Embracing Digital Technology in Science Classrooms—Secondary School Teachers’ Enacted Teaching and Reflections on Practice

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# Abstract

The aim of this case study was to investigate what happens in science classrooms when teaching is almost entirely based on the use of digital technology. Two secondary school science teachers participated, together with their seventh grade classes. Data were collected through eight observation sessions (altogether about 9.5 h) and 9 h of interviews with the teachers. For analysis, a modified version of the Technological Pedagogical and Content Knowledge framework was used. The results showed the science teachers’ general approach in the classroom and revealed that they were self-confident in using digital technology, and utilised predetermined digital study material and, when it was felt necessary, supplemental materials. The teachers were positive about using digital technology since they thought it motivated their students and made assessment easier. The teachers claimed that digital technology had improved their teaching, providing more breadth because of access to varied digital tools; teaching had also become more individualised. Few differences were identified between different lessons, whether in physics, chemistry or biology, and unfortunately the identified relationship between the use of digital technology and content knowledge was limited. The teachers also reflected on the challenges they faced, especially in supporting low-achieving students and effectively using inquiry-based teaching through digital technology. Despite some acknowledged limitations, the study enhances our knowledge about how the Technological Pedagogical Content Knowledge framework can be used as an analytical tool in authentic teaching, with specific contexts and, above all, when education is largely based on the comprehensive use of digital technology rather than its occasional integration.

# Outcome

"The teachers were positive about using digital technology since they thought it motivated their students and made assessment easier. The teachers claimed that digital technology had improved their teaching, providing more breadth because of access to varied digital tools; teaching had also become more individualised. Few differences were identified between different lessons, whether in physics, chemistry or biology, and unfortunately the identified relationship between the use of digital technology and content knowledge was limited. The teachers also reflected on the challenges they faced, especially in supporting low-achieving students and effectively using inquiry-based teaching through digital technology." (Authors, in Abstract)