Designing for Children
- With focus on 'Play + Learn'

Virtual Learning Environments
An Extension of the Physical World and More

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Abstract: The way in which children frame their experiences with pedagogical systems arises out of the interplay among the child's past experiences, exposure to multiple socio-cultural environments, family's socio-economic status, parental education, the educational system, child's peers, and individual personality and cognitive ability. An important factor which comes into play here is the socio-cultural relevance of the learning objects, i.e., localization of content to make learning more comprehendible using examples a child is familiar with. Children learn best in environments that are aligned to their cognitive and mental models. With the Indian educational system promoting ICTs in classroom settings, Indian tweens are increasingly embracing the digital world for leisure and learning. Results from the current research being undertaken on Indian tweens suggests that children exposed to multiple socio-cultural environments have a broad outlook to virtual environments and show a great degree of acceptance of multicultural content, besides exhibiting enhanced technological adaptability.

1. Introduction
Culture and traditions have a deep impact on the development of an individual and advancement of society as a whole. Exposure to multiple socio-cultural environments widens the intellectual horizons of individuals, leading to an intellectually empowered nation. Variety in ways of approaching a subject is possible with the knowledge of various cultures and traditions of one's own nation or of other nations of the world. Lack of awareness or consideration towards cultural differences can hinder the acceptance or flow of information between the benefactor and the beneficiary. To illustrate, in a topic on Indian marriages, it would be unwise to show image of the bride in white saree as cultures

of most of the Indian states denounce wearing white for a wedding, even though white saree is worn on auspicious occasions in the east and south of India!

In light of this cultural differentiation in use of color and many more similar differences, a proper investigation is required on the knowledge children bring with themselves from their physical environments to the virtual pedagogical environments. The current exploratory study on how Indian tweens (children in the age-group of eight to twelve years) browse the educational websites, is an attempt in this direction. This investigation would be able to give an account of users' overall experience while negotiating with interface and interaction styles and features of the existing educational websites. One of the key objectives of the study has been to look for justification for incorporating the culture-cognition associations in the design of educational websites for Indian school children. As part of this research a preliminary level investigation has been conducted to know how and in what manner the educational websites are being used by the tweens studying in privately run schools[1], and living in various urban areas in India.

2. Pedagogical use of Information Technology

There has been a paradigm shift in the classroom settings of Indian schools, especially those located in the urban areas. Technology is playing an important role in hastening the supply of expert and age-appropriate information that can seamlessly be incorporated into the classroom settings or home learning environments. After numerous deliberations on its pros and cons amongst the policy-makers (MHRD, 2009), educationists, and various other stakeholders of the academic environment, the traditional classroom framework has shifted towards the information and communication technology framework. However, the success of this change will heavily depend on the quality and socio-cultural relevance of the web-based pedagogical systems, besides removal of mental blocks of the trainers in integration of information technology with the traditional classroom teaching ((Kingdon, 2007), (Farrell and Isaacs, 2007), (Demetriadis, et al., 2003), (Wang and Chan, 1995), (Goddard, 2002)).

While discussing about pedagogical usage of technology, it is impertinent to mention that utilization of more number of sensory faculties through the constructivistic and interactive applications increases the mental processing exponentially, thus enhancing the

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[1] The private education market in India is estimated to be worth $40 billion in 2008 and will increase to $68 billion by 2012 (Raghunathan, 2008).

assimilation of information and its effective conversion into knowledge. Various historical events, solutions to complex mathematical equations, experiments which aren't possible in a school-laboratory setting, can be taught with the help of multimedia applications ((Williams, et al., 2000), (Kheterpal, 2003)). By employing the audio-visual technological aids, the learners are afforded opportunities to use their multi-sensory approach to learning (Rao, 1993). In fact, trainees learn only 16 percent of what they read, 20 percent of what they see, but 70 percent of what they see, are told and respond to, and 90 percent of what they do (Smalley, 1994). Interactivity of e-Learning system addresses the necessity of the 'doing' act by the trainees, and also enables increased human support and communication between students and instructors through text chat technology, electronic bulletin boards, synchronous content delivery and online tutors. Creating these sorts of learning experiences, which challenge the learners' instincts, requires rigorous understanding of the learner, the unique learning styles, and the course curriculum (Kheterpal, 2005).

Learning through usage of technological aids is seen as more interesting and motivating by the trainees as they feel less threatened by the machine (Jereb and Smitek, 2006). However, most 'off-the-shelf' instructional packages are designed with a presumption that most facts and observations are common to most nations and hence can be treated as universal. These packages don't take into account the personality factors like personal biases of the child, prejudices, local cultural strengths, and interaction between one's own experience, observation and interaction with environmental factors, which are generally different for each individual. If the pedagogical solutions can keep pace with these differences in perception and mental make-up, and learning style of individuals, these would be in a better position to capture and retain the learners' attention.

Children learn best in environments that are conducive and aligned to their cognitive and mental models (Brouwer-Janse, et al., 1997), environments that are playful, experimental, allow for a great degree of exploration, and raise a child's curiosity, besides providing constant motivation in terms of some reward points or praise for the efforts of the child (Kheterpal, 2009). The perceptual acuity of the children in the age-group of 8 to 12 year-olds reaches a level that children can understand the way two or more software tools can be used together to accomplish a task (Schneider, 1996). Their literalness and rule-driven nature allows them to learn arbitrary rules and behaviors, making them adaptable to different kinds of computer interfaces. The majority of children of this age-group use the Internet to visit websites, followed by those who send and

receive emails (Pryor, 2000). Websites are accessed mostly for games and puzzles, followed by their utilization for doing homework and research (Turow, Bracken and Nir, 1999).

It is acknowledged that learning skills correlate to various stages of child development, linguistic skills, kinesthetic abilities and social skills (Leon, 2006). Learning becomes more effective and memorable when people participate in educational activities that are practical and useful in their real life, and are culturally relevant to them. As children interact with their environment, they learn problem solving skills, critical thinking skills, and language skills. Sequential flow of information is critical to learning. Hence it is important to show the relationship between what the children would be learning about and what they already know from their past experiences.

3. Culture, Instructional Modules, and the Indian Context

With the objective to understand the influence of perception based on observation and experience on the adaptability of children to varied instructional content, contextual enquiry method was used to solicit feedback of elementary-school children (tweens) on navigability and learnability of the instructional modules available on various educational websites, either designed especially for the Indian children or having a universal context. The study was conducted in four different cities of India, namely, Ahmedabad, Bangalore, Chandigarh, and Durgapur. From the preliminary findings it has been found that keeping the age-group and medium of education constant, children responded differently to the educational content. Their comprehension of textual labels and visual symbols differed. Their ease in navigability of the websites too differed even though they had past experience of atleast one year (with minimum access of once a month) in accessing the Internet at home or school.

Technological orientation in most of the Indian schools is not sufficient in current situation. Computer as a curricula level component is new in Indian school system though this issue is taking momentum in recent times. Most of the schools in India either lack the optimum computer-student ratio, or do not have broadband internet connection which is a must-have as educational websites contain heavy graphics and image contents. The motivation and involvement to consult web resources depends largely on the attitude of the student towards knowledge, pedagogical practices, and educational technologies available in the society. Normally in Indian situation, this is further influenced by factors like parents, teachers, school policies, peer group, social status and rank the student belongs to. Students high on achievement motivation show positive attitude and

willingness to learn from technology-based sources and adapt quickly to educational technologies. In modern schools, most of which are privately run and have advanced educational infrastructure, it is observed that students use web resources more frequently for various purposes. As a result, students who regularly use computers and web resources gradually gain skill and efficiency in navigating the website satisfactorily.

As feedback was taken from children living in different cities, the initial findings of this research suggest that children exposed to multiple socio-cultural environments have a relatively broader outlook and are easily able to recognize various cultural symbols and visuals and adapt with greater ease to such a content as compared to those with limited exposure to other cultures and traditions. Children, whose parents are in transferable jobs, tend to come face-to-face with a variety of social and cultural settings. As they come in contact with different languages, customs, traditions, festivals, and social environments, it is far easier for them to experience and identify some of the cultural and traditional customs and symbols of the states or countries they have stayed in. This widens their perceptions and leads to increase in their mental databank about various things and processes; they are better able to form opinions to related questions and situations.

Regarding children who have lived in the same socio-cultural environment throughout, it was found that their perceptions and knowledge are essentially based on the information supplied to them through general/course books, encyclopedias, television programs, CDs/DVDs, or through experiences of their family and friends. First-hand experience of and exposure to varied environments has more impact on the mind than the information acquired from other means.

Children, whose parent(s) were in transferable job(s), mainly belonged to small nuclear families, with at the most one sibling, though in most of the surveyed cases they were the only child of their parents. 80 percent children had a computer at home, to which they had free access and which they used for playing games, especially when they were alone at home. Being alone gave them more freedom to explore and experiment with various options of the games and software applications. This translated to better adaptability to learn the software applications being taught at school. They were more adept with textual labels or visual symbols like home, back, etc and could understand what the arrows in the interface could imply. This, however, hasn't been derived whether these children are better in understanding the web interfaces of educational websites, than those children with limited access to interactive computer games or websites; these are just the

preliminary findings. This knowledge becomes indispensable to the pedagogical developers who must take into account the limitations faced by children with limited access to technology and limited exposure to varied socio-cultural environments.

Children bring different sets of expectations, knowledge, skills, computer expertise, and Internet literacy to the website interface. The interface features, functions, interaction style, and information architecture of the educational website should be developed on the children's cognitive profiles so that they get better user-experience while using the sites. India has rich storytelling and visual narrative structures and traditions. Indian children participate in a lot of game-like activities which possess and provide rich social and collaborative experience; the communicative practice of children too has a unique cultural flavor. Children in India are exposed to rich array of visual symbols, signs, colors, etc. which are part of the culture. Cultural background strongly shapes and influences children's choices and preferences regarding the content and graphical elements of educational websites. All these facts about Indian culture provide a rich framework for interface and interaction designers of educational websites, tools and products.

Amongst the children surveyed so far, the following key similarities have been noticed: Educational websites are mostly accessed for project work/homework; Children are more explorative and show more patience while accessing the gaming websites than the educational websites; They make use of Back button of browser for reaching home page and very rarely did any child know the usage of logo/branding for reaching the home page; They are quite appreciative of the pedagogical agents as they feel connected to them while browsing the content; They preferred search primarily through the textual links and secondary preference was given to search box; They weren't clear about what 'Contact Us' label can do and also, how to send the email if the default Outlook Express opens; Children with less frequent access to the Internet could not easily make out between the advertisements and the website related images/content.

It has also been found that in case of educational portal/website user-centered design approach is missing completely in Indian context as children as the main users have not been considered or consulted adequately in terms of their needs, interests, knowledge, style, demographic and psychographic influences, computer and technological awareness and competency etc. Genuine participation of children in the design process of educational sites/portals should be practiced and encouraged in India.

4. Conclusion

Culture influences and affects various aspects of education. It is highly desirable that a proper investigation into the cultural characteristics in education in India should be done to guide the design of user interface for educational websites/portals. It may be concluded here that exposure to multiple socio-cultural environments can have a positive impact on the intellectual development of the child. Children who have stayed in a variety of environments tend to have a broader outlook and adaptability to various learning applications and content. They are better able to opinionate and suggest diverse solutions to a given problem based on their own experience. These children are more conversant with usage of technology. They are more explorative and open to experimentation, which translates to their displaying better adaptability to e-Learning solutions and software applications being taught at school.

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