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Topic	A comparative study of science curriculum of NCERT and QCA (UK) to evolve a model for the integration of ICT in science teaching at the upper primary and secondary level
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ABSTRACT

The use of information and communication technologies (ICT) is perceived as being of importance in school education in general and science education in specific by various policy documents. The government has also undertaken various projects to facilitate the integration of ICT in schools; private players are also involved in this effort. However, the use of ICT in science teaching remains piecemeal and sporadic in Indian upper primary and secondary classrooms. While the related literature has consistently reported the benefits of integrating ICT in science, the role of the teacher remains critical for developing appropriate learning experiences. At the same time, many barriers have been reported to the successful integration of ICT. The National Curriculum developed by the Qualifications and Curriculum Authority (QCA) (UK) made the use of ICT statutory for teaching science at the upper primary and secondary levels over a decade back. Also, the QCA curriculum, like that of the National Council of Education Research and Training (NCERT), the apex body dealing with curricular framework development in India, also recommends the teaching of science without compartmentalisation into physics, chemistry and biology till the 10th year of schooling. With the foregoing discussion as a backdrop, it was considered to be relevant and beneficial to compare the integration of ICT in science teaching in England and those schools that have adopted technology in India, with the intent to draw lessons for integration of science teaching in Indian schools.

Keeping this and the fact that our education system has its roots in the British colonial period in mind, this study was undertaken with the objectives of comparing the NCERT and QCA curriculum for teaching science, assessing the use of ICT resources in the teaching-learning process in schools following the NCERT and QCA science curriculum, determining the issues involved in the integration of ICT in the teaching-learning process as perceived by both sets of students, teachers and school authorities, comparing the integration of ICT in the teaching-learning process in schools following the NCERT and QCA science curriculum, with the intention of developing a model for the integration of ICT in science teaching in Indian schools

These objectives were achieved through a mixed methods approach. The first objective was addressed through document analysis of the intended curricula operationalized as defined by the Position Paper on Curriculum, Syllabus and Textbooks. To achieve the second and fourth objectives, a questionnaire for teachers was prepared based on the Technology Integration Standards Configuration Matrix (TISCM) (used with due permission from Dr Steven C Mills); these were administered online. To achieve the third objective, open-ended questions for teachers, interviews with school leaders and focus group discussion with students were used.

The curricular comparison revealed the major difference that the QCA curriculum explicitly states development of ICT skills in the aims of education, and specifically marks opportunities for ICT use. Also, despite over a decade of systematic and research-informed integration of ICT in school education, use of ICT in the UK is not optimal, while in India it is at a minimal stage. However, more sophisticated use of ICT was reported in the UK. Despite the prolonged use of ICT in science teaching in the UK, most issues pertaining to the use of ICT are common to both India and the UK. The integration of ICT in science teaching in the UK is limited largely to planning and making resources accessible to students. Using ICT effectively for facilitating autonomous creation of knowledge as well as the development of desirable scientific capabilities while assessing authenticity of resources and demonstrating ethical use still remains at a rudimentary level. Student involvement in creating technology resources is at an unacceptable level. As far as teachers in India are concerned, they seem to be at a very nascent stage of use of technology. Finally, a model for the integration of ICT in science teaching was developed, juxtaposing the cognitive demand categories of science and the issues identified by stakeholders in both countries, along with articulation of the context and enablers to facilitate the same.