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Tracking mathematical giftedness in an egalitarian context

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Abstract

In three different studies upper secondary school head teachers' characterization and identification of mathematical giftedness was investigated. A survey study (Paper II) explored the conceptions held by 36 randomly selected upper secondary school head teachers in mathematics. An interview study (Paper III) investigated the conceptions held by three purposively selected head teachers working at the longest running gifted programs in mathematics in Swedish upper secondary schools. A third study (Paper IV) looked for creativity, the characteristic head teachers' most frequently associated with giftedness, in the admission tests used at the cutting-edge programs in mathematics in upper secondary school.

As compared to theoretical models, results showed that the head teachers collectively expressed nuanced characterizations of mathematical giftedness and the identification thereof. This was especially demonstrated by the head teachers at the gifted mathematics programs. Still, for individual head teachers, there is a need to further their knowledge about the different abilities contributing to manifestations of mathematical giftedness. This would increase the possibility to identify and develop the mathematical abilities of an even greater number of mathematically promising students. Krutetskii's (1976) structure of mathematical abilities manifested by capable mathematics students was used as a framework for the content analysis in the first two studies, and Lithner's (2008) framework for creative and imitative reasoning was used in the third study.

In a fourth study (Paper V) the representation of different student groups at five purposively selected gifted programs in upper secondary school was investigated. Findings from this comparative study of demographical factors – gender, geographical origin, and highest education of parents – were complemented by findings from the interview study where the cognitive, as well as personal and social, characteristics of students participating at three gifted programs were expressed.

Results from the interview study indicated that students participating at the gifted programs showed signs of mathematical giftedness that are not necessarily connected to schoolhouse giftedness. Both mathematically gifted students who were individualists and reluctant to participate in traditional school mathematics, and those who were hardworking and ambitious, were recognized. Participating students had special needs, such as to approach mathematical tasks in their own way and learn how to communicate mathematics in written solutions, connected to their giftedness that call for special education. The demographical study showed that it is mostly males with highly educated parents who have found their way to gifted programs in mathematics. In sum, results indicate that the head teachers at the gifted programs acknowledge that there are gifted mathematics students with special educational needs at their gifted programs. There is also a call for the development of complementary educational activities to reach a greater number and variety of gifted students.

Keywords: mathematics, giftedness, creativity, identification, characterization, gifted education