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Development and validation of a computer-based situational judgement test to assess medical students' communication skills in the field of shared decision making

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ABSTRACT

Objective: To develop a computer-based test (CBT) measuring medical students' communication skills in the field of shared decision making (SDM) and to evaluate its construct validity.
Methods: The CBT was developed in the context of an experimental study comparing three different trainings for SDM (including e-learning and/or role-play) and a control group. Assessment included a CBT (Part A: seven context-poor questions, Part B: 15 context-rich questions) and interviews with two simulated patients (SP-assessment). Cronbach's α was used to test the internal consistency. Correlations between CBT and SP-assessment were used to further evaluate construct validity of the CBT.
Results: Seventy-two students took part in the study. Mean value for the CBT score was 72% of the total score. Cronbach's α was 0.582. After eliminating three items, Cronbach's α increased to 0.625. Correlations between the CBT and SP-assessment were low to moderate. The control group scored significantly lower than the training settings ($p < 0.001$).
Conclusion: The CBT was reliable enough to test for group differences. For summative assessment purposes, considerably more questions would be needed.
Practice implications: We encourage teachers who particularly work with large student numbers to consider CBT as a feasible assessment method for cognitive aspects of communication skills.

1. Introduction

Communication skills (CS) training has become a major component of medical education worldwide. In this context, developing strategies that assess CS is increasingly important in order to determine whether students have effectively acquired essential skills. In addition, assessing such skills has been recommended as one of the fundamental strategies for integrating CS into the core of a medical program [1]. Recommendations for assessing skills favor direct observation of students' performance with predefined marking schemes based upon a theoretical framework [1–4]. The best known assessment format is the Objective Structured Clinical Examination (OSCE) [5–8]. One disadvantage of OSCEs is the high demand on personnel and financial resources. For medical schools facing large student numbers, more economical methods are needed to assess students' communication skills.

1.1. Written and computer-based assessment of communication skills

Written tests are particularly useful for identifying and analyzing cognitive aspects of CS, like applying knowledge to clinical scenarios and patient problems. In the last years, a series of written tests for the assessment of CS has been published [9–15]. Since all of them use clinical scenarios as a stimulus for students'

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responses, they are considered to be context-rich. In contrast, context-poor stimuli rather rely on facts or abstract problems to stimulate students to respond to the question. Hulsman and colleagues [9] describe a summative computer-assisted assessment method for preclinical students in the form of an Objective Structured *Video* Examination (OSVE). These videos present history taking, breaking bad news (BBN), and shared decision making (SDM), and are accompanied by short essay questions. Humphris and Kaney [10] also conducted an OSVE that utilized a constructed ("open-ended") response format. They were able to show that the tested knowledge had a small but significant influence on students' OSCE performance. The authors interpreted the correlation between OSVE and OSCE results as evidence for the construct validity of the newly designed OSVE [10,11]. In summary, there is already a sound basis of evidence for the relevance of written assessment and computer-based testing (CBT) to assess general CS. Unfortunately, specific test blueprints and underlying communication models are rarely provided by the authors which could give important insights into the test construction. Some authors defined subscales or specific topics of their tests [9,13,14], though they provided little information about test dimensionality and reliability of subscales. Only few tests included explicitly challenging situations like BBN and SDM as a specific task in doctor-patient consultations in their test [9,13,14].

1.2. Shared decision making

In recent years, many expert groups have recommended the inclusion of challenging communication situations like BBN and SDM into undergraduate medical education [16–18]. Since 2000, patient preferences for their role in the decision-making process are moving increasingly towards more involvement in the decision making process. That trend has been particularly reported for cancer studies and studies including patients with long term conditions where a majority of patients preferred to participate in decision-making [19]. A number of recent developments seem to have prompted this shift in patient preferences including easier access to health-related information e.g. via internet, an increasing awareness of aspects of patient safety, establishments of patient forums, and an increase in health awareness [20,21]. Therefore, students need to be prepared during undergraduate training to respond to patients needs and preferences in terms of decision making in their future careers. Several models have been developed to operationalize the process of SDM. Elwyn and colleagues [22] defined an eight-step model of stages and competencies of involving patients in health care decisions. Charles et al. [23] use three analytical stages: information exchange, deliberation, and deciding on treatment to be implemented. Kriston et al. [24], provide nine process elements within their questionnaire SDM-Q-9. What they all have in common is the inclusion of relationship building, exploring patient's needs and expectations, sharing information, negotiating, and decision making. The effectiveness of SDM trainings is mostly measured by self-assessment questionnaires or observation either in real situations or in simulations [25–27]. Again, these observation-based assessment methods are rather resource and time intense, and more cost-effective formats are needed to provide feedback to learners not just once but recurrently over a longer period of learning.

1.3. Assessment of SDM

For physicians, SDM can be seen as an important task in clinical practice and as an interlinking element between communication and clinical reasoning. Clinical reasoning is a complex cognitive skill which medical experts use to define the objectives of the encounter together with the patient, categorize the patient's problem into a medical concept ("scripts"), evaluate the fit between the clinical data and the categorization and negotiate and decide on a purposeful action plan together with the patient [28]. This concept is also mirrored by the basic principles of Evidence-Based Medicine (EBM) where the patient's situation and preference are supposed to influence the eventual treatment decision [29]. It can be argued that tests aimed at measuring clinical reasoning may also be useful for measuring SDM. Three test formats seem to be particularly appropriate: the script concordance test (SCT), the key feature approach (KF), and the situational judgement test (SJT). SCT was developed by Charlin and colleagues [30] to assess specific aspects of clinical reasoning, namely the ability to interpret medical information under the condition of uncertainty [30,31]. The KF approach also aims at assessing clinical problem-solving skills. A key feature is a critical step in finding the solution of a problem that an expert is more likely to fulfil than a novice [32,33]. The SJT has most frequently been used for selection purposes in various professions and aims at assessing professional, "non-academic" attributes [34], such as interpersonal and communication skills [35]. In an SJT, candidates are faced with written or video-based scenarios that focus on job-relevant situations. They are asked to identify an appropriate response from a set of options. Scoring is based on comparing candidates' responses with a predetermined scoring key agreed by experts. Although the SJT has been described as being a reliable and valid assessment method [34], it has not yet been used for assessing CS in undergraduate medical education.

1.4. Aim of the study

The aim of the study was to develop and validate a computer-based test designed for the assessment of communication skills in the context of SDM. We report psychometric properties, application options, and limitations of the CBT. To test construct validity, we compared trained and untrained students with the hypothesis that trained students would score higher in the CBT. To test criterion validity, we tested the relationship between the CBT and performance-based assessment results with the hypothesis that the correlation of the test results would be significant and positive.

2. Material and methods

2.1. Description of setting and study population

The test was developed in the context of an experimental study comparing three different training settings to teach SDM to medical students with a wait-list control group [36,37]. Within the context of the experimental study, the effectiveness of the training was assessed by the CBT and two performance-based stations with simulated patients (SP-assessment).

Participation was on a voluntary basis. Students in their second to last year of studies were asked to volunteer. Participants were recompensed with a book voucher. Participants were randomly distributed to three different treatment groups and a wait-list control group by a lottery without controlling student factors like age, sex, or prior knowledge of CS. Group sizes of 24 students per group were calculated to reveal medium size effects with the probability of $1-\beta = 0.80$.

2.2. Description of training settings

The training settings focused either on an experience-based educational approach, on a deductive-cognitive approach with visualizations or on a combination of both. The content of all three training settings were based on a theoretical framework for

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