: 10.1111/j.1365-2648. 1987.tb01376.x.
13. Beretta R. A critical review of the Delphi technique. Nurse Res. 1996;3(4):79-89. doi: 10.7748/nr.3.4.79.s8.
14. Couper MR. The Delphi technique: characteristics and sequence model. ANS Adv Nurs Sci. 1984;7(1):72-7. doi: 10.1097/00012272-198410000-00008.
15. Vergel J, Quintero GA, Isaza-Restrepo A, Ortiz-Fonseca M, Latorre-Santos C, Pardo-Oviedo JM. The influence of different curriculum designs on students' dropout rate: a case study. Med Educ Online. 2018;23(1):1432963. doi: 10.1080/10872981.2018.1432963.
16. Ghasempoor Khoshrodi E, Nateghi F, Jalalvandi M. Designing a Curriculum Pattern via Service-Learning Approach in Organizations for Students. Organ Cult Manag. 2019; 17(4): 661-86. doi: 10.22059/jomc.2019.248802.1007421.