INNOVATING THE COMPELLARY STUDY SUBJECT OF PAEDIATRICS AND THE CREATION OF MULTIMEDIA TEXT FOR PRACTICAL TRAINING

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Abstract

Paper is presenting project of innovation in teaching subject of Paediatrics at Palacky University in Olomouc. The project aims at modernizing and increasing quality, efficiency and development of student education. Innovating Paediatrics, as a subject, involves the creation and institution of the up-till-now missing multimedia learning support aimed at extending and changing the contents of practical training with direct involvement of infant patients in the teaching process. At the same time, the project also provides the possibility of effective self-study on the part of students using web interface and hypertext links to recent publications in renowned journals.

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1. Introduction

At the Faculty of Medicine and the Faculty of Health Sciences at Palacky University in Olomouc, a new project is being implemented where main objective is to innovate and revamp the subject of paediatrics with the intention of enhancing quality and modernizing and developing respective university teaching in order to extend students’ knowledge and skills. In line with the new trends in viewing medicine as an evidence-based medical subject and with new, ever-growing, findings in paediatrics, it was required to modify and customize the contents of lessons both at theoretical and

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practical levels, with focus on interlinking the theoretical knowledge, clinical skills and decision-making skills of students. Modernization changes were carried out, allowing students to use, in the course of their preparation, a wide range of modern information technologies, both with a teacher in a classroom and within one’s own individual studies at home.

At present, more emphasis is being given to the practical aspects of student teaching (bedside training during practical exercises), the ability to make their own decisions, practice the acquired skills and to incorporate multimedia learning support (within practical as well as theoretical teaching - teaching becomes more interlinked). Therefore, a new multimedia learning support was created (multimedia textbooks, web interface), which is based on individual case studies addressing specific paediatric patients and resulting in better decision-making skills of the students and the future graduates. This study support consists of hyperlinks to recent publications in renowned national and foreign magazines and web-based interface with the possibility of self-study. Within the innovative teaching, students elaborate on case studies of individual patients within their workshops where they have the opportunity of consulting on possible solutions and alternatives with practising professionals. Processing of the given case according to this study support will become part of the state examination for students of general medicine and part of the examination in paediatrics for students of dentistry and physiotherapy.

It was essential to implement this project due to the rapid and unprecedented developments in medicine, as it is necessary to adapt and modernize the teaching of medical students in order to combine new theoretical findings with the acquired clinical skills, an aspect so badly needed for preparing the future generation of physicians. Students are increasingly overwhelmed with new theoretical knowledge, but modern study support for practical training and testing of students of paediatrics, as one of the core subjects of medical training, has been missing up till now. The creation of this multi-media support has brought new opportunities to students in the following sense:

- targeted and interlinked tuition of seminars to be prepared
- transfer of knowledge and skills in diagnosis and treatment
- widening the scope of clinical work in practical exercises during bedside training
- self-education
- applying the acquired knowledge and skills
- testing in the course of preparation for the state exam.

Another reason for the need of multimedia study support in the field of paediatrics was the fact that in the current study literature, introducing students to specific cases (patients) and their diagnostic and therapeutic solutions is totally missing. When compared with EU and other countries, our students lack continuity in practice, especially in independent solutions of individual cases. The aim of this project is to help offset this deficit.

2. Students

This project can be utilized by all students of the study programmes of General Medicine and Dentistry of the Faculty of Medicine, and by students of the bachelor's degree programme with specialization in health care (field of physiotherapy) and the master's degree programme with specialization in health care (field of physiotherapy) at the Faculty of Health Sciences UP in Olomouc. Paediatrics belongs among the compulsory subjects and is part of the fifth year of the study programmes for general medicine and dentistry, and second year of the physiotherapy studies. Students who take part in this subject have already fulfilled all compulsory theoretical subjects and are preparing for their practical professional performance. The subject of paediatrics is, in the general medicine study
programme, accomplished with a final state examination; in other courses with a compulsory examination.

The total number of annual students in all programmes is at least 250, out of which 150 students study the General Medicine study programme, 70 students fall under the Dentistry programme and 30 students attend the Physiotherapy fields. In the course of a study term, students are divided into blocks, each being a four-week block and the maximum number of students in one block is twenty five, which allows for a rather personalized approach to the teaching and enables achieving higher efficiency in education. Another application of the project, modified to the English language, is working with foreign students that study at the UP General Medicine programme. It is necessary to emphasize that the newly created multimedia support has a website that can be, pursuant to posting a request to the administrator, used by virtually everyone, including the students of other medical departments all over the Czech Republic.

3. Preparation of the training materials

For the purposes of ensuring correct implementation of this project phase, the gathering of data and visual documentation were crucial as the necessary platforms for further high-quality processing of these materials. Data collection for the preparation of teaching materials was conducted through thorough examination of the available literature (textbooks, recent articles in professional journals, internet resources, including server updates, etc.). Highly valuable information was also gathered from meetings with experts from other workplaces in the Czech Republic and through participation in professional conferences. The major part of data collection consisted of field work. At the meetings of the implementation team and at consultations with leading professionals in paediatrics, suitable patients were selected for case studies from various disciplines. Data was assembled in the form of extracts from medical records, patients’ cards, and photographing and filming patients, always with the consent of each patient and/or their legal representatives. In the course of creating base materials for case reports, a database from the radiology clinic was used to obtain visual documentation. The values of laboratory results were acquired thanks to the hospital information system.

During this project phase, a new computer programme was developed, which has been fully operational since the end of November 2010. The programme is editable and the administrator can insert texts of case studies created by co-authors. The created editorial programme serves the purpose of simulating work with a patient, from acquiring information on admission up to the final treatment. When working with the programme, students gradually open individual windows with description of a patient, enter their own evaluation of the urgency of the patient’s case, through description and analysis of the considered differential diagnosis select indicated treatments (laboratory, visual and other specialized for each field). Students evaluate the findings, including picture and video documentation, as well as opting on the final diagnosis, justifying the selected therapy. All case studies are extended by a professional theoretical section and students have the opportunity to extend their knowledge through the Internet literary references, which are part of each case.

The programme has its own internet domain-www.pedkaz.cz and is password protected. Every fifth grade student of General Medicine at the Medical Faculty of Palacky University in Olomouc and assistants of the Department of Paediatrics have their access names and passwords. The site is also a reference to the principal investigator and it is possible to ask for access permission, which will be then sent to the applicant.
4. Creation of multimedia learning support

Another part of the project is creating multimedia learning support as such. This is realized by processing the documents obtained during the development of materials for case studies. The support is created by means of a computer programme, whereas the text has to be divided into several parts depending on its structure. Study support is also divided into several sections. The first part is anamnestic, in which a student obtains the basic information on a patient (history taking): current condition, personal history, social, family, pharmacological, allergy, epidemiological and gynaecological history, see Fig 1. After reading this information, a student should be capable of forming an idea of the source of patient’s problems and subsequently, he/she should be able to prepare the possible differential diagnosis of the case and to decide about potential hospitalization of the patient and thus determine the urgency of his/her condition.

Fig. 1. Current condition of the patient with accessible files- photos

Another part is the diagnostic and therapeutic stage when a student indicates the respective examinations and evaluates the results. He/she chooses from a wide range of laboratory, radiological and specialized examinations divided into many subgroups, see Fig 2,3.
Fig. 2, Range of laboratory examinations- biochemical tests

Fig. 3, Radiological examination - x-ray of the patient
The aim is to teach students how indicate examinations in close-to-real-life situations and make their own decisions. On the basis of the obtained information, the student then selects from 5 -10 diagnostic options and justifies the correctness of his/her decision, see Fig.4.

Fig.4 Range of diagnostic options

In the therapeutic part, the student again chooses from 5 -10 options of therapeutic approaches to the patient, based on the assumed diagnosis. After concluding the testing phase, evaluation of the student’s performance in the case study is displayed with a commentary on the mistakes and the correct answers, including notification of what should have been examined. Finally, the theoretical part is displayed with a theoretical summary of the diagnosis and the literary references, see Fig.5.
Case studies are analysed prior to entering the programme with the target group, since it is necessary to know the feedback from the programme users and at this stage, possible shortcomings or issues may be eliminated.

Until today, 66 case studies have been created, 6 on each field- cardiology, intensive medicine, allergology, surgery, neonatology, nephrology, endocrinology, gastroenterology, pneumology, rheumatology and haematology.

The Website with a new computer programme is fully functional. It is possible to enter any number of case studies to the computer application; three modes of starting-up have been configured.

a) Teacher: the programme runs in trial mode and the results and the correct answers will be displayed to the examiner only after entering the personal username and password.

b) Student: this mode serves as a self-study tool for students. Students, wherever connected to the Internet, can test themselves on a case study and correct answers are displayed immediately after saving the entered data. The programme is, however, set in such a way that the sequence of optional responses is mixed in repeated testing in order to prevent abuse by students training for the exam.

c) The last option is the administrator: case studies can be inserted into the programme. The computer programme not only allows testing of the student but is also able to evaluate, according to a pre-set submission by authors, errors in scoring and notifies the tested student of the failures or deficiencies, including the justifications and explanations.

Case studies are, even at this stage, consulted with eminent experts in the field of paediatrics. The theoretical part also plays an important role where students learn more about the disorder and may further extend their knowledge.

The programme is set in such manner that the tested student works in the same way as if he/she
would examine a real patient and thus he/she improves practical medical performance and develops one’s own skills. Visual documentation is also highly important as it, thanks to real radiological pictures and patients’ photos, simulates real work with a patient.

5. Implementation of innovative teaching

The final part of the project deals with the implementation of innovative teaching itself. It aims at working with students. A computer programme is applied during the practical student training at the department, both in the test mode as well as in interactive teaching using the student mode where the given health conditions and approaches to a patient are simulated on the basis of case studies. This is performed in the presence of an assistant who discusses the given health conditions with the students and is also familiar with the newly acquired information from domestic and foreign sources on this topic in the theoretical part of the programme. This type of tuition has been already conducted in eight study groups of the students of General Medicine, two groups of future physiotherapists and two groups of students of dentistry. The programme has also been presented to foreign students during their excursions. Each teaching block is opened with a seminar in which the students are introduced to the computer programme and to working with multimedia text. Thanks to the evaluation of the teaching, it was found that most students use the programme also during their home preparation and find such method of teaching preferred and beneficial.

Conclusion:

The aim of the project is to enhance the existing system of preparation of students resulting in greater awareness, flexibility and more independent decision-making that are essential for increasing their erudition and qualification. Hand in hand with the students’ increased competitiveness on the job market, this project also ensures better care for paediatric patients. Innovating the study subject of Paediatrics implies the creation of multimedia learning support (interactive, audio-visual, etc.) that has been lacking to date, serving to change and extend the contents of practical training with direct involvement of an infant patient into the educational process. Our multimedia support enables to make self-study much more effective by means of web interface and hypertext links to recent publications in renowned journals.

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