Can Minimally Invasive Education (MIE) be an Alternative System of Education?

CENTRE FOR CIVIL SOCIETY

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Abstract

The paper, in its four different sections, talks about Minimally Invasive Education (MIE), a concept pioneered and popularized by Dr. Sugata Mitra's Hole-in-the-Wall Project in the late 90s. The opening two sections establish a background of the seemingly radical educational pedagogy which talks about education without schooling or guidance in an informal, spontaneous framework. The second section in particular also talks about the constructivist theory, the basis for MIE, and ends with an all-encompassing, eclectic definition of MIE based on background research, interviews, and field research. The last couple of sections talk about the current status and future prospects of MIE as an alternative to schooling and other formal and non-formal forms of education.

"Education Is Not the Filling of a Pail, But the Lighting of a Fire."

Introduction

According to the UNESCO Institute for Statistics, in 2008, there were 36,70,42,000 children of school-going age in India[1], which accounts for nearly one-third of its total population[2]. But how many of them actually made it to school?

At the outset, the Gross Enrollment Ratio (GER) in primary schools, at 114.6%, might seem very encouraging. Also, the statistics show a very negligible discrimination between the male and female GER, respectively being 115.9% and 113.2%. However, the GER does not take into account the corresponding age-group of the students enrolling in primary schools, which means that children outside the age window of 6-10 years enrolling into primary schooling are also considered. This is why the ratio can be, and in this case is, above 100%. The Net Enrollment Ratio (NER), which does take into consideration the age-group of the enrolling students, is far from encouraging. At 88.5%, the gap between male and female enrollment is also higher. This means that around 1,43,01,055 of the children in primary school-going age never make it to enrollment, let alone the subsequent problems of absenteeism and repetition.

Comparing the GER with the NER also reveals the startling fact that while the gross enrollment is pretty high, children who should in fact be in secondary school or higher education are enrolling for primary education; in most cases, this is either due to repetition, or the financial or social inability to enroll earlier.

There is another gaping hole in the data collection process. It seems that the UN is concerned with the process and pedagogy of education rather than its outcome. The institutions taken into account form

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[1] UNESCO Institute for Statistics, Data Centre,
http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx,

January 2008.

[2] United Nations Population Division, *World Population Prospects: The 2006 Revision*, March 2007.

part of the formal education system of India, and include all sorts of schools, pre-schools, colleges, distance-educational institutions and other similar institutions which are within the mandate, or at least registered with the Government of India. In short, all institutions which are capable of conferring a degree or certificate upon the students after the completion of a set curriculum or a pre-decided duration are the ones whose enrollment is being used as a barometer to measure the development of education in India. However, the outcome of education is not limited to the degree or certificate it confers; the tangible object, the piece of paper is not even the most valuable outcome. Education seeks to instill a sense of intellectual liberty, a stronghold of knowledge, and a life-long yearning to learn in its students. Formal education, in this sense, may or may not achieve the latter goals of education, but the impact of informal modes of education, while not capable of being measured with the importance of a tangible outcome, can surpass the conventionally accepted end of the learning process. But what exactly are the formal and informal modes of education, and how do they differ?

Claudio Zaki Dib, in his paper on the concepts of different forms of education[3], classifies education as belonging to one of the three broad systems – formal, non-formal, and informal. Of formal education, he says:

'Formal education corresponds to a systematic, organized education model, structured and administered according to a given set of laws and norms, presenting a rather rigid curriculum as regards objectives, content and methodology.'

Further on, formal education or conventional education is characterized by the presence of a teacher, and the learning process taking place in an institution. The necessity of a teacher, or synonymously an educational guide, an instructor, a professor or a lecturer and the presence of a tangible end in the form of a degree or certificate are the main characteristics of a formal system of education.

The non-formal system of education, it seems, has more in common with the formal educational system than it has with the informal system. It comprises of methodologies such as distance-learning, correspondence-courses, and open school systems, all of which at least one of the characteristics of

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[3] *Formal, Non-formal and Informal Education: Concepts/Applicability,* Claudio Zaki Dib, Institute of Physics, University of Sao Paolo, Brazil.

formal education such as, say, the presence of a visible student-teacher relationship, or a visible institution. However, what these two have in common is the presence of a rigid curriculum with regard to any particular discipline of education, and the tangible end in the form of a diploma or a degree. While there is relatively more flexibility in what the student may want to learn, the learning process and the curriculum is still rigid.

John O'Leary, motivational speaker and President of Frontier College, Canada – a popular institute for non-formal learning and adult education courses – considers informal education or as he calls it, 'popular' learning an indefatigable part of the human life experience[4]. Every place and every experience confers learning upon the human subject and such learning or unsupervised education goes on for a life time. While the concept in its prime is philosophical, we can say that the organized form of unsupervised learning and learning through experience is what can be christened informal education.

In its various forms, informal education forms part of the formal education system in the form of field visits, museum tours, competitions and contests, class and cafeteria discussion, as well as peer learning. All of these are indispensable parts of a student's learning experience. However, of late, informal education has begun to take a more organized structure in the form of several experiments, pilots, or even sufficiently proliferated projects throughout the world with one of the three primary objectives:

1. To accentuate and make visible the informal learning process in schools and colleges through organized peer groups, discussions, and unsupervised, discovery based learning by the use of Information and Communications Technology (ICT) and educational toys.
2. To supplement the formal learning process through spontaneous study groups, online learning, self-education through technology, library education, and training and internships.
3. To liberalize the learning process by developing informal education as an alternative to existing, conventional models of education.

Often, educators themselves confuse non-formal and informal education due to the element of unsupervised learning being common to both. However, the major difference lies in the inability of informal education, as of yet, to confer a degree, diploma or certificate upon the student, and to

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[4] *John O'Leary on Popular, Informal Education* **-** http://www.youtube.com/watch?v=b_kcKvcgqDo

convincingly measure the outcome of the learning process in a standardized manner. While the latter has been achieved in some cases, the phase remains experimental[5].

Some of the more successful examples of informal education systems are Dr. Sugata Mitra's Hole-in-the-wall Project, the Digital Doorways Project, The Bhandup Project, and to some extent, the Khan Academy. Of these, the project of interest is Dr. Mitra's Hole-in-the-wall Project and the educational pedagogy termed by him as Minimally Invasive Education (MIE). MIE can be considered as a methodology within the scope of informal education, and for the purposes of this paper, is the central subject of discussion. The next section will discuss MIE as a concept and its underlying philosophy of constructivism.

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[5] *Sugata Mitra's new experiments in self-teaching* - http://www.youtube.com/watch?v=dk60sYrU2RU

"I say without fear of my figures being challenged successfully that today India is more illiterate than it was fifty or hundred years ago, and so is Burma, because the British administrators, when they came to India, instead of taking hold of things as they were, began to root them out. They scratched the soil and began to look at the root, and left the root like that and the beautiful tree perished."

- Mahatma Gandhi speaking at Chatham House, London, 20 October 1931

Introduction to the Concept of Minimally Invasive Education

Minimally Invasive Education (MIE), a term coined by Dr. Sugata Mitra[6], Chief Scientist, Emeritus, NIIT, borrows its terminology from the concept of minimally invasive surgery. In his paper, he does not explicitly define MIE as a stand-alone methodology. Rather, he chooses to loosely define it in the context of constructivism and the technology-specific approach he chooses to test the methodology.

'The Internet with its limitless capacity to entertain, educate and connect people together will definitely form the basis of new pedagogies for learning. The approach that our experiments seem to suggest is that based on free access and minimal intervention. We call the approach Minimally Invasive Education, MIE.'

However, in the same paper, he goes on to say:

'While this approach is specifically for the learning of computing skills, our experiments and results suggest that the method can be easily adapted for many other subjects as well.'

Hence, we can assume that while Dr. Mitra chose to concentrate on Information and Communication Technology (ICT) as a component of MIE, the methodology by itself stands for more than that. The use of computers was to concentrate on the discipline of computer literacy, but other subjects might or might not demand the use of technology by the student. MIE, on the other hand, is a composite of techniques such as group learning, discovery approach, constructivism, peer guidance and several others. But if we were to come up with an all-encompassing definition of MIE, what all would we have to include?

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[6] *Minimally Invasive Education for Mass Computer Literacy,* Dr. Sugata Mitra, NIIT, June 2000

Ms. Ritu Dangwal, Head of Monitoring and Evaluation at Hole-in-the-Wall Education Ltd. (HiWEL), explains the pedagogy and the rationale behind it by elaborating on the ways children, or people for that matter, learn[7].

Learning broadly happens in three ways. In the first, the teacher determines the content, pace, methodology and outcome of learning for the student; this system is prevalent in public schooling in India where the course curriculum is determined by a central governing body such as the CBSE, ICSE, and other national and state boards. In the second method, the teacher and the student together determine the aforementioned elements of learning. In this method, the acceptance of both the student and teacher for the decided method is important; this is seen in the Cooperative Learning[8] pedagogy prevalent in education system of Finland, a country which boasts of complete literacy and high Programme for International Student Assessment (PISA) scores[9].

In the third method, the learner himself or herself decides what is to be learned, at what pace it is to be learned, and how it is to be learned. This concept does not concern itself with the presence of a teacher or preacher, and is known as unsupervised education, which forms the basis of MIE. It is important to note that MIE is not synonymous with unsupervised education; the former comprises of several other elements which are not necessarily present in the relatively broader concept of unsupervised education.

MIE as a pedagogy is based on the philosophical theory of constructivism, and adds to it its own methodology of the formation of social groups via spontaneous order. Constructivism, or more specifically Social Constructivism, says that learners create or construct their own learning environment based on their existing knowledge and psychological background, and also based on the social externalities and influence of peer groups.[10] Hence, knowledge is constructed by an amalgamation of pre-existing knowledge and exposure to fresh knowledge.

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[7] Personal Interview with Ms. Ritu Dangwal, HiWEL, Kalkaji, June 2012

[8] *Cooperative Learning in Finland*, Dr. Pasi Sahlberg, IASCE Forum, February 2004

[9] *The Finnish Education System and PISA*, Kupianen, Hautamaki, Karjalainen, Ministry of Education, Finland, 2009

[10] *Constructivist Pedagogy*, Virginia Richardson, University of Michigan

Constructivism, in some of its principles, goes further than MIE does. It takes into concern something Virginia Richardson calls 'meta-awareness', that is, the learner being conscious of the learning process that he has created for himself. In simpler words, constructivism involves thinking about thinking and learning about learning, so the learner is able to construct a conscious learning process which can be followed then on. On the other hand, Ms. Rita Dangwal concentrates on the importance of the learner being unconscious of the learning process for MIE to work. Since the time spent at a Hole-in-the-wall kiosk is a replacement for recreational time, the equation of the kiosk with something as "dull" as say, studies, would defeat the whole purpose and rid the children of their interest in the technique. In this sense, MIE exists in each and every walk of life when we unconsciously construct our own understanding from our experiences such as in the case of say, a child learning to drive a car by himself. He learns through trial and error, through observation of road rules, and even if he ends up a perfect driver, he will never have studied from an organised form of data about the perfect method to drive a car.

From her experiments, as Ms. Ritu Dangwal tells us, other than the aforementioned three methods of learning, she discovered three layers within the body of learners.

The first layer was of the children who actively worked on the kiosk. They preferred the hands-on approach to learning, and created knowledge through trial and error by using the computer actively for as much time as possible.

The second layer was of the semi-passive learners who used to observe the first layer and give them suggestions and inputs as to how to try new techniques and where they might be wrong. In this sense, they gave spontaneous guidance by using their observations – based on imperfect knowledge – to guide the active learners and using the system through them rather than having a hands-on approach.

The third layer, albeit the most interesting and misleading one, was of the very passive learners who used to stand apart from the crowd and silently observed the children working on the computer. On the first glance, they might seem uninterested and dim, but as soon as they got their chance, they would apply their observations and actually achieve more of a success rate in the context of what they wanted to achieve and what actually happened. In this sense, their method involved less error and was evidence to their power of perception.

Based on the aforementioned layers, the theory of constructivism, the importance of peer education, and the phenomenon of spontaneous order in the midst of provided resources, we can come up with an all-encompassing definition of MIE.

Minimally Invasive Education (MIE) is an educational pedagogy based on constructivist theory which says that the learner constructs his own learning environment based on his pre-existing knowledge and his social and psychological background, and there is minimal or non-existent guidance by a learned teacher or guide. Learning through MIE typically occurs in spontaneously constructed groups where different kinds of active and passive learners evolve impulsive guidance to derive knowledge out of given resources.

"Children have to be educated, but they have also to be left to educate themselves."

- Ernest Dimnet

Motives of current Minimally Invasive Education projects

The amount of existing literature on MIE consists of mostly news articles covering the popular success story of Hole-in-the-wall, or the research papers written by those directly involved in the primary experimentation within Hole-in-the-wall Education Limited (HiWEL). A first-hand exposure to one of the more popular kiosks in Kalkaji, New Delhi revealed a humungous board on the top of the computer which said,

खुल जा सिम सिम[11]

Installed by the Department of Education

Managed by Hole-in-the-wall

More surprising was the fact that it was installed in the boundary wall of the local Government Boys Senior Secondary School. Leaving the couple of children using the kiosk in peace, I went inside the school and managed a couple of words with the overtly busy Principal. According to her, the motive behind installing the computer in the school wall was to attract footfall of the children in the nearby slum in the hope that they would eventually enroll their way into the school.

In the very beginning of the previously mentioned interview with Ms. Ritu Dangwal, she revealed that HiWEL had in fact been thinking about developing the capabilities of its systems to serve as an alternative to formal schooling. However, she did mention that on the outset, the birth of the project was not in the form of an alternate educational pedagogy, but in the form of an experiment to examine the interaction of children with technology; children who possibly had never seen or used or had regular exposure to a computer system other than the one in the kiosk.

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[11] 'Open Sesame' in English

Other similar projects such as Africa's 'The Digital Doorway'[12] aim solely at increasing computer literacy among the locals, rather than trying to teach other subjects through the use if Information and Communication Technology (ICT) or MIE.

Hence, there are three primarily existing motives behind MIE which we can recognize as of now:

As an experiment in educational technology and in the importance of computer literacy among the masses; MIE here becomes a supplement to formal education.

As a pathway into formal education; MIE here becomes a compliment to formal education.

As a parallel system of learning; MIE here becomes an alternative to formal education.

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[12] *The Digital Doorway – Minimally Invasive Education in Africa*, Gush, Cambridge, Smith, CSIR

"You cannot teach a man anything; you can only help him find it within himself."

- Galileo Galilei

Can Minimally Invasive Education be an alternative to formal schooling?

The premise for any arguments against MIE rests on the notion of knowledge being synonymous with education. Even if one is able to unlearn the stereotype which associates education with schooling, what still remains rigidly lodged in general consciousness is the need for an eclectic mix of incomplete knowledge. 17 year old Virendar, who regularly uses the computer installed in Kalkaji to tackle questions of calculus, loves being near his favorite subject more than he likes sitting in class. However, according to the Central Board of Secondary Education (CBSE) - it formulates the centralized curriculum for most schools in the country - he needs to learn dabbles of incomplete information about the UN and the Russian Revolution along with pieces of prose by Umberto Eco and Amitav Ghosh.

Hayek expounded upon the importance of incomplete knowledge in society.[13] Something similar emerged from Ms. Ritu Dangwal's description of her experience of installing computers in Kunnam, Tamil Nadu, an impoverished village where the government school's bustle with activity only when the mid-day meal is being served, the classrooms sparsely populated otherwise. In such a place, an MIE resource such as the Hole-in-the-Wall computer provided additional knowledge and a chance to learn for people who otherwise were living off their perfect knowledge of farming. They wanted to be at liberty to choose what they want to learn about.

Think about it. A student choosing to pursue higher education in a narrow field of knowledge does not draw entirely from his schooling, where education is analogous with a thin sheet of water spread over a large field. One cannot dive deeper. The choice that student makes to dive deeper into a specific field of knowledge is encouraged not by his textbooks but either by his intrinsic interests, or his discovered additional knowledge about one subject from among the dozen or so he has to study, or from his need to earn and prosper.

The one major problem for MIE in India is the problem of standardized testing. Most higher education institutions require necessary high school examination, whichever may the field be. Hence, schooling becomes a necessity. Although a child, through alternate channels, can take the 12th standard examination without having attended school, the freedom of his education is bound by the walls of the curriculum which is covered in these examinations. On the contrary, the Sudbury Valley Schools, Massachusetts, known as one of the most democratic and minimally invasive systems of education in the world, enforces no examination upon its students. Yet, some 80% of its alumni have gone on to graduate from college.[14]

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[13] *The Use of Knowledge in Society*, F.A. Hayek, The American Economic Review, September 1945.

[14] *Legacy of Trust*, *Greenberg and Sadofsky, Sudbury Valley School Press, 1992*

The only other problem is the process of initiation into numeracy and literacy at the very outset of childhood. There has been no concrete study on the incidence of Hole-in-the-wall users becoming literate through the computer, but Ms. Dangwal, on her field-visits, has noted several sporadic cases of the same. However, skills like writing and understanding words and numbers still require a guide or a teacher. Once this instrument for further learning has been acquired, a child can chart his own path.

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