2008

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Vishnu Vinekar
Fairfield University, vvinekar@mail.fairfield.edu

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Human Capabilities versus Environmental Determinism

Vishnu Vinekar
Fairfield University
vvinekar@mail.fairfield.edu

ABSTRACT

Urban migration in developing countries is expected to increase the number of slum inhabitants from 940 million in 2003 to over two billion by 2030. As socio-economic status at birth is a strong predictor of future socio-economic status, slum children seem destined to a life of poverty. However, emerging examples of empowerment appear to demonstrate possibilities of information technology to benefit the lives of slum children. In this paper, we use social cognitive theory to study why children participate in IT learning in the absence of formal training courses, using the constructs of symbolizing, forethought, visceral, self-regulating and self-reflecting human capabilities. In doing this, we attempt to validate a theoretical basis for human capabilities of slum children to overcome the forces of environmental determinism working against them.

Keywords

Slum children, empowerment, social cognitive theory.

INTRODUCTION

The topic of empowerment of slum children is important for the following reasons. First, over 940 million people live in slums (UN-Habitat, 2003) and consequently suffer from extremely poor living conditions, endemic poverty, and lack of security. Second, this problem is growing, and by the year 2030 over two billion people are expected to live in slums (UN-Habitat, 2003). Third, slum children in developing countries are adversely affected, as being born in a slum practically seals their fate. Several studies show that the living conditions of a child's parents before and during childbirth has strong effects on the child's mental and physical health, as well as the child's future socio economic status (Margolis et al 1992, McLoyd 1998, Mullick and Goodman 2005). These studies indicate that the substandard conditions that these children are born into affect more than just their physical health. High exposure to toxic substances and lack of access to resources during childbirth and during formative years diminish their cognitive functions, scholastic achievements, Intelligence Quotient (IQ), and ultimately affect employability and income levels. These forces of environmental determinism acting against a child born in a slum are debilitating, and very likely to cause a life of poverty.

Empowering of slum children through their gaining self-efficacy of Information technology (IT) is highly relevant to the field of Information Systems (IS), for the following reasons. First, although empowerment is a strong concern in several fields, there are some who dismiss the idea of using IT to empower slum dwellers and believe it should be a low priority (Neuwirth 2005). Since the IS field is well suited to understand these concerns, there is a need for research in this field to address the question of empowerment of slum inhabitants. Second, emerging reports indicate that IT training has made a difference in the lives of slum dwellers (Mair and Verges, 2003; Onyango, 2001). The IS field is particularly well-suited to address research issues here due to our cumulative research on IT adoption and use.

This paper specifically focuses on an emerging model of empowerment through IT without any formal training or computer courses. Our research question is "what explains why and how some slum children learn IT skills within their debilitating environment?" Despite the importance of the topic and the relevance to the field, research in IS has been slow to respond. Although we have several theoretical models addressing IT adoption, they are inadequate for answering our research question. First, Davis' (1989) Technology Acceptance Model (TAM) assumes a certain minimum familiarity with computing technology. Constructs like perceived usefulness and perceived ease of use make little sense to a slum child who has never

touched or seen a computer before. Second, several factors work against a slum child participating in self-learning. The slum dwellers do not believe that they will be able to learn these IT skills, especially since they have a history of poor academic performance, with most dropping out of school. Therefore, constructs like perceived self-efficacy may not be sufficient. Third, the social and subjective norms in Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) and Ajzen's (1985) Theory of Planned Behavior (TPB) work against technology adoption here. The parents of these children may be strongly against the children spending time on IT, as they consider this not only a fruitless and pointless endeavor, it also takes time away from the work they could be doing to support their family's immediate needs. Subjective norms are particularly strong in the case of female children in some developing countries. For example, the conservative views of minority settlements in South Asia are strongly against girls leaving the house, and independence and skill in girls are perceived as highly undesirable qualities. Furthermore, none of these models explain how slum children learn about complex, unfamiliar subjects like IT in the absence of formal training and courses.

This study make a valuable contribution to research by extending Social Cognitive Theory (SCT) (Bandura, 1986) to the research question. Bandura's (1986) abstraction of human capabilities are utilized to explain how slum children learn about IT. The construct of symbolizing capability considers the ability of slum children to imagine possibilities of this new technology that they have no idea about. The construct of forethought capability explains how slum children envision desirable futures of better lives, and work toward those possibilities instead of focusing on immediate needs. The construct of visceral capability explains how slum children learn through observing others in the absence of formal training. The construct of self-regulating capability explains why these children disregard social norms and conventions, and instead hold their actions up to an internal set of values, standards, and beliefs. Finally, the construct of self-reflecting capability explains how and why these slum children persevere in their efforts in the face of repeated failures.

This paper proposes to validate the theory through an empirical study of a sample at a few slums in New Delhi, India. In the informal settlements in Delhi, India, a few slum children have taught themselves IT skills to express their creativity, including basic webpage creation, blogging, maintaining audio and video archives, and short animation clips (Times of India 2004). This has garnered these slum children worldwide attention, including an invitation to demonstrate their creative skills in Hamburg, Germany (Sarai, 2004), increased their employment opportunities (Times of India, 2004) and has even helped stay the Government of India from displacing their illegal squatter settlement (Nangla Lab, 2006). These are relatively high achievements for slum children in the developing world.

This paper makes a valuable contribution to the practice of empowerment as well. Empowerment of slum children through IT is still nascent, and the numbers of those empowered still lag far behind the growth of slums. Merely setting up labs where children may come and teach themselves IT skills may not be enough. Practitioners also need to focus on addressing the capabilities of these children to overcome their debilitating environments and empower themselves through learning. The constructs used in this paper - symbolizing, forethought, visceral, self-regulating and self-reflecting capabilities provide a valuable guide to practitioners on where best to direct their efforts to increase empowerment.

SLUMS IN DEVELOPING COUNTRIES

In developing countries, slum dwellers account for 43% of the population in contrast to about 6% in developed countries (UN-Habitat 2003). The 2003 United Nations study found 940 million people, close to one in every six people, living in slums, with Asia alone having 550 million slum dwellers (Guardian, 2003), due to urban migration. While some of the urban migrants are able to avail of employment opportunities, accommodation for the migrants is a problematic issue for the already overburdened and underdeveloped infrastructure of cities in developing countries. Urban population in these countries grew by about 36% in the 1990s (Guardian, 2003). Urban migration has therefore resulted in the development of informal settlements of the migrants, including slums, shanty towns, and squatter colonies. These settlements are usually overcrowded, with little infrastructure. Some of the housing may be temporary structures built of corrugated metal sheets, plastic, plywood and cardboard. Others may be permanent but low-quality structures built of brick and concrete block. Several of these settlements may be illegal, as the migrants may squat on government or private property that is either undeveloped or abandoned. In these cases, the inhabitants live in constant fear of eviction by the government, and consequently make little or no effort to improve their living conditions. Informal settlements usually do not have running water inside the structures, and have to rely on a communal water source. Makeshift electrical connections are frequently appropriated by stealing power off public electricity lines. In 2003, 32% of the world's urban population lived in slums (UN-Habitat, 2003). This number is projected to rise to in the next 30 years to two billion people (Guardian, 2003), close to one-third of the current population of the world.

ENVIRONMENTAL DETERMINISM AND SLUM CHILDREN

Environmental determinism posits that environmental factors play a strong role in several life outcomes of individuals. Socioeconomic status at birth, and even before birth, has strong correlations on long-term mental and physical health, and on future socio-economic status. Empirical results of earlier studies demonstrate that being born in a slum to parents of low socio-economic status probably means a destiny to suffer from poor physical health, poor mental health, low cognitive development, low academic achievement, low IQ, low employment opportunities, low income levels, and a low future socioeconomic status.

 In a comparison of the mental health of children in a rural area, a moderately prosperous urban area, and an urban slum, Mullick and Goodman (2005) find that not only are the slum children more likely to have serious behavioral problems than other urban children, they are also disadvantaged compared to the rural life that their parents had left behind. McLoyd (1998) demonstrated that persistent poverty has detrimental effects on IQ, school achievement, and socio-economic functioning. She showed that the diminished cognitive capacity among poor children was caused by higher rates of prenatal complications, high exposures to lead, and lower home-based cognitive stimulation. Poor academic achievement was caused by lower teacher expectancies and lower academic-readiness skills among poor children. Bernard (1939) reported that as middle and higher income group children grow older, they tend to mix with others outside their neighborhood. However, lower income group children do not exhibit such behavior and associate only with other low income group peers as they grow into adulthood. Children of lower socioeconomic status are also more prone to persistent illness due to environmental factors (Margolis et al, 1992). These studies indicate that environmental determinism is a major factor in predicting the physical, mental and economic outcomes of slum children. Slum dwellers are acutely aware of this and tend to resign themselves to their fate. In the words of a slum dweller "I was born in a slum, I live in a slum, I will probably die in a slum, and if there is a slum in heaven, then I will most likely end up there too" (Warah, 2004).

EMPOWERMENT THROUGH IT

In the face of environmental determinism, it appears that slum children have little hope of improving their life. Research on empowerment has been slow in addressing the issues of slum children. A new model of empowerment explicitly stresses on information and communication as strategic resources for slum dwellers as it gives them voice (Madon and Sahay, 2002). While critics of this approach believe that IT should be low on the list of priorities in empowerment, Non-Government Organizations (NGOs) in developing countries are attempting to empower slum children through IT training. NGOs have set up schools to teach IT skills to children in the Brazilian slums or 'favelas' (Mair and Verges, 2003) and in African slums (Onyango, 2001). However, developing countries suffer from several resource constraints, from financial resources to human resources. Due to low rates of literacy and education in the middle class of developing countries, most government focus their resources on the larger sections of the middle class, leaving little resources for urban slum dwellers. Therefore, new models of empowerment are needed which are less dependent on outside resources. In this study, we focus on a model of empowerment through IT where the slum children are not trained by others, but are mostly self-taught.

This leads to our research question: what enables slum children to learn these skills on their own? According to the findings of the studies on the detrimental effects of the slum environment, slum children have low academic achievements and IQ, in addition to suffering from poor physical and mental health. These children have not been exposed to IT earlier, as their schools, workplaces, and homes consist of rudimentary facilities at best with little modern technology. Life inside the slum is all they know of, and they are well aware that possibilities of entering the outside world are remote, let alone enter the outside world as a skilled individual. Therefore, most slum inhabitants may consider it impossible for them to develop computer skills, and, even if they do develop these skills, they may not consider it likely that these would improve their employment opportunity or any other aspect of their lives. Developing computer skills with this disadvantaged background may be formidable enough, and doing so in the absence of a formal course and trainers is even more formidable. Female children may face even greater pressures in cases where there are strong cultural, religious and social norms that oppose female children from working outside their homes. For these slum children and their disadvantaged background, learning without any formal training may be very difficult. Therefore, for the children to engage in an activity that most other slum inhabitants would consider fruitless, and disregard social convention in doing so, is highly unlikely. In this study, we make a valuable contribution to research by analyzing the process of learning in slum children.

SOCIAL COGNITIVE THEORY

We approach our research question through the perspective of Bandura's (1986) formulation of Social Cognitive Theory (SCT). SCT believes that people are neither driven by inner forces nor are they automatically shaped and controlled by external stimuli. Instead, human functioning is explained through an interactional model of triadic reciprocity in which

environmental events, personal factors and behavior all operate as interacting determinants of each other (Bandura 1986). This allows individuals some opportunities to change their destinies within limits of self-direction. We choose this theory as it takes a more holistic view of human action (figure 1). This takes into consideration the results of earlier studies that show that the environment has an effect on personal/cognitive factors as well as on behavior (paths 1 and 2 in the model). It also takes into consideration the view espoused by several theories in the IS literature such as Davis' (1989) TAM, Fishbein and Ajzen's (1975) TRA, and Ajzen's (1985) TPB, which predict that attitude affects behavior (path 3 in the model). It also includes results of social experiments that demonstrate that behavior influences attitude as shown in path 4 (Festinger and Carlsmith, 1959). In addition, individuals may be able to affect their environment (paths 5 and 6) indicating the possibility of slum dwellers changing or enacting their environment.

Figure 1. Triadic Reciprocity between the Environment, Behavior, and Personal factors
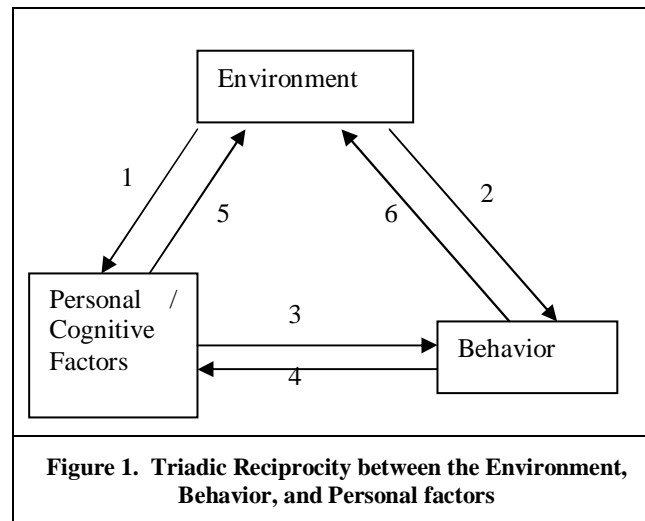
SCT posits that humans have several capabilities including symbolizing capability, forethought capability, vicarious learning capability, self-regulatory capability, and self-reflective capability (Bandura 1986). *Symbolic capability* means that humans do not attempt to test different alternatives by putting them into practice by trial and error. They test these symbolically and determine the best alternative before actually choosing a course of action. *Forethought capability* posits that humans do not simply respond to immediate stimuli, nor are they driven by the past. Forethought is "the product of generative and reflective ideation" (Bandura 1986). Human capacity for foresight lessens the impact of present and past experiences in lieu of a desirable future. The concept of *vicarious learning capability* rejects the notion that humans learn primarily from their actions, and believes that humans learn from other people's experiences instead. *Self-regulatory capability* believes that individuals do not change their behavior depending on social preferences, but instead, have internal standards that they use to evaluate their own actions. *Self-reflective capability* posits that people reflect on their experiences and their thought processes, to derive knowledge about the world around them. This lets them evaluate and alter their own thinking.

HYPOTHESES DEVELOPMENT

SCT provides us with an appropriate framework to study our research question: why may some slum children engage in an activity that most other slum inhabitants consider fruitless, and disregard social convention in doing so? The answer may lie in the human capabilities that SCT defines.

First, slum children may use their symbolizing capability to generate innovative courses of action. Using symbols, they may be able to use imagine possibilities about the use of IT that they have not seen or heard about. This may lead them to see IT like those of us that are familiar with it do, or, more probably, they may imagine unlikely and fanciful possibilities of the technology beyond our expectations. They may then act on these conceptions (or misconceptions) that to others may seem irrational. Therefore, we arrive at our first hypothesis:

H1: Symbolizing capability is positively related to participation in IT learning

Second, slum children may use their power of forethought to imagine a desirable future. This desirable future may include more skills, expertise, higher socio-economic status, and voice. The child may imagine that some of these are possible through the new technology and unknown possibilities. These images of a desirable future may guide and motivate their present behavior to participate in the learning activities. Therefore, we arrive at hypothesis 2:

H2: Forethought capability is positively related to participation in IT learning.

Third, slum children may observe a few other slum children who learn IT skills and use them to express their creativity. They may also notice that these children gain respect in the community as a result. The slum children may use their vicarious capability to draw from these exemplars. Through social interaction they may learn about uses of IT by observing other slum children work on the computers and other media. This enables them to learn about complex subjects like IT when they have no chance of acquiring this knowledge spontaneously. This brings us to our third hypothesis:

H3: Vicarious capability is positively related to IT learning.

Fourth, the reason that some slum children do not follow the social order of the community may be due to their self-regulatory capability. Subjective norm or social norm (Ajzen 1985, Fishbein. and Ajzen 1975) of the friends and family of the slum children would pressure the children to avoid IT. The community at large may believe that it is not possible to learn about IT, and that even if some IT skills are learnt, it may not have any positive benefits. In the case of male children, families may believe that they are wasting their time with IT instead of helping out with housework and sharing the family burden. In the case of female children, the family may feel that they are violating social and religious customs and norms. These social norms may prevent them from engaging in the activities to learn about IT, as the theory of reasoned action and the theory of planned behavior may predict. However, self-regulating capacity may be the reason that some young slum children defy social norms to participate in the IT learning activities. Slum children have personal standards to which they hold their actions. This exercise of self-influence determines the course of the children's participation in IT learning.

H4: Self-regulatory capability is positively associated with participation in IT learning.

Fifth, environmental determinism would predict that slum children have low IQs and low academic achievement due to the poor health of their parents, the high levels of environmental toxins that they are exposed to during and after birth, and the sub-optimal resources and facilities that they have had access to in their formative years. Their challenge to learn IT would then become an uphill battle, with high probabilities of failure to comprehend the complexities of the new technology. Conditioning and associative learning would predict that these children would give up after the first few failed attempts, as they have put in a lot of time and effort, defied social norms, received no reward for their actions, and in fact, may have been punished by the frustration of failure. Self-reflective capability may indicate why some children persist even in the face of failure. This capability lets the children reflect on their actions, on the causes of their success or failure, and decide what needs to be changed on the next attempt, and whether it is worth investing more time and effort after a series of failed attempts. This brings us to hypothesis 5:

H5: Self-reflective capability is positively associated with participation in IT learning.

These hypothesis are represented in figure 2.

Figure 2: The Effects of Human Capabilities on IT learning
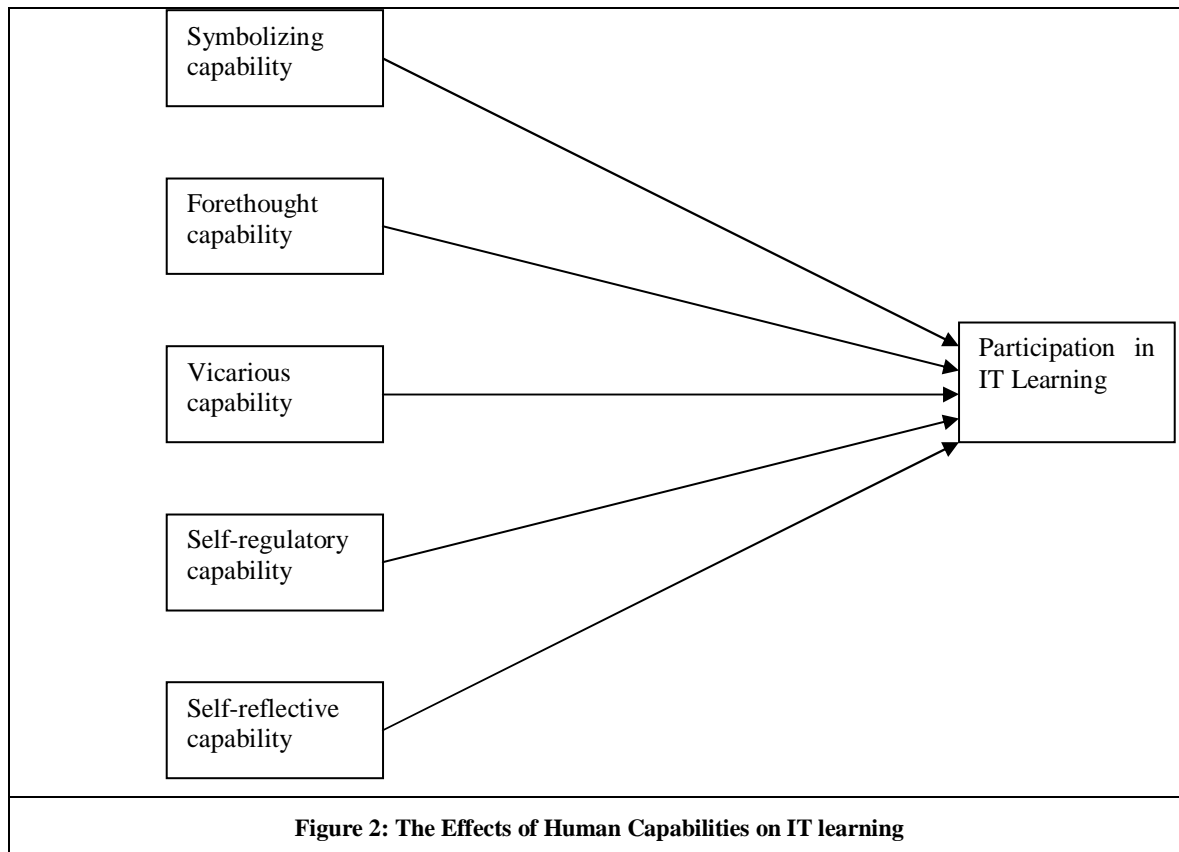
PROPOSED METHODOLOGY

This paper proposes to study the research model through an empirical survey of a sample consisting of slum children in settlements in New Delhi, India. These slums are the site of as a joint project between Sarai, a new media initiative of Centre for the Study of Developing Societies, and Ankur Society for Alternatives in Education, a Delhi-based NGO (Times of India 2004). The project is called 'CyberMohalla', which translates into 'cyber-neighborhood'. These are located in an illegal squatter settlement named Lok Nayak Jai Prakash (LNJP) Basti, a resettlement colony named Dakshinpuri, and in another illegal squatter settlement named Nangla Maachhi (Wikipedia, 2006). In 2006, the Government of India began displacing the Nangla Maachhi settlement. The Dakshinpuri settlement is legal; however, it is plagued by endemic poverty and violence, like the other two informal settlements (Sarai, 2006).

The project consists of five 'CompuGhars' (computer houses) or 'locality labs'. Each locality lab consists of three computers, portable audio recorders, cameras, and scanners. Around sixty children from these slums with no previous computer experience have used these labs to teach themselves IT skills to express their creativity, including basic webpage creation, blogging, maintaining audio and video archives, and short animation clips (Times of India, 2004). These children now report benefits of increased visibility in the community and internationally, increase in the respect of their peers and their elders, greater confident about their skills, and improved employment opportunities (Times of India, 2004). Their self-taught skills have garnered these slum children worldwide attention, including an invitation to demonstrate their creativity in Hamburg, Germany (Sarai, 2004). The increased visibility has even helped stay the Government of India from displacing their illegal squatter settlement (Nangla Lab, 2006). These are high achievements for slum children in the developing world. Therefore, they may have important benefits through their participation in the cybermohalla. At the community level, it may enable them to have voice that national policy makers and international organizations may hear. At the individual level it helps them develop skills, self-efficacy, confidence, and increases their status inside the community. It also may provide them with a social support network consisting of other slum children who participate in the cybermohalla as well as others in their virtual network outside their geographic region. This social support is critical as it provides vision and connects slum members to opportunities and resources. These slum children now have improved employment opportunities, and some have moved to better environments (Sarai 2006).

The results of the proposed empirical analysis should give some insight into the factors that distinguish between the slum children who have been able to empower themselves through IT and those that have not. This may be valuable in future initiatives for empowerment of slum children.

CONCLUSION

In this paper, we use SCT to study why children participate in IT learning in the absence of formal training courses. In doing this, we make the following contributions:

Research on information technologies for underserved communities is growing, but so far there is very little done in terms of theory building addressing the empowerment of slum children in developing countries through IT. This is a highly relevant topic, as the magnitude of the problem of slum dwellers is enormous, and is projected to grow rapidly over the next quarter century. In using SCT to study this issue, we bring in a broad framework to address the complexity of the issues involved.

In studying this issue, we see that the constructs used in user acceptance of IT literatures have limited utility in addressing the empowerment of slum children. For example, the TAM constructs of perceived usefulness and perceived ease of use assume some level of basic familiarity with computer technology. These assumptions do not hold when dealing with slum children, as these constructs make little sense to a slum child who has never touched or even seen a computer before. It would be irrational to assume that a child will have perceptions of ease of use of a completely alien technology. Here, we see that it is not perceptions of ease of use, but of imaginations of possibilities that actually play a part in whether these slum children participate in learning or not. We make a valuable contribution here by extending SCT to understand the dynamics of slum children learning about IT. Symbolizing capability enables slum children to imagine various possibilities of a technology that they have little to no comprehension of. Forethought capability allows them to envision a desirable future and work towards it, reflecting human aspirations to pursue dreams. Vicarious capability enables these children to learn about IT without formal training, and instead, learn about IT by observing others who use it. Self-regulatory capability allows these slum children to reject subjective and social norms and conventions and forge a new course for their lives, in spite of all the beliefs and evidence to the contrary all around them. Self-reflective capabilities allow the children to persist in the face of failure, changing their actions with the feedback they receive, to keep trying until they succeed. In doing this, we attempt to validate a theoretical basis for the human capabilities in slum children to overcome the forces of environmental determinism working against them.

We make a valuable contribution to the practice of empowerment through self-learning in IT. As the forces of environmental determinism are strong, it may not be enough to simply set up these labs and expect large numbers of slum children to benefit. Practitioners, therefore, also need to focus on addressing the capabilities of these children to overcome their debilitating environments and empower themselves through learning. The constructs used in this paper - symbolizing, forethought, visceral, self-regulating and self-reflecting capabilities provide a valuable guide to practitioners on where best to direct their efforts to increase empowerment.

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