

## **Of Mice and Men: Educational Technology in Pakistan's Public School System**

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### **Abstract**

In this paper I use a critical lens to examine the introduction and adaptation of computer and information and communication technologies in Pakistan's educational system. This examination is based on two broad contentions: a) the introduction of technology in Pakistan's educational system is not conducive to the creation of a locally relevant knowledge system; instead the motivation is to create a market for foreign technology (hardware and software) and technological ideas; b) such an uncritical introduction of technology suits the needs of the undemocratic governments and hierarchical societies in the developing world and the neo-liberal economic forces abroad. I argue that such introduction of technology in education suits the former because, unlike critical education, the market model of education does not prepare students to question unjust and inequitable social and political practices around them. It rather suits the latter because education based on a market model produces a global pool of semi-trained laborers that can process technological and scientific raw material without gaining the expertise required to produce knowledge that is socially relevant and of benefit to them. I conclude that in this way technology becomes a source of hegemony and yet another tool of oppression rather than a vehicle for liberation and a just society.

### **Introduction**

Pakistan is in the early stages of introducing computers into its public schools. In line with its current information technology (IT) policy, the government of Pakistan has launched various schemes to promote the use of computers in public schools. Some of the projects have been started start as pilot projects that may or may not continue, depending on the success/failure of the project or on the availability of funds from governmental and international aid agencies. Other projects have been started under various policy initiatives, such as those of the Federal Ministry of Science and Technology (MOST) and the federal and provincial ministries of education.

Economic reasoning employed by the policy makers in Pakistan explains the rationale behind introducing technology in a narrowly defined technocratic sense rather than as part and parcel of the production of knowledge that can improve people's lives by broadening their outlook, promoting a better understanding of local, national and global problems and encouraging citizens to take up responsibilities and actively participate in the democratic process. Skills being imparted through techno-centric curriculum have little to do with creation of the knowledge needed to solve social and human development problems that Pakistan faces today. Imparting a few technical skills that will soon become obsolete does not impart critical capabilities to Pakistani students to understand

and deal with complex social realities of their own society or those of the rapidly changing, inter-connected globalized world.

Different societies have different circumstances and therefore different goals for educating their young. However, there are some universal goals such as respect for law, respect for diversity, respect for human life, responsibilities of good citizenship, respect for democracy, etc., that all educational systems aim for. Educational technology can offer opportunities for communication, dialogue, audio visual aids, diverse and unlimited resources and can therefore be used as a great resource for educational purposes. However, an educational system where technology's only use is to produce better technicians severely limits the use and scope of the pedagogical potential that technology has to offer. If students are not taught with an aim of learning how to learn they will not be able to keep up with the fast changes in technology. Given that technology becomes obsolete fast the technical skills imparted to the technicians if not continuously updated will put them out of market after a certain time.

In this paper I examine the introduction of technology (computers and ICTs) in Pakistan's educational system. Specifically, I examine one educational technology project, namely, 'Establishment of Computer Labs in Secondary Schools in Punjab' (ECLSSP). There are two broad contentions that underline my examination and analysis of the introduction of educational technology in Pakistan. First, I contend that the way technology is being introduced into Pakistan's educational system is not geared towards creating a locally relevant knowledge system. Instead, it conforms to a market model where the motivation is to create a market for foreign technology (hardware and software) and technological ideas. Secondly, the introduction of technology based on an uncritical educational model suits the needs of the undemocratic governments and hierarchical societies in the developing world and the neo-liberal economic forces abroad. It suits the former because, unlike critical education, the market model of education does not prepare students to question unjust and inequitable social and political practices around them. It rather suits the latter because education based on a market model produces a global pool of semi-trained laborers that can process technological and scientific raw material without gaining the expertise required to produce knowledge that is socially relevant and of benefit to them. Thus, seen from a critical perspective, technology becomes a source of hegemony and yet another tool of oppression. However, if introduced properly, where the first aim is to educate people, to help them to understand their circumstances, same technology can become a tool for liberation and a just society.

Basic questions that undergird this analysis are: How is educational technology policy being articulated at different policy levels in Pakistan? How is educational technology policy being implemented? How do various stakeholders perceive the introduction of technology and its role in education? And how does this policy affect issues related to teacher training, teaching methods, learning, curriculum integration, and evaluation?

I have organized the discussion in four main sections. In section one I briefly discuss how critical pedagogy and critical theory of educational technology provide the conceptual context of the study. In the second section I briefly lay down some of the methodological orientations that I followed for this research. In section three I present an overview of the ECLSSP followed by an analysis of the project in section four.

### **Conceptual Context of Inquiry**

The conceptual framework that informs my study is grounded in critical theory of educational technology which takes its bearings from critical theory and critical pedagogy.

Critical theory is concerned with how society's dominant discourses, with their ideological and hegemonizing power, socialize people and shape their life experiences. This is the starting point for critical pedagogy. Just as critical pedagogy evolved from the well-established discourse of critical theory, critical theory of educational technology shares its contextual territory and goals with critical pedagogy. Like critical theory, critical pedagogy focuses on issues related to opportunity, voice and dominant discourses. However, the context of investigation is not the workplace but educational institutions. Similarly, critical theory of educational technology retains all the aims and goals of critical pedagogy, except that the context of investigation is technology. The possibilities that technology can offer in an educational context, either as a tool of imposition of dominant social norms and control or as an educational tool for equitable and liberating educational experiences for learners is the central focus of critical theory of educational technology. It aims to interrogate how educational institutions appropriate technology. It is concerned with finding out ways in which technology in education, rather than becoming a tool of oppression and means of control, can lead to raising critical awareness in learners so that they can transform the world.

Both critical pedagogy and critical theory of educational technology acknowledge the importance of the dynamic inter-relationships between different players in the learning context and seek to examine various external influences on the process of learning. Critical theory of educational technology takes into account the local as well as global factors that influence the use of technology in education.

To begin with, critical pedagogy regards specific belief claims not as propositions to be evaluated for the truth of their content, but as parts of systems of belief and action that have aggregate effects within the power structures of society. It first asks questions about the systems of belief and action; who benefits from such a system? The primary preoccupation of critical pedagogy is with social injustice and how to transform inequitable, undemocratic, or oppressive institutions and social relations. It gives primacy to the social, the cultural, the political, and the economic in order to understand better the working of contemporary schooling.

Critical theorists of educational technology point out that rapid advancement of information and communication technologies has led to a more interconnected world. Thus, the social and political life of learners is no longer confined by geographical boundaries. Connected computer with information from around the globe has now become the new discursive and political location. With technology learners can not only use dialogue to engage in various discussion groups but utilize a number of other methods to enhance their critical consciousness. The meanings of liberatory education now include not only social and political analysis of the learner's life in the local context but also in the global context.

Critical theory of educational technology focuses its attention on the use of technology in schooling processes. In other words, critical educational theorists are interested in finding out how teaching, learning, knowledge creation and systems of education are affected by the introduction of technology in schools. Their interest lies in exploring ways in which the educational use of technology can enhance the critical thinking abilities of learners. At the same time critical theorists of educational technology warn about the possible risks that uncritical, un-planned and hasty introduction of technology in schools can cause to the larger aims and objectives of education. Critical theory of educational technology directs our attention towards the fact that, increasingly, technology is being used as the defining aspect of quality education. Just as classical critical theory was concerned with analyzing how technology was 'selectively' appropriated in the capitalist production process, critical theorists of educational technology focus their attention on how technology is 'selectively' being introduced in educational institutions and effects of such introduction of technology on knowledge production. They argue that computers have been introduced in schools without critical reflection or defining educational goals. Critical theory of educational technology studies the new forms of power and authority associated with both 'control of technology' (technology producing developed countries) and 'control through technology' (surveillance/scrutiny).

The proponents of critical theory of technology argue that the hasty introduction of computers into schools is a result of narrow technology-inspired neo-liberal discourse, which may have significance for business but has limited or no educational significance. Therefore, there is a need for further research and careful analysis of the role of technology and its interaction with pedagogical practices. In their analysis of technology critical theorists remain focused on the main concerns of critical pedagogy, such as education for justice, critical awareness and empowerment. As such, critical theory of educational technology is not only concerned with the role technology plays in knowledge construction, but also in examining the kind of knowledge that is produced by putting technology in classrooms and who benefits from such knowledge. For example, it is argued that technology's role and importance in education should be evaluated in terms of its ability to act as a catalyst to make the educational system equitable and enhance knowledge that empowers learners to transform their unjust society.

It is important to note that by rejecting the notion of the neutrality of technology, critical theorists of educational technology try to bridge the gap between two extreme 'for technology' or 'against technology' views held by many with regards to the role of technology in education. They do so by rendering the use of educational technology in its cultural, social, political and economic context. In other words, critical theory of educational technology argues that use of technology for educational purpose cannot be seen in isolation from larger socio-cultural and political factors that affect schooling and education. It is argued that that dichotomous model of the 'either/or' position about technology closes the door to the possibilities of discussion about the benefits or harms of the use of technology in education. Proper contextualization of technology within the context of education and contextualization of schools within particular socio-cultural, political and economic surroundings can lead to a better understanding of the role technology can play in the educational systems of particular societies.

Technology has become the defining characteristic of the current era so much so that the computer has become a dominant cultural form. Critical pedagogy refers to empowerment as learners' ability to understand the dominant cultural forms in their social and political context. Using similar criteria critical theorists of educational technology argue that empowerment includes learners' ability to understand possibilities technology has to offer in the local and global, social and political context.

Looking through the lens of critical theory of educational technology I am interested in examining the possible divides/struggles/knowledge gaps that educational technology can create or fill in the context of Pakistan to find solutions to improve the system of education. In this paper I follow the critical theorists of educational technology in arguing that an un-critical and non-problematic approach to introducing technology into schools can enhance the possibilities whereby the act of placing computers in schools itself will increase the current inequalities at both the local and global levels as more of what constitutes as technical knowledge or technological knowledge is also linked with power relations and dominant discourses and is symbolically created in the minds of people.

Furthermore, following critical theory of educational technology I make a distinction between techno-centric knowledge and technological knowledge. I believe that the narrow skills-based model meant to impart certain skills and to evaluate students on what they 'can do' rather than what they 'can know' has no scope for the empowerment of learners or authentic knowledge production. Technological knowledge demands learners' ability to read digitized text for the ideological sub-text and the meanings it embodies. Finally, I believe that in order to develop technological knowledge, it is important that learning take place through computers and not about computers.

Critical pedagogy points toward social, cultural, historical, economic, psychological, ideological and linguistic factors that play a very important role in knowledge production and acquisition. The total business of pedagogy or "doing school" (Apple 1990; Giroux, 1988; McLaren 1989) is political, and educators (consciously or unconsciously) are also part of this political act. Similarly, critical theorists of educational technology argue that it is important to consider the wider socio-cultural context of those schools where technology is to be implemented. Critical theorists (Honey et al., 2000) argue that technology should not be perceived as a solution to educational problems in isolation but rather as one resource in a school's comprehensive plan to address specific educational challenges.

### **Methodology of Inquiry**

This study is a part of a larger research project that I carried out in Pakistan in 2003-04. My research sites were the cities of Lahore (in the province of Punjab) and Islamabad (the Federal Capital). Following is a brief description of some of the qualitative methods that I used to gather data while in the field.

#### **Focus Groups**

A total of five focus groups were conducted with 4-6 research participants in each group. I held focus groups to see how different group participants attached meanings to the use of technology in education, how they defined technology, and how they defined education. In the focus group with parents I was especially interested to find out how they

viewed the instructional use of computers, how they defined technology and its relevance for their children. I wanted to find out about parents' understanding of how their children were being affected by the introduction of technology and larger educational reform. In this respect, the main purpose behind holding focus groups was to identify the issues most relevant to different sets of research participants.

The questions I asked during focus groups were open ended and encouraged description and depth. I used simple, clear language that participants could understand. I generally started with 'how' questions and then later in the discussion raised the 'why' questions. For example I started by asking the teachers 'how do you feel about the addition of computer labs in your school? Or 'what is your opinion about the computer curriculum? Do you think computers are helping students learn better? Only later did I ask the 'why' questions. For example, 'Why do you think public schools need computers? Similarly, in focus groups with parents, I started with simple opinion questions and then went on to ask questions that needed more reflection and details. For example, I would start with simple demographic questions such as how many children someone had and then go on to ask questions like, 'what are some factors that motivated you to enroll your child in computer course or the afternoon schools'?

As I mentioned earlier I conducted five sessions in all. After each session I asked the participants whether they understood the questions. How, I asked, could I make my questions clearer? I also asked them if I had left out any important topic or aspect, and their suggestions proved very helpful in further discussions and picking samples for interviews.

### *Interviews*

Out of the 24 research participants chosen I was only able to complete twenty-one interviews. One research participant went into labor (childbirth), two went abroad and could not complete their interviews and one participant changed his mind and dropped out half way through. I interviewed three policy-makers (all males), four bureaucrats (two male and two female), four school principals (one female and three males), six teachers, and four parents (two males and two females).

### *Documents*

I analyzed policy reports, documents and texts in conjunction with interview transcriptions. While analyzing the text I paid special importance to the construction of discourse about technology and its role in education, various claims within such discourse, and where these claims were coming from. I also analyzed how my research participants were reproducing such discourse in making meanings and sense about technology-related issues in education.

### *Organization of Data*

I organized the data gathered during the fieldwork in such a way that descriptions would not end up being detached from the contextual aspects in which data was collected. For example, because I audio-recorded most of the interviews, at the beginning of the first session I asked each interviewee to give a brief biographical account of him or herself. At the end of each session I use to record my impressions about the interview, the interviewee, non-verbal behavior, the interviewee's ease or discomfort with certain

topics, issues I wanted to explore further with the particular interviewee, etc. I took photographs, and maintained detailed field notes along with a field journal in which I recorded my own reflections and daily analysis of research activities in the field along with my impressions of how the day had gone by entering both personal and analytical accounts in the evening. Maintaining field notes and the daily field journal in fact helped me in continual reflection on the special and temporal conditions throughout my relatively long research period and really helped me stay focused on my research objectives.

### **Establishment of Computer Labs in Secondary Schools in Punjab (ECLSSP)**

The project, entitled 'Establishment of Computer Labs in Secondary Schools in Punjab' (ECLSSP hereafter) was launched as a pilot-project by the Federal Ministry of Science and Technology (MOST). It is a federal initiative that seeks to introduce computers and related education at the provincial level in the province of Punjab. ECLSSP, started as a pilot project in a limited number of schools identified for the establishment of computer labs. The project planners envisaged that the number of schools would increase as the project evolved. Initially, 54 schools from all 36 districts of the province of Punjab were identified for participation in the pilot project. Each school was to be provided with 15 Pentium-III computers and one printer. These machines were to be equipped with modems connected and configured to a Local Area Network (LAN) environment in a peer-to-peer network arrangement. The only software that was supposed to accompany the computers was Microsoft Windows XP operating system with Office XP as the application software. A private sector vendor was chosen to provide services associated with software-related problems for a period of one year. The contract to provide furniture for the computer laboratories was handed out to another private sector vendor.

A time line for the completion of the pilot project was set at 8-12 months. The project was not included in the incumbent five-year plan and so it was financed out of the block allocation for development of IT. The cost of the project was estimated at Rs. 39.240 million (approximately CAD 1 million at 2004 conversion rates). The project planners started out with the assumption that each of the schools chosen for the project will be able to provide a room that could be converted into a computer lab. Thus, the project only provided the above-mentioned equipment and furniture and not the infrastructure. The project did include on-site training of five teachers in each of the selected schools, but the training of teachers was left to the supplier of the computer hardware, a private distributor with no expertise in the educational sector or in teacher training. The project also proposed to hire an IT instructor for each of the schools for a period of one year at a salary of Rs. 5500 per month (approximately CAD 140 at 2004 conversion rates). Ministry of Science and Technology (MOST) committed to provide the salary for the IT teachers for the first year and the cost was included in the project. However, the hiring of IT teachers was later dropped at the request of the Government of the Punjab. The funds allocated for teachers' salaries were instead directed to The University of Education (a different Directorate of Staff Development in Punjab for general teacher training). The decision not to hire the IT teachers caused substantial change in the scope of the initial

plan and caused many problems that I mention below. The annual recurring expenditure to continue the ECLSSP project was estimated at around Rs. 4.104 million and the provincial and district governments were to take over the project after the first year.

The major focus of the project plan was the provision of computer hardware. Little attention went into how this hardware was to be used as a tool to create knowledge in the classrooms, or how the teachers would be trained. Similarly, little attention was paid to the appropriateness and adequacy of the software that accompanied the computers for the needs of the learning communities where they were being introduced. The ECLSSP project design was influenced by two sets of factors. First, the global instrumentalist discourse on the introduction of computers in educational institutions was clearly at play in the articulation of the rationale for the introduction of computer technology in educational settings in Pakistan. This discourse articulates technology as the panacea for educational problems and sees hardware provision and connectivity as the most important issues in the introduction of educational technology in classrooms. This discourse, however, ignores several important issues, such as access, equity, quality and knowledge creation, which should be central to educational planning in general but especially in developing countries. Furthermore, the global discourse on technology in education looks at the issue as a pre-requisite to an effective and 'productive' educational system that has the capacity to catapult developing countries into an advanced stage of development. What is neglected in this discourse is the cultural, social and economic context of the educational sector in the developing countries. The discourse is also silent on issues of criticality in the context of technology in education.

The second factor that influenced ECLSSP project was the ad-hoc approach that has been the hallmark of educational policy-making in Pakistan. An additional factor that seems to have influenced the planning process in this respect is the feeling among Pakistani policy-makers that Pakistan has been left off the information bandwagon, especially as compared to its archrival, India.

### **Analysis of the project**

My research and interviews with various personnel and stakeholders involved in the project highlight a number of problems that I will discuss in detail in this section.

#### *Lack of expertise in the planning bodies*

Let me start with the legacy of ineffective educational policy-making in Pakistan in order to put the analysis of the ECLSSP project in perspective. To begin with, the Ministry of Education did not conceive the ECLSSP. The sponsoring agency of the ECLSSP project was instead the Federal Ministry of Science and Technology (MOST). The sponsoring ministry left the execution of the project to National Telecommunication Corporation (NTC), the Punjab Information Technology Board (PITB), and the provincial and the district governments in the province of Punjab.

The first two executing bodies, namely the NTC and the PITB, have neither the mandate for nor expertise in educational policy-making. To take one example, a serving officer of the Pakistan Air Force on deputation with the NTC formulated the project. While the said gentleman had training in computer science, he did not have training in

dealing with the educational or the pedagogical issues related to the introduction of technology in educational settings. During my conversations/interviews with him it became apparent that his mind-set was clearly influenced by the global instrumentalist 'technology-in-education' discourse. For example, responding to questions about the specific aims and goals he said, "putting computers in classrooms will enhance IT knowledge among students and this knowledge is extremely important as Pakistan has been left far behind in the field of IT in this global age of knowledge economy". When asked about his vision of the relationship between education and technology or precisely what role technology can play in knowledge construction, learning, teaching, etc., he did not have much to say. Similarly when I asked where he sees the project five years from now, he did not appear to have a long-term vision.

Like the NTC, the second executing body, the PITB also lacked expertise in pedagogical issues, especially at the school level. As a matter of fact PITB has become quite controversial, as it has increasingly been operating in areas that are beyond its mandate. PITB was set up in 1998 initially as a consultative body for providing input into issues related to information technology, especially the development of software companies. However, over the years PITB has been venturing more into the educational realm and has taken up a number of educational roles without having the necessary expertise, infrastructure and/or monitoring/evaluation machinery. For example, the PITB initially assumed the role of an education board to impart professional education and training in IT, sponsoring Java, Oracle and other IT-related short courses. In doing so the PITB not only duplicated what was already being done by the private sector without any government investment, but it also became a competitor with private parties. In 2001, the PITB also assumed the role of controlling and imparting Inter-Computer Science (ICS) education at the college level, and started publishing and printing textbooks in IT education. Finally, the authority to approve private entrepreneurs to start ICS education (in over 300 colleges in Punjab) under the public/private partnership was shifted from the education department to the PITB.

Having neither the expertise nor the infrastructure necessary to support educational planning, monitoring and evaluation tasks, the PITB was once again nominated to execute the ECLSSP project.

### *Rhetorical articulation*

In my opinion, assigning educational tasks to agencies that clearly lack educational and pedagogical expertise indicates that there exists a problem of articulation and that the policy-makers do not clearly distinguish between information technology, technical education and educational technology, three broadly interrelated but essentially different areas. The failure to make this important distinction leads to a number of tensions and complications that are evident in the ECLSSP project design. The rhetoric used in the project design implies technological determinism, i.e., a technology-led theory of social change where technology is seen as the main force in moving society forward. For example, the goals for launching the pilot project state:

"Government of Pakistan is making maximum effort to promote information technology education desired areas in the country. The need of the hour is to introduce I.T at grassroots level i.e. to students of schools. The distribution of PCs

in the secondary schools will be a major contribution in familiarizing students with basic computer knowledge and its operation. The computer laboratory in the schools would also act as a community center for general public in the evening". (GoP, 2002).

In outlining the objectives of the project, similar rhetoric is used:

"The National IT Policy aims at promoting information technology education at all levels of social sector. This project is planned to provide low cost computers to schools in order to introduce the students with computer technology.

Distribution of low cost computers to secondary schools would assist in teaching computer subjects at school level resulting in our generation blessed with basic knowledge of Information technology" (GoP, 2002).

Such a techno-centric view is precisely what critical theory of technology warns educators to be cautious about. Mere emphasis on hardware sidetracks the main issues related to education in general and pedagogical practices in particular. The claim that computers will lead towards a generation blessed with knowledge of Information Technology, presupposes a number of factors. First, that technical knowledge is the most important knowledge. Second, that technical development is the prime cause of change (good) in society. Third, that technology is the fundamental condition underlying the pattern of social organization. Fourth, that human factors and social arrangements (i.e., issues related with teaching methods, hierarchy, curriculum relevance, etc.) are secondary to technology. Such a preoccupation with technology itself rather than with the role it has to play in education is also evident in the project design policy articulation and in the project goals. This leads to non-translatibility of goals for the administrators, teachers or anyone involved in monitoring and/or evaluating the project.

The neo-liberal position, which has been translated into policy advice for the developing countries, is also evident in the policy rhetoric of the project. Seen from this lens the global success of information and communication technologies in the business world has had major impact on global trends in educational policy making and in the way of thinking about education. The global idiom is clearly reflected in the ECLSSP rhetoric, which in turn creates pressures and conditions that result in a situation where computers are projected as a major tool for instruction and a symbol of quality education within the classroom. For example, phrases such as 'maximum effort to promote information technology', 'need of the hour', 'grassroots level', 'computer knowledge', and 'community centers' reflect the influence of the global rhetoric about the importance of IT echoed in the language used in project design. However, such projections are quite detached from social reality of Pakistani context (also see Tyack & Cuban (1995) and Cuban (1986, 2001) on this issue).

In their report on OECD (Organization of Economic Co-operation and Development) countries, Venezky and Davis (2002) remark on a lack of consensus between teachers' interests in teaching with technology, and the inability of national curriculum and examinations to accommodate the teachers' vision in the early stages of introducing computers in education in Europe. In Pakistan's case, I believe, such a situation can be attributed to an impulsive and unreflective desire on the part of decision makers to jump onto the technology bandwagon without contextualizing the educational needs and

priorities of Pakistani society. One principal who I interviewed summed up the situation in the following terms:

Pakistani educational policy-making demonstrates a history of following foreign trends without rationalizing their use in the context of Pakistan's educational needs. I believe putting computers in the schools should also be seen in that light. Otherwise who in their right mind will talk about putting computers in the schools in a country where 20% schools are without buildings and more than 50% without a boundary wall? The country is facing major power crises and there is often no electricity at least eighteen hours out of twenty-four hours.

#### *Domestic discourse on computers-in-education*

In Pakistan's case the push factors are multi-layered and complex. As mentioned earlier, competition/comparison with India has been one of the major push factors for the introduction of computers in Pakistan's public education system. An interesting observation that came from talking to a number of people in policy-making positions was the Indo-centric vision of the policy-makers. It is no secret that Pakistan's foreign and defense policies have always been Indo-centric. India also features in a large way in the domestic political discourse as well as in the articulation of nationalism and citizenship in school texts in Pakistan (Naseem, 2004). Thus, it comes as no surprise that the motivations behind 'getting wired' and 'catching up' with the technological bandwagon are also driven in part by rivalry with India. In a number of instances it was commonplace to hear the lament that India has pulled ahead in the field of technology and that Pakistan must catch up (personal interviews). Similarly, talk of the success of neighboring India, China or the "Asian tigers" abound in conversations as it does in the print media in Pakistan.

Another important push factor, behind the introduction of technology in the public educational realm is provided by the need to secure loans and aid from international agencies. The role of donor agencies like the World Bank and the IMF in this respect cannot be ignored. Pakistan has a long history of relying on aid money. It is no secret that international aid always comes with strings attached. In fact, a certain level of connectivity is a prerequisite for securing some concessional loans for the education sector. Thus, one major factor pushing Pakistan's government to introduce computers in education is to please the donor agencies<sup>1</sup>.

#### *Problems related to hiring and training of teachers*

One of the most important components of meaningful use of technology for educational purposes is a well-trained teaching workforce. In the ECLSSP the teacher-training component was left entirely to the discretion of the computer vendor. Talking to various stakeholders revealed that the teacher training provided by the vendor did not

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<sup>1</sup> Scholars such as Shore (2005) analyze the effects of conditional foreign aid on developing countries in terms of 'colonizing imperatives' or 'asymmetrical dependency'. Majority of projects that originate due to external stimuli tend to ignore local contexts and needs and therefore end up in failure. Often enough, rather than resulting in development that could lead to empowerment, these externally stimulated initiatives lead to a greater rich/poor, North/South divide and result in accumulating debt for the nations that implement them. Also see Allman, 2001, 1999; Giroux, 1994, 1997, 1988; Macedo, 1994; Hill, 1999; Cole, 1988, 2000 and Brosio, 1994

amount to anything more than instruction on how to start and shut down the computer. Ironically, even this basic training could not be imparted in certain cases, as the schools did not have a person designated for such training.

Flaws and contradictions inherent in the ECLSSP project became apparent once the implementation began. To take one example, there were problems related to the vague hiring jurisdictions especially in terms of hiring teachers who can teach IT-related curriculum. Teachers could not be hired as the provincial government was not ready to commit a budget to hire 54 IT teachers for any length of time beyond the initial year (for which the federal government had promised the salaries). This refusal by the provincial government was as much because of the lack of clear jurisdiction as it were a result of grievance due to the token representation it had been accorded in the policy-making process and the perceived lack of provincial autonomy.

There is no doubt that provinces show no ownership of such projects. However, the refusal to hire IT teachers should also be seen in terms of a lack of clear understanding about the aims and objectives of launching a new pilot project that was expected to expand from the provincial to the national level. The project clearly failed to define specific goals for introducing computers in schools that might have highlighted the need to hire IT teachers. The provincial government's refusal to hire IT teachers clearly undermined the whole project. My interviews with school administrators and teachers reveal frustration with not being able to deal with the machines delivered to them. At the same time, lack of trained teachers for the use of expensive IT equipment in many cases results in the loss of precious and scarce resources that could have been spent on other much-needed amenities or education development programs. The provincial government justified its refusal to support teachers' hiring on the grounds that:

the syllabus, approved by Punjab Text Book Board for class 9, 10 shows that the high tech IT teacher is not required for teaching computer to matric students of the Project Schools. Rather the existing teachers can better handle the task, in case adequate training is provided to them in IT (GoPb, 2002).

The refusal of the provincial government either to train current teachers or hire new IT teachers actually changed the scope and focus of the project in a significant way. It is interesting to look into this issue in order to see the rationale behind the provincial government's decision to do so. The first reason given by provincial Government of Punjab was that "as the project does not provide any allocations for IT teachers beyond its completion period (the first initial year)," therefore the hiring of IT teachers should be dropped altogether. The second reason is more troublesome. Once again it was based on economic rather than educational reasoning. The government's rationale was that it is not economically viable to hire IT teachers since IT is an optional subject for grades 9 and 10. The reason given was that it would not increase the number of students in the project schools; rather, existing students will opt for computers in the place of some other optional subjects. Finally, it was pointed out that much of the budget is spent on the salary component of the administrative staff and ghost teachers. This leaves no room for any expenditure on the recruitment of teachers who can use technology or staff development. Here once again we see that educational decision-making has been subjected to quantitative and economic reasoning while ignoring the importance of

proper teacher training in learning and knowledge creation through the use of educational technology.

#### *Problems related to content*

The importance of an integrated curriculum to the enhancement of higher-level thinking cannot be underestimated. Current research on the educational benefits of technology suggests that use of technology as a cross-curricular tool helps to develop concept understanding and promotes active learning through problem solving (Baker, Gearhart, & Herman, 1994; New London Group, 2000).

A cross-curricular or integrated curriculum approach reflects a humanistic model of technology integration that is capable of creating knowledge relevant to the socio-cultural milieu where technology is being introduced (Leventhall *et al.*, 1993; Nicholson, 1995). However, treating technology as a separate subject as is the current practice in Pakistan reflects a techno-centric mindset, which, at best, is capable of imparting some technical skills to learners. While these skills enhance students' chances of being employed they do little to address the needs of human and social development.

Many developing countries, such as Cyprus and South Korea (Karagiorgi, 2000), learnt this the hard way. They started with a techno-centric introduction of technology in education, but after evaluation and research they shifted towards a more integrated approach. Even though there is enough evidence based on some excellent conceptual and empirical research that emphasizes the need to develop innovative and integrated curricula and develop multiple literacies to avail the maximum potential of educational technology (New London Group (2000)), the national curricula in Pakistan still treats technology as a separate subject. The narrow techno-centric curriculum is designed to impart a few basic operational skills through rote learning and drill practices. However, such skills become obsolete as hardware and software changes.

One of the results of the introduction of computers in education as an optional, stand-alone subject is the perception among students and parents that it is not as important a subject to be studied and paid for. This is based on a common perception among Pakistani parents and students that compulsory subjects are more important and that they require more time and attention. Furthermore, since this subject is not integrated into/with other subjects or the existing curriculum it is not considered as useful in helping acquire knowledge about other subjects. As one senior administrator told me, this perception has been a cause of failure of other such programs in the past. According to him:

All previous attempts to introduce technology in Pakistani educational system have failed precisely because of the half hearted efforts made by government. Take the example of agro-technical educational scheme that was introduced in the seventies. It failed because it was not examined through the Board and was taken too casually by students, teachers and school administration. I see not much difference in agro-technical education of seventies and computer-technical education of today.

Similarly, the principal of one school was of the opinion that,

Unless government makes using computers a required part of school experience by that I mean using computers for a number of subjects not just one optional subject I don't see computers playing any significant part in a student's learning. At the same time I also have to say I don't know how the government will be able to do that, because they have not been able to do that with their own government departments even.

### *Pedagogical Issues*

In most of the computer classes, mostly teachers are using computers while students are still getting their information from lectures and texts. Such a 'banking model'<sup>2</sup> minimizes the potential offered by educational technology as students fail to develop a significant understanding to apply what they have learned to situations outside their texts and classrooms. Thus, such a model does nothing for the social or intellectual development of learners. It will not be far fetched to say that computers in most classes in Pakistan are being used in the educational process in a passive manner

This is not to imply that basic skills are not necessary, only that mere concentration on basic skills should not be the focus or aim of using educational technology. Basic computing skills have to be embedded within more complex tasks that necessitate higher-order skills of reasoning, comprehension, word decoding, and contextual reading of materials. This can be accomplished by teaching students to use computers to generate knowledge and not only as yet another subject to study and pass.

There is also an incongruity between the societal worldview on learning and the kind of learning that takes place when using technology for educational purposes. By and large the educational system is still based on the belief that rote learning is the best way to learn. The national examination system in Pakistan is basically a test of good memory. Technology as an educational tool discourages rote memorization and requires re-visioning of the education. Technological transformation in education requires knowledge creation through reflection, research, contextualization, and making connections (Feenberg, 2002; Kellner, 2004). The essential purpose of having computer-based knowledge is jeopardized when traditional methods of learning such as rote memorization, etc., are employed instead of a more meaningful hands-on approach where students can relate to the use of computers for learning by and for themselves.

Technology can be used for educational purposes in a number of non-conventional ways; for example, there is educational software that promotes learning through games for young kids, and learning can also take place through exploration and collaboration. If technology is used in a manner that engages students it can significantly contribute to decreasing the high dropout rates that are the biggest challenge to the educational system in Pakistan at present.

Another way to promote learning is to make what is being taught relevant to the lived experiences of the target population. In developing countries, like Pakistan, which have

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<sup>2</sup> The idea of the banking model was presented and critiqued by Brazilian philosopher Paulo Freire in *Pedagogy of the Oppressed* (1970). Banking model refers to a model of education in which teachers deposit information/skills into the students. The stress is on memorization of basic facts rather than on understanding and critical thinking.

little infrastructure to support technology especially in villages and rural areas, technology can be used to enhance skills needed according to the context of the local market requirements. Such experiments have been conducted in other developing countries and the rate of success and participation has been very encouraging. For example, in El Panecillo in Quito, the Internet was used to educate young students to learn to make and improve the candles, which they could sell in the local market (Phillip, 2002). Policy-makers have to be cognizant of the fact that use of technology for educational purposes and its long-term sustainability can only be assured by linking educational technology with skills needed for local micro-level enterprises. Disadvantaged communities can see the results of educational technology and are most likely to support it as they can see it enhances the quality of their lives and of those around them. However, the model being used in Pakistan currently aims to prepare students for low level data processing skills, mostly associated with outsourced call centers in a global marketplace. The use of educational technology in current model has no relevance to most rural and disadvantaged communities.

Technology can enhance learning if the emphasis is not only on learning about technology but mainly learning through technology. In other words, by using technology as a tool to impart relevant knowledge through integrating technology across a wide range of subjects instead of treating it as a separate subject, learning can be made socially meaningful and relevant. Thus, technology can play a significant role in winning students' attention and encouraging them to acquire knowledge that can significantly improve their lives.

When I asked the IT teachers questions related to identifying the unique learning needs of the students, such as, the issues most students faced, their reading and writing abilities, their access to computers at home, etc., most teachers seemed a little surprised. I was told this is not how teaching is carried out in Pakistani public schools. The response of one of the teachers sums up the situation,

If I were to spend time on identifying the particular needs of each student in a class of 65-70 students, when would I get time to teach? I can tell you they are all from poor backgrounds: Why else would they come to public school? Of course their needs are similar to the needs of all poor people, but what has teaching got to do with it? We can't help them even if we wanted to, they (students) don't do their homework because their parents are illiterate or they (students) have to work in off school hours so we ask them to repeat the lessons loudly in the class; this is the extent to which a good teacher can help his students. (Personal interview)

#### *Lack of monitoring and evaluation*

There is no doubt that monitoring and evaluation (M&E) has to be treated as an integral, continuous and built-in part of the planning process at all levels of educational policy-making and planning. However, my examination of the educational technology-related projects in Pakistan shows that M&E is coordinated neither within nor between departments for policy-making in this respect. For example there is no proper liaison between the federal and provincial monitoring authorities and, as such, no uniform pattern for monitoring progress. To say the least, the current monitoring systems are conspicuous by their absence.

None of the heads of the schools, teachers or parents I interviewed were happy with the monitoring and evaluation or any kind of project support. I was told that many projects were simply 'paper' projects that never got implemented. Similarly, absenteeism and poor performance are common and go unreported. As one of the teachers said,

What government terms as evaluation is in fact narrowly focused and strictly administrative tasks and they have nothing to do with the goals of the implemented project and every thing to do with controlling teachers (interview).

As a matter of fact, M&E are accorded such low priority that like most projects an M&E wing was only established for a limited period of time for ECLSSP and was allocated inadequate resources.

### **Conclusions**

In Pakistan the rationale behind introducing technology in education is based on 'techno-centric/skills based/economic reasoning'. Such an argument is self-defeating for a number of reasons. First, it ignores the social and political conditions of Pakistani society: the majority of the Pakistani population lives in rural areas where computer skills are not of much relevance to gaining employment. Second, such an argument tends to utilize technology for commercial and market needs rather than for educational and human development needs. Third, it treats technology in education as an add-on rather than as a catalyst for new thinking about teaching and learning. Fourth, mere emphasis on skills conceals issues of equity, access, and the lived experiences of poor and minority groups. Fifth, emphasis on utilizing technology for developing just a few technical skills does little to encourage reflection on the power issues underlying decisions by a small ruling minority (bureaucracy and military) affect the majority of the population. Therefore, such an articulation is not only blind to the exigencies of knowledge construction and production but it also ignores the broader ethical, moral, political, and historical implications, knowledge of which are essential for citizenship education, democracy social justice and equity or in other words, for the social and human development of Pakistani citizens. Research has proved that computer-based applications that encourage students to reason deeply enhance learning, whereas the use of computers for repetitive skill practice seems actually to decrease performance rather than improve learning (Wenglinsky, 1998; Resnick, 1990).

It is not only hardware that is needed but also a commitment to life long up-gradation and import of hard and software from those countries that produce it. Such a commitment can be very pricey for many developing countries if they are not producing their own hardware and software. Even in cases where hardware and software can be produced locally, any given system can only absorb a certain number of technicians, but all societies need good citizens. Thus, it makes sense to utilize technology in education for creation of knowledge that leads to an equitable and just society. In this sense technology's purpose in education is different than its use in business world and it is important that policy makers and educational planners are aware of the differential use of technology within education or educational technology. Educational technology unlike technical education that aims at certain skills development, aims at development of higher order thinking and critical consciousness. Such consciousness and ability to make historical, social, political connections promotes creation of relevant knowledge that can be used by learners to improve their lives. In other words use of technology for

educational purposes can lead to empowerment of people and therefore can cause significant human and social development.

A thorough reading of current IT policy in education reveals that Pakistan continues with imitative direction with respect to the issue of introducing educational technology in Pakistani public schools. The above analysis of ECLSSP shows that proper research was not carried out prior to implementing the projects. Concerned parties and stakeholders were not involved in making decisions about the needs of community or education system. ECLSSP is a clear example of a global trend in educational policy making based on a technological mindset that focuses on learning about technology rather than learning through technology. The current initiatives in Pakistan in introducing technology within classrooms represent a jump on the bandwagon of information technology for reasons that are not directly related to education.

### **Postscript: Is there light at the end of the tunnel?**

Despite the above-mentioned problems I found a tiny minority of teachers trying to use computers as pedagogical tools. For example, the teacher who assigned students tasks to collect information about a specific topic from the internet or two teachers who confirmed they were using on-line dictionaries to enhance vocabulary and correct their own and their student's pronunciation. The teacher who observed that students were not familiar with terms used in textbooks showed remarkable insights into the importance of connecting curricula with students lived experiences. The afternoon school administrator who tried introducing computers in teaching grades 6-8 because he thought audio-visual capabilities offered by technology could engage young minds and was facing fines for doing so. In one way or the other all above examples reveal some understanding of how technology can be used as a pedagogical tool. Many research participants in their interviews reveal awareness that technology is both a combination of technical and social factors. I see such instances as indicators of hope and light at the end of the tunnel.

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