

## Assessment of Research Methods in Healthcare by Analytical Hierarchy Process Technique

Ajami S<sup>1\*</sup> and Ketabi S<sup>2</sup>

<sup>1</sup>Department of Management & Health Information Technology, School of Medical Management and Information Sciences, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>2</sup>Department of Management, Faculty of Administrative Sciences and Economics, University of Isfahan, Isfahan, Iran

\*Corresponding author: Sima Ajami, Ph.D., Professor, Department of Management & Health Information Technology, School of Medical Management and Information Sciences, Isfahan University of Medical Sciences, (P. O. Box: 81745-346), Isfahan, Iran, Fax: +98-31-36684799, E-mail: [ajami@mng.mui.ac.ir](mailto:ajami@mng.mui.ac.ir)

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### Abstract

**Introduction:** Advances in human health and welfare ultimately depend on research projects. Healthcare research can provide important information about disease trends and risk factors, outcomes of treatment or public health interventions, functional abilities, patterns of care, and health care costs and use. Teaching healthcare research is done to make change and meet human needs in the community. The aim of this study was to assess research methods in healthcare (content and methods of teaching) by Analytical Hierarchy Process (AHP) before and after intervention.

**Methods:** This research was applied and educational intervention. The study population included two group students, who taught before and after intervention (old and new methods) in "Research Seminar" syllabus at Isfahan University of Medical Sciences. The data were gathered from matrix forms, which approved the validity of by experts, through brainstorming in several sessions. Then the data were gathered in two steps that second step was after six months of intervention. The findings were based on the ranking of both content and methods of teaching (before and after intervention). Then the data were analyzed by using the software "Expert Choice" and "Analytical Hierarchy Process" technique.

**Results:** Findings showed both in aspect of the application for a student during school and aspects of knowledge production that the new content and new teaching method is higher than the old ones.

**Conclusion:** Training should be changed according to community and learner needs. Living in today's conditions, community needs are constantly changing; it is recommended that universities should also regularly improve their content in training courses.

**Keywords:** Assessment; Research methods; Process; Healthcare

### Introduction

Research is essential to guide improvements in health systems and develop new initiatives [1]. Medical writers require to be familiar with searching the medical literature, understanding and presenting research data, the document review process, and editing and publishing requirements. They also need to get the required training in the science and art of medical writing, and upgrade their knowledge and skills on an ongoing basis [2].

The syllabus is a description and plan for a course and, if it writes well. It may be a tool that improves student learning, facilitates faculty teaching, improves communications between faculty members about their courses, and assists with monitoring program quality. Providing a well-written syllabus will help the students in the learning environment and will assist faculty members as they teach. This review provides a guide to the variety of sections that may be included in a syllabus [3].

Assessments are an essential part of the instructional process. The concept of learning management systems includes a combination of

improved learning factors, including leadership, administrative and bureaucratic compliance official duties, informal relations in human resource development, curriculum design, curriculum development, evaluation, control, career guidance, job training, educational and behavioral and environmental decision making.

Each of levels in the elementary school, junior, high school, and academic requirements the operation and administration of public and private education departments and agencies of the need for change in management of educational courses and related syllabus [4].

The Analytic Hierarchy Process (AHP) Method belongs to the most popular and recently most utilized methods for a multi-criteria decision-making. The solving of complex problems in a decision-making process with this method is based on their decomposition into a hierarchy structure; their elements are; goals, criteria (sub-criteria) and alternatives.

The method is quite simple; the number of samples is not critical key; it may be widely applied, it equally evaluates work experience and knowledge as well as numerical data. It is possible to work with 5-7 criteria at the same time. The criteria are attributes used to describe alternatives and their purpose is to directly or indirectly provide

information on the extent to which certain alternative is able to secure the desired goals, so that in the end, a rank list of alternatives shall be made and shall be used for making a final decision. The other reason for a large popularity of this method is good software Expert Choice which might be obtained free-of-charge for two weeks [5-8].

Outcomes and products in educational institutes should address and respond to the needs. To reach this educational goal, learning needs should analyze. Educators learners these questions: Do curriculum and syllabuses meet the needs of their community and expectations? Educators should evaluate different methods of teaching and selecting the most suitable of them.

So, according to majority healthcare students' viewpoints (85%), the "Research Seminar" course, is important to assess as follows:

- Graduate student position in the production of knowledge.
- Match the curriculum and syllabuses (approved by the High Council of Medical Education Planning in the Ministry of Health) with current student needs, that include offering his/her thesis report maximum by six semesters, offering the acceptance of her/his article which extracted from his/her thesis in the English journal that indexed in Information Sciences Institute (ISI) or PubMed databases.

On the other hand, the students tended to be extremely precisely and effectively learn the skills and techniques which are necessary to successfully complete their thesis.

So, they asked that universities should teach research methodologies, analytical skills, the ability to prepare articles, prepare an academic poster, and oral presentation at conferences.

In respond of their needs, in the second phase (as a new method), all requirements, which mentioned in above, were fulfilled.

Therefore, the aim of this study was to compare and assess research methods in healthcare (content and methods of teaching) by Analytical.

## Method

This research was applied and educational intervention. The study population included two group students, who taught before and after intervention (with old and new methods) in the content of "Research Seminar" syllabus at Isfahan University of Medical Sciences during 2013-2014. The first (old method) group taught in old syllabus content and method of teaching was lecture and teacher oriented. The second (new method) group taught in new syllabus content which is based on the students' needs and problem-solving technique. In the second group, method of teaching was student oriented. In both new and old groups had a total of four students were 8 people. In two groups, two different content and teaching methods were compared. After 6 months, in several meetings, the two groups discussed about the effective criteria on teaching methods and syllabus in "Research Seminar" course.

The new syllabus of "Research Seminar" course was divided into two criteria. Then, the influence factors for each criterion, and thus the sub-criteria were determined. Thus the analytic hierarchy process diagram was drawn. The data were gathered in two steps that the second step was after six months of intervention. The data were gathered from matrix forms, which approved the validity of by experts, through brainstorming in several sessions. The findings were based on the ranking of both content of the syllabus and teaching methods.

Then the data were analyzed by using the software "Expert Choice" and "Analytical Hierarchy Process" technique.

## Results

According to opinion of students, educational goals should be changed into below (new content):

- Knowing how to prepare reports for research, thesis, and dissertations,
- Knowing how to present an oral report at the conference and defense day,
- Knowing how to prepare articles from research reports for research, thesis, and dissertations,
- Knowing how to prepare academic posters,
- How to find relevant journal articles in field of study,
- How to submit articles to scientific journals around the world,
- Knowing who is the author and what is authorship conditions,
- Knowing scientific databases.

Finally, both new and old contents in these criteria were compared. Figure 1 shows the analytic hierarchy process parameters associated with the "Research Seminar" syllabus.

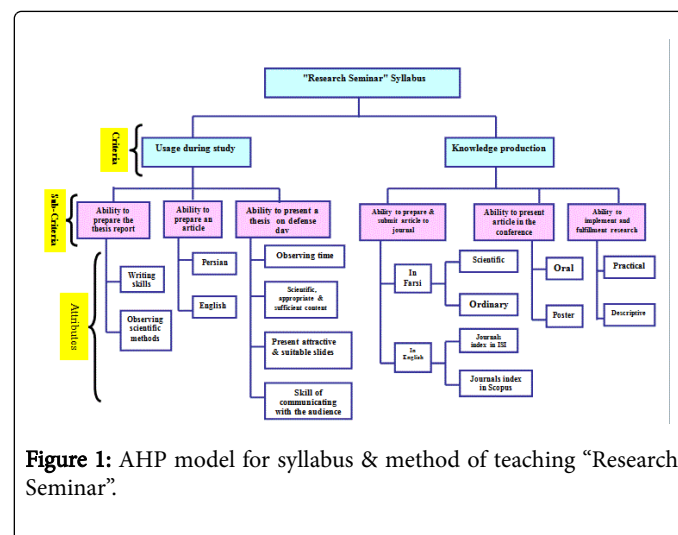


Figure 1: AHP model for syllabus & method of teaching "Research Seminar".

## AHP model

The AHP method basic model includes for the requirements of this research, the goal, six selection sub-criteria divided from two criteria, and two alternatives (Figure 1).

### Goal:

Assess both syllabus criterion and methods of teaching.

### Alternatives:

**The first (old) group:** The first group was trained with no change in the syllabus and its methods of teaching were lectured and teacher oriented.

**The second (new) group:** The second group was trained in the new syllabus content and method of teaching was the student oriented method, which obtained from consensus by the students' first and second groups in brainstorming meetings.

**Criteria (components or factors):**

**Usage during study:** sub-criteria:

- Ability to prepare a thesis report,
- Ability to prepare an article,
- Ability to present a thesis on defense day.

**Knowledge production:** sub-criteria:

- Ability to prepare & submit articles to the journal,
- Ability to present article in the conference,
- Ability to implement and fulfillment' research.

The criteria related to the "Research Seminar" teaching in viewpoints of students were recognized. There were three sub-criteria for usage during education factor as follows;

- Ability to prepare a thesis report,
- Ability to prepare an article,
- Ability to present a thesis on defense day"(Figure 1).

The findings showed, according to viewpoint of students the more important issue belongs to "Ability to prepare a thesis report" with 0.63 the relative weight.

There were two attributes for "Ability to prepare a thesis report" as follows; "Academic writing skills" and "Observing scientific methods" in which "Observing scientific methods" with 0.525 the relative weight had higher weight.

There were two attributes for "Ability to prepare an article" as follows; "prepare an article in English" and "prepare an article in Persian" in which "prepare an article in English" had higher weight than "prepare an article in Persian".

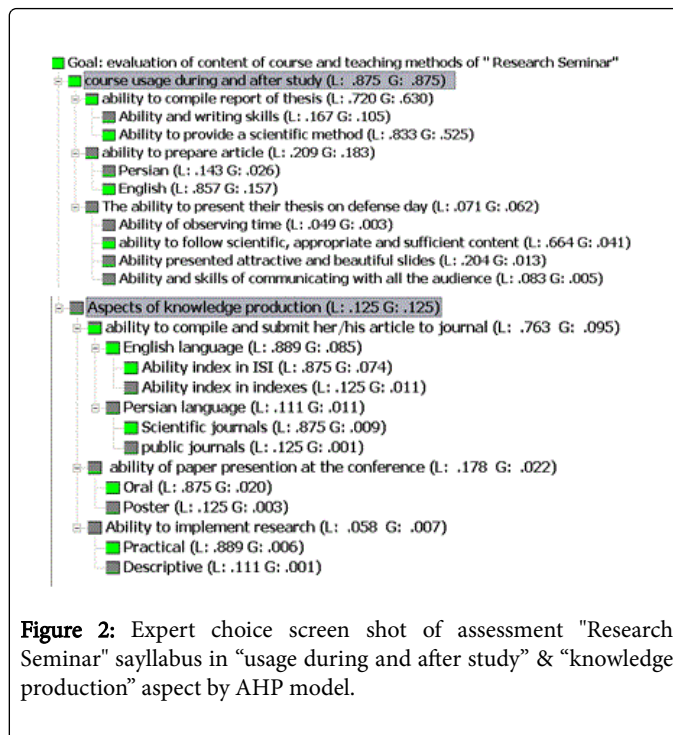
There were four attributes for "Ability to present a thesis on defense day" as follows; "Observing time", "Scientific, appropriate, and sufficient content", "Present attractive and suitable slides", and "Skill of communicating with the audience" in which "Present attractive and suitable slides" had higher weight than others with 0.13 the relative weight.

There were three attributes for knowledge production factor as follows; "Ability to prepare & submit articles to the journal", "Ability to present article in the conference", and "Ability to implement and fulfillment research". In this criterion, the analysis demonstrated according to viewpoint of students more important issue belonged to "Ability to prepare & submit articles to the journal" and " Ability to implement and fulfillment research" with 0.095 and 0.007 the relative weight respectively (Figure 2).

As Table 1 shows, the use of new methods and content of both usage students during their education and knowledge production ranked higher than the old one.

Criteria		Students' use	Knowledge production
Alternatives	Old	0.108	0.160
	New	0.892	0.840

**Table 1:** Comparison on new and old methods of the "Research Seminar" syllabus aspects of "students' use" and "knowledge production".



**Figure 2:** Expert choice screen shot of assessment "Research Seminar" syllabus in "usage during and after study" & "knowledge production" aspect by AHP model.

There were two attributes for "Ability to prepare a thesis report" as follows; "Writing skills" and "Observing scientific methods".

According to synthesis test concluded in new syllabus based on three sub-criteria; (ability to prepare and submit articles to the journal; ability to present article in the conference; and ability to implement and fulfillment research) were more privileged than the old method.

**Discussion**

Dyer and Forman concluded that group decision-making process base on AHP can eliminate personal, tangible and intangible values. In this type method, exchange of ideas will continue until all relevant information from participants in a group should be considered and reach to a consensus [9]. Therefore, results should be more reliable and repeatable.

Gold and Atkinson mentioned that to move forward, health educators need to organize their knowledge and make it accessible. This includes explicit and tacit knowledge, work in progress, and a coordinated research agenda. Finally, health educators need to be flexible so they can enable future research needs [10]. Therefore, researchers, who are health educators, assessed current community needs, and adapt and modify the curriculum and their syllabuses according current needs.

Brownell et al. focused their course primarily on writing' communication because i), they developed students' writing skills, ii), they used student writing as a proxy to assess their mastery of the scientific content of the course, and iii), they incorporated extensive draft and revision opportunities. However, they believed it should need for formal training of scientists to communicate orally to the lay public is equally important [11].

In this study, new method also designed as much as possible according to the future needs of students during school and after graduation.

Results of a study that entitled "impact of two methods e-learning and lecture on learning maternal and child health nursing course showed learning of the two groups were similar.

## Conclusion

Current age is duration change and learning cannot stay away from these changes and need to be changed. In higher educational, educational curriculum should lead to the ability of graduates to meet the needs of the labor market. Due to the growing and diverse needs of the labor market, the curriculum also requires a fast update. In the age of information and communication technology, in which the production of knowledge doubles every five years, another important problem in higher education is obsolescence syllabuses with the current needs of the community. Training needs to be done to make changes. As regards conditions of modern life, are constantly changing the needs the community it should be recommended that universities should modify their teaching curriculums.

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## Ethical Issues

The study protocol was approved by by deputy of research at Isfahan University of Medical Sciences.

## Authors' Contributions

SA contributed for conducting a research project, gathering data, preparing and editing manuscript, approval of the final version of the manuscript, and agreed to all aspects of the work. SK contributed in the design of the study, the analysis data, and agreed to all aspects of the work.

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