

# Aggregation in Evaluation of Computer-Assisted Assessment

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A necessary component of computer-based learning environments is an assessment part, where learners can test themselves in order to get feedback about their learning progress. Most of these assessment parts tend to contain a database of different questions which are designed in a way that the evaluation of given input and the corresponding feedback can be computed automatically (for examples, see e.g. [6, 7, 8, 9]).

Since Multiple-Choice-Questions (MCQ) (“choose the correct option”) and Multiple-Response-Questions (MRQ) (“choose all correct options”) seem to be easy to handle from a computational point of view, much effort has been spent for designing and implementing good MCQs and MRQs (for hints how to write objective questions see e.g. [1]). Usually, the questions’ feedback is restricted to an assignment whether the question is solved correctly or incorrectly or whether it has been answered at all. Sometimes, each option corresponds to a certain amount of points and the “value” of a given answer is reported by the sum of points achieved by a certain answering behavior [5].

In this contribution, we investigate how the correctness and value of a given answer can be approached from a logical, instead of a statistical, point of view. Therefore, we will define a set of necessary conditions for the evaluation of an answer and will examine how suitable different kinds of aggregation are for fulfilling these conditions [2, 3, 4]. We will investigate if the correctness of an answer can be aggregated from the selected options’ correctness and if cardinality-based similarity measures can be used for the interpretation of correctness as similarity between given and correct answer.

## References

- [1] CAACentre. <http://www.caacentre.ac.uk/objections/index.shtml>, last visited: Oct-29-2001.
- [2] T. Calvo, A. Kolesárová, M. Komorníková, and R. Mesiar. *A Review of Aggregation Operators*. Servicio de Publicaciones de la University of Alcalá, Madrid, 2001.
- [3] J. C. Fodor and M. Roubens. *Fuzzy Preference Modelling and Multicriteria Decision Support*. Kluwer Academic Publishers, Dordrecht, 1994.
- [4] M. Grabisch, H. T. Nguyen, and E. A. Walker. *Fundamentals of Uncertainty Calculi with Applications to Fuzzy Inference*. Kluwer Academic Publishers, Dordrecht, 1995.
- [5] Mathe Online. <http://www.univie.ac.at/future.media/mo/tests.html>, last visited: Oct-29-2001.
- [6] Hot Potatoes. <http://web.uvic.ca/hrd/halfbaked>, last visited: Oct-29-2001.
- [7] Questionmark. <http://www.questionmark.com>, last visited: Oct-29-2001.
- [8] RoboTutor. <http://www.robotutor.com/>, last visited: Oct-29-2001.
- [9] WebCT. <http://www.webct.com/>, last visited: Oct-29-2001.