32% of lessons in English , 14-21% of lessons in Hindi and 50-69% of lessons in Mathematics carry science and technology terms, topics, names of inventors, etc.

If we seriously want to decide the dose of *technology* for the age group 9-14 , we might catch them at this stage for effectively taking part in decision-making process required by any technological community of this century. Terms like satellite communication, mobile phone, internet, microwave oven, fuel cell imply newer technologies reforming older ones like telegraph, telephone, primus stove, lead-acid cell, etc.

For each technological term, establishment of language connection is most important, *Technology* is a typical ally to science. Could the *technological* term be linked with history, geography, mathematics, SUPW/work experience? If, yes, history part of *technology* should go to the history book, mathematics part to the mathematics book, and so on. This will reduce the burden on the teacher and the taught, reduce the weight of the school bag, as well as will contribute to *technological literacy*.

Any curriculum has basically six elements: rationale, objectives, implementation strategies, curricular materials, transaction method, evaluation. It might take a few years to introduce *technology* as a separate subject at the lower and upper primary levels in the school. Just now we should integrate *technology* with science in the S&T text book.

The textbook of S&T must have at least the following sections:

(a) There will be a box giving he list of keywords/ *technology* terms used in the chapter at the very beginning of the chapter

(b) Another box with the title 'hands-on activitity' or 'Quick- Lab' has to be given at a suitable place illustrating how to go about the activity. Such illustration should be 'worth one thousand words' .

(c) A third box will contain *problem solving questions*, which could be *convergent*, *divergent* ,*literal, interpretive* . Success of introduction of technology will depend on the quality of these problem solving questions.

(d) A fourth box will detail the references to resources, eg. Science museum, planetarium, industry, scientists and technologists, laboratories, lectures, science magazines, etc.

Classroom transactions will have a mandatory component of hands-on activities somewhere in the cycle of *pre- plan, focus, teach, apply, re-teach*.

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Placing Technology Education within the Gender Perspective

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The issue

Since ancient time men and women have tried to understand their environment and solve problems of daily life using science and technology (S&T). Women have enjoyed symbolic respect and importance in many cultures. The earliest myths and religions have often placed women at the beginning of technologies of agriculture, law, medicine and timekeeping. Many cultures till today retain the image of the "wise woman", the healer, who has access to natural and supernatural knowledge (Stanley, 1995).

Women have contributed in many ways to the technical advancement of humanity. Indeed women as food gatherers are likely to have made the momentous discovery of agriculture that changed the course of human cultural evolution (Ehrenberg, 1989). Yet, women appear to play the role of users and consumers and not that of designers and developers of technology. Excluded from the community of technology practitioners, even women's contribution to technology is *hidden from history*. Their areas of contribution, like child rearing, housekeeping, nutrition and agriculture, are deemed to be either non-technological or low in technology (Wajcman, 2000). Historically, women have had limited access to education and technological practices. There are a variety of complex social and psychological reasons for this situation where only a few women enter the fields of education or work explicitly labelled S&T (Schiebinger, 1989; Zuga, 1999).

Alternate positions

Any technology is the product of society, of social relations, forces and choices shaped by social arrangements. The gendering of society in general and school education in particular has important implications for women's role in knowledge and technology production. In India, like elsewhere, till not too long ago, women were excluded from the formal education system of which the Indian *gurukul* system is an example. Within the institution of education, discrimination and exclusion of women in areas considered S&T may have apparently reduced, but persists in subtle ways.

One way in which this gendering is implemented is through the use of language and stereotyping at all levels from toys, educational software to occupations (Kalia, 1986; Bradshaw et al., 1995). According to Wajcman (2000), S&T are popularly viewed as masculine, with the engineering culture epitomizing this masculinity. The transaction in S&T classrooms reflects these views (Jones, 1989; Sadker et. al., 1989). Hands-on-experiences in S&T, tool usage or real life experiences which could facilitate learning of S&T, differ among males and females in and out of school (Chunawala and Ladage, 1998; Jones, et. al., 2000; Sjoberg and Imsen, 1988).

The "Pupils Attitudes To Technology" (PATT) studies conducted since early 1980's have highlighted the role of gender in students' perception of technology education in several countries (de Klerk Wolters, 1989). Other literature also suggests that male and female students bring in, hold or leave with different attitudes towards S&T education. (Rosser, 1993) However, there are few studies in the Indian context on students' ideas about technology.

The decrease in women's participation in S&T is sharp in tertiary education (World Education Report, 1995, Parikh and Sukhatme, 2004). There is a need to challenge gendered perceptions and practices of technology in schools so as to overturn traditional ideas about masculine and feminine roles and bring about a richer and more inclusive view of technological activities.

Our framework

India, has recently introduced technology as a part of school science curriculum. Technology in the school curriculum has had a chequered history in India. It has appeared in the guises of vocational education and "Socially Useful and Productive Work" that have been stereotyped on the basis of gender. Technology taught to girls has been limited to food or domestic work, such as, sewing, embroidery, tailoring, cooking and nutrition while boys have been restricted to bookbinding, carpentry, electronics. Overall technology related subjects included in Indian schools have been given a low priority by curriculum framers, who reflect the prevalent perceptions.

At the Homi Bhabha Centre for Science Education (HBCSE) a project on Design and Technology education at the middle school level has been undertaken. One of the aspects of the study is to elicit the perceptions and attitudes about technology among middle school students and teachers. This is followed by development of prototype classroom intervention units on technology tasks for school students.

A survey of urban and rural students in and around Mumbai city sought to uncover middle school students' spontaneous ideas about technology. The questionnaire utilized various formats of questions including a pictorial component similar to that developed by Rennie (1995). The analysis of this survey provided interesting insights into students' perceptions of technology and the gender dimension of these perceptions. The paper will present and discuss the implications of the findings relating gender and technology.

A significant component of the study is the focus on *gender sensitive* technology education. Several issues are involved in developing intervention tasks that are inclusive for girls and boys: nature of tasks, the ordering of activities within the tasks, the structure of the groups that collaborate, the process of group formation and the nature of communications and interactions that are facilitated. The paper will explore the development and trials of meaningful technology education tasks in urban and tribal school settings with reference to issues of gender.

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A Study of Laptops in Science Education

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Purpose and Theoretical Framework

A study of laptop computer use in K-12 science was conducted using the criteria of infotech hierarchy of use (Owen, Calnin, and Lambert, 2002), models of laptop use (Concentrated, Dispersed, Class Set, Desktop, Mixed) (Rockman Et Al, 1997; Belanger, 2000), and grade level (elementary, middle, secondary). (Laptops include Notebook, Powerbook and Pen-point computers.) According to Owen, Calnin, and Lambert (2002) an "infotech curriculum is more than just an alternative to computer education approaches that have been traditionally offered in schools. There is a move away from a situation where the teacher has the major control over the knowledge acquired by students. The infotech curriculum is a quadratic involving teacher, students, content, and notebook [laptop computer] use. In an infotech curriculum, students have individual access to their own notebook computer which is integral to the day-to-day learning activities planned by the teacher...[and] students come to regard the computer almost as an extension of themselves" (p. 137). Advantages include increased opportunity for independent learning, problem-solving skills and research skills. Owen et al. (2002) described the following hierarchy of computer use in an infotech curriculum: Support (e.g., database management, graphic presentation), Link (e.g., email, videoconference), Resource (e.g., researching the Internet), Tutorial (e.g., drill and prac-