RECENT DISSERTATIONS

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Teaching Photosynthesis in a Compulsory School Context. Students' Reasoning, Understanding and Interactions.

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Abstract

According to previous research, students show difficulties in understanding photosynthesis and respiration, and basic ecological concepts like energy flow in ecosystems. There are successful teaching units accomplished in this area and many of them can be described as inquiry-based teaching. One definition of inquiry-based teaching is that it involves everything from finding problems, investigating them, debating with peers and trying to explain and give solutions. Accordingly students need to be confronted with challenging questions and empirical data to reason about and teachers need to implement student-generated inquiry discussion since students often stay silent and do not express their thoughts during science lessons. This thesis will focus on young peoples' understanding of the functioning of plants, students' participation during biology lessons, and how biology teaching is accomplished in primary and secondary school.

Two school classroom projects focusing on teaching about plants and ecology are described. Four teachers and their 4th, 5th and 6th grade classes plus two science teachers and their three 8th grade classes collaborated. Photosynthesis and respiration were made concrete by using tasks where plants, plant cells, germs, seeds and the gas exchange were used. The aim was to listen to students' reasoning in both teaching and interview situations. Learning outcome, as described by students' reasoning in the classrooms and in individual interviews but also by their test results, is especially focused. Student-student and student-teacher interactions have been analysed with an ethnographic approach in the classroom context.

The plant tasks encouraged the students' in primary school to develop scientific reasoning and the interviews confirmed that the students had learned about photosynthesis. The ecology teaching in secondary school showed a substantial understanding confirmed both by students' oral and written reasoning. Analyses of test results and understanding as presented in interviews did not always correspond. The interviews showed the importance of letting students try to explain concepts and to correct themselves. Primary students' reasoning and understanding about photosynthesis were in the interviews almost the same as the secondary students'. The secondary students' questioning during the lectures showed wonderments and interest for ecology from a broader view than in the content presented by the teachers and the textbooks, but the large classes and disruptive students stole too much time from the teachers' management in the classroom. Students' knowledge was underestimated and their interest in ecology faded away.

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