



INNOVATION OF UNDERGRADUATE EVIDENCE-BASED PAEDIATRIC CURRICULUM: A CASE STUDY

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Abstract

The aim of the paper is to outline an innovative project of the existing evidence-based paediatric course at a 'bench to bedside' learning platform. Three-year experience based on the feedback gathered from students has demonstrated that the students' actual clinical cases may improve uptake of EBM knowledge. The current curriculum includes formal training for use of online search skills by medical librarians as well as interactive web-based tutorials. Students work in pairs, they are assigned an actual patient case, ask a clinical question, and select an article that would assist in answering their question. The online curriculum consists of self-learning as well as facilitated units. Each pair of students has to go through evaluation afterwards. In general, students have confirmed the value in the curriculum, but many of them cited the time commitment as a weakness. Based on the results of SWOT analysis we have defined a set of innovative parameters to eliminate the weaknesses: online collection of peer-reviewed students' paediatric cases with repeated common diagnoses but different complications; lecture podcasts; PICO seminars for group discussion of clinical questions and their relevance; (e)-mentoring. The innovated educational prescription will be demonstrated on an example of acute lymphoblastic leukaemia complications.

Key words: evidence-based paediatric curriculum, case-based learning, blended learning, e-mentoring

Background

In 2008, Palacky University Olomouc (Czech Republic) pediatricians launched a project with the goal to involve 5th year general medicine students in an evidence-based healthcare approach around real-life scenarios. This required a sound methodology including web-based learning materials to make a new course attractive and acceptable.

3-year-experience has confirmed that the idea of using actual clinical cases during the students' paediatric clerkship may facilitate uptake of EBM skills and knowledge. A new feature of the curriculum was a two-layer architecture, combining clinical education and information skills training provided by a multiprofessional team of educators with the involvement of medical librarians. In the end students presented their EBM case reports at a



mini-conference; they were evaluated according to a set of pre-defined criteria by a committee nominated by the head of the Paediatric Department

Online learning materials were available through the Czech National Medical Education Portal MEFANET [1].

Surveys & Feedback

In two consecutive academic years 2008/2009 and 2009/2010 a total of 226 medical students who had completed the paediatric clerkship were surveyed by a questionnaire consisting of structured questions (1-to-5 rating + open-ended). The trainees expressed their opinion about perceived values of the curricular features, in particular value of practical training, teachers' willingness, and impact of instruction on increased interest in the discipline. The results showed the following best scored instructional features : teachers' willingness (score 1 by 72 % respondents), quality of practical training (score 1 by 44 % respondents), and increasing interest in the specialty (score 1 by 32 % respondents).

There was a separate questionnaire survey among the same cohort of the students (n = 226) focused on their perceptions of 3 modes of information skills training, namely: mandatory non-interactive demonstration of a PubMed search, elective interactive small-group hands-on classes, and online tutorial with animations, fulltext examples of various study designs, templates for study design interpretation etc. Up to 70 % of the students self-reported their post-training level of search skills as average, but satisfactory to accomplish the task. 82 % of the respondents were fully satisfied with the hybrid instruction package consisting of a non-interactive PubMed search demonstration supplemented with the web-based search skills tutorial, whilst 14 % did not find this package sufficient without subsequent interactive hands-on sessions. In this context, the survey data showed that nearly 62 % of the respondents regarded subsequent hands-on training as important, whilst a total of 45 % did attend the sessions. Fisher's exact test confirmed the statistically significant correlation ($p < 0.0001$) between these two perceived values: 89 % of the hands-on session participants agreed on its efficiency, as well as up to 39 % of those who had not actually attended the interactive classes.

Open-ended questions produced some thought-provoking verbatims:

„ I found this learning activity refreshing, illustrative, enriching, BUT extremely time consuming“



“For me, it was a waste of time, not a very efficient educational tool...I prefer textbooks.”

„In the beginning, I was hopeless, because I had no idea what it was going to be about. Later on I understood that searching databases should be always inevitable to find the best treatment option for my patients. Having completed the clerkship, I decided to become a pediatrician....“

„I was especially fond of the EBM workshop, including demonstration how and why to search for relevant literature.“

“I am very happy that I had an opportunity to be trained how to search PubMed, even if the beginnings were not very easy. Now I feel competent enough to find what I need.“

SWOT Analysis

A SWOT (Strengths - Weaknesses - Opportunities - Threats) analysis [2] was used to interpret the results of the surveys including verbatims with a special attention to weaknesses of the educational procedures. There were three main areas deserving reasonable improvements: time management & (e)-mentoring, formulation of PICO questions, model solutions with Web 2.0 apps.

Innovations

Time Management and Mentoring

Originally, there had been one student per patient that was considered enormous teaching and learning load. According to a new arrangement one patient is allocated to a pair of students. More mentoring is offered by educators, librarians, and online through asynchronous communication service run by the university for registered users as part of the courseware [1].

PICO Workshop

The practice of evidence-based medicine supports 21st century healthcare and involves asking questions, searching, appraising and applying best available evidence.

Questions arising during patient care include general (background) and complex (foreground) questions. Background questions dealing with a clinical problem or a disease process are best answered by internal evidence, expert opinions, relevant review articles, pre-filtered EBM knowledgebases (eg. UpToDate)[3], or respected evidenced-based textbooks. Foreground, patient-centered problematic questions require consideration of primary studies in the



literature. These can be approached efficiently and effectively by formulating a searchable question in a PICO format. PICO is an acronym for Patient – Intervention - Comparison – Outcome.

The literature reports [4] that many clinical questions remain unanswered due to lack of skills in formulating relevant questions and searching. In this context and based on students' surveys a PICO workshop supported by online templates was introduced to help trainees accomplish this difficult, but important step of the EBM process. Under guidance of clinician-teachers and librarians, students share and finetune suggestions how to formulate relevant PICO questions before searching PubMed.

Model Solutions

Paediatric clerkship is held in the Paediatric Department of the University Hospital in Olomouc. The profile of the department can be characterized by the following features: (a) patients within age categories 1-18; (b) acute and chronic diseases; (c) specialized care in the fields of emergency medicine, onco-haematology, gastroenterology, respiratory diseases, nephrology & urology, surgery, endocrinology, neurology, etc.

For 3 years now, we have been archiving all case reports developed by the students in the format of PowerPoint presentation. Some of them have been peer-reviewed and published online on the MEFANET portal [1], other are being sorted out by basic diagnoses and ready for further use.

Our goal is to show medical students a complexity of paediatric care for each patient as a multi-layer individual clinical problem with potential complications. As a model solution, we are presenting 3 real cases of childhood acute leukaemia management with cytostatic-induced complications for the students to follow.

Future doctors must be aware of the existence of current guidelines and recommendations for disease management, but in parallel they should respect the patient-oriented evidence that matters (POEM). In practice it may happen that published evidence on disease complications of the individual patient is very weak (study designs such as case reports, case series etc.).

Some authors [5] go too far claiming that „the only thing that actually changes practice is adverse anecdote“. From the theoretical point of view this idea is closely related to experiential learning [6] that helps better understand and remember new events.



Modern information technology, in particular Web 2.0, brings about new opportunities to improve cognitive impact of learning materials, eg.podcasts accompanying web-based courses.

Conclusion

The paper describes innovation of the existing evidence-based paediatric course at a 'bench to bedside' learning platform. SWOT analysis had revealed some weaknesses that were alleviated in terms of time management & (e)-mentoring, training in PICO questions formulation, and model solutions with Web 2.0 apps.

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