What do students want to know about science? Using students' questions to identify their scientific interests

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Summary

Within the science-education community, much thought has been given to the question of "what students should know about science", but not to the question of "what students are interested in knowing about science". Indeed, many students find standard science curricula largely out of touch with their personal interests, a factor which contributes to the low number of students pursuing advanced science and mathematics courses in high school, and going on to choose scientific careers. Involving students in decisions about their life in school is not only a useful and pragmatic pedagogical strategy; it is also an important moral and educational principle. However, educators lack the necessary information and tools to guide modifications that could make use of the power of student-specific interests in improving those students' individualized learning and competency in scientific subjects.

A great number of studies have explored students' scientific interests by inviting them to respond to questionnaires. However, these questionnaire-based methods have traditionally relied on adult-centric views of what subjects should be meaningful for students. To overcome this inherent bias, during the course of this PhD a naturalistic approach to defining students' specific concerns by using students' self-generated questions, as an indication of their scientific interests, was developed. Over ninety thousand questions were collected from many different Ask-A-Scientist sites, television shows, and schools in order to use student's self-generated questions as an indication of their interests in science and technology.
Several age- and gender-related trends were identified using this method: an increase in the cognitive level of the questions with age, while the

psychological distance of the object in question and its order of magnitude decrease; a developmental shift in interest in biology, accompanied by a decrease in interest in zoology and an increasing interest in human biology with age; the tendency of high school students to ask questions imposed by their teachers; the dominance of questions asked by females in web-based free-choice science learning environment; and the widening stereotypical gap between girls' and boys' science interests. Finally, six types of science questions were identified using cluster analysis. Implications for curriculum development, mainstreaming of science education and biology classroom practice are suggested.