Original Article: Examining Teaching Methods in Chemical Engineering Education in Oil and Refinery Company

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A B S T R A C T

Teaching is an activity, but not any kind of activity, but an activity that is done consciously and based on a specific goal. An activity that is performed based on the students' cognitive status and causes them to change. The act of teaching is a series of regular, orderly, purposeful and pre-planned activities. An activity that aims to create favorable conditions for learning. An activity that takes place in the form of interaction and mutual behavior between the teacher and the learner. The teaching method is actually a set of principles, educational activities and management methods that the teacher uses to achieve teaching and learning goals in his classroom. Considering the time limit in Iran's education, the important issue is what fields the teacher should provide in order to develop the child's creativity. According to this, it seems, the teacher's hand should be left open enough in the educational system. The structure of the educational system should not limit the teacher to the presentation of lessons, but the appropriate facilities should be provided in order to develop children's creativity and the teacher should be allowed to maneuver in order to make maximum use of the minimum time in order to develop creativity. In this context, extracurricular activities are very important. Teacher, student and curriculum are factors that must be related to each other. Because the interaction between them causes children's creativity to grow.

Introduction

Working with students for the purpose of teaching and learning is a stressful activity and it is difficult to maintain focus, manage behavior and encourage them to actively participate in the education process. Therefore, one must learn the thought patterns necessary to overcome these challenges. One of the issues that may help teachers, who are the main audience of this article, to deal with some of these challenges [1], is learning different teaching methods. You don't have to pick one method and stick to it, but you'll find that there are specific methods and styles

for different learning environments that you can employ. The term teaching method is general principles and educational and management strategies that are used for classroom teaching. Choosing a teaching method depends on what strategies are right for you, and it depends on the educational philosophy, class demographics, subject areas, and goals of the educational center [2] in which you operate. Teaching theories can be divided into four categories based on two main parameters:

- ✓ Teacher-centered approach versus student-centered approach.
- ✓ Teaching using high technology versus teaching using low technology.

In various civilizations and cultures, since the time when the issue of educating the new generation has been raised, there has also been the issue of choosing the teaching method. Today, in the field of education and training of learners, the discussion of teaching methods is considered one of the challenges of teachers and using the appropriate teaching method for each subject is of particular importance.

In other words, one of the basic issues that educational systems are currently facing is the discussion of innovation and change in teaching methods, which can play an important role in adapting the content and educational methods to adult life. New research evidences and surveys show that if we want to improve students' learning and improve the performance of the educational system in order to achieve its lofty goals, we should act on the spread and application of new methods of education and teaching in the country's schools. Therefore, one of the most necessary changes in the educational systems is the change in the attitude and teaching method of the teachers of the educational system [3].

With the development of societies on the one hand and the practical knowledge of man on the other hand, the principles and methods of teaching also changed. It's not like in the past

when the teacher rules the classroom like a king and the students listen to him and go to school with fear every day and have the nightmare of being beaten by the teacher at night.

Nowadays, the student can express his opinion in the class and can even disagree with the teacher's opinion, without fear of being punished, and the teachers, instead of thinking of ways to scare the student, can better control the class. get, they seek to create interests in the student in order to use it to teach more effectively.

One of the most basic issues of education is paying attention to teaching methods. If the educational content is not taught with the best methods, it will not be effective. It seems, how to teach is more important than its content. Because educational texts are found everywhere, but good teaching strategies and methods can guarantee learning.

Choosing a teaching method is one of the important stages of educational design. Usually, after choosing the content and before determining the means, the teacher should choose the appropriate teaching policy and method. Because the teacher's policy and his teaching method determine how students work to achieve educational goals. Teaching methods are so important in education that a group of educational scholars have considered the mastery of teaching methods more important than the teacher's scientific knowledge and information.

Experience has shown that teachers who have mastered teaching methods have been more successful than their colleagues who relied only on scientific information. It goes without saying that being satisfied with previous knowledge and prejudice in the application of traditional methods, especially in the field of teaching all subjects and in the education of a new person, is invalid.

Because the ineffectiveness of traditional, old and inactive educational systems in new

environments has been evident, first in advanced societies and then in developing societies, according to recent advances in the field of teaching. There are various methods for teaching, each of which is suitable for a specific lesson and situation, so the teacher and planner should consider the educational goals, the subject of the lesson, the characteristics of the students, the available facilities, the atmosphere that governs the class, the number of students, the time Choose the most appropriate teaching method according to the class and dozens of other issues [4].

Examining teaching methods

1- Linguistic methods: in this group of methods, only the teacher works. He uses various available tools and facilities and teaches the subject.

2- Active methods: In this group of methods, students have an active role in learning and work together with the teacher and instructor and are concretely related to the subject being taught. One of the most important active teaching methods is the problem-solving method, the group discussion method, the question-and-answer method, the brainstorming method, the method of mutual assistance through the teaching of team members, the method of mutual assistance through the team efficiency plan.

All kinds of new and new methods

Among the types of new and innovative teaching methods, we can mention things such as explanatory method, lecture, discovery, problem solving, discussion method, question and answer, work unit, small groups, individual learning, experimental method.

Some of the new teaching methods are explained below

1- Conference method: This method is different from the lecture method. Because in the lecture method, the teacher is responsible for giving information to the students, while in this method, the information is collected and presented by the students. This method can determine how much students know [5].

2- Problem solving method: This method is one of the active methods of teaching. If the educational system wants to teach students the ability to solve problems, of course a problem does not mean a problem. In other words, the problem is not an issue that creates a problem for us, but reaching the goal in every action is a kind of problem solving. In this method, education is carried out in the context of research and leads to authentic, deep and sustainable learning in students.

3- Project method: The project teaching method allows students to improve their management, planning and self-control. In this method, students can choose a subject according to their interest and actively participate in the completion of that subject.

4- Practice method: the teacher usually encourages the learner to repeat the material or use it through practice so that the learner acquires the necessary proficiency in the subject. For example, the English teacher asks the learner to learn their correct pronunciation by repeating terms orally, or to make five conditional sentences after finding out how to make conditional sentences.

5- Demonstration method: In this method, the teacher usually uses various tools and objects to make the students understand a specific subject. If the teacher cannot do experiments to understand the subject matter, the

demonstration method can be a good way to clarify the concept for the learners.

What are teaching techniques?

Teaching methods and techniques are mostly formed based on the creativity of the teacher, knowing these techniques helps in the ease and ease of teaching.

3 main subjects are important in teaching

- ✓ The interaction between the giver and the recipient.
- ✓ A purpose predetermined by the giver.
- ✓ Creating an environment for easy learning.

What is the teaching model?

A pattern is usually a small sample of something or a collection of countless things that has the important and main features of that big thing or things. The teaching model is a special framework in which the important elements of teaching can be studied. The choice of a teaching model will depend on the teacher's knowledge of the philosophy and attitudes of education [6].

Types of teaching patterns

1- Problem-solving model: In this model, students use their previous experiences and knowledge to think about the events of their environment in order to solve the problem they have encountered in an acceptable way.

2- Preadvance-organizer model: Pre-organizer is a topic or a general concept that comes in the introduction of teaching to relate the topic that is presented to the students with the previous topics of the same lesson and is a basis for Relate the new concepts with the previous ones. In this pattern, the contents are usually examined from the whole to the details.

How to choose the teaching method and the best teaching method

Choosing the appropriate teaching method requires the teacher's attention to various components, including the conditions of the teaching method, the characteristics of the teacher, and the characteristics of the students. All this, along with the nature of the intended educational content, can be a good guide for choosing a teaching method.

From this point of view, the novelty of the teaching method alone is not the criterion for choosing a teacher, and it is necessary to pay attention and examine the appropriateness and connection of the method with the purpose of learning from various aspects in the educational design. The teacher's promptness and reflection at the stage of choosing the teaching method can lead to the formation of an effective and rich learning experience for students [7].

So, you must have realized that we do not have anything as the best teaching method and it is the teacher himself who chooses the appropriate teaching method according to the subjects, lesson objectives, facilities, abilities and needs of the students and his skills.

It can be different for different courses. Different teaching methods can be used even for one lesson. It is important to use a method that conveys the content correctly to the audience. Teaching methods are used as a tool to achieve educational goals, to convey information to students. Sometimes the lecture method is useful, sometimes the role-playing method, sometimes question and answer, sometimes the demonstration method, sometimes the group discussion, sometimes the exploratory method, sometimes many topics that are taught during education and in the form of textbooks.

They will never have time to plan and if the concepts are not well conveyed to the student, he will have problems in memorizing and recalling what he has learned.

Usually, at least three features are listed in teaching

- ✓ The presence of interaction between the teacher and the learner, not a one-way flow where the teacher is the only speaker and the students are pure listeners.
- ✓ There are predetermined goals so that the teacher knows for what purpose to carry out these activities.
- ✓ Creating the right opportunity and atmosphere for learning

The necessity of fostering creativity in students, effective factors in creativity, barriers to creativity and the characteristics of creative students are stated. Teaching students' creativity is one of the most important goals of education professionals. The findings of this article show that research is a suitable platform for strengthening and expanding the spirit of initiative, innovation and creativity. The teacher as the creator of the conditions and the facilitator of the students' learning can, through innovation, flexibility, not forcing the students to memorize and accumulate mentally, humor, avoiding formal strategies and methods of education, creating the ground for the students' self-expression and increasing Self-confidence in them, stimulating the curiosity of learners and finally making education and training creative education and fostering creativity in children and teenagers.

Types of teaching methods

1- Memorization and repetition method: Memorization and repetition method is one of the oldest teaching methods used in schools. The method of doing this teaching can be seen from its name.

2- Lecture teaching method: The lecture method has a long history in educational systems. Presenting concepts by the teacher orally and learning them through listening and taking notes by the student forms the basis of this education. In this method, a kind of learning transfer and mental relationships are created between the teacher and the learner, and all factors are under the control of the teacher, and the message transfer is a one-way flow of thought from the teacher to the student.

3- Question and answer method: Question and answer is a method by which the teacher encourages the learner to think about a new concept or express something. In this method, learners move from the known to the unknown. This method is also called the Socratic method.

4- Demonstration teaching method: Demonstration method is based on observation and seeing. Perhaps this is the first method that mankind has used, and if there are not enough facilities, it may be the most suitable method for learning skills [8].

5- Interactive method: interactive teaching includes and encourages students' participation. It is the use of techniques that encourage all students to participate in classroom activities and help students improve retention and learning of the materials presented during teaching. There are strategies such as thinking, group work, sharing, whereby students first think about a problem alone and then share the problem with their classmates and finally with a group or the whole class. It is very good for encouraging participation and active learning.

Effective factors in improving teaching quality

Before entering the discussion, we will define teaching from Langerin's point of view. Teaching is a complex and pre-planned process that is carried out by the teacher in the classroom, and its main goal is to create objective and mental interaction of the learner with the material to be learned.

According to Kumiz, the factors inside the school that are effective in teaching are:

- ✓ Training objectives.
- ✓ Curricula.
- ✓ Teachers.
- ✓ Teaching methods.
- ✓ Educational technology.

Students' learning in schools depends on many factors, including family backgrounds, students' motivation to study, lesson planning, time dedicated to training and practice, teachers' ability in classroom administration, teachers' position and education, and their behavior in the classroom.

Among the factors that can be effective in improving the quality of teaching are:

- ✓ Getting to know the students and being friendly with them.
- ✓ Motivate and encourage students.
- ✓ Student participation in the learning process.
- ✓ Using appropriate teaching methods.
- ✓ Adhering to the principles of content presentation.
- ✓ Establishing discipline in the classroom.
- ✓ Using educational aids and facilities.
- ✓ Creating suitable physical conditions in the classroom.
- ✓ Continuous evaluation of students.

America; Teaching methods based on student needs

When Joe Fadrey started teaching 25 years ago, he noticed that his students were not paying attention to his lessons, but instead of getting frustrated, he completely revamped the teaching method and used music and different media. Faderi, who teaches at a school in the small town of Effingham, Illinois, USA, tells his students to dream big and see their failures as part of their creative flourishing process. Many years ago, Fadri was close to giving up teaching. Because he could not make his students interested in grammar lessons, and at that time he got an inspiration. He says: First of all, I realized that the problem is me and I have to solve this problem from today. In this way, I look for things that connect the student with the real world. Then the student himself helps me to find such projects. Fadri started with music and asked the students to sing songs based on classical poems. Today, he also teaches art, 3D printing, writing, drama and engineering in his classes, and students are free to create whatever they like. He says: In order to be successful in life, a student must learn how to manage a project, how to cooperate with others, how to face constructive criticism and even destructive criticism. Unfortunately, many students are not given such training.

Using the group method in active teaching methods

According to an analysis from research, a typical teacher in a class of 30 students speaks an average of 90 lines for each student, or in other words, in a class of 30 students, the teacher speaks eight times more than the average student hit the first step in making children talk in class is to create balance and harmony in classroom teaching and educational and educational situations. In a study of 1,000 students aged 13 to 17, humor, making the class interesting and mastery of the subject matter were the most important qualities students listed for their teachers.

Familiarity with different teaching methods or types of training

As mentioned in the introduction of the article, one of the most important topics related to teaching is choosing the appropriate teaching method or teaching method. Choosing a teaching method, as part of the steps of writing a lesson plan, includes choosing activities, tools and educational aids, the time required to implement each activity.

Teaching methods can be divided into four general categories, which are:

A) Teaching methods based on direct transfer:

B) Teaching methods based on interaction.

C) problem-oriented teaching methods.

D) Individual teaching methods [7].

A) Teaching methods based on direct transfer: Teaching methods based on direct transfer are one of the traditional methods in the teaching and learning process. In this category, we can consider three important teaching methods, which we will examine the characteristics, advantages and limitations of each method.

1- Memorization teaching method: Memorization method is one of the very old teaching methods. In this method, memorizing the material, repeating it by the students and cultivating the power of mind and memory is the main goal of teaching. The teacher presents the concepts orally or in writing and it is up to the students to repeat and memorize these contents. Memorization teaching method can be used especially in subjects such as language, history and literature. It also strengthens and keeps memory active. It can be implemented individually and in groups. Therefore, you can also use this method in private classes.   One of the limitations of the memorization method is that it does not strengthen the student's power of thinking, analysis, and creativity. Reward and punishment are among the motivational factors in students in this method. Teacher-student relationships are very formal and based on respect and fear [9].

2- Lecture teaching method: In the lecture teaching method, as the name suggests, the teacher presents the course material in the form of a lecture. To implement this method, the teacher must prepare an introduction for his speech to attract the attention of the students and motivate them. Then provide the desired content. Finally, finish your speech with a suitable conclusion. This teaching and learning method are very suitable for crowded classes. Its low cost is also one of the advantages of the lecture teaching method. One of the disadvantages of the lecture method is that the teacher is monotonous and the students are inactive. In this case, students are very dependent on their teacher. On the other hand, the mentality of some teachers is not compatible with this method [8].

3- Scientific demonstration teaching method: The scientific demonstration teaching method, which is also known as the demonstration teaching method, is based on seeing, observing and touching. In this way, the teacher can show the concepts in the book in a visible and tangible way to the students. To implement the demonstration teaching method, one must first prepare the necessary tools and then provide an introduction to the students and finally perform the desired demonstration and perform the necessary evaluations. Among the advantages of the teaching method of scientific demonstration, we can mention its practicality and students' direct experiences, their activeness and constant participation. This method can be costly due to the need for educational facilities and equipment. It is not applicable in crowded classrooms and does not promote high-level thinking such as creativity.

B) Teaching methods based on interaction: The teaching method based on interaction is implemented in different ways in different situations and according to the content, population and facilities of the class. Question and answer methods, role play, group discussion and collaborative learning are included in this category. In the following, we provide explanations about each method.

1- Role-playing teaching method: In this method, one or more students choose roles according to their interests based on a scenario prepared by the teacher. Then, with the supervision of the teacher and the participation of other classmates, they perform the desired subject in the form of a demonstration. One of the advantages of the role-playing teaching method is that students immediately apply the subject they have learned in the real world and in different situations. In this method, students' emotions are fully involved in learning and this will lead to deeper and more lasting learning. Many students remember the role they played in a class play even years later. This issue shows the effect and importance of the role-playing training method, especially in the elementary school. The role-playing method is not suitable for complex educational purposes, while it is not considered as a serious teaching method due to its theatrical and artistic aspect. Also, the method of playing a role requires proper implementation, spending enough time, and preparation and supplies, and doing it is time-consuming. Studies have shown that students remember the role they played in the class play years later.

2- Group discussion teaching method: In this method, students discuss and exchange opinions about the subject of the lesson. To implement the group discussion teaching method, you must first select the desired topic. Then motivate students to participate in the discussion. In the next step, it is time to determine the members of the group, the leaders, and determine the rules of discussion and its implementation. Students sharing in each other's experiences, strengthening the sense of cooperation, self-confidence and spirit of criticism, strengthening the power of management, leadership and reasoning and creating the opportunity for people to evaluate themselves are among the advantages of the group discussion teaching

method. The teaching method of group discussion on subjects such as social studies, history, geography, sociology, psychology, philosophy, economics is completely appropriate and practical. In addition, this method is not suitable for elementary school students and it is better not to use it for crowded classes.

3- Collaborative learning teaching method: In this method, the teacher divides the students into groups in which a combination of strong, medium and weak students is placed in each group. Students do the activities cooperatively and the rewards earned belong to all group members. The most important advantages of the cooperative education method are creating equal opportunities for learning and strengthening the cooperation skills and social relations of students.

Problem-oriented teaching methods

The problem-oriented teaching method is one of the new teaching methods in which the teacher tries to make students think and research by creating a new question or situation instead of transmitting information. Scientific tour teaching method, laboratory teaching method, exploratory teaching method, exploratory method and unit-based method are examples of problem-based teaching method.

1- Scientific tour teaching method: One of the common methods for teaching course topics, especially in the case of a subject like science, is the scientific tour teaching method. A field trip is actually an educational activity that takes place outside the school environment and with the teacher, such as visiting a factory and observing the steps of making a product, visiting a museum, and such things as determining the topic, goals and location of the field trip. Making the necessary arrangements, including with the authorities of the desired location and parents,

providing the necessary facilities, including report writing sheets for students, dividing tasks and conducting evaluations after the field trip are among the steps of this teaching method.

2- Laboratory teaching method: In the laboratory teaching method, the teacher tries to provide conditions so that students can learn the concepts of the lesson by conducting experiments. In fact, in this method, the teacher plays the role of guide and facilitator, and the main responsibility of learning is with the students themselves. In this method, because learning is achieved using direct experiences, it will be much more permanent. At the same time, it increases motivation and self-confidence in students. One of the problems of the laboratory teaching method is the need for many tools and facilities. Also, many teachers may not have enough experience to use this method.

3- Exploratory teaching method: In the exploratory teaching method, the teacher encourages students to interact with their environment and discover the relationships between phenomena by researching, thinking and manipulating objects and reach a correct understanding of the subject instead of memorizing information. In this method, the teacher must first teach the principles and methods of problem solving to the students with the help of the lecture teaching method. After that, a questionable situation is designed for them. This position should be presented to the students through the teacher. Then it is the turn of the students to analyze the information and discover the relationships. Finally, the teacher checks the students' achievements and provides the necessary guidance. Using this method makes the subjects more understandable and students achieve higher levels of knowledge, but in general, using the discovery method is not very practical for students at lower levels such

as elementary and first secondary, because they cannot learn on their own. discover knowledge.

Individual teaching methods:

The individual teaching method is one of the student-centered teaching methods, which of course does not only mean private tutoring and teaching by one teacher to one student, but it also means that the student's educational progress is based on his ability and learning speed. The main goals of this method are independence in learning, habit of studying, self-control and self-evaluation. Individual training may be implemented in different ways, but the most important methods that fall into this category are:

1- Learning to mastery method: In this teaching method, a topic is continued until the student reaches complete mastery in that topic. Otherwise, the new topic will not be started [9].

2- Private tutoring method: Private tutoring method can be used in all academic levels and degrees. This method is more suitable for students who cannot have acceptable learning in group teaching methods. Of course, many gifted students also use the private education method to pass special exams such as the government sample, the gifted, the national entrance exam, etc.

3- Programmatic teaching method: In this method, educational materials are divided into smaller steps and activities and presented to the student. In this method, the teacher tries to make students actively participate in learning. Also, after each activity is done using student evaluation methods, necessary feedback is provided immediately. The steps should be very short and the student should go through all the steps. Also, the main goal in designing steps should be learning to the extent of understanding, not to the extent of memorizing.

4- Computer-based education: Computer-based education is actually the same as programmed education, with the difference that in programmed education, the steps and steps of education are provided to the student by the teacher on printed sheets, but in computer-based education, these steps are provided by A computer or other educational devices and technologies are provided to the student. Many scientists in the field of education and planning believe that this method requires less time for training and is much more effective than other traditional methods due to the attention to individual differences of students and its precise and regular structure. One of the disadvantages of this method is the lack of communication between students. In addition, the efficiency of this method is higher in university levels than in secondary and elementary levels.

Conclusion

Although the term "teaching" seems a familiar concept in educational science texts, most teachers and curriculum leaders are familiar with its true meaning and nature. Different perceptions of teachers on the concept of teaching can have a positive or negative effect on their attitude towards students and how to work with them.

Multiple perceptions of the concept of teaching can have different reasons. One of the most important of them is the weakness of basic knowledge and differences in translation and teachers' misperceptions of different educational perspectives. Sometimes the confusion and confusion in the understanding of educational concepts is so much that many experts, teachers and students of this field consider concepts such as upbringing, education, teaching and vocational training to be the same and use them interchangeably. Although these concepts may have common and intertwined aspects in some aspects, they are basically independent concepts and have their

own meaning. Education is a stream, regular and continuous, whose purpose is to guide the physical, cognitive, moral and social growth or in general the all-round development of the personality of students in order to acquire and understand human knowledge and the norms accepted by the society and also to help the flourishing of talent. it is them Based on such a definition, it is the cultivation of a system, a system whose basic function is to develop talent and educate citizens who acquire the norms accepted by the society and are committed to its values.

Even many educational experts have a function beyond the mentioned function for education and believe that instilling the values, traditions and morals accepted by the society to people is one of the oldest views of education, instead of such a function, the educational system should develop cognitive skills from such as critical thinking, to put the analysis of group values and skills in the focus of its functions, to provide the basis for democracy in the society.

Another group believes that the educational system should be the agent of social change. The analysis of the mentioned concepts and functions shows that in no way can the concept of education be equated with concepts such as education, teaching or vocational training. Cultivation is a general concept that can include other concepts.

The concept of education is not opposite to education of a system, but education is an activity, purposeful and pre-designed, whose purpose is to provide opportunities and situations that facilitate and speed up learning within an education system. Therefore, education is a means for education, not education itself.

Training is a specific and carefully designed activity. Therefore, its goals are more precise and specific and earlier than the educational goals. Education may be done with or without the presence of a teacher through film, radio,

television and other media. The concept of teaching refers to that part of the educational activities that happens with the presence of the teacher in the classroom.

Teaching is a part of education, and like education, it includes a series of regular, purposeful and predetermined activities, and its purpose is to create favorable conditions for learning by the teacher, to that part of the educational activities that are carried out by the media and without the presence of the interaction between the teacher and the students takes place, it is not called teaching in any way.

Therefore, education has a more general meaning than teaching. In other words, it can be said that every teaching is teaching, but every teaching may not be teaching.

There are four specific characteristics in the definition of teaching, which are

- ✓ There is interaction between the teacher and the students.
- ✓ Activity based on specific and predetermined goals.
- ✓ Regular design according to the location and facilities.
- ✓ Creating opportunities and facilitating learning.

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