European Scholar Journal (ESJ)
Available Online at: https://www.scholarzest.com
Vol. 3 No.12, December 2022
ISSN: 2660-5562

EXPLANATION OF THE TOPIC "USE OF RADIOPHARMACEUTICALS IN GAMMA THERAPY" IN HIGHER EDUCATION INSTITUTIONS USING THE "THOUGHT, REASON, EXAMPLE, GENERALIZATION (THREG)" METHOD

Ashurov Jasur Djorayevich
Associate Professor of "Innovative and Information Technologies in Medicine, Biophysics" Department, Bukhara State Medical Institute

Article history:

Received: 13th October 2022
Accepted: 13th November 2022
Published: 22nd December 2022

Abstract:

This article is devoted to the implementation of advanced educational methods and an innovative approach during the pedagogical process. In particular, by using the "Thought, reason, example, generalization (ThREG)" method in the teaching of the topic "Radiopharmaceutical preparations" in the subject of nuclear medicine, in addition to achieving theoretical knowledge and practical skills and competences of the students, their general the possibilities of drawing clear conclusions from thoughts, assimilation of information through comparison, and formation of independent creative thinking skills are analyzed.

Keywords: *ThREG method, radionuclide, isotope, radiopharmaceutical preparation, radionuclide diagnosis, radionuclide therapy.*

INTRODUCTION

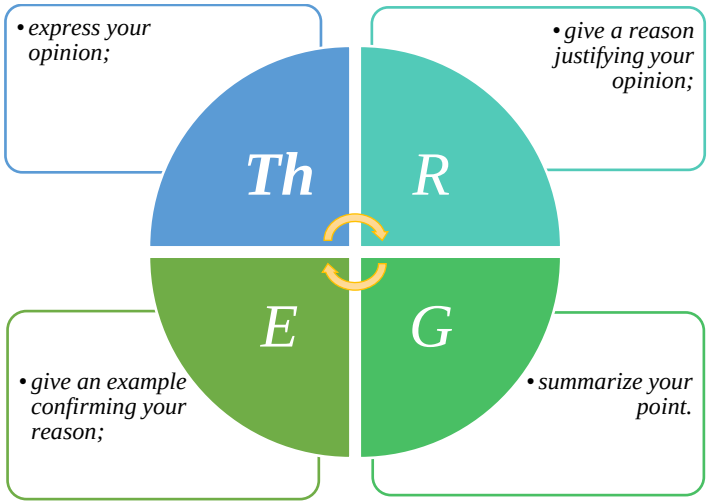
In recent years, special attention has been paid to the issues of improving the quality and effectiveness of personnel training in our country, creating the necessary conditions for training highly qualified specialists based on educational standards, widely introducing advanced innovative pedagogical technologies into the educational process, and developing modern professional knowledge and skills of students. Currently, one of the specialties in high demand in the educational market is the urgency of training mature personnel with high professional competencies for the rapidly developing field of nuclear medicine. It was also reflected in the decision of the President of the Republic of Uzbekistan No. PQ-4492 of October 16, 2019. One of the goals of the strategy is to train highly qualified candidates in the field of nuclear energy and it was noted: to develop nuclear physics, nuclear medicine, radiation safety, life support safety, materials science, hydrogeology, meteorology and other fields in and in order to develop non-energetic directions of nuclear energy use." [1].

From this point of view, the introduction of the scientific-social system of education and one of the main tasks of teachers in this system is to create a basis for educating a socially active person, to encourage students to think freely, to actively participate in debates in defense of their opinions, in addition, teaching to analyze acquired knowledge. In this process, teacher is required to act as a facilitator,manager of the educational process and an analyst of the achieved results. Today, one of the advanced pedagogical methods that provide the opportunity to ensure the modernity of classes and have a positive effect on the educational process is the ThREG method, which provides the opportunity in terms of to developing theoretical, practical and creative thinking in students.

The ThREG method is a method of teaching and practicing during the discussion of the topic studied in the training, students express their opinions on the issues related to it, show the reasons justifying these opinions, give examples that confirm them, and ultimately draw general conclusions. [2, 3].

This method helps students to draw clear conclusions from general ideas, to assimilate and summarize information by comparing and contrasting, as well as to form independent creative thinking skills [4]. ThREG analysis is the basis for faster and successful assimilation of professional and theoretical knowledge by participants based on practical exercises and existing experiences.

The general scheme of the ThREG method



An example of the practical application of the ThREG method:

During the lesson, the teacher forms several small groups based on the number of students, prepares handouts on the topic in advance and distributes them to the groups. Determines the time for each task, performs general management during the execution of tasks.

Group 1. Express your thoughts on the topic "Difference between radiopharmaceuticals and conventional drugs" using the ThREG method.

Radiopharmaceutical preparation (Radiopharmaceuticals, RFP) are radioactive preparations used in medicine for the diagnosis and treatment of various diseases.

Radiopharmaceuticals are fundamentally different from traditional medicines recommended by doctors:

- These drugs are radioactive because they contain a specific radionuclide.
- Most radiopharmaceuticals are used for diagnostic purposes, while traditional non-radioactive drugs are more often used for therapy.
- Conventional non-radioactive drugs are usually taken several times, while radiopharmaceuticals are given to the patient once.
- Radiopharmaceuticals do not cause physiological reaction of the patient.
- The composition of radiopharmaceuticals is based only on the physiological function of the target organ . Unlike x-ray methods based on differences in tissue density, visualization of radiopharmaceutical distribution is mainly related to the absorption and retention of the injected drug in the organ, as well as differences in the rate of elimination of radiopharmaceutical substances from the body through the kidneys and liver.
- The mechanism of localization of radiopharmaceuticals in a specific organ can be as simple as physical capture of particles or as complex as an antibody reaction.

Group 2. Express your thoughts on the topic "Stages of using radiopharmaceutical drugs" according to the ThREG method

The process of development and application of radiopharmaceuticals usually consists of a number of separate independent steps:

When searching for or synthesizing a chemical compound, it is important to identify the characteristics of its accumulation in the organs or tissues that are planned to be investigated.

Selection of areas whose availability, production technology and nuclear-physical properties correspond to the requirements existing at a certain time.

Development of technologies for the inclusion of the selected radionuclide in the composition of the found chemical compound and the preparation of medical (medicinal) forms of radiopharmaceutical preparations.

Preclinical testing of radiopharmaceutical dosage forms in animals, with special emphasis on drug safety (including radiation safety). The result of the pre-clinical tests is the draft of the instructions for the clinical use of the radiopharmaceutical drug, as well as the preparation of various documents necessary for obtaining permission for clinical research of the drug.

Clinical trials of the created radiopharmaceutical. Confirming the effectiveness of the new drug and explaining the instructions for its use. The results of clinical studies are analyzed and summarized in a general report, which is reviewed by the Pharmacology Committee.

If the results of the full cycle of clinical trials are positive, the Pharmacological Committee recommends the new radiopharmaceutical for use and serial production. The final document of the inspection is the drug registration certificate obtained by the creator or manufacturing organization.

Group 3. Express your thoughts on the topic "Use of radiopharmaceuticals in gamma therapy" using the ThREG method.

Gamma therapy is another type of photon therapy, which affects the part of the body affected by cancer by ionizing rays of radionuclides. Gamma therapy has two main goals:

a) destroys mutated cells in the center of pathological tumor growth;

b) stabilization of the development of a new tumor by blocking the reproduction processes of cancer elements.

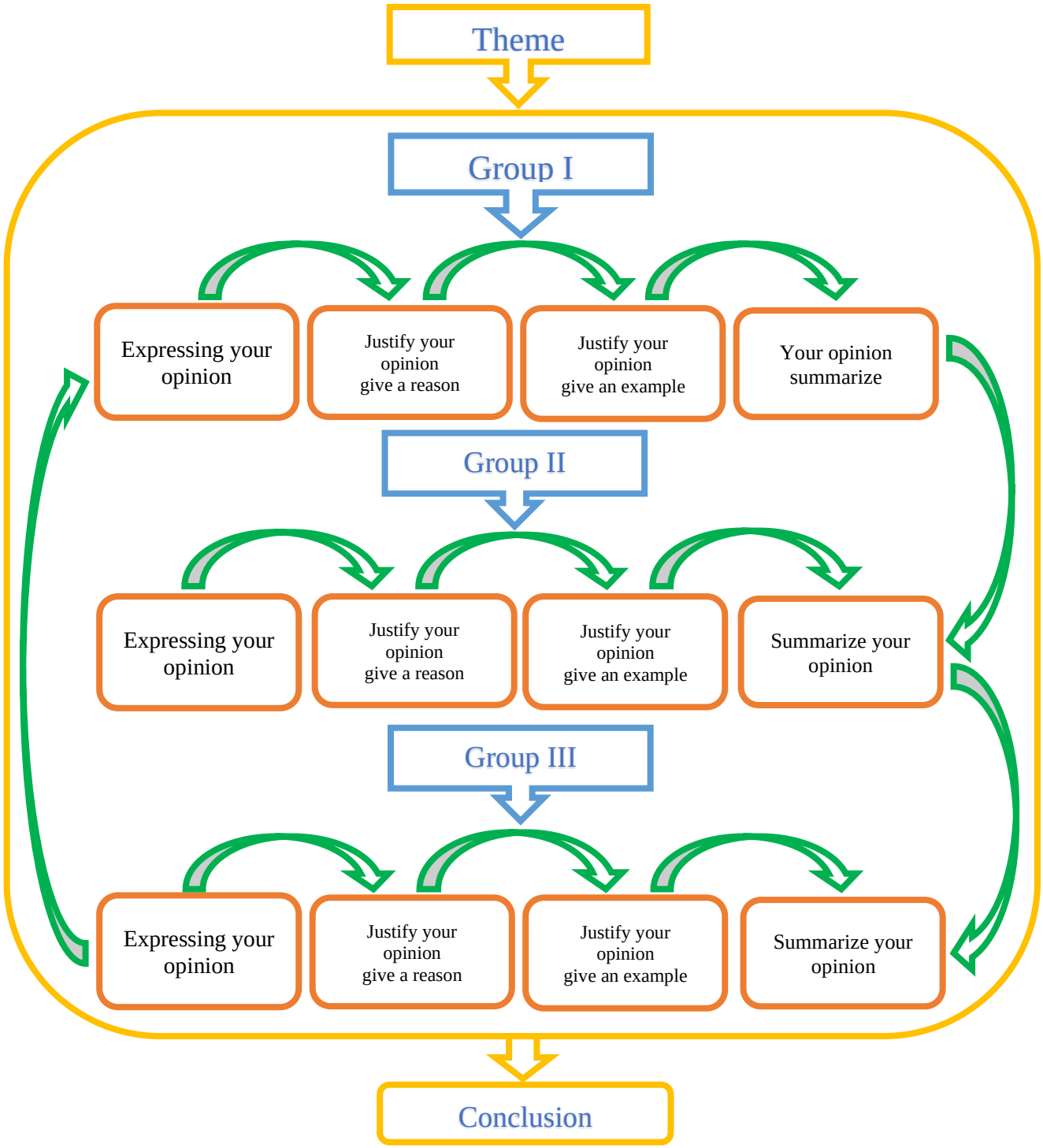
Tasks depend on the type of oncological damage.

Gamma therapy is performed remotely or by contact. The contact method uses radioactive nuclides or radiopharmaceuticals. Remote treatment uses medical treatment equipment equipped with an ionizing radiation source. With the contact method, procedures can be performed on internal tissues and internal spaces. The choice of one or more methods of treatment depends on the location of the mutational focus.

The teacher monitors the discussion process on the topics given to the groups, gives advice to the group members in the necessary places, gives guidance, and makes sure that the tasks assigned by the groups are solved correctly. then asks to make a presentation on the given topics.

After all groups have been assigned, each group will ask the other groups a predetermined number of questions about their topic, and the group that answers the most questions will be encouraged.

Model of the ThREG method:



The purpose of organizing such a question-and-answer session is that the students of each group should try to learn and listen to the topic of the other group in addition to studying the topic assigned to them. As a result, all students fully master the subject.

At the end of the lesson, the teacher summarizes the information given by the groups on the topic, makes a mutual integrative connection, and together with the students, creates its model. He evaluates the students who actively participated in the lesson and concludes the lesson. The creation of such a model creates creative thinking skills, thirst for knowledge, self-confidence, and a new worldview in students. At the same time, it activates the educational process, makes it possible for students to achieve a high level of mastering the educational material.

Based on this method, pedagogical experiments were conducted among students of the biomedical engineering department of Tashkent State Technical University, Faculty of Engineering Technologies, in parallel groups, and compared to traditional lessons in control groups, interactive methods, including the ThREG method ,were more effective in experimental groups. The results of the analysis showed that (Fig. 1).

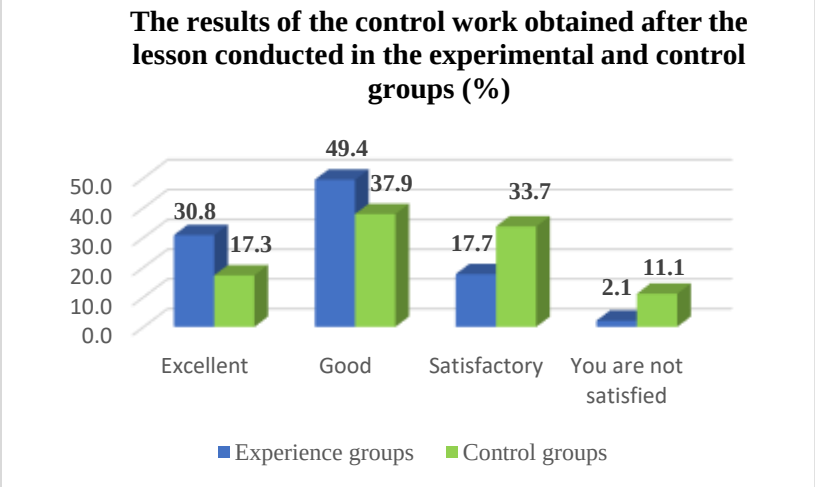


Figure 1. *Analysis of learning indicators of experimental groups and control groups.*

CONCLUSION

The above-mentioned "Thought, reason, example, generalization" (ThREG) method teaches students to draw clear conclusions from general ideas, assimilate information by comparison, draw conclusions, and also gave an opportunity to form independent creative thinking skills. The use of the method significantly increases the quality and efficiency of the educational process.

This article is based on the pedagogical analysis of the materials written within the innovative project No. AM-PZ-2019062031 "Creation of multimedia textbooks for bachelors and masters in the fields of "Nuclear energy", "Nuclear medicine and technologies", "Radiation medicine and technologies"" . Thanks the authors of the textbooks.

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