Indian adaptation of Motivated Strategy Learning Questionnaire in the context of Hole-in-the-wall

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ABSTRACT

Research has indicated that Hole In The Wall Education Limited (HiWEL) learning stations provide an opportunity for children to pick up necessary skills to operate a computer and self-instruct themselves to learn new things on their own. This clearly indicates that children in the age range 8 to 14 years using HiWEL learning station are self – regulated learners. The very nature of the learning station encourages children to organize themselves and form groups to use the learning station. As there is no teacher/instructor at these learning stations, children are self – motivated to work at the learning stations. They decide when and how to use the learning station. They use meta-cognitive strategies such as elaboration, rehearsal, etc to work at these stations. The question now is to ascertain whether HiWEL learning station acts as a catalyst in increasing the self-regulatory behavior among HiWEL users.

This paper is an attempt to find out whether school-going children who are exposed to the HiWEL learning station are higher on self regulatory behavior as compared to school going children who are not exposed to HiWEL learning station. Though, this study is exploratory and is a smaller part of a larger study, yet the results are very encouraging and point in the direction that HiWEL learning station plays a vital role in enabling children to become self-regulated learners.

In this paper, due acknowledgement is given to 'Motivated Strategy Learning Questionnaire' (MSLQ) which has been adapted in the context of HiWEL Learning stations to measure self regulation among children. Interestingly, it also throws light on the fact that some parameters in self –regulatory are more prominent and these parameters are critical to a HiWEL users.

PRESENT SCENARIO OF ELEMENTARY EDUCATION IN INDIA

Education is important not only for the full development of one's personality, but also for the sustained growth of a nation. Elementary education is the foundation on which the development of every citizen and nation hinges. But making primary education available for all specially in a country like India with a population of about 1.28 billion (census 2001), has also been one of the major challenges for the Government. Moreover, the quality of elementary education in India has also been a major cause of worry for the government. In fact, making elementary education in India accessible, universal and relevant has been a goal since the eighth five-year plan (www.indiaedu.com).

Elementary education in India means eight years of schooling from the age of six. The government has made elementary education compulsory and free. But, the goal of universal elementary education in India has been very difficult to achieve till now. The Government has introduced many Programs like District Primary Education Program (1994) and Sarva Siksha Abhiyan or SSA (2001) to universalize and improve the quality of elementary education in India through community ownership of elementary education. It had set 2007 as the deadline for providing primary education in India and 2010 as the deadline for providing useful and relevant elementary education to all children in the 6 to 14 age group. Government has taken many initiatives such as Operation Blackboard (1987–88, Restructuring and Reorganization of Teacher

Education (1987), Minimum Levels of learning (1991), National Program for Nutritional Support to Primary Education (1995), District Primary Education Program (DPEP) (1993), Movement to Educate All (2000) and Fundamental Right (2001) to improve the quality of education in India.

Despite all the efforts by the Indian government, universalization of elementary education in India remains a distant dream. This is because of the persistent poverty and various prejudices prevailing in the Indian society. Lack of appropriate strategy or framework to provide quality elementary education to all children belonging to age group of 6 to 14 is not only dominant in India, but also in most of the countries of South Asia and Sub Saharan Africa. The 1990 Conference on Education for All pledged to achieve universal primary education by 2000. But in 2000, 104 million school-age children were still not in school, 57 percent of them girls and 94 percent were in developing countries – mostly in South Asia and Sub-Saharan Africa *(http://www.ceeindia.org/mdgs/goal_2.htm).*

Therefore, emphasis on primary education has been given high priority under the Millennium Development Goals by UNESCO. Millennium Development Goals set a more realistic, but still difficult, deadline of 2015 when all children everywhere should be able to complete a full course of primary schooling.

CHALLENGES IN PROVIDING PRIMARY EDUCATION TO ALL

Despite efforts to incorporate all sections of the population into the Indian education system, through mechanisms such as positive discrimination and non- formal education, large numbers of young people are still without schooling. Although, enrolment in primary education has increased, it is estimated that at least 35 million, and possibly as many as 60 million, children aged 6–14 years are not in school (Lall, 2005). Severe gender, regional, and caste disparities also exist. The main problems are the high drop-out rate, low levels of learning and achievement, inadequate school infrastructure, poorly functioning schools, high teacher absenteeism, the large number of teacher vacancies, poor quality of education and inadequate funds. Other groups of children 'at risk', such as orphans, child-laborers, street children and victims of riots and natural disasters, do not necessarily have access to schools (Singal, 2002).

School System in India

Interestingly, there is no uniform schooling system in India; children are channeled into private, government-aided and government schools on the basis of their family's economic conditions. At the top end are English medium schools affiliated to the upscale CBSE (Central Board of Secondary Education), CISCE (Council for the Indian Schools Certificates Examination) and IB (International Baccalaureate) examination boards, offering globally recognized syllabuses and curricula. Those who cannot afford private schooling attend English medium government-aided schools, affiliated to state-level examination boards. And at the lowest level are poorly managed Governments or Municipal schools, which cater for children from economically weaker sections of the society. Therefore, while education for all is safeguarded by the constitution, and a majority of people can now access educational resources, the quality of the education that young people in India receive varies widely according to their economic means and background, portraying a worrisome and problematic trend.

In India's 600,000 villages and multiplying urban slum habitats, 'free and compulsory education' is in fact basic literacy instruction dispensed by barely qualified 'Para Teachers'. The poor quality of these schools and their rudimentary physical and human infrastructure often lead to children dropping out of the school system without learning or continuing in it with limited learning.
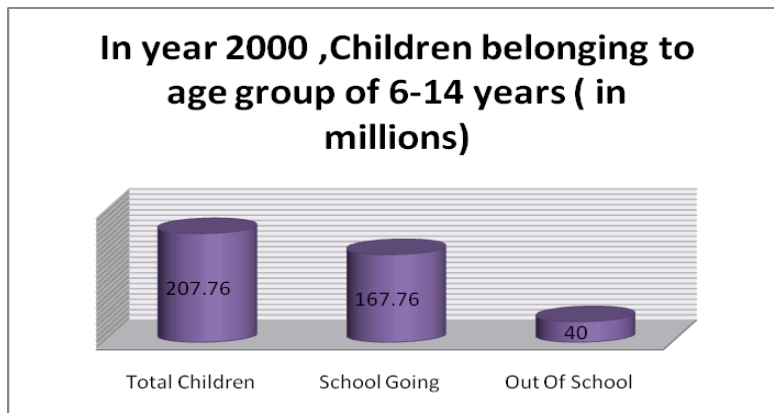
Figure 1: Out of school Children in India (Lall. M, 2005)

In India, there are approximately 207.76 million children (figure 1) in the 6-14 age group in 2000 out of which 40 million are not attending school (Lall, M, 2005). Those outside the school system are mostly girls, SC/ST children, working children, urban deprived children, disabled children and children in difficult circumstances. Providing access and motivation to these difficult to reach groups, without compromising on the quality of education is a challenge for the Government.

One of the reasons for this poor performance is the lack of motivation among the students 'to learn'. The low motivation level and the absence of any learning strategy among students keep them away from education. There seems to be a lack of 'self regulatory behavior' among children that leads to drop out from schools. This is supported by a survey conducted by 'The National Family Health' (NFHS-II), in 1998-99, which stated that one of the main reasons for students dropping out is their lack of interest in studies. This reason attributed to the 75% cases of dropouts.

ALTERNATIVE METHODS FOR ELEMENTARY EDUCATION:

Alternative methods for Elementary Education: All the developing countries have been following different strategies to find out alternative systems to provide elementary education to children. Despite all the efforts, the attainment of the objective seems difficult due to several factors like unawareness, poverty, lack of interest in the formal set up of schooling, lack of resources etc. So there has to be a model that not only imparts quality education but is also cost effective and self sustainable.

Devising an altogether different delivery mechanism is the need of the hour. The mechanism should be able to deliver the three fold objective of 'Universal Access, Universal Retention and Universal Achievement'. One of the mechanisms could be the ICT based education system. The ICT based educational infrastructure can be deployed in the communities and interactive educational contents can be provided to the children for use. The ICT based educational system has multi-faceted advantages that can help to remove the present hurdles like lack of schools, absenteeism of teachers, unaffordable school fees etc, of the traditional education system especially in the context of rural or remote areas.

One of the experiments that have shown significant results in non-formal education is the Hole-in-the-wall education (HiWEL) Model of education. The HiWEL model of education is ICT based

education system that allows the children in the age group of 8 to 14 years to access the educational content free of cost without any external supervision.

About Hole-in-The-Wall Education Limited

HiWEL is fully owned subsidiary of NIIT Ltd. and was established in 2001. HiWEL works with Government of states and centre, Non Governmental Organizations, Foundations, High net worth Individual and Corporate companies (CSR) to set up Hole-In-The-Wall Learning stations for underserved children in public places like schools, community halls, streets etc.

A typical HiWEL Learning station (LS) consists of two to four computers (depending upon the population of the location) mounted in a wall like setup facing outside at public places (figure 2). The computers are placed at such a height that it can be comfortably used by children only.

Figure 2: HiWEL LS, Nagaland

Since computers are mounted in the 'Hole' in a wall so it is called 'Hole-In-The-Wall' model of education. The Learning stations are fully equipped with educational content consisting of games and internet (depending upon resources available). The hardware like keyboard and mouse are proprietary and are robust in nature. The contents provided at the HiWEL LS are educational and cover subjects like Mathematics, Science, Social Science, English, Computer Literacy, and General Awareness etc for grades 1 to 12.

HiWEL Pedagogy: In a HiWEL LS children have free access to the content. The children use their own methods to explore the contents available at the LS as, there is no teacher available to teach the children visiting the LS. HiWEL LS pedagogy clearly established that, irrespective of background, children organize themselves into groups and are able to attain basic computer literacy (Dangwal et al, 2005; Inamdar 2004; Mitra 2003, 2004).

The pedagogy at these learning stations is called 'Minimally Invasive', as there is no adult intervention and children learn on their own (figure 3). This innovative methodology was first tested in a slum of kalkaji, New Delhi in 1999. The first adopter of the idea was Government of NCT of Delhi. At present, there around 500 learning stations in Asia and Africa.

As HiWEL LS has an unsupervised open environment, its dynamics are very different from that of a class room learning environment. HiWEL has not only devised a new approach to quality elementary education but moreover, has developed a discipline among its users for regulating their own behavior in terms of motivation and learning strategies.

Figure 3: An unsupervised open environment

Profile of HiWEL LS Users: HiWEL LS are placed in open public places to cater for the underserved children of the society. Most of the children visiting the LS belong to economically deprived sections of the society. Users of HiWEL LS includes children of street hawkers, rickshaw pullers, wage labors etc. Even some of the users work in tea shops, Beetle Shops or hotels. Few of the users were also found to be drug addict and prone to anti social activities.

Impact of exposure to HiWEL LS on users: HiWEL pedagogy uses the learning environment to generate an adequate level of motivation to induce learning in groups of children, with minimal, or no, intervention by a teacher. The learning environment of HiWEL provides an adequate level of curiosity that causes learning among the groups of children. The children's desire to learn, along with their curiosity and peer interaction, drives them to explore the environment in order to satisfy their inquisitiveness. As children explore new things, they relate their past experience with new one and new learning take place (Mitra, et al, 2005).

The children self-organize themselves in such a manner that they can visit the LS regularly and can learn new things on their own. It has been observed that a number of dropouts and out of school children have joined formal schooling. They try to visit the LS at least once a day or whenever they get some free time from their daily schedule (Dangwal, & Kapur, 2008) HiWEL LS is not only uplifting the educational level of the children but has also been impacting the 'motivation to learn'; in other words, it impacts self regulation.

SELF REGULATION

"Self-regulation underlies our daily decisions and long-term behavioral tendencies, when people make poor choices - for example about health, school, work, or relationships; it is usually because of a failure of self-regulation. With regard to early development, children who learn to control themselves and make good choices do better socially and academically than children who are overly angry, aggressive or impulsive." (Dr. Ponitz, Article by Todd Hoffman, 2009).

Self regulation can be defined in various ways but there are three components that seem very important for constitution of self regulation. The first component is students' metacognitive strategies for planning, monitoring and modifying their cognition. Second, students' management and control on their effort to perform on academic tasks. And, third important aspect of self regulation states that, children/student learn, remember and understand the system.

Self regulation of cognition and behavior is an important component of student learning and academic performance. According to Barry Zimmerman (1989), self-regulated learning involves the regulation of three general aspects of academic learning.

- First, self-regulation of behavior involves the active control of the various resources students have available to them, such as their time, their study environment (e.g., the place in which they study), and their use of others such as peers and faculty members to help them (Garcia & Pintrich, 1994; Pintrich, Smith, Garcia, & McKeachie, 1993).

- Second, self-regulation of motivation and affect involves controlling and changing motivational beliefs such as self-efficacy and goal orientation, so that students can adapt to the demands of a course. In addition, students can learn how to control their emotions and affect (such as anxiety) in ways that improve their learning.

- Third and finally, self-regulation of cognition involves the control of various cognitive strategies for learning, such as the use of deep processing strategies that result in better learning and performance than students showed previously (Garcia & Pintrich, 1994; Pintrich, Smith, Garcia, & McKeachie, 1993).

Hence, the term *self-regulated* can be used to describe learning that is guided by metacognition (thinking about one's thinking), *strategic action* (planning, monitoring, and evaluating personal progress against a standard), and *motivation to learn* (Butler & Winne, 1995; Winne & Perry, 2000; Perry, Phillips, & Hutchinson, 2006; Zimmerman, 1990; Boekaerts & Corno, 2005).

Dynamics at HiWEL learning station: Even though there is no teacher/facilitator, it is observed that slum children or children living in rural or semi-rural settings who have had no prior exposure to computers not only pick up computing skills but also acquire formal instructions. "……The results indicated that children were capable of browsing, playing games, painting pictures, chatting, e-mailing, constructing documents, and even acquiring formal instruction (Frontline/World, 2002; Education Guardian, 2000; Businessweek Online, 2000; Mitra, 2000, 2003;Wullenweber, 2001; Inamdar, 2004).

It has been observed that children self organize themselves in groups while working at the learning station(s). As these learning stations are placed in public playgrounds and are freely accessible by the children. Groups of children work together at these learning stations. According to Vygotsky (1978), "Learning process takes place in the presence of groups of children collaborating together." It was observed that social networking is a process of linking, that is, the way a child connects with another to create and construct a network or a social group that she/he can depend upon to acquire information, as and when she/he needs it. Interviews with children and sociometery (research in progress) has revealed that children often approach either peers, younger and/or older brothers and/or sisters, acquaintances, any one working on the computer at

that given point in time, or at times any person perceived as knowledgeable – one who has some knowledge about computers. With time the child working at the computer develops a structured network to obtain information and learn computing skills. Thus, development of social networking, where each child interacts with varied others and draws upon their knowledge – social, educational, informational, or emotional (Dangwal & Kapur, 2009).

"Hole in the wall" computers encourage the emergence of group processes or social networking and, this in turn enables the manifestation of learning methods and strategies used by groups of children to attain basic computing skills. The methods identified are primarily observation and modeling, trial and error, accidental discovery, and self discovery. Groups of children make use of these methods, singly or in combinations. The present research indicates the influence of social interaction and collaboration amongst children, and in turn on the cognitive development of children (Dangwal and Kapur, 2008).

Figure 4: A girl showing her peers the contents at HiWEL LS, Uttar Pradesh.

Here, the child is an active "maker of meanings" in such a fluid and non-formal learning environment. It is in this context, that HiWEL learning stations have a huge potential and can be used as an alternative to formal schooling (Dangwal, 2005). Children have free access to computers but they are not provided with any teacher, instead they learn by operating in groups i.e. learning through peers who, by trial and error and/or observation, construct knowledge about it. In other words, they learn by "collaborating or by shared cognition". [Bathla, G, 2002]. Secondly, the HiWEL environment encourages peer group learning, which enhances the level of aspiration (goal setting behavior) among children (Bathla, 2002; Cappelle, Evers and Mitra, 2004).

The learning environment is characterized by its absence from adult intervention, openness and flexibility. Children are free to operate the computer at their convenience; they can consult and seek help from any other child or other children, and are not dictated to by any structured settings. It is observed that children tend to rely upon themselves to generate the necessary learning environment, and to organize themselves for learning. (Mitra, 2004).

As result of the dynamic setting children resort to using various learning strategies and hence are prone to self –regulate their behavior and learning.

RATIONALE OF THE PRESENT STUDY

The present study is an attempt to inquire how a non-traditional education system like HiWEL learning station impacts 'Self Regulation' measured by 'Motivated Strategy Learning Questionnaire (MSLQ)' developed by Pintrich, Smith, Garcia, & McKeachie (1991) and the Adapted MSLQ developed in-house. The two tests were administered on a sample of 200 children in the age category of 10- 14 years to study its reliability and validity.

The study also examines any change in the self regulatory behavior of children exposed to HiWEL learning stations vs. children not exposed to HiWEL learning stations.

Flowing from the rationale, the present study has two primary objectives:

Objective 1: To validate the adapted MSLQ and original MSLQ such that adapted MSLQ measures self-regulatory behavior for HiWEL users.

Objective 2: To examine whether children using HiWEL learning station perform high on self-regulatory behavior than children not exposed to HiWEL learning station.

TEST TOOL

Motivated Strategy Learning Questionnaire[1]: Motivated Strategies for Learning Questionnaire (MSLQ) is an 81 item self-report instrument designed to measure college students' motivational orientations and their use of different learning strategies (Pintrich, Smith, Garcia, & McKeachie, 1991). The MSLQ instrument consisting of 81 items is divided into two broad section first, Motivation sections consisting of 31 items that assess students' goals and value beliefs for a course, their beliefs about their skill to succeed in a course, and their anxiety about tests in a course. Second learning strategies section consisted of 50 items regarding, students' use of different cognitive and metacognitive strategies, and student management of different resources.

MSLQ consists of 15 sub-scales, six within the motivation section and nine within the learning strategies section. The instrument is completely modular, and thus the scales can be used together or individually, depending on the needs of the researcher, instructor, or student. Table 1 shows the 15 sub scales that comprises the Original MSLQ.

The adapted MSLQ has been re-phrased without changing its essence and meaning. Also, the questions that were not applicable in the context of HiWEL LS have been removed. In the Adapted MSLQ, the first 31 questions belong to Motivation scale and rest 36 questions belong to Learning Strategies. The 15 sub scales with the corresponding number of items is presented in Table 2.

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[1] A Review of the Motivated Strategies for Learning Questionnaire, Anthony R. Artino Jr., University of Connecticut

Table 1: Scale and Sub Scales of Original MSLQ

Part 1: **Motivation Scales**		Part 2: **Learning Strategies Scales**	
Scale	# of Items	Scale	# of Items
1. Intrinsic Goal Orientation	4	1. Rehearsal	4
2. Extrinsic Goal Orientation	4	2. Elaboration	6
3. Task Value	6	3. Organization	4
4. Control of Learning Beliefs	4	4. Critical Thinking	5
5. Self-Efficacy for Learning & Performance	8	5. Metacognitive Self-Regulation	12
6. Test Anxiety	5	6. Time/Study Environmental Management	8
		7. Effort Regulation	4
		8. Peer Learning	3
		9. Help Seeking	4
Total Number of Items	31	**Total Number of Items**	50

Table 2: Distribution of Questions in the adapted MSLQ

MOTIVATIONAL SCALES	Items
Intrinsic Goal Orientation	4
Extrinsic Goal Orientation	4
Task Value	6
Control of Learning Beliefs	4
Self Efficacy for Learning & Performance	8
Test Anxiety	5
LEARNING STRATEGIES SCALES	
Rehearsal	4
Elaboration	4
Critical Thinking	2
Metacognitive Self Regulation	9
Time / Study Environment Management	7
Effort Regulation	4
Peer Learning	2
Help Seeking	4

Examples: Below are a few statements taken from Original MSLQ questions and Adapted MSLQ:

Original MSLQ Questionnaire:
Question1: In a class like this, I prefer course material that really challenges me so I can learn new things.
Question 2: If I study in appropriate ways, then I will be able to learn the material in this course.
Question 3: When I take a test I think about how poorly I am doing compared with other students.
Question 4: I think I will be able to use what I learn in this course in other courses.

Adapted MSLQ or HiWEL MSLQ:
Question1: At the computer (or Learning Station), I prefer content that really challenges me so I can learn new things.
Question 2: If I regularly use the computer (or Learning Station), then I will be able to become an expert
Question3: When I am working at the computer (or Learning Station), I think about how poorly I am doing compared to other children at computer (or Learning Station).
Question 4: I think I will be able to use what I learn from the contents of computer (or Learning Station) in my class.

METHODOLOGY

Objective 1: For validating adapted MSLQ and original MSLQ, a sample of 200 children from different HiWEL sites were taken belonging, to age range is 10 to 14 years. The questionnaire was filled-in by each respondent individually and her/his response was captured on a 5 point Likert Scale.

To capture the responses, there was a dedicated facilitator who took permission to administer the test both for HiWEL users as well as non-HiWEL users. Care was maintained to eliminate any bias while explaining to the children. The facilitator explained the statements as they were. The respondents took 15 to 20 minutes to answer the complete set of MSLQ questions and Adapted MSLQ questions.

Each point of Likert scale was assigned a weight corresponding to the response. Table 3 describes the weight assigned to the scales.

Table 3: Weightage assigned to the Likert Scale

Scale	Weight
Strongly Agree	5
Agree	4
Can't say	3
Disagree	2
Strongly Disagree	1

There were 7 items in the adapted MSQL which were reversely coded, these items were included to validate the other questions having similar objective. The scoring for reversely coded questions was done by subtracting the value of option chosen by the respondent by 6. After putting up the scores of all the items responded by the children, the six sub scales from Motivation Scale and 8 sub scale from learning strategies scale were analyzed separately.

Reliability:

To determine the reliability, the Split Half Reliability method was used and it has been observed (Table 4) that the reliability is very high. It is highly significant at .01 level.

Table 4: Split Half Reliability Test

		Adapted MSLQ 1st half	Adapted MSLQ 2nd half
Adapted MSLQ 1st half	Pearson Correlation	1	.981(**)
	Sig. (2-tailed)	.	.000
	N	105	105
Adapted MSLQ 2nd half	Pearson Correlation	.981(**)	1
	Sig. (2-tailed)	.000	.
	N	105	105

** Correlation is significant at 0.01 level (2-tailed).

To study the reliability, split half reliability was examined and it has been observed that the reliability is very high. It is highly significant at .01 level.

Validity: Construct validity was studied by examining the relationship between Original MSLQ and Adapted MSLQ. Pearson's correlation was examined and it was observed that there was very high positive correlation between the two tests. Pearson correlation = .961 significant at .01 level. The results are given in Table 5.

Table 5: Pearson's Correlation

		Original MSLQ	Adapted MSLQ/ HiWEL MSLQ
Original MSLQ	Pearson Correlation	1	.961(**)
	Sig. (2-tailed)	.	.009
Adapted MSLQ	Pearson Correlation	.961(**)	1
	Sig. (2-tailed)	.009	.

** Correlation is significant at the 0.01 level (2-tailed).

Objective 2: In order to study objective 2, a representative sample group of children were selected with due considerations for demographic and socio-economic variations. Two groups of children were undertaken namely:
1. Experimental group: This group consists of children using HiWEL Learning Station
2. Control group: This group consists of a comparable set of children from a nearby locality who do not have access to the learning station.

Research Tools: Original MSLQ and adapted MSLQ were used to capture and analyze the data for the research.

Data collection: The research design is based on performance of experimental and control group before and after installation of the Learning Stations. Data was collected for both the groups with help of above mentioned questionnaires. Control group was given the original MSLQ questionnaire while the experimental group was given the original as well as the adapted questionnaire. This gives a clear picture of the initial level of both the samples as it was necessary for the purpose of this report.

Then, the experimental group was given access to the learning station and after an gap of few months, data was collected again for both the groups with the help of the previously used questionnaires in the same respect.

Pilot testing: For analyzing the survey a total of 50 children from different HiWEL sites were taken belonging, to age group of 8 to 14 years. The questionnaire was filled by each respondent individually and her/his response was captured on a 5 point Likert Scale. Permission was sought from the users to conduct the survey. The respondents was given personal assistance to understand the questionnaire and each respondent took approx. 15 to 20 minutes to answer the complete set of adapted MSLQ questions.

FINDINGS AND DISCUSSION

The first question of the study concerned the relations between the motivational and self-regulated learning components; the results were generally as expected. Table 1 and 2 displays the stage 1 and stage 2, the zero-order correlations and summary statistics for the motivational and self-regulated learning variables.

1. **Control Group: Correlation Analysis:** As per Table 1, among all the parameters the top 3 correlations were observed between extrinsic goal orientation with self-efficacy, Intrinsic goal orientation with peer learning and finally between elaboration with time and study environment. The scores were r'=0.834, r''=0.67 and r'''=0.637 respectively. In compliance with data it was observed that extrinsic goal orientation and self-efficacy shared the strongest interdependent positive relation. The weakest of all interdependent relation was observed among test-anxiety with intrinsic goal orientation. It has a negatively relation, r = -0.26108. From the table, one can draw out the interdependency of one factor with other thirteen parameters. Table 6 comprises of results obtained from Stage 1 of the study.

Table 6: Stage1- Correlation between Factors

	int	Extr	Tskv	cont	slfef	tanx	reh	elab	crit	mcg	tsdy	eff	prlrn
Extr	0.629155												
Tskv	0.380164	0.489982											
cont	0.473493	0.404954	0.541679										
slfef	0.666602	0.834759	0.416908	0.480236									
tanx	-0.26108	-0.07886	0.090151	-0.11191	-0.09468								
reh	0.155014	0.097596	0.459254	0.343685	0.099929	0.245461							
elab	0.625109	0.71357	0.533045	0.48842	0.558549	-0.06683	0.302068						
crit	0.446142	0.463842	0.345102	0.331134	0.362739	0.327466	0.376834	0.476104					
mcg	0.202253	0.147859	0.258819	0.197583	0.086002	0.302548	0.11085	0.407311	0.173924				
tsdy	0.526354	0.665736	0.166831	0.338424	0.622482	-0.00826	0.089527	0.637391	0.38159	0.16949			
eff	0.310278	0.535172	0.466672	0.15327	0.5656	-0.07035	0.057173	0.309033	0.31406	0.014789	0.18893		
prlrn	0.670557	0.57857	0.356044	0.414955	0.523912	-0.0757	0.054621	0.52498	0.309073	0.412807	0.363133	0.350781	
Hsk	-0.00967	0.342285	0.509022	0.324647	0.332869	0.198315	0.2204	0.121954	0.454398	0.069713	0.012052	0.535455	0.206653

Note: Intr: Intrinsic Goal Orientation
Extr: Extrinsic Goal Orientation
Tskv: Task Value
Cont: Control Beliefs about Learning
Slfef: Self-Efficacy for Learning and Performance
Tanx: Test Anxiety
Reh: Rehearsal
Elab: Elaboration
Org: Organization
Crit: Critical Thinking
Mcg: Meta-cognitive Self-Regulation
Tsdy: Time and Study Environment
Eff: Effort Regulation
Prlrn: Peer Learning
Hsk: Help Seeking

The result obtained in second stage is interesting. It corroborated the findings of stage 1. From Table 2.0, it can be observed that strongest correlation exists between extrinsic goal orientations with self-efficacy r = 0.72. The next two strongest interdependent relation exists between intrinsic goal orientation with self-efficacy and control of self-beliefs with self efficacy with r' =0.617 and r" =0.57 respectively. In Stage 2, self-efficacy emerged as one of the most important parameters. However, the least interdependent parameters observed were intrinsic goal orientation with help-seeking with r = -0.331.

Table 7: Stage 2- Correlation between Factors

	int	Extr	Tskv	cont	slfef	tanx	reh	elab	crit	mcg	tsdy	eff	prlrn
Extr	0.461032												
Tskv	0.348637	0.445321											
cont	0.48668	0.462287	0.490655										
slfef	0.617609	0.720401	0.471886	0.572921									
tanx	-0.12253	-0.10134	0.141714	-0.05986	-0.21627								
reh	0.028013	0.092884	0.126204	0.127369	0.029475	0.294045							
elab	0.305489	0.446569	0.557855	0.460024	0.422598	0.084445	0.339593						
crit	0.12502	0.095306	0.082001	0.24255	0.007129	0.498335	0.427283	0.445604					
mcg	-0.17145	-0.192	0.084444	0.035624	-0.19747	0.328471	0.036042	0.140531	0.062344				
tsdy	0.494133	0.615416	0.342702	0.365002	0.382377	0.041823	0.19557	0.499559	0.30943	-0.12763			
eff	0.124306	0.484035	0.473152	0.334275	0.480275	-0.07041	-0.24016	0.161455	-0.12864	0.079701	0.04984		
prlrn	0.151266	0.390934	0.239673	0.055947	0.45869	0.081953	-0.13503	0.2202	0.122996	0.401007	0.045581	0.512703	
Hsk	-0.33126	0.241537	0.279626	0.19379	0.039456	0.191903	0.124926	0.350089	0.439535	0.14177	0.040822	0.335252	0.228994

2. **Experimental Group: Correlation Analysis:** According to Table 3, the best three correlation exists between intrinsic goal orientation with control of self-belief, critical thinking with meta-cognitive self regulation and extrinsic goal orientation with task value. The values for each of them are r =0.582, r' =0.565 and r" =0.557 respectively. The weakest interdependence was observed among control of self belief and help seeking, coefficient of correlation r = -0.626.

Table 8: Stage1- Correlation between Factors

	int	Extr	Tskv	cont	slfef	tanx	reh	elab	crit	mcg	tsdy	eff	prlrn
Extr	0.128757												
Tskv	0.040457	0.557415											
cont	0.582274	0.178897	0.346817										
slfef	0.399139	0.34598	0.492598	0.544205									
tanx	0.109157	0.310989	0.312563	0.375009	0.171443								
reh	0.202809	0.316463	0.306368	0.383864	0.415451	0.157638							
elab	0.191526	0.017171	-0.0177	0.298945	0.329499	-0.03585	0.351512						
crit	0.402587	0.022563	0.158203	0.340394	0.151268	0.033919	0.245606	0.509116					
mcg	0.390781	0.106616	0.103047	0.271633	0.286478	-0.03449	0.303055	0.399933	0.565492				
tsdy	0.165706	0.128511	0.001621	0.379825	0.259778	0.210171	0.360258	0.373649	-0.11689	0.025046			
eff	-0.09735	0.047763	0.127593	-0.4641	-0.15194	-0.60784	-0.07032	-0.2127	0.052929	-0.1101	-0.16812		
prlrn	-0.28178	-0.00242	-0.01122	-0.12342	-0.13898	0.301448	-0.1981	-0.16729	-0.27279	-0.31783	0.100617	0.047215	
Hsk	-0.25702	-0.07761	0.061562	-0.62694	-0.28673	-0.22383	-0.00137	-0.24714	0.010626	0.096781	-0.37321	0.55306	0.081555

Another correlation table was formulated for Stage 2 (termed as Table 4). Here, the strongest correlation was observed among efficacy and help seeking with coefficient being r =0.674. The second strongest was among intrinsic goal orientation and control of self belief with r =0.61. And the third best was extrinsic goal orientation with task-value where r =0.563. This observation did prove to be a big step in realizing our purpose of the study. This indicates that some external factor in the environment is effecting more than the internal factors in an individual.

Table 9: Stage 2- Correlation between Factors

	int	Extr	Tskv	cont	slfef	tanx	reh	elab	crit	mcg	tsdy	eff	prlrn
						Correlation between factors							
Extr	0.095272												
Tskv	-0.02149	0.563406											
cont	0.610027	0.001916	0.19985										
slfef	0.338258	0.38957	0.41236	0.339084									
tanx	-0.02285	0.179074	0.209149	0.226746	0.008807								
reh	0.369684	0.235752	0.025634	0.447341	0.180255	0.258853							
elab	0.332365	0.04717	-0.09993	0.190225	0.148129	-0.19447	0.210452						
crit	0.288741	0.24665	-0.00739	0.474089	0.138661	0.190301	0.468069	0.355846					
mcg	0.37119	0.131697	0.060285	0.210703	0.310113	-0.1951	0.094999	0.491997	0.373694				
tsdy	0.003641	0.064356	0.083092	0.256273	0.297016	0.129916	0.194537	0.283454	-0.07801	0.0687			
eff	-0.03634	-0.31215	-0.35529	-0.1763	-0.41694	-0.48453	0.062429	0.210012	0.169764	0.023746	-0.24224		
prlrn	-0.49813	-0.19795	-0.1069	-0.14263	-0.01014	0.318711	-0.21603	-0.03484	-0.11976	-0.3442	0.245341	-0.05833	
Hsk	-0.04343	-0.05943	-0.1264	-0.3251	-0.11201	-0.45463	-0.01472	0.422654	0.151609	0.355384	-0.24666	0.674102	-0.218

In the above analysis, it is clear that certain parameters are strongly interdependent. The change in value of one will affect the other value. The findings in Stage 1 are similar to findings in Stage 2 i.e., the two parameters which were strongly interdependent in Stage 1, strongly correlated in Stage 2 with supported evidence. If any of the parameter increased, the other parameter increased proportionally. This was evident in both control and as well as experimental group.

3. Overall:

Table 10: Control group (original MSLQ) – Stage 1 vs. Stage 2

Factors	Stage 1 of CG	vs.	Stage 2 of CG
Int	13.52		14.52
Extr	13.88		15
Tskv	20.68		21.04
cont	12.56		13.36
slfef	27.04		28.4
tanx	14.4		14.12
reh	13.44		14.04
elab	18.12		20.28
crit	15.4		16.72
mcg	37.28		39.44
tsdy	24.96		27.44
eff	12.56		13.6
prlrn	9.2		10.4
Hsk	12.32		13.44
Total	245.36		261.8
Percentage	60.58272		64.64198

The respective mean of each parameter is calculated as per the number of components each parameter had in questionnaire. It is evident from the table that there is an increase in self-regulation. There has been an increase of 4% approximately after an interval of one month.

Table 11: Experimental group (original MSLQ) – Stage 1 vs. Stage 2

Factors	Stage 1 of EG (Original)	vs.	Stage 2 of EG (Original)
Int	17.32		18.04
Extr	17.64		18.16
Tskv	26.36		26.68
cont	15.72		16.44
slfef	33.08		33.88
tanx	18.8		20.72
reh	17.52		18.04
elab	21.36		25.56
crit	16.08		19.52
mcg	38.16		50.96
tsdy	29.4		29.68
eff	11.24		15.08
prlrn	6.4		9.96
Hsk	14.24		16.28
Total	276.92		309.04
Percentage	68.37531		76.30617

As performed in case of control group, similar procedure was applied here. The mean of every parameter was calculated as displayed in the above table. It is evident from the above table; the increment in the overall percentage of self-regulation in case of experimental group is 8%. The important thing to remember here is that these respondents were those who had an exposure of HiWEL learning station. If we examine each parameter, there are some parameters that seem to have experience an exponential growth in comparison with other parameters. These are:
1. Critical thinking: Experienced an increment of 3 points.
2. Elaboration: Experienced an increment of 4 points.
3. Meta-cognitive self-regulation: Experienced an increment of 12 points.
4. Efficacy: Experienced an increment of 4 points.

Table 12: Experimental group (Adapted MSLQ) – Stage 1 vs. Stage 2

Factors	Stage 1 of EG (Adapted)	vs.	Stage 2 of EG (Adapted)
Int	12.2		12.8
Extr	17.4		17.52
Tskv	26.92		25.48
cont	17.4		16.32
slfef	18.44		30.68
tanx	18.52		18.04
reh	15.2		14.24
elab	17.32		17.76
crit	5.16		8.36
mcg	21.48		29.48
tsdy	25.44		26.64
eff	14.32		15.2
prlrn	7.84		8.56
Hsk	9.08		13.48
Total	226.72		254.56
Percentage	67.67761		75.98806

These set of calculations were carried out on the adapted version of original MSLQ (motivated self learning questionnaire). The results obtained here are quite encouraging and support the claim of learning station as a catalyst to increase self-regulation. As incase of original MSLQ, here also the rise in self-regulation was noticed. The increment was observed to be 8% after an interval of one month. The most interesting thing here to be noted is the increase in individual parameters. As original MSLQ, some of the parameters rose tremendously in comparison with others. They are:

1. Self-efficacy: Experienced an increment of 12 points.
2. Meta-cognitive self-regulation: Experienced an increment of 8 points.
3. Critical thinking: Experienced an increment of 3 points.

Another interesting fact that was observed was the similarity in the factors that increased tremendously in original MSLQ and adapted MSLQ.

The results from the study reveal that, students have self-regulation and it varies from individual to individual. According to the analysis, it is evident that students who are exposed to HiWEL learning stations tend to have higher level of self-regulation than those who have not been exposed to the learning stations. Although, the increase in self-regulatory behaviour was observed in both the control as well as the experimental group, however, the difference is observed to be more in the experimental group. This increase can be attributed operating at the HiWEL learning station.

From the above data it is also evident that out of all the parameters, Self efficacy, Meta-cognition and critical thinking play a critical role in self regulatory behavior among HiWEL users. Let us examine each of the three parameters and the role of HiWEL learning station.

Bandura (1986) stated that *self-reflection* plays a critical role in the social cognitive theory. "….Through self-reflection, people make sense of their experiences, explore their own cognitions and self-beliefs, engage in self-evaluation, and alter their thinking and behavior accordingly…" And out of all factors that affect human functioning, *self-efficacy* beliefs plays a prominent role. Self-efficacy is "people's judgments of their capabilities to organize and execute courses of action required attaining designated types of performances" (p. 391). Self-efficacy beliefs provide the foundation for human motivation, well-being, and personal accomplishment. This is because unless people believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of difficulties. Much empirical evidence now supports Bandura's contention that self-efficacy beliefs touch virtually every aspect of people's lives— whether they think productively, self-debilitatingly, pessimistically or optimistically; how well they motivate themselves and persevere in the face of adversities; their vulnerability to stress and depression, and the life choices they make. Self-efficacy is also a critical determinant of self-regulation (Bandura, 1977).

Not only this, but people form their self-efficacy beliefs through the *vicarious experience* of observing others perform tasks. And, it is observed that at these HiWEL learning stations, a lot of learning that happens is vicarious, by observing others.

The second important parameter observed is 'Metacognition'. According to Flavell (1976), Metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them, e.g., the learning-relevant properties of information or data. For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact." (p 232).Metacognition has to do with the active monitoring and regulation of cognitive processes. Metacognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. Planning the way to approach a learning task, monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are metacognitive in their nature. Similarly, maintaining motivation to see a task to completion is also a metacognitive skill. They are self-regulated learners who utilize the "right tool for the job" and modify learning strategies and skills based on their awareness of effectiveness. At HiWEL learning stations, children learn observe their own behavior while working at the station. They are able to figure out pieces of content that will require help versus content that they can easily play. As stated earlier, after a few rounds of trial and error … "*the child makes the connection between what he did and what appeared on the screen. The child repeats the action deliberately, either immediately or after a time lag to get the same outcome*" (Dangwal & Kapur 2009). Then comes the stage of self-discovery, wherein, "*there is progression from a state of "I do not know" to "I know something" to "I want to learn more*." There is a gradual crystallization of learning (Dangwal & Kapur 2009).

As stated by Dangwal & Kapur (2009), learning at MIE LS indicates the social aspect of situations (Lave, 1991)……….. "*the cognitive as characterized by a triggering context which has novelty and interest, leading to the form of exploration and exchange of ideas and information, showing the path to connections and associations, rehearsal and "stamping in" of the relevant responses and integration of learning*".

Lastly, the third parameter that appeared very important is critical thinking. Critical thinking is the ability to think clearly and rationally. It includes the ability to engage in reflective and independent thinking. A critical thinker is able to deduce consequences from what he knows, and he knows how to make use of information to solve problems, and to seek relevant sources

of information to inform himself. Interaction that arises in the course of such activities provides a context for social and cognitive learning (Brownell & Carriger, 1991; Resnick, 1991).

Fig 5: Tamanna working at the Learning station

Learning at HiWEL stations confirm the view that young children learn most efficiently when they are engaged in interaction, rather than in merely receptive or passive activities, as has been observed in formal schooling practices (Dangwal & Kapur, 2009).
As independent learners, they are able to gauge and introspect their own shortcomings and seek help when required. Tamanna who is a HiWEL user had dropped out of school at a very early age. She started using HiWEL Learning Station and is now one of the frequent users. According to her, "*I started with alphabets and now I can frame sentences, point out noun, pronoun, tense etc. I also like Math and can solve basic equations.*"

From the analysis of data captured from survey it was found that children practice meta-cognitive self-regulation, critical thinking and efficacy to increase self-regulation. It was observed that the children who spend more time in the HiWEL LS are found to be more self regulated than those who do have access to the HiWEL learning stations.

SUMMARY

The results of this study have proven the effectiveness and utility of HiWEL LS. It indicated the impact of HiWEL learning station in the behaviour of a child in a short span of time. This study was conducted only keeping an interval of one month before taking second observations. Yet the results and findings look highly promising and encouraging. If given proper time, undoubtedly learning station can yield unprecedented results at an optimal cost. Keeping this in mind, we shall be conducting this research for a year.

HiWEL learning station is setting up a perfect example how technology can be utilised in the education sector. It is not only cost convenient but has multi utilities. It can be set up in far flung areas of India where setting up school is a huge challenge. And, is also an answer to the shortage of teachers all over in India.

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