

Improving medical education in Iran: an action research in changing the curriculum and teaching and learning methods

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Abstract

This article is the report of an action research carried out in a medical university aimed at developing the teaching staff's professional skills and revising the curriculum of medical education. The academic members were reoriented towards active methods in teaching and learning basic sciences with a view to upgrading the quality of medical education and improving the curriculum.

The action research was carried out in Shaheed Beheshti University of Medical Sciences and Health Services in Tehran during 1999-2000. The participants were 42 academic members and 686 students of the first and second years of the basic sciences in the medical school. The courses selected for the study were anatomy, parasitology, immunology, histology, biochemistry, English, physiology and bacteriology. A number of different activities were carried out before and during the period of the action research in order to prepare

both the teachers and the students for the change. These activities included educational workshops, skills learning sessions, individual guiding and consulting sessions, feedback and evaluation consulting sessions, collective decision-making and exchange of views at all stages of the project and briefing sessions for a number of the students. The traditional lecture based method of teaching was gradually replaced by the active methods, emphasised in these sessions. The academic members were encouraged to write lesson plans that incorporated active learning methods. The project was evaluated through frequent observations, various interviews and different questionnaires.

The results indicated that the project was fully successful in changing attitudes and developing the necessary skills among the academic members of the school, improving class curriculum and the quality of education. The project was not

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significantly successful in changing the attitudes of the students. The main reasons behind this lack of success were attributed to the high number of students enrolled in each course, an intensive syllabus and limited facilities.

Introduction

Higher education has an important role in training human resources, in developing individual capabilities and in bringing about social, cultural and economic changes. Given this significance, its efficient functioning and productivity are matters for permanent study and scrutiny. Conducting research and evaluating the system to promote the quality of education and to increase its effectiveness have become essential objectives in any educational system. This is particularly true in the case of medical education which is concerned with the provision of national health care.

In spite of the constructive efforts made after the integration of medical education with the health services in Iran, there are still many pitfalls and barriers in the educational system of the country which warrant urgent attention. One objective of the integration was to increase the admission to medical schools (Marandy in this volume) and as a result, number of students in each class increased dramatically. Teachers dealt with this difficult situation by relying more on a lecture-based teaching format rather than having the students' active participation in the learning process. This was seen more in the basic sciences, which is more theory driven, than in the clinical sciences, which is more practically oriented. Consequently, a gap was created between basic and clinical sciences and Azizi (1997), addressing this problem, called for an integration of basic sciences with clinical sciences which would serve as a bridge between theory and practice.

Two separate studies have been conducted in the medical school of Shaheed Beheshti University of Medical Sciences and Health Services (SBUMSHS) to evaluate the educational system of the basic sciences. The first study looked at how

efficiently the system was working and what could be done to make it better (Sedri Ardakani, 1997). The second study was a survey of the viewpoints of students and lecturers of the basic sciences in order to ascertain the drawbacks and barriers in the system (Mirzabeygie 1998). Both these studies highlighted problem areas such as a lack of affinity to lessons, a lack of the active participation of students in classes and projects, a lack of favourable student attitudes towards the importance of and the necessity for basic sciences and their application in the clinical stages, the absence of a necessary link between basic and clinical sciences in basic medical education and the existence of problems concerning materials, equipment and educational facilities.

Reorienting the academic staff toward active methods in training medical students, developing skills in writing lesson plans and using them in the classes were regarded as possible solutions to the problems indicated by the staff and students. In addition, changing the attitudes and abilities of students, creating a better educational environment and utilizing more suitable material, equipment and educational facilities were also considered to be important factors in improving the quality of education.

These two studies prompted this action research which sought to remedy the problems. The main objective of the research was a gradual improvement in the curriculum, medical training and the learning process. Four major factors were targeted in the research: students, professors, the curriculum, and educational facilities.

The use of active methods in teaching and learning

In medical education, there is increasing emphasis on the necessity for promoting the quality of learning and educational methods by replacing traditional procedures with innovative and more effective ones. For Baldwin (1992), for example, these are main issues in his study of the history of

transformation and innovation in the medical education curriculum.

As part of this transformation, the importance of applying active methods in higher education and modifying the traditional methods has been emphasized by many sources, such as McBeath (1992), Newman (1993), Newble and Canon (1997). Amongst the many studies on various teaching methods, the most significant are those on the application and results of PBL (Problem-based Learning) (Norman and Skemit, 1992). The results of a study, carried out on the attitude of students towards learning basic medical sciences, based on PBL and traditional teaching methods indicated that the students present in the PBL classes had a more positive attitude towards the curriculum than those in traditional classes (Kaufman and Mann, 1997).

Much research has been carried out in our country to compare the application of both the traditional and active methods and the effects of specific techniques and activities in medical education (Javid, 1998 & Rafi'ian).

Active methods and developing the curriculum

As the curriculum is that which underpins education and learning, improving the curriculum is a major preoccupation for those involved in the field. In studying the philosophical and historical principles of the curriculum, Ronald Doll believes the necessity to improve schools is a concept as old as the existence of schools themselves (Doll, 1992). This necessity is found at all levels of education. The qualitative improvement of learning methods in higher education is also considered to be of great importance (Ramsden, 1992). However, few educational projects aimed at promoting the quality of education and improving the curriculum with an emphasis on active methods have been conducted at the level of higher education

There are examples from different parts of the world of innovative programs in medical education which use active learning methods. For instance, there was the introduction of the Problem-based Curriculum (PBC) and studies were carried out at the University of McMaster in Canada (1965) as well as in Europe at the Universities Maastricht and Limburg in the Netherlands (1974). Other examples are the application of the Integration Method in clinical and basic sciences at the University of Newcastle in Australia and the application of Community-Oriented Medical Education (COME) at the Suez Canal University in Egypt and the University of Sudan in 1999 (Shajari 2000). A further example is the introduction of the program titled "New Pathway to Medical Education", which was designed and executed at Harvard University in 1983. The main objectives of this program were to modify the traditional methods to make them more student-centered and problem-based, and to incorporate the patient-doctor relation and lifelong learning methods (Tosteson et al, 1994).

Three projects titled "Curriculum development and quality of teaching and learning" at pre-university levels have been conducted in Iran. These projects were carried out in three different primary schools in Tehran in the academic year 1996-1997. The emphasis of each project was on the application of active methods in teaching and learning. During the projects, participants' skills in teaching and learning and applying active methods were improved. This resulted in a fundamental shift from the traditional teaching methods toward active methods and also led to developments in the curriculum (Mirzabeygi 1997). There have been no other studies conducted to improve the curriculum with an emphasis on using active methods in Iran.

Action research

Much has been published on action research (operative research) and many research studies based on this method have been carried out in social and educational fields, such as those carried out by Kurt Lewin, Stephen Corey, Elliot, Carn and

Kemmis (mentioned in Stuart, 1991). The action research method is different to other methods of research where an existing situation is studied and a general conclusion is arrived at by the researcher who does not get involved in changing the situation s/he is studying. In action research, the researcher's involvement is the key to improving education through creating changes and gaining valuable experience from the results (Kemmis, 1997)

One relevant research study carried out using action research was the "Classroom Action Research in Africa: A Lesotho Case Study of Curriculum and Professional Development" (Stuart, 1991). This research, which was carried out at a high school and teacher training level, is different to the present research in many respects including the level and course of education, but has common objectives and a common methodology, where the emphasis is on developing the skills of teachers, and promoting the quality of education.

In Iran, few research studies have been carried out based on action research and only a few pages in the book written by Naderi and Seyf Naraqi (1985) have been dedicated to the method. There are also two articles by Gouya (1372) and Bazargan (1372) which refer to this method. There has been only one report about a research carried out using action research at the Faculty of Mathematics at San'ati Sharif University in Tehran. The study was entitled 'Action Research and its Application in Promoting the Quality of Higher Education: A Case Study of Improving the Quality of Education at the Faculty of Mathematics at San'ati Sharif University' (Zohouri Zanganeh & Gouya, 1998). The major objective of the research was to evaluate the educational system of the University and seek solutions for the betterment of the system. The study proposed the need for "promoting friendly and academic relations between students and professors" and "evaluating the roles of supervisors". Unfortunately, the research did not follow all the stages of an action research method

and lacked a systematic approach to action research.

The general objectives of the present research were to create changes in order to develop the skills of professors, improve curriculum, change attitudes of students and educational conditions and facilities aimed at promoting the quality of basic medical sciences education with emphasis on active methods.

The primary objectives were aimed at:

- bridging the gap between basic and clinical sciences, changing attitudes, developing skills in curriculum planning, teaching based on active methods and using different educational facilities.
- improving the curriculum through using appropriate lesson plans, applying active methods, using suitable materials and educational facilities by the academic members.
- changing the attitudes of students and promoting active participation in teaching and learning.
- supplying and utilizing different material and facilities and creating better educational environments.

Research Method and Participants

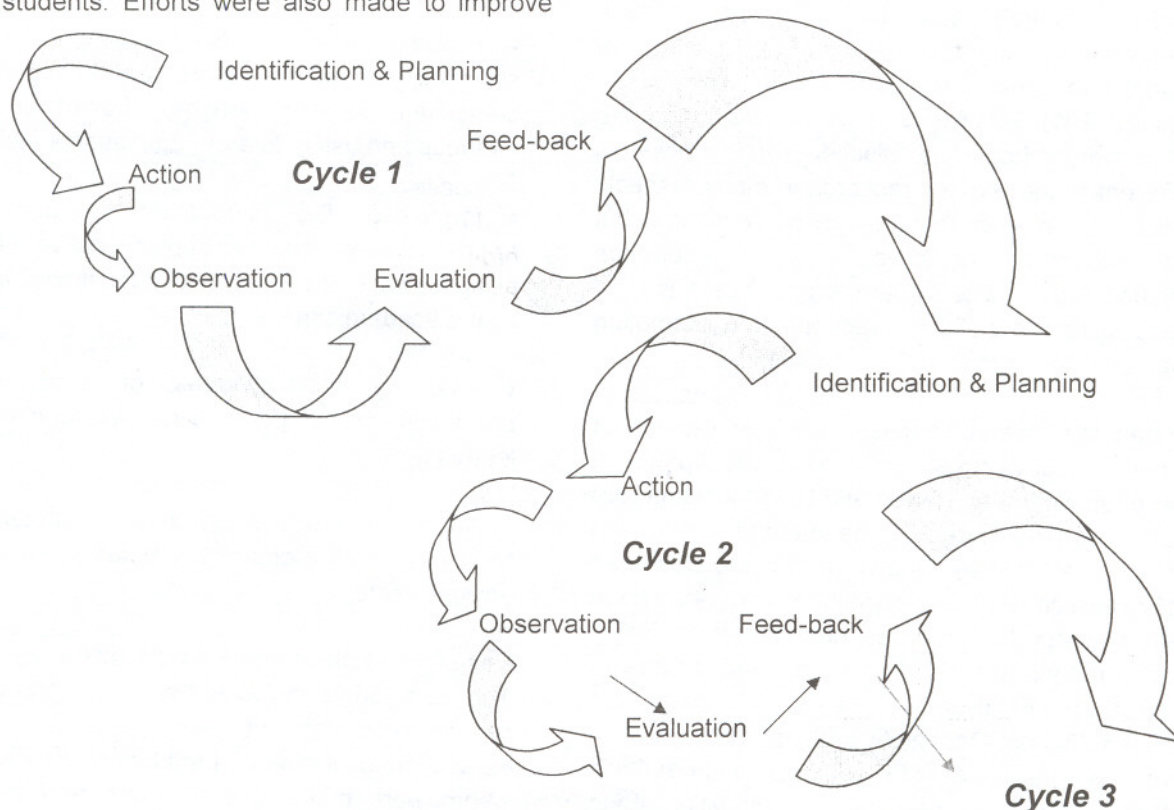
The participants included two major groups. The first group consisted of 42 academic members of the basic sciences, 25 of whom were males and 17 were females. They were selected from the eight different departments of Anatomy, Parasitology, Immunology, Histology, Biochemistry, Physiology and Bacteriology and English. The learning of medical English is a mandatory subject for basic sciences students. In general, there were around 3 to 4 participants from each mentioned departments except the English Dept. which had only one participant. The second group consisted of a total of 686 students, 302 males and 384 females, all of whom were first

and second year medical students studying in the classes taught by the academic members participating in the study.

The action research method was used in the present research and consisted of two main stages. The main stage of the present research was the action research carried out by the researcher in training and developing the skills of academic members in order to improve the curriculum. Active methods of teaching and learning were employed to change the attitudes of the students. Efforts were also made to improve

the conditions and facilities. In the second stage, action research was carried out by the professors in their classes to introduce new teaching methods to replace the traditional lecturing method with active methods (i.e. utilization of audio-visual learning techniques).

The action research method consists of inter-related cycles. Each cycle itself consists of different stages such as identification and planning, action, observation and feed-back.



The Main Stages of the Action Research Method (Stuart 1991)

With identifying the existing problems and deficiencies in teaching and learning basic medical sciences, the first cycle consisted of planning, then action, observation and then evaluation to get feed-back. The second and third cycles were based on the experiences gained by the first cycle, followed by identification, planning, action, etc.

Actions Taken to Meet the Objectives of the Project

A number of different activities were carried out before and during the period of the action research. These activities included educational workshops, skills learning sessions, individual guiding and consulting sessions, feedback and evaluation consulting sessions, collective decision-

Improving medical education in Iran

making and exchange of views at all stages of the project and holding briefing sessions for a number of the students.

The activities also included:

- Establishment of a training workshop for the academic members titled "Designing Curriculum with Emphasis on Active Methods"

- Group skill-learning sessions for the representatives of each department

- Educational consulting and guidance sessions for academic members (individual sessions) prior to carrying out project in classes

- Group sessions and training workshops for academic members to evaluate, analyze feed-back, exchange mutual experiences and propose decisions at the end of each cycle

- workshops and individual teaching sessions for the academic members and the representatives of the departments to improve their ability in writing lesson plans.

- workshops and teaching sessions aimed at designing teaching methods to create links between the clinical and basic sciences.

- Briefing sessions for the students

- Breakdown of overlarge classes (200 students) to half

- Increasing educational facilities and equipment for the academic members, in order to be able to evaluate, exchange experiences and analyze the feed-back and establish more effective teaching patterns

With regard to the first stage, the professors' skills (increase of knowledge, change of attitudes and skills learning) were developed to obtain the objectives of the project and lessons were taught

through active methods (and the educational media) in at least 20% of the class sessions in each subject, in both semesters of the academic year 1377-78. To achieve the objectives of the project, follow-up sessions, meeting and theoretical and practical courses (including workshops) were held.

In the second stage, which was aimed at creating changes in students, briefing sessions were held to change the attitudes of students and increase their interests in active methods. The academic members attempted to create changes in the abilities of students in class sessions and to encourage active participation in learning. To create changes in educational conditions and facilities, the number of students per class was decreased, the utilization of educational material and equipment was increased and professors were provided with better access to educational material and equipment with the cooperation of the university authorities.

Data Collection and Analysis

The data was collected throughout the project through direct observation and video recordings of classroom discussions, as well as through interviews and questionnaires.

As collecting data through the action research method is not merely quantitative and is actually a combination of quantitative and qualitative methods, the evaluation of the project was carried out informally by the researchers at the end of every semester. The official, external evaluation of the project was carried out as an independent research by the Medical Education Development Department of the University.

Results and Discussion

The results of the internal, informal evaluation indicate that the research has been relatively successful in achieving the primary objectives of the project.

In addition to the opinions expressed by the research team in regard to the success of the project in increasing the skills (an increase in knowledge, change in attitudes and skills learning) of academic members, three professors from three different departments gave feedback. One of the professors found this type of research extremely useful and two of them found it useful.

In response to the questions "how would you evaluate the action research method and its different stages? How useful has this method been for the teaching staff?" the three professors found the strongest points of the method to be as follows:

- The participation of all academic members, who were able to discover their teaching weaknesses of which they were not previously aware
- Training workshops and group examinations
- The enthusiasm of the students in participating in such programs
- Closer relations between the professors and students
- Creating motivation and suitable atmospheres for further discussions during sessions
- Creating interest in students
- Creating strong motivation in students
- Encouraging the students to confront scientific subjects on their own
- Creating interest in professors

The weak points expressed by the three professors are as follows:

- Lack of sufficient time to carry out active methods
- Excessive number of students
- The professors who showed interest in the project were not granted more benefits, compared to those who showed no interest, and the time spent carrying out the program was not calculated as part of their work load
- Many students and professors were not completely aware of the details of the program

Regarding the first primary objective which is concerned with creating links between basic and clinical sciences, most of the objectives were achieved through understandable and applicable teaching methods followed by case studies in many classes. A special team consisting of academic members was formed to design new teaching patterns to create links between the clinical and basic sciences departments. During the various sessions, two curricula were designed on this basis. The teaching patterns were to be put to use in classes and used as samples by other members after the results were recorded on video. Unfortunately, this operation was not performed due to the work constraints of the staff and the difficulties in recording the sessions.

With regard to the primary objective No.2, over 20% of classes were held using the new active methods including lesson plans and utilizing auxiliary teaching equipment. Major progress was observed in regard to the change in attitudes of the students, the increase of skills-learning in academic members in using new active teaching methods.

With regard to the primary objective no.3 which was concerned with the change in attitude and abilities of students, although some of the students showed interest in participating in class discussions, nevertheless, the project did not fully achieve its goals in this matter

With regard to primary objective no.4 which concerned educational conditions and facilities, the results indicated that there was an increase in auxiliary teaching material and equipment and the professors had better access to these equipment. There were also a decrease in the number of students in classes and halls.

The most important results of the research have relevance for three main issues.

1. Multifaceted approach to the development of skills in academic members

This issue has been greatly emphasized in educational sources. This finding is also similar to the results of the action research carried out by Stuart. In describing the results of her experiences, she has written that the combination of a variety of methods in a stable teaching pattern, prepares an excellent framework for effective teaching and learning" (Stuart, 1980). Although Stuart's point was based on experiences gained from teaching high school students, nonetheless, the experiences gained from the present project indicate the importance of the same issue in training the teaching staff. As mentioned before, the methods used in this research included training workshops, group skill-learning sessions, individual guiding and consulting sessions, briefing sessions, gatherings and exchange of experiences and group decision making. The design of the sessions was based on the actual experiences acquired during the project.

2. The importance of teaching in small groups in changing of attitudes and developing the skills of academic members

Creating motivation in individuals to participate in the modification of teaching methods and improvement of curriculum, primarily depends on the change in their attitudes.

The experiences gained during the project indicate that in order to change the attitude of individuals

who work in the field of education, it is necessary to form small groups in order to exchange opinions and have discussions in class. This point is similar to that expressed by Abbat (1992), who believes in the importance of forming small groups in order to change the attitude of the participants.

The relative lack of success in changing the attitudes of students in comparison with that of the professors, was due to the lack of opportunity for working with the students in regard to this matter. The major reason behind this problem concerns the large sample of both students and professors. Despite the reluctance of the researchers, the decision to increase the number of students and professors was made by the university authorities, to discard any possible discrimination and to create better coordination between the members of the basic sciences department and the clinical sciences department.

3. The necessity to create appropriate changes in curriculum and evaluation procedures

Creating changes in curriculum and teaching methods largely depends on changing all elements of the curriculum, auxiliary teaching equipment and media as well as evaluation procedures. The elements of a curriculum are closely inter-related to one another. This inter-relation as envisaged by Orstein and Hunkins (1993) is shown below.



Orstein and Hunkins, 1993

Evaluation plays an important part in the existing educational system. This importance has repeatedly been mentioned in different references,

especially in references about the new methods of medical education. Often, the most critical task for a professor is the evaluation of a student. Most

professors take this task very seriously but unfortunately most of the assessment methods used are insufficient and inaccurate (Newble and Cannon 1998, Ivan 1998).

The lack of changes in methods of assessment which disregard the active participation of students causes the students to lose interest in bringing about constructive changes in effective learning. It can also result in the gradual decline in interest of professors who at first encouraged active teaching methods. Improving curriculum and applying active teaching methods not only increase teaching skills, but also change the attitudes of students and encourages them to improve their mental and practical skills. But assessment procedures often emphasize learning through memorization which neutralizes the results of active learning methods. Consequently, the real abilities of the professors and students cannot be identified. This problem will gradually lead to the return to traditional methods of teaching. Unfortunately, in our educational system, the success of professors and students is based on the final exam results, which only reveal the student's level of knowledge rather than his capabilities to perceive and understand the subjects and apply innovative solutions to the problems. In the present research, a lack of interest in following active methods and returning to traditional methods amongst some of academic members, is due to the existing system of student evaluation, which in turn has negatively affected the results of the project.

Independent action should be taken to solve this problem. It is recommended that the following actions could be taken:

- Correction and improvement of the existing evaluation system of final exam results
- Introduction of correct and appropriate evaluation methods to the scientific board, in coordination with active methods and educational objectives

- -Briefing sessions for students to make them understand the importance of learning-skills which would be more meaningful, understandable and applicable in comparison to learning through memorization
- Granting extra scores for student participation in classes and their mental and practical abilities
- Granting extra benefits for academic members who design and apply appropriate curriculum, active methods, auxiliary equipment and evaluation procedures.

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