

– we can use many materials at the same time: video or audio materials, pictures, texts and internet resources, etc. We can develop all the speech skill of the learners with the help of audio and video materials.
– using Activote we can conduct testing system.

Today, all schools are equipped with multimedia resource rooms. Each of them is equipped with an interactive whiteboard and electronic books. In this way we have achieved the most advanced levels of state language learning. Today, as a result of the use of information and communication technology, telephone, Internet and interactive whiteboard we are able to teach distantly, to consult distantly. These communicative and information technologies play an important role in Kazakh language learning.

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TO THE PROBLEM OF PRACTICAL IMPROVEMENT OF TRAINING PROCESS ON INNOVATIVE MEDICAL TECHNOLOGY

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During the recent five years medical education has been experiencing reformation that is defined by integration between our domestic medical education and European standards. In these terms requirements towards education in medical universities grow steadily. Therefore, during the period of post-graduate training of intern doctors of years 6–7 certain problems stand before department workers: regular study of healthcare requests that respond to modern requirements, increase in motivation among students and tutors in achieving high results of education process. In order to create an efficient training-practical work that nowadays is one of prior problems of modern high school, it is necessary to establish continuous search for training methods, renewal of “old” but useful means and introduction of new innovative directions, oriented for the world standards.

In West-Kazakhstan state medical university of Marat Ospanov there is well-equipped training-clinical center that corresponds to modern requirements. It uses innovative technology of training interns with implementation of dummies, virtual computer simulation, starting training process from fundamental motions to complicated skills [4, 5]. Such form of education leads to remembering of theoretical knowledge, received during classes, and better mastering of practical skills. During multiple trainings within the process of module training within innovative directions interns learn and master a certain sequence of operative interference

that will give intern doctors confidence, required for independent work in surgical rooms, centers of ambulatory hospitals, and hospitals.

Each intern requires an individual approach. Since 2009–2010 until 2014–2015 interns of years 6–7 took their training in consultation centers of different stations, and they will report the received practical skills at objective structured clinical exam.

An efficient method of training with mastering an innovative technology tutors-specialists should be trained at modern level.

Since 1993 surgical departments of hospitals in the city and region districts methods of laparoscopic surgeries have been mastered in practical aspect. The existing educational programme neglects problems of innovative technologies of Laparoscopic cholecystectomy. Regardless of this fact, interns are interested in module education according to innovative technology of consultation centers. Realizing the fact that an expensive laparoscopic apparatus, acquired by a hospital, interns will not practice on people. Therefore, some of them take courses in consultation centers by universities, though they intend to train at simulators. A reliable mastering of the innovative technology implies demonstration of videofilms on laparoscopic cholecystectomy and appendectomy.

Advantages of laparoscopic methods are well known by doctors and patients, number of surgeries increases rapidly [5, 9]. In nearest future a significant part of surgeries of stomach pathology will be carried out through laparoscopy. Many medical institutions, even in regional centers of the country now have the necessary equipment and tools. At the same time a lack of surgeons who can at least assist in laparoscopic surgery arose. Therefore, medical mistakes are still frequent, especially at early stage of work.

Thus, **educating surgeons** who can carry out basic laparoscopic operations on stomach organs with guaranteed high quality, **is the most significant problem of modern surgery** [10]. Laparoscopic intervention place certain high requirements towards a surgeon [12]. A surgeon who plans to master basic skills of surgical laparoscopy, must take an active part in assisting and then carry out laparoscopy independently, have a conscious desire and serious motivation. Regretfully, there are not many surgeons of different specialties who want to develop professionally in this direction [11]. However, there are even fewer practicing laparoscopic surgeons who intend to improve their expertise. Nevertheless, even among those who want to take up laparoscopic surgery it is necessary to introduce additional selection with consideration of type of highest nervous activity and psycho-emotional features of a doctor’s character in order to predict and correct intra-surgical behavior of some surgeons.

There are candidates who are high-qualified general surgeons but due to their special features (choleric temper, unstable type of CNS) [6, 7]

or a negative and initially unfair attitude towards low-traumatic methods of surgery are unable to master laparoscopic methods completely. Besides, a doctor must have the necessary experience of practical treatment, be familiar with traditional technique of surgery, understand and implement this tactic in case of emergency and development of intra-surgical complications.

But, a surgeon who carries out traditional interventions [9] with a rich practical experience cannot transit to laparoscopic surgeries without taking the corresponding training. Mastering innovative technique for carrying out laparoscopic interventions and preparing most of laparoscopic surgeons must proceed according of principles of deontology. It is proved that **simulation methods** [8, 10] bear the greatest efficiency of developing manual skills of laparoscopic surgery. In order to realize them it is also recommended to use virtual computer simulators Lap Mentor, LapVR, and others. However, such training should be considered not only as additional training course with simulators or models, but, first of all, as implementation of certain innovative pedagogic technologies that provide for succession of the system of forming, processing, improving practical skills and preparation for carrying out professional activity at all stages of a doctor's training. Nowadays there are no existing objective criterions that would allow a surgeon to start his independent laparoscopic interventions. As a rule, a young specialist gains access to laparoscopic surgeries according to a subjective evaluation of his tutor, and criterions of this evaluation differ among tutors. At the same time, it is important to secure that a tutor is able to provide this access in accordance with his medical position, in other words, possesses a sufficient administrative resource. In this case full responsibility for actions of a young doctor lies on his teacher that, one the one hand, motivates a tutor to train his student well, and, on the other hand, provokes an excessive caution and slows down access of young specialist to independent laparoscopic work.

Preparing a surgeon for undertaking laparoscopic surgeries is a **continuous and tedious process**. In foreign medicine a surgeon is allowed to perform practical work via laparoscopic method after his graduation. The main complication of such education lays in necessity to obtain a great number of manual skills [8] and tactile sensitivity [13] by a doctor. We should outline that technique of carrying out laparoscopic interventions in various medical specialties of surgical profile has a lot of mutual aspects [1, 3]. It is reasonable to develop a habit to control the flow of surgery according to two-dimensional screen picture with lack of lack of depth perception in terms of the limited view over the area of surgical intervention, learn to move tools in space economically and regulate one's motion accurately in conditions of "lever effect" and masking effect of rubber closure rings of trocars, and also

evaluate resistance and consistency of tissue by vision and tactile perception through an indirect manipulation of a long tool [12]. These skills must be formed and developed at the stage of postgraduate education.

At the same time, there is no possibility to equip profile surgeons with all necessary tools in medical institutions. **Special training centers** are supposed to solve this problem, for example, in consulting center of West-Kazakhstan state medical university, profile departments of medical universities, and scientific centers (national center of surgery of A.N. Syzganov) that have an ability of aimed training in techniques of carrying out laparoscopic surgeries as corresponding goals are set before these institutions. [9,11]. There are several stages of module systems to train doctors with taking certain testing tasks.

Within the first module interns receive the necessary theoretical knowledge, including that on topographic anatomy and operative surgery with usage of digital textbooks and interactive digital guides, anatomic models, tools of 3D visualization (Control Lab). It allows us to improve motivation to educate and approach mastering practical skills consciously.

At the second stage interns master basic skills of laparoscopic surgery at visual simulators. Regrettably, the system of registering simulation task results does not allow to evaluate quality of following all rules and recommendations. Of course, these parameters can be estimated visually with usage of video recording, but such evaluation is unlikely to be objective of technological. Series of five daily courses has been selected as organizational scheme of training module, devoted to mastering practical skills. At the first class interns take a test that allows tutors to evaluate their initial level of expertise. Every move, made by an intern, is registered and analyzed by computer, as a result, the system is able to evaluate over ten parameters of operation quality in terms of the given task (consumed time, quantity, safety, speed, efficiency of motion,), outputting it as a table. It is also possible to analyze video record, discuss a student's actions, reveal mistakes.

At the final stage of this module each intern or young doctor take all exercises in "examinational" regime with registration of results. A great number of parameters, registered by the simulator, complicate work of the tutor who has to classify and analyze a great volume of information. A necessity to evaluate quality of this training module results and form "standard of qualification" defines creation of integral system of parameter calculation. A value, formed by the system, must be objective, clear, and consider maximum number of parameters, regulated by the simulator.

According to the formulated requirements, the basic idea, put into the foundation of developing integral evaluation system, is defined by the following: a perfect result is finishing all exercises without time costs, using tools, but with maximum efficiency in all tasks. The basic principle of results calculation is distribution of parameters according to their significance, efficiency, necessity, and safety.

The smallest significance has been referred to the time of finishing an exercise, further the following parameters go: number of motions with tools, distance of motions with tools, economy of motions, efficiency of trials in taking exercise, and unfinished tasks.

The suggested algorithm of forming evaluation makes the system of its generation more versatile and interesting, thus stimulating an intern to maintain various, even incompatible requirements. It encourages a student to search for a compromise and select an optimal way of solving an objective, trying to minimize number of penalties for each fixed parameter of fulfillment. Besides, while comparing the registered parameters in analysis, we managed to develop a method of indirect evaluation of quality of elements that are not included into the list of those, registered by the simulator, for example, patient's safety during coagulation.

In order to simplify calculations, an automatic computer system has been developed, it is represented by a base in Excel format that contains the developed module system. At the same time, an average result for finishing each exercise is calculated and total final mark is defined. Presence of such database of results, exposed to statistical procession and evaluation by experts, will allow us to create a system of access towards various stages of training in laparoscopic surgery.

At the foundation of integral basic module evaluation a tutor makes a decision on the future training programme. In case of unsatisfactory marks, an intern is recommended to take another course in the finished module. Some interns who are interested in education, require additional training time to master basic manual skills. In case the results are good or excellent, transition towards following stages is recommended.

Module training of general surgeons allows them to master implementation of cholecystectomy and appendectomy. At the same time, it is reasonable to use simulators with tactile feedback that can make training more comfortable from its initial stages and lead to a faster stabilization of qualitative parameters. It is also necessary to consider the fact that expression of tactile sensitivity depends on the nature of set objective and sufficiency of an intern's zeal in process of education [12]. Placing a stitch or setting a knot refers to complex surgical manipulations that require an accurate orientation on intern's behalf. Mastering technique of placing a stitch is reasonable to take to exercises with simulators [13] and even home. First of all, an intern should master placing surgical and self-fitting knots.

Development of various manual skills is possible and should be taken to practice, that includes technique of introducing trocars and stages of laparoscopic surgeries with implementation of electrocoagulation, stitching facilities, alloying tools, and also implementation of different types of stitching and fixing knots.

In order to master a technique of carrying out laparoscopic surgeries, one needs to:

1. Take test of topographic anatomy and operative surgery.
2. Pass basic training course at virtual simulators.
3. Train at mechanical simulators.
4. Take advanced training course at virtual simulators.

Only after these stages are passed, it is reasonable to continue an intern's or young doctor's training in surgical room in terms of surgical department with tutor, whose work should be observed and assisted with provision of necessary comments, and then under his observation and assistance. To complete training in laparoscopic interventions and realize educational programme adequately, it is necessary that a tutor possesses a sufficient experience in laparoscopic cholecystectomy and appendectomy as well as in traditional methods.

These conclusions are also confirmed by results of certain researches [7, 8, 9]. During the process of questioning interns it has been registered that a number of interns improved their indicators in laparoscopy after practical training:

- 78,0% of interns obtain a skill to maintain horizontal level of image at videoscreen while working with laparoscope after practical courses;
- 82,7% can steadily fix an object in the middle of the screen with laparoscope;
- 71,7% provide a surgeon with comfortable working conditions by assisting him;
- 66,9% can achieve their target quickly with the tool;
- 54,3% don't make unnecessary motions;
- 78,7% fix an object with the tool firmly;
- 56,7% can tract tissue safely;
- 32,3% are potentially prepared to take up separate stages of laparoscopic interventions.

Conclusion: during an independent training in laparoscopy interventions one should follow certain organizational and tactical aspects:

- It is necessary that surgeons, who desire to master and improve laparoscopic method of surgical interventions accumulate experience of carrying out traditional surgeries that will allow them to estimate a situation quickly and make adequate decisions without delaying conversion of access, and manage possible complications independently during and after a surgery.

One should remember that laparoscopic surgery is not a separate specialty, but a method of undertaking operative aid. Therefore, it is important that a surgeon, involved into laparoscopy, carries out traditional surgeries as well.

- At early stages of carrying out laparoscopic surgeries it is useful to watch video record or surgical interventions after operation in order to analyze the process in detail and study mistakes as well as evaluate the work objectively, it is also beneficial to attract more experienced surgeons to this procedure. All endoscopic interventions through video

recording should be studied in cases when certain technical complications emerge or the process oscillates from the standard flow, post-surgical complications develop.

• It is necessary to take courses and trainings of thematic improvement in order to improve qualification, participate in various surgical forums, read specialized literature regularly. Nowadays the necessity and reasonability of continuous improvement of expertise among surgeons of laparoscopic profile is proved by the very flow of surgery development, and this direction cannot be doubted.

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IMPROVEMENT OF METHODOLOGICAL PREPARATION OF THE INFORMATICS TEACHER BY A TRAINING TECHNIQUE TO A SUBJECT ON AN INNOVATIVE BASIS

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The use of innovative technologies in education has brought many changes in the pedagogical activity of school teachers. These changes affected the purpose and objectives, content, structure, methods of teaching the subject of computer science related to the applied direction of informatics as a science. The role and place of science in education changed, i.e. known methods used in teaching computer science, acquired general scientific sense, and methods used in the forming of knowledge, competencies and skills, focused on general intellectual development.

Studies in the theory and methods of training informatics teachers, have identified the following problems:

- 1) incomplete perfection methodological system according to a new model based on innovative teaching methods associated with the development of modern science and technology;
- 2) inconsistency of the theory and practice of modern information innovative technology to modern informational and software provision;
- 3) insufficiency of psychological, pedagogical and methodological subjects, training the use of innovative technologies in the educational process

Science of teaching informatics covers all stages of information education. This requires a continuous search in the direction of formation of information competence in improving teacher training. Problems of teaching methods with a focus on the individual, differentiated learning, individual learning, specialized education and others became urgent tasks of methodical science. When profile training teachers faced a number of difficulties in organizing and holding of elective courses on various branches of computer science. It was noted that their methodical preparation is insufficient during conducting elective courses. In connection with this occupation by methods of training informatics became the main work of the teacher. This fact shows the importance of armament of teacher by methodological knowledge on the basis of innovation, improving his methodical preparation.

Modern teacher must know the methodological, psychological, pedagogical, subjective and methodological components of teaching informatics, the methodology of scientific research, the theory of teaching and ways of its implementation in practice, be able to justify the innovation model, to apply