Dental implant issues: forms and methods of education for international students

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Abstract. The article analyzes the experience of teaching the discipline "Dental implantation" to foreign students in Dentistry studying at the Chuvash State University in Cheboksary in the context of internationalization and digitalization of higher education. Forms and methods of teaching Dental implantation and international academic mobility of faculty members are proposed. Foreign students are active participants in the student scientific circle of the department "Dentist of the Future"; they take part in the annual International Student Conferences, tooth drawing competitions "Da Vinci’s Tooth", All-Russian festivals of students and youth "Man. Citizen. Scientist". The authors emphasize the significance of professional and communicative competencies denistry teachers. The teachers of the department are members of the International Club of Implantologists - International team for Implantology. In 2019 in Valletta on Malta the first summit “World Women’s Implantology Communities WIN EMEA” took place, and in May the University of Bern in Switzerland hosted a symposium in honor of Professor Daniel Buser "20 Years of Progress in Implant Dentistry". The teachers of the department took part in these events. The main emphasis in the programs was placed on the active use of digital technologies in dental implantation, teaching discipline at the university using international standards. Internet resources allow you to check tasks for the teacher. For more than ten years, online testing has been carried out to monitor and assess the level of knowledge, skills and abilities of students in this discipline. The department tests students in Online Test Pad. Computer tools and technologies are used to help educate dentistry students. To improve the quality of diagnosis and treatment, digital technologies for virtual examination and treatment are used: computed tomography, intraoral scanning, data collection and planning methods, CAD / CAM technology, tools and materials for 3D production. The department is aware that foreign graduates will represent Russian education in their country, and seeks to transfer knowledge using digital technologies, international standards and experience. Unitig efforts with foreign colleagues improves the quality of work with foreign students and develops competitiveness of university alumni.

The processes of globalization, the expansion of international and intercultural relations in various areas of public life create a need for highly qualified young professionals.

In the multipolar world, the role of education has increased. It is an integral part and form of the foreign policy strategy. Education acts as one of the elements of public diplomacy. The advantage of influencing the world through education is obvious. It is education that can act as an effective mechanism that can become one of the most important competitive advantages in the struggle for international leadership [1].

The staff of the department has made great efforts to develop international cooperation and established friendly relations with Italy, Sweden, Switzerland, etc. Acquaintance of teachers with new medical technologies for diagnosis and treatment, the system of medical education and medical care in other countries allows the introduction of modern achievements and innovations in practical activities and educational activities of the university. Russian education has reached a new level of interaction with foreign students. Any activity in that is characterized by an international presence is considered internationalization [2–3]. In the context of the influx of foreign students to the Chuvash State University, educational services have become an object of internationalization. The internationalization of the educational program of the discipline "Dental implantation" is the involvement in the educational process of the teaching staff who speak a foreign language and students of foreign countries [4–5].

The purpose of the study is to acquire professional competencies in the discipline "Dental implantation" by foreign dentistry students using the experience of leading foreign universities.

For this purpose, we have solved the following tasks:
1. Teaching foreign students in Dental implantation, implemented in English by the teaching staff who have fundamental knowledge of dentistry and English.

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2. Increasing the international academic mobility of the staff. Educational visits to universities of foreign countries in order to acquire experience of leading foreign universities.

3. Participation of teachers and students in international dental events and research projects.

For more than ten years, the department has been using innovative forms and methods of teaching in English while maintaining the best traditions of teaching dental implantation. The discipline "Dental implantation" is taught both in English and in Russian on clinical bases with patients who speak Russian. We are aware that foreign graduates will represent our education in their country, and seek to transfer knowledge using international standards and experience [6].

To help educate dentistry students, computer tools and technologies related to their future professional activities should be used. In dentistry, to improve the quality of diagnosis and treatment, digital technologies for virtual examination and treatment modeling are used: computed tomography, intraoral scanning, including data collection and planning methods, CAD/CAM technology for modeling dental treatment, tools and materials for 3D production [7].

The discipline "Dental implantation" is taught in the fifth year of the tenth semester. Students from Egypt, Iraq, Iran, Syria, Morocco, Italy, Vietnam and other countries are provided with knowledge about dental implantation. They study equipment and tools used in dental implantation. Among the innovative approaches to higher education of a dentist are digital tools and learning technologies.

Foreign students have the opportunity to improve the skills of dental implantation in English during lectures, seminars, and practical classes. The future specialist needs to know about the possibility of prosthetics based on dental implants using digital technologies.

Digital technologies are the most important part of modern medicine. One of the most technologically advanced industries is dentistry. Implantology as one of the fastest growing and most demanded branches of dentistry, beats all records in the implementation of technologies. The subject is taught on the basis of the dental clinic "President" in Cheboksary and in the center of X-ray diagnostics "Voxel". The Voxel Center trains students in 3D research. For more than 15 years, Nobel Procera CAD/CAM has been the world's leading company in the production of orthopedic structures. In the dental clinic "President" fifth-year students study the equipment, tools necessary for dental implantation, participate in operations of introducing dental implants into the bone of the lower and upper jaws. They get acquainted with CAD-CAM technology in dentistry, with optical scanners which quickly and accurately scan impressions and models of teeth, and create high-precision orthopedic structures due to conoscopic holography [8]. They also participate in implant placement operations using Nobel Guide templates created in DTX Studio Implant. DTX Studio Implant is a comprehensive concept for orthopedic treatment planning and implant placement using the surgical template. Nobel Guide templates are used for both pilot drilling and guided implantation and installation of denture structures. The use of CAD/CAM technology in prosthodontics has a long history. This technology is based on the use of industrial capabilities in the manufacture of precise and durable products with the obligatory consideration of individual requirements [6]. In 1983 Mats Andersson (Sweden) developed a unique technology that made it possible to manufacture bridges, crowns, abutments and veneers using high-tech hardware systems. This technology combines personalized esthetics and industrial manufacturing to enable dental labs and dentists to perform top quality esthetic work quickly, easily and at an affordable cost. The main idea of the technology is the use of frames created by milling block blanks from titanium, zirconium dioxide or cobalt-chromium alloy using computer simulation technology [9, 10]. The elements have great strength, while the thickness of the finished structure does not exceed 0.4 mm. Zirconia constructions allow for achieving high aesthetic and functional results. They do not injure the tissues of the marginal gingiva and do not cause allergic reactions [11]. The prosthesis cannot be formed manually due to the high strength of the materials. The CAD/CAM system is used at three stages: scanning images of teeth models cast from impressions, virtual creation of a prosthesis, and fabrication of a structure. The results are processed by software, and the virtual prosthesis is created [10]. The entire production process is controlled by computers at the micron level, so the influence of the human factor is absolutely excluded. The finished frame is delivered to the clinic, finalized and installed in the oral cavity. The patient is provided with a certificate of authenticity for each design, which confirms the purity of the raw materials used with a 5-year warranty period.

At the department, lectures are delivered in the form of multimedia presentations. The Internet provides a large number of services that a higher school teacher uses in his work. Internet resources allow you to perform the work of checking completed tasks for the teacher [13–15]. For more than ten years, online testing has been carried out to monitor and assess the level of knowledge, skills and abilities of students in this discipline. As a tool for creating test tasks, the multifunctional free web service is used. The bank of test tasks for the disciplines of the department contains more than ten thousand questions. The teacher gets the opportunity to test each student individually. The possibility of cheating is excluded, the time for completing the task is displayed, automatic verification and evaluation of test results are carried out. After testing, the teacher assesses the test results and analyzes mistakes of each student. Online testing eliminates the need for a computer, students do not need to register on the site. It is enough for the teacher to know his login and password, as well as to have access to a device with Internet access. Students use their mobile phones during the test control. The teacher provides access to the test in the form of a link on the Internet and the student opens the test questions on his mobile phone. The main advantage of the test constructor "Online Test Pad" is instant processing of test results and full reporting on the average score and
errors. Its use to control student progress is an objective assessment of student's knowledge and a way to analyze the teacher's work. Test results are evaluated on a five-point scale based on the percentage of correctly completed tasks. Test results are saved as an Excel or PDF file, and used in the analysis of academic performance [12].

Let us give one of the examples of online testing during the intermediate certification in the discipline “Propaedeutics of Dental Diseases” of second-year students. Bank of test items amounted to about 3000 questions. 30 questions were automatically selected from the general bank of tasks. One minute was allotted for each question. Each group consists of more than 30 students, each subgroup consists of 15 to 18 students. On fig. 1 shows the results of online testing of 17 students of one subgroup: 12 students answered 30 questions in an average of 20 minutes. Of these: 3 students answered the mark “excellent”, 9 students received the mark “good”, 3 students completed the task satisfactorily, 2 students completed the test unsatisfactorily. The mean score for the group was 72%. Information about the results of online testing is available for students to review (Fig. 2). The following questions are presented, to which the majority of students answered incorrectly (Fig. 3).

In today's information world, learning is becoming more mobile, accessible and efficient. The answer to the increasing requirements for the quality of the pedagogical process in higher education is the introduction of computer tools and learning technologies. The online test constructor is convenient for conducting classes in all disciplines of dentistry.

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**Fig. 1.** The results of online testing of second-year students in the discipline “Propaedeutics of Dental Diseases”.

**Fig. 2.** The result of the student's online test.
As part of the International Student Conference “Week Science” dedicated to the 60th anniversary of the first flight of human in space and labor feat builders of Sursky and Kazansky defensive frontiers, the department held a conference "Evidence of the effectiveness of dental implantation", which foreign students participated in. Activists of the student scientific circle of the department "Dentist of the Future" took part in the sectional meetings of the scientific All-Russian student conference dedicated to the 75th anniversary of the Victory in the Great Patriotic War of 1941–1945, the 100th anniversary of the formation of the Chuvash Autonomous Region, the Year of the Cultural Heritage of the Peoples of Russia and the Year of the Outstanding Countrymen in the Chuvash Republic. Students from Iraq, Egypt and Yemen became winners in the competition for outstanding countrymen in the Chuvash Republic: Andrians Grigoryevich Nikolaev is the legendary cosmonaut from Chuvashia who entered the top three Soviet people who conquered space, Nadezhda Pavlova is a ballerina, Honored Artist, Stanislav Fedorov is a famous ophthalmologist of Russia.

The teaching staff is developing strategic partnerships with foreign universities, cooperating in dental implantation. The teachers of the department are members of the International Club of Implantologists. They attend symposia, congresses, major scientific and practical events, where world experts share their rich experience in dental implantation. In May 2019, a constellation of world-renowned scholars and educators gathered at the University of Bern in Switzerland.

World-famous lecturers presented an overview of the achievements in dental implantation: Daniel Buser, Anton Sculean, German Gallucci, Andrea Mombelli, Mario Roccuzzo, Stephen Chen, Ronald Jung, Michael Bornstein, etc. The achievements and merits of Professor Buser for dental implantology are invaluable. The symposium was attended by the head of the department L. Nikitina who has been engaged in dental implantation for more than twenty-five years. For more than ten years, the department has been using educational films by Professor Daniel Buser "Surgical Procedures in Implant Dentistry" when teaching the discipline.

In March 2019, the first summit of the World Women's Implant Society WIN EMEA was held in Valletta, Malta. This event was attended by about 200 female implantologists, teachers of higher educational institutions from 80 countries. The summit was of a scientific and practical orientation, the main emphasis was placed on the use of digital technologies in dental implantation, teaching discipline at a university using international standards. Communication between female experts enriched everyone with new ideas and approaches in teaching and research. Joining forces with foreign colleagues improves the quality of work with foreign students and develops the competitiveness of university graduates.

Nowadays, educational services have become an object of internationalization. New ways of learning and teaching have been implemented due to professional activities of each teacher, their motivation to develop intercultural competencies and to study foreign

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**Fig. 3. Questions with wrong answers.**

What class according to Black's classification is TTZ lesion in this patient?

- IV.
- V.
- I.
- VI.
- II.
- III.

Name the shown tool

- Contra-angle handpiece for micromotor
- Contra-angle for rigid hose
- Endodontic handpiece
- Turbine tip
- Ultrasonic scaler

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languages. The result is the English-taught program, the expansion of cooperation with foreign universities, leading scientists and the training of a foreign graduate student for life and effective professional activity in a new reality.

References