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Structured evaluation and need-based restructuring of the cranio-maxillofacial surgery module within surgical clerkship

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ABSTRACT

Background: Evaluations are important for teaching courses and contribute to educational quality assurance. CMF surgery provides a module in the skills-lab week in preparation for surgical clerkship. Even though the CMF module receives positive evaluations, the students report deviating content. Subsequently, exams skills were often not mastered correctly. The aim of this study is to gather the contents taught within the course and to revise the module accordingly.
Methods: A structured evaluation sheet was used to evaluate the CMF modules. The detailed time frame used, teaching methods integrated, and learning objectives taught were documented. Based on the results, the module was restructured and re-evaluated twice.
Results: There were substantial fluctuations among the taught learning objectives in the first evaluation (21%–47% of the objectives were totally covered). The deployed time (160.50 ± 32.55 min) for the module was much shorter than scheduled (210 min).

After restructuring, more learning objectives were totally covered (44%–100%), which corresponds to a significant gain ($p = .024$). The deployed teaching time for the modules was used more efficiently (183.65 ± 21.10 min/$p = .005$), and the additional time (51.89 ± 21.23 min vs. 37.55 ± 16.06 min before/$p = .011$) was used mainly for practical exercises.
Conclusion: Structured evaluations are a meaningful tool for gaining valuable insights regarding the contents and quality of teaching courses and pinpointing potential for improvement. Key factors for the improvement of an educational module are the definition of learning goals within the context of a transparent and structured module.

1. Introduction

In the 1990s, criticism was raised about the lack of instruction focused on practical skills in medical schools (Pabst, 1995). The main emphasis was on the prevalence of multiple choice items related to theoretical knowledge, and few opportunities were available to help medical students acquire practical skills and experience with direct patient contact. Thus, many medical licensing boards and societies around the world have called for the strengthening of practical clinical skills in undergraduate medical training, as they are currently deemed insufficient (Burch et al., 2005; Sicaja et al., 2006; Coberly and Goldenhar, 2007; GMC, 2016, Tallentire et al., 2011). Therefore, new licensing regulations for physicians in Germany were established in 2002 and revised in 2013 through the *ÄAppo*-the German medical licensure act. These regulations put practice in the foreground in an effort to better prepare medical students for their future as responsible and independent doctors. The decisions regarding the specification of learning contents and when they shall be taught were left, however, to the medical faculties. The updated ÄAppo required

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evaluating all courses on a regular basis. However, once again it lacked specification regarding form and content.

International studies have shown that medical students are not sufficiently prepared for practical skills (Goodfellow and Claydon, 2001; Moercke and Eika, 2002; Ladak et al., 2006) and the clinical clerkship alone is not suitable for acquiring those practical skills (Remmen et al., 1999). A majority of final-year medical students not only in Germany but also worldwide rate their practical skills training as average or even poor (Remmen et al., 1999; Goodfellow and Claydon, 2001; Moercke and Eika, 2002; Birch and Mavis, 2006; Ladak et al., 2006; Hüttemann, 2009). According to Elsenhans, (2014), students feel they have received poor guidance from their practicing medical colleagues. Surgeons receive the lowest ranking in the survey, with only 10% of all students reporting a very good supervision experience and 20% rating their learning experience as very poor. Our own studies regarding practical exams have shown a large gap between the expected and displayed competencies, such as in regard to physical examination and suturing of lesions (Höfer et al., 2013; Landes et al., 2014).

To comply with new regulations and with current international studies, the entire teaching system used in the department of surgery at our university hospital was revised. A modern system of teaching and practical skills training (TPF) was implemented to prepare students for surgical clerkship (Russeler et al., 2010). Within TPF, a faculty member teaches subject-specific training content via talk-and-chalk settings, pre-recorded videos, practical hands-on training, and interactive repetition of practical tasks. The foundation of the system is based primarily on the belief that practical skills and patient-centered communication must be at the forefront of medical education and the profession (Goodwin, 1995). Every future physician in all possible disciplines should have basic surgical skills, including examination of the abdomen, the use of a musculoskeletal apparatus, and the performance of a systematic craniofacial examination (Remmen et al., 1999; Friedlich et al., 2002; Woolf et al., 2004; Schuebel et al., 2014).

1.1. Positive results of a switch to a competence-based system have been shown

In combination with the teaching concept, a new examination format was implemented for assessment with the objective of structured clinical examination (OSCE) (Harden et al., 1975; Harden and Gleeson, 1979). In the beginning, the OSCE, the total TPF, and the constituent modules of the TPF were evaluated as being highly valuable by both students and instructors alike (Schuebel et al., 2014). However, the results for the CMF-surgery module were below average compared to the other modules (2.11 on a grading scale from 1 (highest) to 5 (lowest)). Furthermore, learning objectives were not mastered according to the defined expectations of the OSCE, and the exam results seemed to be dependent on the instructors. As a result, ideas for solutions emerged regarding how the subject can be made more interesting for students and regarding methods for assuring that students are taught more efficiently.

First, the reasons for the progressively worse exam results of the students had to be analyzed. For this analysis, existing evaluations were not sufficient since they did not allow for in-depth analysis of the detailed structure of the lessons in the various modules. Also, randomly conducted interviews of students and instructors did not suffice since they only provided hints without a complete and specific picture of the situation. For example, the students lamented that instructors were not on time and were not motivated enough. On the other side, young colleagues of the faculty in particular did not feel well prepared at times and complained about out-of-date course material.

This study addresses these issues with the following aims:

1. To pinpoint the reasons for the worsening exam results and the below-average standard evaluations by a newly applied in-depth structured evaluation method.
2. To reestablish a need-based design of the CMF module within the surgical clerkship after analysis of the underlying causes for the negative decline of the exam results and evaluations.
3. To reevaluate the success of the newly designed module in accordance with quality assurance.

2. Material and methods

Since each instructor participating in the TPF course generally knows about the teaching evaluations, additional information regarding the new evaluations was not presented to them. The procedure was discussed with the dean, and the ethics board at the University Clinic Frankfurt, Goethe University stated that ethical approval was not required for this study.

2.1. Evaluation sheet

We used a special evaluation sheet with specific items. Before commitment, the sheet was tested and revised in regard to usability by students and didactic experts.

2.2. Evaluation

The evaluation sheets were given to 2–3 students who attended small course groups. Participation in this study was voluntary. Students were chosen for filing evaluations by a lottery system since the number of volunteering raters exceeded the number needed. The evaluation was first conducted during the winter semester of 2013/2014 (WiSe 2013/2014) and again in the summer semester of 2014 (SuSe 2014) and winter semester of 2014/2015 (WiSe 2014/2015).

2.3. Restructuring

In total, the restructuring process can be divided into three phases:

Phase I: Conception of the evaluation sheet and the evaluation process
Phase II: Conception, preparation (from providing the learning goals to teaching of instructors), and implementation of the new CMF-surgery module within the TPF.
Phase III: Quality assurance composed of the OSCE results of the students and the results of the reevaluation.

After the 1st (WiSe 2013/2014) analysis of the evaluation sheets and the decisive factors, learning goals were defined (Fig. 1) relating to a new learning objectives catalogue and the blueprint for the restructuring of the CMF module was conceptualized (Fig. 2). A plan for the implementation of a change management concept was also designed. The implementation of this concept was subdivided in single steps, as shown in Table 1.

2.4. Statistics

Statistical analyses were performed using SPSS Statistics version 19 (IBM, Armonk, USA). If a Gaussian distribution was not present in the data of the variable, then non-parametric test methods were applied. If a Gaussian distribution was present, then parametric test methods were applied. To test for significant mean differences, the

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