БІЛІМ БЕРУДЕ ИННОВАЦИЯ МЕН ДӘСТҮРЛЕР
ТРАДИЦИИ И ИННОВАЦИИ В ОБРАЗОВАНИИ
TRADITIONS AND INNOVATIONS IN EDUCATION

Marina Smirnova, Irina Samoilova, Gulnara Tynbayeva

Ye.A. Buketov Karaganda State University, Kazakhstan
(E-mail: smirnova_marina_alex@mail.ru)

On the implementation of innovative teaching strategies of the discipline «Information and communication technologies»

The article presents the generalized personal experience of the authors in teaching the discipline «Information and communication technologies». The implementation of the principles of existence of combined learning environment in collaborative learning (mutual learning) is analyzed. The experience of using various methods of group work is shown; their advantages and risks are considered. Particular attention is paid to the management of various elements of dialogical training and group work. Critical thinking strategies are described in details, and the authors presented students' skills obtained in the course of teaching. In the article the authors considered effective innovative strategies used in the process of conducting laboratory studies of the «Information and communication technologies» course, such as JIGSAW, Challenge, Cluster, Insert, and their techniques. The necessity and effectiveness of these strategies application is substantiated. The immediate tasks of teachers' development are presented on the basis of independently conducted reflection of activity. The authors proposed the ways of forming teacher's readiness to select necessary innovative teaching strategies based on critical analysis, understanding of information and ability to make decisions. Based on the analysis, the authors concluded that it is necessary to implement effective innovative strategies in preparing a new generation of specialists.

Keywords: ICT, competence approach, collaborative learning environment, group work, dialogical learning, strategies JIGSAW, Challenge, Cluster, Insert, role playing, critical thinking.

The competence-based approach, relevant in the education of Kazakhstan and focusing on the effectiveness of education, is not in a certain amount of knowledge acquired by a student or the amount of information acquired, but in finding students' intellectual and creative potential, which allows them to produce new knowledge, which in practical terms will serve as a source of sustainable development of the state, the nation, will provide technological superiority in a number of other countries. This idea is supported by T. Alexander, who, as a top priority in education, sees not only the acquisition of certain knowledge by learners and students, but the skill of critical thinking, the skill «to participate in wider communication processes effectively and successfully, where they have increasing access» [1].

The focus today is on the «cooperation» of skills. Teachers need to organize training, which provides a challenge, enabling a student to engage in active interaction with peers, thus creating a «teamwork skill». Different researchers (Johnson, Sharan, Slavin, Susan) give different definitions to collaborative learning, but they all highlight methods that help students achieve their learning goals [2].

Collaborative learning environment in collaborative studying will exist if groups work in the way when all members of the group direct their actions towards facilitating each other's learning. Johnson defines collaborative learning as learning, where students working in teams perform a common task under conditions that include five principles:
– positive relationship;
– individual responsibility;

– face-to-face interaction;

– proper use of collaboration skills;

– group reflection.

These principles were implemented at all classes during teaching «Information and Communication Technologies» subject in organizing group work. One way to create a positive relationship is to assemble the subgroups carefully. Different ways of combination can be used, for example: random choice; choice during the game; according to the friendly relations.

The experience of using various methods has shown that each of these methods has its own advantages and risks. The most successful were the ways of random choice, because students had the opportunity to feel themselves in a new role, in a new team and a way to choose a leader who was able to organize effective work. The risk in every case was the possibility of psychological incompatibility.

To provide individual responsibility and effective cooperation, it was necessary to assign roles in study groups. During conducting classes, the most frequent distribution of used roles: time manager, speaker, secretary, designer and assessor expert.

The advantage of roles distribution was a small size of the group. The risk was an unfortunate distribution of roles based on the context of training tasks. In order to avoid this risk the role of the «leader» at some classes was distributed in advance and it was based on the training tasks.

One of the options for implementing the proper use of collaboration skills is to define group work rules. Due to organizing classes for freshmen, the rules were proposed by teacher in advance at the first lesson. Students at the first lesson visualized them and determined the significance of these rules for each of the classes, making the choice of «The rule for today».

In the implementation of the «face-to-face» principle of interaction, the work resulted in various positive effects of collaboration, such as:

– members of the group provide assistance to each other during carrying out a collective task of determining the elements of computer's system unit and attaching signed stickers to selected elements;

– possibility of sharing information and materials in the joint creation of an advertising brochure for the sale of a set of PCs or laptops;

– successfully achieve common goals in collective assembly of the system unit;

– an opportunity to dispute each other's conclusions during the debate on the theme «Which operating system is better, Windows or Android?»;

– explore different points of view when performing a task on studying various characteristics of Excel in the course of applying the JIGSAW strategy.

Currently, dialogue emerges as the most effective means of building complex systems of people relations in various spheres of public life, including education. Being a certain form of communication and performing all its functions, it has its own specifics, providing it with a special role in the organization of the educational process. According to Alexander's figurative expression, «... dialogical conversations in learning are not a one-sided process of communication, but, on the contrary, a mutual process where ideas pass in two directions and on this basis promote the student's learning» [3].

In connection with the globalization and integration of economies, cultures, public and state structures and educational systems of various countries and continents, the requirements increase not only for communicative but also for language competence of university graduates, who need to develop a high level of speech activities such as listening, speaking, reading, writing.

A dialogue is a form of speech consisting of an information exchange process between the parties involved in it. The meaning of the dialogue itself is in its result. Without contact with other people, there is no professional growth and training for creative, professional interactive cooperation. Dialogue is a universal way of understanding the world. Its organization makes it possible to communicate through knowledge, and maintain knowledge through communication. It is in the dialogue that the creative communicative, reflexive abilities of the student develop. One of the main conditions for organizing a dialogue is the creation of an atmosphere of trust and goodwill, freedom and mutual understanding, co-creation of equal and different Teacher-Student, Student-Student.

During classes, various elements of dialogical training were organized. The most interesting in the opinion of students was discussion-debate on the topic «Which operating system is better: Windows or Android?». In order for the debate to be productive and pedagogically effective, it was necessary to choose a problematic question that would have different solutions that deserve discussion and

for which there are no definite answers; the question should be relevant, important for student, should have a personally significant character.

An obviously formalized discussion, built on the basis of pre-fixed speeches of participants representatives of two opposing, rival subgroups, and denials. A variant of the type of chosen discussion is so-called «parliamentary debate», which reproduces the procedure for discussing issues in the British Parliament. There discussion begins with a speech of a representative from each of the parties, after which a rostrum is provided for questions and comments of participants from each side in turns.

This form of conversation was chosen for the fourth lesson, when teacher was already familiar with students. The teacher acted as a moderator. At this lesson the combination of groups that participated in debates was done according to friendly relations, the subgroups were formed by student leaders Azamat and Aizhan. This was done specifically to the atmosphere in class, was focused on cooperation rather than competition. Competition manifested itself in conversation-debates. The organization of debates showed a great difference in the opinions of students, which contributed to the formation of communicative skills of speech activity, the ability to formulate thoughts, listen to and take into account different points of view and opinions of other people, leadership skills and qualities, and teamwork.

The main difficulty in organizing debates was to prevent a shift in emphasis to the importance of «winning» the debate than solving a real problem.

Due to the need to hold debates in the fourth lesson, where students would be most active, it was very important to alternate types of work, combining at one lesson, familiar to students «quiet» and very «active» forms of work. Therefore, the Cluster strategy was chosen, which is familiar to many first-year students from school.

Another method of dialogical learning, interesting for students, was organization of the game «Sticker on the forehead». By reviews of many students, this game was already familiar to them. The game created a very relaxed and pleasant environment at the second lesson; it was a repetition of previously completed training material on the topics «Hardware». Stickers were taken from the previous lesson, thus, first-year students knew in advance the entire volume of the presented terms. The game in a certain way improved mood, both during the game and after it.

The main purpose of this technique was to teach students to put effective questions to guess the term placed on his forehead; develop listening and speaking skills. This technique was integrated with the development of critical thinking. At first, students asked only simple questions — subtle questions, answering which, it is necessary to name some facts, remember and reproduce certain information: «What?», «When?», «Where?», «How?». During the game, teacher had to offer students to put other types of thick questions to their opponent: specifying, interpretative, creative, evaluative, and practical.

It was interesting to observe the dialogue of a pair of students during organizing the role-playing game «Master of computer assembly». Each person played individual role, modeled the communication situation of the computer assembly master and a computer buyer. The conditions of the simulation game were extremely relevant and close to the life situation. Students initially did not have the experience to solve it, but had basic knowledge of PC architecture, imagination, and other abilities. Students-masters have developed the skill of communication with a potential client; students-clients have developed the skill of correctly formulating their needs. Monitoring students' communication has led to one more discovery: during the classes, teacher needs to teach the skill to ask thick questions, to teach students to classify thick questions and to see differences between interpretation and creative questions, between clarifying and evaluation questions, to teach how to ask practical questions.

In teachers' opinion the most interesting and unexpected in terms of performance, was a research conversation organized according to the JIGSAW strategy on «Software» topic. In the process of research conversation to study the terms of various Software through the organization of group work. This type of conversation contributed to understanding the basic characteristics and classifications of terms through the use of dialogical learning strategies; developed the ability to make judgments about the student's personal position through the analysis of concepts.

The result was a list of concepts formed for each student; understanding of their distinctive features and key characteristics; the ability to create their work through this knowledge (practical work using Excel and Word) and assess their own capabilities. During the conversations there were identified optimal solutions for controversial issues, problems, and different approaches in arguing judgments, solving tasks.

The introduction of techniques of dialogic education requires a certain change in the life of student group, as well as requires a long time to prepare both for a student and teacher. Teachers and students needed to get used to them and get some experience using them.

As practice has shown, the activity of students with the mentioned forms of the implementation of dialogical training is higher in comparison with the monologic exposition. Students were not only passive listeners of teacher's messages, but active participants of search and with a certain degree of independence they participated in solving learning tasks.

During performing group study assignments, the difficulty for teacher was the necessity to consider learning not only from the standpoint of knowledge volume, but also from the standpoint of developing metacognitive skills. A student who is able to think critically, has a variety of ways to interpret and evaluate an informational message, is able to highlight contradictions and types of structures in it, argue their point of view, relying not only on logic, but also on an interlocutor's conceptualization [4].

Such student feels confident working with various types of information, they can effectively use the most diverse resources at the level of values, and critically thinking student can effectively interact with information spaces, fundamentally accepting the multipolarity of the environment, the possibility of coexistence of different points of view within the framework of universal human values. Therefore, he can adapt to modern life with greater success.

During the work in an educational institution, teacher must develop skills such as acquisition of evidence through observation and listening, taking into account the context, and application of appropriate criteria for making decisions. Included critical thinking skills can be described as:

– observation;

– analysis;

– conclusion;

– interpretation.

Our classes were built according to a special scenario of critical thinking technology. The basic model of a class within the framework of critical thinking development technology was conducted as follows:

– stage of challenge;

– stage of reflection;

– stage of contemplation or reflection.

– «Challenges» were intended to cause:

– in the memory of students the necessary at this class information;

– interest to a new topic;

– students' activity.

The choice of «Challenge» strategy was based on the topics of the lesson, place of this topic in the section, etc. For example, at the stage of challenge at the first lesson, students were asked the problematic video question «Motherboard is a.k.a.» Students were already familiar with the subject of motherboard at the lecture. In fact, this challenge was decisive since, it set the pace and tone of the lesson. It was at this stage that occurred not only the repetition of the material studied (if we use familiar terms), not only actualization of knowledge, but also the most important thing formation of interest. Since using the technologies of critical thinking we have focused on what students themselves have identified — the things they want to learn at this lesson, why they need it. This circle of goals and objectives was defined at the challenge stage.

At the challenge stages, such techniques as «Slide Analysis», «Collect Puzzles» and «Glossy» were used. At one of the classes, we organized group work on the fulfillment of the task, where it was necessary to name 6 associations connected to the concept of «Cybersafety». From these 6 associations, later on 3 were selected and students visualized them. From answers offered by students, a mini-glossary was compiled. During carrying out this task, students had to comprehend again the associations they had indicated and select in their opinion the most important ones. Different situations occurred in the process of performing this task. For example, students find it difficult to choose the most important ones, since they regard all associations as equally important. In this case, additional analytical activity is required. In another situation, students easily cut off not so important associations, apparently, because initially they were contrived.

The simplest in organization and at the same time integrated with grouping was the type of challenge «Prediction according the illustration» challenge. Students joined in groups on the offered illustrations cut in advance. They put forward their ideas and assumptions about the thing depicted and how it relates to the topic of the lesson.

After analyzing the stages of the challenge we carried out, now we realized that this stage is important for the activation of all students in group. Students were able to express their opinions and assumptions, without hesitation and without fear to make a mistake. At this stage, simple sets of all ideas and suggestions

were offered. And all the mistakes, inaccuracies were corrected already during the lesson. This is what allowed students themselves to see their shortcomings, learn how to build logical chains from the «old to the new», saw the interrelation of already studied material and the new one, learned to use the accumulated experience to solve new tasks.

Another important point: the challenge stage activated all students. If earlier passive students were left aside, providing an opportunity for more active ones to participate in the actualization of knowledge, now that case is excluded. Each student in group participated in the work. And our task as educators was to help to systematize the accumulated experience on this topic, to see inconsistencies, ambiguities, gaps and to determine the range of issues that require permission during the training session.

In classes, using various strategies for development of critical thinking, the main role of a teacher was to coordinate. So at the stage of understanding the main task as a teacher was to keep students interested in the topic, covering the necessary and sufficient amount of information. At the same time it was important to direct activities of students, emphasizing the connection of old and new knowledge.

To develop the skill of identifying significant similarities and differences, cluster strategy was used at the fourth lesson. During this work students formed and developed their skills to:
  − highlight the most important things in work of operating systems;
  − establish cause-effect relationships in process of OS work;
  − move from particular to general, understanding the problem of installing OS as a whole;
  − compare and analyze;
  − draw analogies in the work of OS and a person.

To develop the skill of identifying significant similarities and differences, we decided to use the Insert strategy. During planning the stage of conceptualization one of the classes, we slightly modified the Insert strategy. Since students were not familiar with this method of work yet, we used a small amount of visualized information on the board. Students made notes on stickers individually, on paper and on interactive whiteboard. They liked the procedure to mark, using 4 types of icons, elements of the Windows operating system interface. During observation of the process of using this technique, we noticed that students paid attention to all elements of the OS interface, concentrated on almost all the details.

One of the important nuances for us when planning was the desire to try out new techniques for the stage of reflection. In practical activities, we tried at first time the methods of «List of self-assessment» and «Triangle of my study», where students reflected information on three levels. Students wrote a brief report on the lesson, pondered their answers, processing the information again. It was unusual for students to carry out self-analysis of the activity and its results on paper.

Taking into account the stated facts it seems appropriate the following strategy of using texts:
  − during the work with information and journalistic messages — introductory reading;
  − during the work with written documentation and correspondence — reading for details;
  − revision reading should be used when studying materials on IT-service and products, news texts in the IT-industry.

In our opinion, critical thinking is the intellectual basis of professional competencies of a higher education institution teacher. To use a wide range of different critical thinking strategies during the work at a university, for teacher it is necessary «to think critically», to have divergent thinking, that is, to have the ability to think in different directions, analyze the training lesson as an object from different angles, in its multiple relations with other objects (students, teachers, learning environment), their properties and relations. Teacher in any educational institution must be prepared to select the necessary knowledge through critical analysis, understanding the information and the ability, to make decisions independently.

For organization of further activities, using group work and dialogical training is necessary for teachers:
  − to conduct permanent monitoring of roles execution;
  − to organize senior students to formulate the rules of group work independently;
  − to study additional information on conducting the debates in order to avoid shifting the emphasis of solving problems in the direction of «winning»;
  − continue to carry out purposeful work on the search for various strategies, techniques of dialogic training in the interpretation of their own delivering disciplines;
  − to practice assignments based on several different strategies in different groups in order to choose the best.

As a result of our own reflection of activities as university professors using critical thinking strategies, we formulated the following immediate tasks:

− prepare methods for the development of critical thinking for lectures;

− select methods for developing students critical thinking in organizing practical classes for small groups;

− learn the diagnostic tools for studying the level of critical thinking development.

We have tested various innovative strategies during teaching «Information and communication technologies» discipline for students at the Faculty of Mathematics and Information Technology and at the Physical Technical Faculty of the Academician E.A. Buketov Karaganda State University. Pedagogical approaches, introduced in training, provide the implementation of innovative ideas during teaching students. Modern view at informational activity as at type of creative activity, which requires, besides developed logical and systemic thinking, the ability to think resourcefully and productively, orients a teacher towards the development of students' imagination and creative thinking. The effectiveness of innovative processes occurring during educational process while teaching students depends mainly on the teacher.

References

1 Батырбаева Н.К. Способы и приемы работы в парах и группах в условиях малокомплектной школы / Н.К. Батырбаева. — Астана: АОО «Назарбаев Интеллектуальные школы» Центр педагогического мастерства, 2017. — 50 с.

2 Chitat Chan. ICT-supported social work interventions with youth: A critical review / Chan Chitat // Journal of Social Work. — 2016. — Vol 18, Issue 4. — P. 468–488.

3 Основы теории коммуникации: учеб. для вузов / под ред. М. Василика. — М.: Гардарики, 2003. — 615 с.

4 Kazimova D.A. Innovative approaches in training specialists in conditions of digitalization of education / D.A. Kazimova, B.Zh. Abdrasheva, M.T. Baimukanova, K.L. Polupan, N.A. Musatai // Вестн. Караганд. ун-та. Сер. Педагогика. — 2018. — № 4(92). — С. 89–95.

М.А. Смирнова, И.А. Самойлова, Г.С. Тынбаева

«Ақпараттық-коммуникациялық технологиялар» пәні бойынша инновациялық оқыту стратегиясын енгізу туралы

Мақалада «Ақпараттық-коммуникациялық технологиялар» пәнін оқытуда авторлардың жалпылама жеке тәжірибесі берілген. Коллаборативті оқыту (өзара оқыту) жағдайында ортақ оқу ортасының бар болу қағидаларының жүзеге асырылуы талданды. Топтық жұмыстың әртүрлі әдістерін қолдану тәжірибесі көрсетіліп, олардың артықшылықтары мен тәуекелдері қарастырылды. Диалогтық оқыту мен топтық жұмыстың әртүрлі элементтерін ұйымдастыруға ерекше көңіл бөлінді. Сын тұрғысынан ойлау стратегиясы толықтай сипатталды және оқушылардың оқу курсының барысында алатын дағдылары ұсынылды. «Ақпараттық-коммуникативті технологиялар» курсының зертханалық сабақтарын өткізуде қолданылатын ДЖИГСО, Вызов, Кластер, Инсерт сияқты тиімді инновациялық стратегиялар мен олардың әдістері қарастырылды. Жүргізілген іс-әрекеттердің негізінде педагогтардың дамуының өзекті міндеттері ұсынылды. Сыни талдауға, ақпаратты түсінуге және шешімдерді қабылдау қабілетіне негізделіп, қажетті инновациялық оқыту стратегияларын таңдауға педагог дайындығын қалыптастыру жолдары ұсынылды. Осы талдаулар негізінде авторлар жаңа буын мамандарын дайындауда тиімді инновациялық стратегияларды енгізу қажет деп қорытылды.

Кілт сөздер: біліктілікке негізделген тәсіл, бірлескен оқыту ортасы, топтық жұмыс, диалогтық оқыту, ДЖИГСО, Вызов, Кластер, Инсерт, рөлдік ойындар, сыни ойлау.

М.А. Смирнова, И.А. Самойлова, Г.С. Тынбаева

О внедрении инновационных стратегий преподавания дисциплины «Информационные и коммуникационные технологии»

В статье представлен обобщенный личный опыт авторов в преподавании дисциплины «Информационные и коммуникационные технологии». Проанализирована реализация принципов существования совместной учебной среды в коллаборативном обучении (взаимообучении). Показан опыт использования различных способов групповой работы, рассмотрены их преимущества и риски.

Особое внимание уделено организации различных элементов диалогического обучения и групповой работы. Подробно описаны стратегии критического мышления, представлены включаемые в ходе преподавания навыки студентов. Изучены эффективные инновационные стратегии, используемые в процессе проведения лабораторных занятий курса «Информационные и коммуникационные технологии», такие как ДЖИГСО, Вызов, Кластер, Инсерт и их приемы. Обоснована необходимость и результативность применения данных стратегий. На основе проведенной собственной рефлексии деятельности представлены ближайшие задачи развития педагогов. Предложены пути формирования готовности педагога к отбору необходимых инновационных стратегий преподавания, основанные на критическом анализе, осмыслении информации и умении самостоятельно принимать решения. На основе анализа авторами сделан вывод о необходимости внедрения эффективных инновационных стратегий при подготовке нового поколения специалистов.

Ключевые слова: компетентностный подход, совместная учебная среда, групповая работа, диалогическое обучение, стратегии ДЖИГСО, Вызов, Кластер, Инсерт, ролевые игры, критическое мышление.

References

1   Batyrbaeva, N.K. (2017). *Sposoby i priemy raboty v parakh i hruppakh v usloviiakh malokomplektnoi shkoly [Ways and techniques of working in pairs and groups in conditions of a small school]*. Astana: AOO «Nazarbaev Intellektualnye shkoly» Tsentr pedahohicheskoho masterstva [in Russian].

2   Chitat, Chan. (2016). ICT-supported social work interventions with youth: A critical review. *Journal of Social Work. Vol. 18, 4,* 468–488.

3   Vasilika, M. (Eds.). (2003). *Osnovy teorii kommunikatsii [Fundamentals of communication theory]*. Moscow: Hardariki [in Russian].

4   Kazimova, D.A., Abdrasheva, B.Zh., Baimukanova, M.T., Polupan, K.L., & Musatai, N.A. (2018). Innovative approaches in training specialists in conditions of digitalization of education. *Vestnik Karahandinskoho universiteta. Seriia Pedahohika» – Bulletin of the Karaganda University. Pedagogy series, 4(92),* 89–95.