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Case-based learning with last year's medical students: new benchmarks for training diagnostic reasoning by using appropriateness criteria

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Learning objectives

- To present **clinical cases** with the focus on imaging in front of an audience.
- To train the systematic and intuitive forms of **case-based diagnostic reasoning** with a focus on imaging.
- To experience the **roles** and **perspectives** in **multidisciplinary teams**.
- To **train the behavior** in a **web-based meeting** and to **use IT-solutions** appropriately.

Within the framework of the subject of Radiology, students of the last year learn how to optimally prepare and present clinical cases for a webinar. They are encouraged to include **multiple choice questions** in their lectures to enhance **interactive teaching**. Each student of the Webinar group plays the assigned role in **Multidisciplinary Team Meetings (MDTMs)** (e.g.: internist, orthopedist, surgeon, etc.). By completing the Webinar, they not only learn **how to deal with new media**, but also **self-directed learning** through tasks in everyday clinical practice, so that they are introduced to **problem-based clinical reasoning.**

Background

Radiology, considered the backbone of clinical medicine, can be regarded in the same way as one of the most relevant disciplines for training medical decisions, i. e. clinical and especially diagnostic reasoning. **Multidisciplinary Team Meetings (MDTMs)**, especially when held in the form of a **webinar** (Fig. 1 and Fig. 2), are useful for applying basic knowledge in a clinical setting and for training communication and other so-called **Noninterpretative Skills (NIS)** (e.g.: professional responsibilities, ethics, professional attitudes, quality and safety skills, etc.) (1) together with the fundamental aspects of professionalism. A webinar is a suitable platform for a two-way communication between lecturers and participants who are not at the location. It should be understood as a **live stream including chat**. It is important to reach students in the associated teaching hospitals and have them participate interactively in these internal activities. An integrated text-based chat forum gives them the ability to ask questions, provide feedback to the live stream moderator, who can be the person presenting a case.

Fig.1: Webinar-Presentation of a clinical case in front of the webinar-participants and a running camera for a live-stream
Reference: Department of Biomedical Imaging and Image-guided Therapy, Medical University of Vienna - Vienna/AT

Fig.2: Students and technical equipment of the Webinar (Software "GoToWebinar"©, Citrix (Fort Lauderdale) on the laptop, a big screen, a microphone and a webcam)

Findings and procedure details

A weekly one-hour **webinar** is being held for the last-year students mentored by two radiologists in an elective two to four month clerkship in radiology. The webinar has been **permanently evaluated** since its implementation for a satisfactory practical learning, training and mentoring process at the clinic to derive optimization needs.
Evaluation of 24 respondents (15 male, 8 female) for 3 terms showed that the planned and expected level of competency was exactly met with a gain in medical knowledge with case-based learning (in 19/24 participants, Fig. 3) and with preparing a presentation (a bit more time preparing in 9/24 participants, roughly as expected and a little less time in 5/24 participants each, Fig. 4). The improvement of professional attitudes was in 10/24 either very or excellent good, in 13/24 good and in 1/24 insufficient (Fig. 5). The IT-literacy and -interest was high in 24/24 of those students with interest in radiology..
The radiologists in their role as scholar reported **significant changes** in their **teaching styles** with a stronger focus on clinical knowledge, appropriate criteria and noninterpretative skills.
Diagnostic-thinking inventory (DTI) (2,3) and **forms of 360 degree evaluation** (evaluation by students, self-assessment for reaching the required level of competency (Fig. 3 and Fig. 4), peer-feedback (Fig. 5) and feedback of the webinar-mentors (Fig. 6)) are, besides the measures of **multiple choice, short answer** and other questions feasible evaluation tools.
In the winter semester 2019/20 the applicability of the questionnaire **"Diagnostic Thinking Inventory"** in **german (DTI-G)** (3) was tested in a **cognitive pre-testing procedure**. The questionnaire was checked for comprehensibility and applicability during the training at the Department of Biomedical Imaging and Image-guided Therapy.

Fig.3: Result of the self-assessment for reaching the required level of competency of the webinar

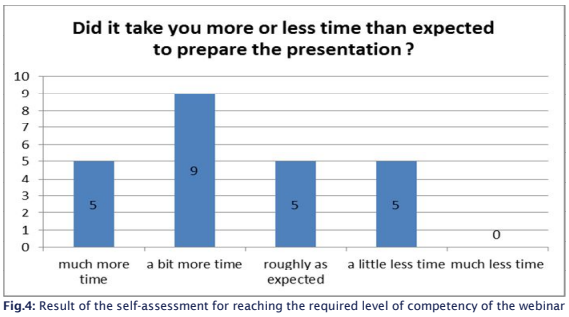

Fig.4: Result of the self-assessment for reaching the required level of competency of the webinar

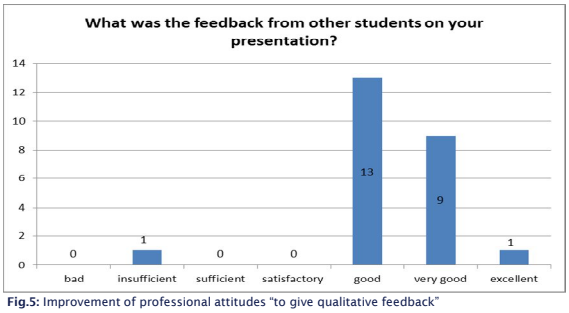

Fig.5: Improvement of professional attitudes "to give qualitative feedback"

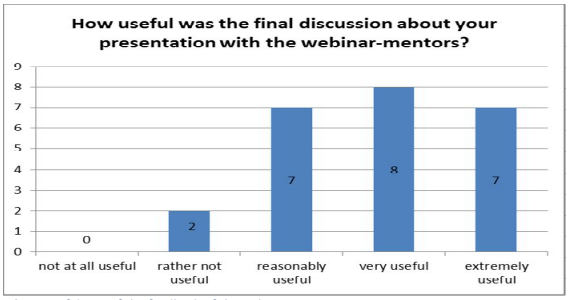

Fig.6: Usefulness of the feedback of the webinar-mentors

Conclusion

Simulated MDTMs are a very good didactic format with high impact for training how to make appropriate medical decisions and support the implementation of radiology in a modern integrated undergraduate curriculum.

References

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3. Schäfer AGM, Sebelin B, Spitzer L. Cultural adaption and validation of the German version of the diagnostic thinking inventory (DTI-G). International Journal of Health Professions. 2019. 6 (1), 32-45.