Method for constructing test questions of a new innovative item format

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Digital testing is increasing rapidly and new innovative item formats (i.e., question types) are developed. Generally, innovative item types have the potential to increase construct representation (Sireci & Zenisky, 2006[i]). The innovative item type of our interest is called the "main-sub". In the main-sub question type, a student is asked to come up with their own strategy to solve a problem. If it turns out that the student is not capable to come up with the correct answer, (s)he is taken to a series of sub questions. In answering these sub questions the student can show what he does and does not understand.

Before the item format "main-sub" can be used on a large scale further research is necessary to establish what the added value is. It is possible that if questions are misunderstood by students there is a discrepancy between what the exam is supposed to measure and what it actually measures regarding content and thinking processes (Leighton, 2004[ii]). The objective of this study is to research to which degree the format "main-sub" is capable to represent the construct. Therefore, the content a teacher intends to measure with the exam is compared with thinking processes of students taking the exam. The targeted domain for this research is Engineering education.

In the hands-on session we will take teachers on the journey of writing test questions in this innovative item format. In the introduction this innovative item format will be introduced. An example of the method to construct a question of this type will be presented. Teachers are asked to bring along one of their own exams, appurtenant answer model, test blueprint if available and answers of students. First, teachers will look at the match between what they intended to measure with the exam questions and what they actually measured. Second, in small groups and with guidance teachers are asked to transfer their 'old' questions to the new format. We will conclude the session with a discussion that centres around two points. The view of the teachers on the "main-sub" item format and usability of the method. The input from the hands-on session will be used as input to further improve our method to construct innovative test questions.

The expected outcome of the hands-on session are guidelines on how to construct new questions in the innovative item format and under which conditions.
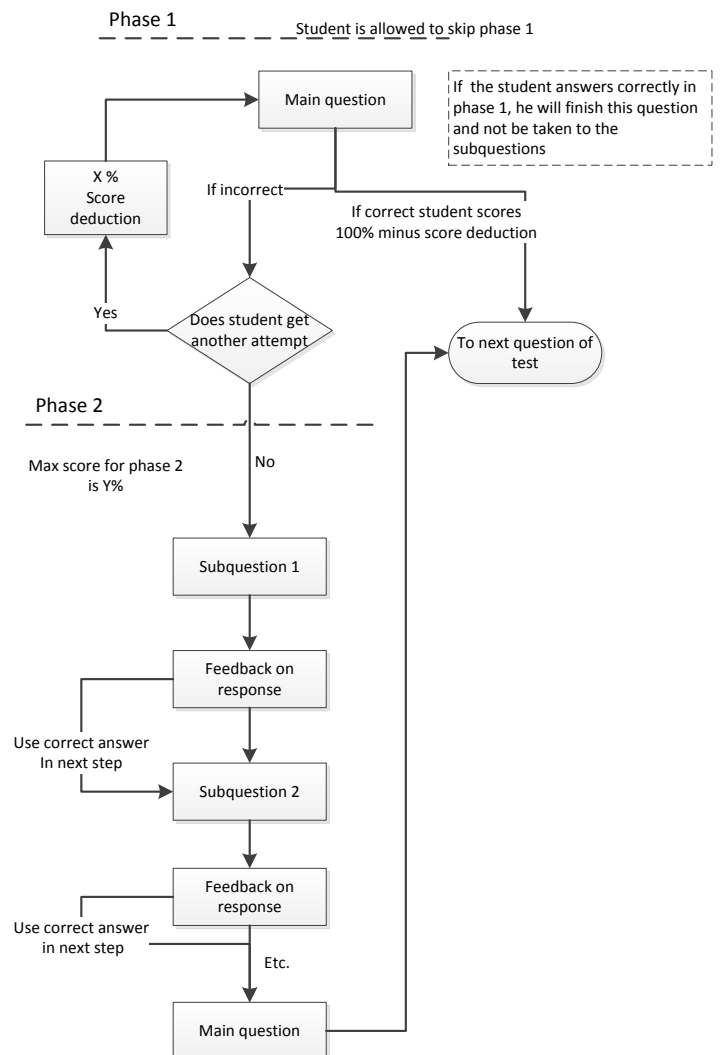
[i] Sireci, S. G., & Zenisky, A. L. (2006). Innovative Item Formats in Computer-Based Testing: In Pursuit of Construct Representation. In S. M. Downing & T. M. Haladyna (Eds.), *Handbook of Test Development* (pp. 329-348). Mahwah, NJ: Lawrence Erlbaum Associates.

[ii] Leighton, J. P. (2004). Avoiding Misconception, Misuse, and Missed Opportunities: The Collection of Verbal Reports in Educational Achievement Testing. *Educational Measurement: Issues and Practice*, *23*, 6-15. doi: 10.1111/j.1745-3992.2004.tb00164.x