Evaluation of Conceptual Knowledge: Review of the Experimental Study

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Abstract

Learning theory [1, 2] takes up the position that structured knowledge is much more preferable than solely isolated facts. Unfortunately traditional testing checks mainly the factual knowledge. As experiments show (see [3] for example), assessment based on knowledge integration is better than traditional multi-choice tests. So my research was aimed at investigation how students are able to link separate terms and concepts into common interrelated picture during learning a course.
For this purpose the content of my favourite discipline “Computer architecture” was first represented as the interrelated structure compounded from 122 basic concepts [4]. This semantic network presents some model of learning material that we want to form in students’ minds. But what is the real structure of student’s knowledge and how to evaluate its organisation? So in 2008 I developed the experimental method of such evaluation [5] and made attempt to measure network quality for my students. During computer checking of knowledge they had to link together pairs of concepts from the proposed list. The analysis of experimental results gave possibility to select the most suitable statistical characteristic of concept structure: combining all interrelated terms into groups, which are independent from each other, we can calculate the average size of these groups. Derived numeric gauge of knowledge organization can be accepted as some measure of learning success: the larger size attests the better result. The joint diagram for all students demonstrates several specific zones for different types of learners. The most evident result is that dim students achieve more stable growth (similar to publication [6]).
The obtained picture brings hopes that the developed method in future can be used for evaluation of conceptual level of students’ knowledge.

References

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