In past decades, political and educational discussions have increasingly raised questions about the quality of education. For monitoring the quality of education, programs for national assessment of educational progress were implemented in many countries. Initially most of these programs heavily emphasized the measurement of educational achievement of national samples of students in basic school subjects. However, the increasing awareness of the usefulness of these monitoring systems resulted in a need for indicators which can help in tracing the deficits and clues for taking measures for improving educational outcomes. A potential powerful set of indicators dealing with the substance of education can be found in the curriculum.

Curriculum can be conceived at three levels. At the macro level of the education system (nation, region) there exists the intended curriculum, at the meso level (school or classroom) the implemented curriculum and at the micro level (students) the attained curriculum. For each level specific indicators seem to be relevant. The intended curriculum can be determined by examining course outlines, textbooks or examination syllabi. The implemented curriculum can be measured by course content, time allocations or instructional strategies. The attained curriculum establishes student outcomes by measuring cognitive skills and attitudes of students. In addition curriculum antecedents, such as the social background of students' family or school neighbourhood as well as resources possessed by schools can be correlated with curriculum contexts to predict curricular outcomes.

In this paper we reviewed 70 publications from research literature based on large scale national as well as international assessments, on curriculum indicators. In the review we particularly paid attention to the implemented curriculum, that is to identifying indicators about what is or ought to be taught, by and to which participants and in which way. Moreover, information was sought with regard to reliability and validity of the indicators and as how the indicator data might be used for diagnosing educational shortcomings.

In total we found 250 different indicators which dealt with the curriculum and for which actual empirical results from national samples were available. From a first overview it appeared that there exists a lack of consistent terminology in the field of curriculum indicators. For instance an indicator such as Opportunity-to-Learn, referring to the implemented curriculum, can be found as Topic Coverage or as Test-Curriculum-Overlap as well. We found five global categories of indicators under which the several curriculum indicators can be classified, namely content, time, participants and instructional characteristics. These categories will be discussed profoundly in the paper. The analysis of the validity and reliability of the indicators used, showed that in only 20 of the reviewed
publications attention has been paid to either reliability or validity or both. Most remarks about reliability referred to problems with data collection, while the remarks about validity referred to predictive validity, that is the relation between the indicator and student achievement. Only a few studies analyzed reliability and validity more in depth.

From this review it is concluded that the implications of curriculum indicators until now are quite meagre, and not very well applied as diagnostic tool in a monitoring system. In the paper steps for further development and research in this area will be proposed.

W.J. Pelgrum
University of Twente
OCTO
P.O. Box 217
7500 AE Enschede
The Netherlands
Phone: +31 - 53 - 893593

J.M. Voogt
University of Twente
Department of Educational Science and Technology
P.O. Box 217
7500 AE Enschede
The Netherlands
Phone: +31 - 53 - 893550
Fax: +31 - 53 - 329136

Tj Plomp
University of Twente
Department of Educational Science and Technology
P.O. Box 217
7500 AE Enschede
The Netherlands
Phone: +31 - 53 - 893595
Fax: +31 - 53 - 329136