

Characterizing environmental factors that are associated with adolescents' motivation to learn science in and out of school

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Abstract

Many educators agree that an important goal of science education should be to develop the foundation for lifelong learning, including the motivation to learn science in school, out of school, and after school. The goal of this study was a comprehensive characterization of environmental factors that are associated with students' motivation for science learning in school and out of school. The environmental factors that were assessed included: schools' culture, teachers' practices and goals emphases, parents' goals emphases and peers' goals in science learning. Cross sectional data was collected from 2100 5th to 8th grade students from 30 traditional elementary, middle and democratic schools. Data was also collected from these schools' management, 55 science teachers and 402 parents. 420 students were followed for two consecutive years allowing for a longitudinal perspective. Quantitative data was analyzed using t-tests, regressions and correlation tests as well as SEM, HLM and Rasch analyses. Interviews were also conducted with 106 students and both content and structure analyzed.

Results of this study show that, in traditional schools, students' motivation for science learning declined toward and after the transition from elementary school to middle school. This was evident in a decline in students' mastery goals orientation, their classroom as well as extra-curricular engagement, and their self-efficacy in science learning. Such declines were not found in democratic schools. In elementary grade levels, student's motivation was higher in traditional schools than in democratic ones. However, in middle grade levels, it was lower in traditional schools than in democratic ones. These results indicate that the decline in adolescents' motivation for science learning is not inevitable.

Relying on students, teachers and school managements' reports, results highlight some aspects in which school culture, teachers' instructional practices and goals emphases are different in the 3 types of schools (elementary, middle and democratic). These differences may explain

differences in students' motivation between school types. Results also indicate the role parents play in influencing their children's motivation for science learning, especially out of school. Nevertheless, findings suggest that the differences in students' motivation between different school types may not be solely attributed to parental differences.

It appears that students' declining motivation for science learning is related to all four investigated factors (school, teacher, parents and peers), but in different ways and different strengths in different grades. For example, emphasizing performance goals by the school, parents, and peers do not predict students' engagement in science learning. However, the teacher's emphasis on these goals - do predict it negatively. The school emphasis on mastery goals doesn't predict students' motivation when they are younger but it does when they are older.

Implications of these findings to both motivation theory and science education practice are discussed, as well as ways to inhibit the decline in adolescents' motivation for science learning in and out of school.