

Synthetic Reaching-Learning Model: A Contextualized Study

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Abstract: This research study examines the possible implications of the constructivist model in the education system in Pakistan and particularly in the Province of Sindh. The study is based on the professional development program implemented by US-AID in Sindh, which is aimed at changing the teacher-centered pedagogical strategies. The current Teaching Learning practices deposit knowledge in the mind of the learner is just as person depositing money in a bank account. Interactive teaching and learning and other participative cognitive approaches are missing. In this study the prevailing learning-teaching practices in Pakistan are analyzed. The analysis is done to determine the causes of deterioration in the quality of education, and to develop an alternative learning model based on Neo-Piagetian-Constructivism. The three learning theories which have been evolved over the years namely the behaviourist, the cognitive and the constructivist are also discussed in comparison to each other. The paper suggests a paradigm shift needed from the directed model (Passive learner) to the constructivist model (Active learner). Moreover, the study identifies the mindset prevailing amongst the teachers, teacher educators and within professional development infrastructure as the core hindrance in the path of desired transformation. Accordingly, taking all aspects into consideration a synthetic model has been designed for application in Pakistan. This model has the special advantage of integrating the semiotic model with the constructivist approach using tools of information technology. The synthetic model presented in this paper assumes that (a) a smooth transition from teacher centered model to learner centered model (b) course content and curriculum of Education Colleges/Institutes will have to be altered to accommodate the constructivist approach (c) in-service teachers have to go through a cycle of training for using the tools of technology in the teaching-learning process (d) technology based resource rooms are to be established in educational institutions (e) existing curriculum is to be transformed into model lesson plans for training of teachers, (f) partnership of public and private sectors in the implementation process will be needed.

Background of the Study

In Pakistan, despite the unprecedented achievements in various sectors of economy, education is still confronted with serious challenges. The efforts made to identify the root cause of the poor quality of instructional programs at all levels of education have been consistently failing. This paper endeavors to critically analyze the problem and recommend a learning-teaching process for improving the quality of education.

The learning and teaching process is a central issue in maintaining the quality of education. The process has three subsets: a) Curriculum, b) Teaching Method c) Assessment. In the present educational training, the teacher is essentially trained to impart instruction within the frame-work of curricular content, supported by textbook materials. This scheme of learning and teaching has a number of limitations as it does not promote critical thinking skills in the students (Hoodbhoy, 2004).

It is necessary to bring into focus two teaching-learning theories namely; the behaviorist and the constructivist. For last two decades, the constructivist model has dominated the learning-teaching processes as has been promoted by the cognitive path of Dewey and Piaget. Seymour Papert, Jerome Burner and Howard Gardner have further fortified the constructivist model, in various forms, which was originally proposed by L.S. Vygotsky and Jean Piaget (Woolfolk, 1998). For ease of discussion the characteristics of the *directed or behaviorist model* and the *constructivist model* (as presented by Elliott, Kratochwill, Littlefield, 1996) is summarized in Table 1.

Table 1 What does Directed and Constructivist Model Mean

Directed Model	Constructivist Model
Teaching using sequential methods	Learn through self- experimentation
Prepare tests derived from skills learned	Pursue global goals that specify general abilities
Stress individualized work over group work	Focus more on group work
Traditional methods like lectures, worksheets and tests	Alternative learning: portfolios, open-ended questions, research, etc

Education Reforms

It is extremely essential to address the modern-age changes in the social context of Pakistan. The fact that the constructivist model is best suited for facilitating the learning process is becoming increasingly obvious. The model also accounts for the care to be taken in view of the cultural diversity prevailing in developing countries (Burbules & Callister, 2000). In fact, the growing influence of information technology and its application into the daily life has increased the importance of the constructivist model and its ascendance almost on a global scale, in the educational institutions.

It is important to examine the constructivist model and its implications to the education system in Pakistan, which relies heavily on teacher-centered approaches (Hoodbhoy, 2004). To keep pace with either with the cognitive approach or the interactive method it has become crucial that we adopt tools of technology in our education (Coe, 1996). In this paper a learning model based on Neo-Piagetian-Constructivist design for application in Pakistan is presented along with a discussion on the causes of the deteriorating quality of education.

Traditional Approaches and Practices

Of the two approaches, the behaviorist and the constructivist, the former enjoys dominance over the later in Pakistan. The present teaching learning approaches in Pakistan are based on the notions of behaviorism. This behaviorist approach, in contrast to the constructivist theory of learning focuses on behavior changes in a desired direction and undermines the ability of the mind to be conscious of the reality in its own way. In the teaching learning process the desired set of behavior is strengthened through reinforcement through different types of evaluation. Thus, the individual responses towards the stimuli present in the environment are not allowed to attain a form that deviates from the norm or standard (Eggen, Kauchak, Harder, 1979).

Moreover, the student's mind in this process is required to accumulate knowledge of the natural world as transmitted by the teacher without contextualizing it in individualistic terms. Therefore it relies on a transmission, instructionist approach which is largely passive, teacher directed and controlled. It has an objectivist belief in the existence of reliable knowledge as being "out there" in the phenomenal world, which is to be transmitted to the learner. The goal of the learner is to receive knowledge, and that of the educators is to impress and transmit the knowledge.

This approach has resulted in producing people who cannot think and cognize beyond what they have learned and are trapped in the stringent limits of learned behaviors towards the situation they confront. They are the copies of a prototype that is unable to deal with the new challenges. The traditional approach of teaching that heavily depends on textbooks, is the only means of understanding the structure of the reality, and limits the possibilities of existence to a minimum.

Experimentation
Specify general abilities
Work
Portfolios, open-ended questions,

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(Jalalzai, 2005). Thus the idea that there is a fixed world of knowledge which the student must come to know, by dividing information into parts and then build the same, into a whole concept should be disregarded. Because of this limited approach, students are not allowed to initiate questions, think independently and interact with their teachers and other students.

According to Hoodbhoy, the behaviorist approach has the following limitations:

"Learner is a tabula rasa; Learner is passive; Learners' task is to accumulate knowledge of fixed objective reality; Teacher is simply a transmitter of information; Learning is only an assimilating process of objective reality; Teachers interpret events for students; Learner is merely to replicate the contents in his thinking; Cognitive processes are not catalyzed; Learner is not exposed to the thoughts associated with the information provided by the teacher" (Hoodbhoy, 2004).

In addition to these limitations there are certain weaknesses in the system of education that further aggravates the situation. These include;

teacher absenteeism; inadequate school environment; ill prepared teachers; de-linked curricula; badly written and shabbily printed textbooks; defective assessment procedure; lack of accountability; little understanding of the educators about the importance of integrating technology in education; a flawed planning process; and much more (Jalalzai, 2005).

The education system in Pakistan has little chances of producing quality man power. The scientific and technological knowledge expansion demands drastic changes. A system which promotes creative thinking is required for facing global challenges and for the development of a strong knowledge base.

Synthetic Model of Learning for Pakistan

Educators globally (Aldrich, Rogers & Scaife, 1998; Coe & O'Neill, 1999; Jones & Moreland, 2003) noticed a major paradigm shift from the behaviorist model. The paradigm shift changed emphasis from the observable external behavior towards meaning, representation and thought. This paradigm shift caused the emergence of constructivism that takes a more encompassing cognitive approach. This change in emphasis from the observable behavior towards the cognitive processes implies drastic changes in the ways in which knowledge is conceived and acquired. Constructivism has an altogether different view of the types of knowledge, skills and activities to be emphasized, the role of the learner and the teacher, and, among others, how goals are established. All these factors are articulated in the constructivist perspective. Over the last two decades several variants of constructivist design have emerged on the basis of intense research activities. Yet, this paper relies only on those elements of constructivist design which have been commonly agreed upon and have considerable merit for application in Pakistan.

In the constructivist design there is a general agreement, for example, on the role of teacher and the learner. The teacher is conceived to play the role of "midwife in the birth of understanding" as opposed to being a "mechanic of knowledge transfer" (Von Glasersfelds, 1995). *The role of a teacher is not to dispense knowledge but to provide students with opportunities and incentives to build it up* (Von Glasersfelds, 1996). Teachers are described as "guides" and Learner as "sense makers". In Greene's (1995) view, teachers are coordinators, facilitators, course advisors, tutors or coaches. These aspects of constructivism lead us further to analyze: a) The learning cycle, b) the role of the teacher and, c) the role of the student. In addition, it seems

necessary for quality assurance to set norms and standards for teachers and students technology is to be integrated in education.

The current status of various learning theories reviewed in the preceding paragraphs, *vis-à-vis* the role of the teacher and the student brings out clearly, as also exemplified by various research studies carried out on this subject that the cognitive theory of Piaget as further fortified by constructivists (Neo-Piagetian) is the theory of choice for delivering curriculum to students of the new millennium. This is also true of Pakistan as a case.

Given the existing situation of constraints prevailing in the country, it doesn't seem possible to apply the constructivist model as such to Pakistani education system (Hoodbhoy, 2004; Jalalzai, 2005). Presently, the formal system of education is fully subservient to the directed model of learning in which instruction is teacher centered. The student only plays a passive role. In-service and pre-service teachers are least prepared for the use of technology in education (Shaikh, 2004a, 2004b). The classroom environment is grossly inadequate. The funds are limited. Research studies on the use of technology in education in our context are limited. There is no established institution in the country to undertake this task. The existing curriculum wings with federal and provincial ministries are unaware of the advances made in curriculum development. Under these circumstances the only path to reformation of education process lies in adopting a model of learning which utilizes the existing capabilities of teachers, and is partially strengthened with constructivist approaches for application of technology in education (Brady, 1985; Joyce, Weil & Calhoun, 2000). This approach is used to develop a synthetic model of learning which takes into combinations the more relevant and effective theories of learning, that is, the behaviorist, the cognitive and the constructivist. It was done for making the teaching-learning process more practical, pragmatic and cost effective.

The behaviorist model relies on "stimulus-response". This part of behaviorist theory cannot be ignored in any design of teaching and learning. The learning of a newborn child, for example, is directly related to physical stimuli impinging upon his neural network from environment. This process continues through out life. This axiomatic approach of behaviorists is the mainstay of teacher centered curriculum delivery in Pakistan. This is partly reminiscent of the Socratic-Platonic educational philosophy.

Piaget's cognitive model approaches learning process on a more scientific basis, which has its roots in human psychology and natural cognitive abilities through evolutionary associations of neurons. The various stages assumed in cognitive development are age dependent. For example, four stages have been identified in linear cognitive progression. First: age, birth to 2 years, in which the cognitive part is essentially sensory-motor. The child through physical interaction with his environment builds his own concepts about reality. Second: age, 2-7, is a preoperational stage in which the *tabula rasa* gradually becomes a subject of physical permanence through association of concepts with reality. Third: age, 7-11, the concrete stage in which there is a rapid increase in cognitive ability supported by identification of objects, memory and expression through language. Finally the fourth stage, age 11-15, presents a formal operational stage in which he begins to appreciate the process of the external world and develops through a varying extent the analytical ability. It has been recommended that curriculum should be structured in conformity with the four stages of cognitive development (Woolfolk, 1998).

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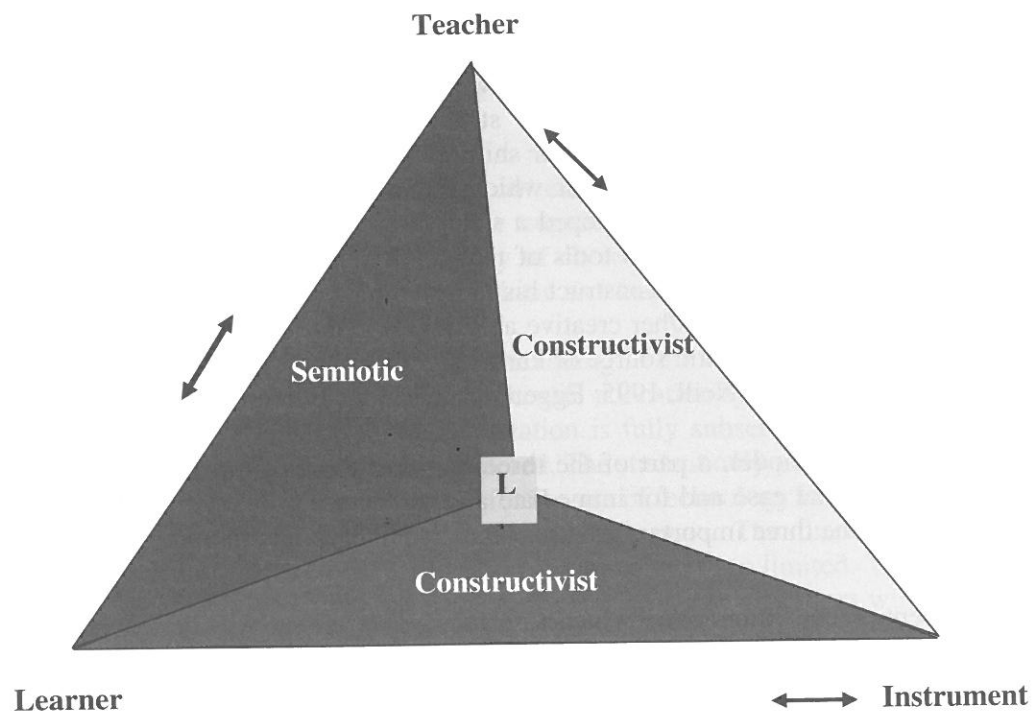
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There is, however, a caveat in Piaget's cognitive plan. This warning relates to the cognitive abilities allocated to various age groups. With the advancement of technology, past the Piagetian period, the present day child is exposed to new stimuli of information through audio-video media. This exposure has brought about a major shift in the age related cognitive processes of the child. This in particular is the theme on which the constructivist structure is designed. Accordingly, the constructivists have developed a scheme of learning in which child from the early stage of development is exposed to tools of technology. According to constructivists the technology tools enable the student to construct his/her own ideas about the concepts contained in the course content and sharpen his/her creative abilities. It is through this process that he/she begins to see the world not as a static source of knowledge but as a contributor to the change of world around him/her (Coe & O'Neill, 1995; Eggen, Kauchack & Harder, 1979).

In preparing the synthetic model, a part of the three learning theories has been synthesized in order to achieve operational ease and for immediate and maximum utilization of the abilities of our existing teachers. The three important features taken from these theories are:

- direct student-teacher interaction which to a reasonable extent will be teacher centered (directed teaching , stimulus response)
- cognitive abilities as envisaged by Piaget but accelerated through exposure to information provided by multimedia
- the use of technology in education as propounded by the constructivist in the process of delivery of curriculum

Based on these three components the proposed synthetic model is schematically shown in following figure (Qazi 2007).



**Proposed Teaching Learning Process for Pakistan
(Synthetic Model)**

Features of this Model are

It's a Teacher-centered instruction but students are active participants and are shown as direct teacher-student interaction, where instruction is based on clarification of concepts through the use of hypermedia. This is shown as teacher-instrument interaction. In this part of the scheme the explanation offered for any concept are to be coupled with various unsolved problems for which the students will seek solution. Such materials will be available in the Server during and beyond the time of the class, for example, in the resource center.

The use of tools of technology by the student is student-technology interaction related to the course content, problem solving or new contents beyond the course out line (web-based). This assumes the fact that our teachers have full mastery over course contents.

No change in curriculum is envisaged at this stage. Curriculum development is an evolutionary process depending upon expansion of knowledge and societal needs. This will take its own course.

In order to achieve positive results in terms of quality of education, the technology tools listed below must be associated with the teaching-learning process:

- (a) *Hardware in the form of computers*
- (b) *Various software's*
- (c) *Printer*

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- (d) Resource room equipped with all the material listed for use by students at various hours of school day
- (e) Multimedia or Overhead projector (optional)
- (f) Internet & Intranet connection

The assessment scheme in the synthetic model is built into the student-teacher interaction based on observations by teachers during group discussion, individual problem solving, assignments and to a limited extent self assessment.

Conclusion

Although the proposed model should be seen as basically a theoretical and conceptual effort, the plan should not be treated as a totally idealistic exercise far removed from the actual ground situation. The model in part was applied and tested in four districts namely; Khairpur, Sukkur, Hyderabad and Thatta of the province of Sindh under the Education Sector Reform Assistance Program. The project had targeted training of 17,000 primary school teachers and 3,000 administrators. The interesting part of the program was a combination of workshop training with actual classroom teaching in the teachers' own schools. The teaching strategies advised in training were constructivist which included problem solving, positive orientation for learning, group discussions, group mentoring, model lesson preparations, presentations and interactive assessments. A school support system was arranged where performance of the teachers could be supervised at their place of work. The training was accompanied by a concurrent system of monitoring and evaluation on a continued basis. The program along with the extension phase continued for three years and met with reasonable success both in meeting quantitative targets and the quality impact. The quality parameters included a paradigm shift from teacher-centered to student-centered methodology and the professional development of primary school teachers through participatory and KWL teaching approaches. The results showed a significant positive change in teacher behavior. The noticeable changes can be enumerated as:

- The level of motivation increased.
- Teachers worked harder in the classrooms and prepared and planned each lesson.
- Increased initiative and application of no cost/low cost teaching aids.
- The activity teaching methods were allowed prominence reflective practices were seen in operation in classrooms.
- Teachers gained in confidence and poise and showed not only increased knowledge and teaching skills but also an increased affinity with students.
- The dropout rates in the schools in the districts showed a decrease and registered a noticeable increase in new admissions in most of the schools.
- Both teachers and parents reported a happier and more willing school going child.

The implementation of the program, however, was not without a share of difficulties and challenges. Most of the hindrances were program difficulties which would have been faced by any other program. They included reluctant teacher attitudes at the start; lack of support from the school administration at different levels; difficulties of distance; logistics; political influence, and unrest among teachers.

The more specific drawbacks concerning the teaching-learning process and in applying constructivist techniques were (1) a not too receptive school environment, (2) rampant

absenteeism among students, (3) general reluctance of school culture to appreciate the importance of practical work, and (4) the lack of teacher incentives. Even small things like preparation of teaching aids were discouraged at the pretext to complete the prescribed courses in time. However, what among the drawbacks featured prominently was the existing culture of schools and the school leadership, which militated against a change in the milieu. In order to continue with the newly acquired motivation teachers needed encouragement at the school level which was not always present. The other difficulty was the non-cooperative attitude of the district administration and their reluctance to acquire the ownership of the program and make it more sustainable.

Evaluation studies regarding the impact of the ESRA project in quantitative terms are in process but the school and classroom indicators during the project amply affirmed a changed and improved teaching learning environment. The field stories emanating from the districts as well as the Monitoring & Evaluation reports are sanguine enough to warrant a more extensive application of the model.

References

- Ackerman, 'Piaget's Constructivism, Papert's Constructionism: What's the difference?': Online http://learning.media.mit.edu/content/publications/EA.Piaget%20_%20Papert.pdf
- Aldrich, F., Rogers, Y., & Scaife, M. (1998). Getting to grips with "interactivity": helping teachers assess the educational value of cd-roms. *British Journal of Educational Technology*, 29(4), 321-332.
- Brady, L. (1985). Models of teaching. Sydney: Prentice Hall.
- Bruner, J. (1960). The Process of Education. Cambridge, MA: Harvard University Press.
- Bruner, J. (1966). Toward a Theory of Instruction. Cambridge, MA: Harvard University Press.
- Bruner, J. (1973). Going Beyond the Information Given. New York: Norton.
- Bruner, J. (1983). Child's Talk: Learning to Use Language. New York: Norton.
- Burbules, N. C. & Callister, T. A. (2000). Watch it: the promises and risks of Information Technologies for education. Colorado: Westview Press.
- Centre for Educational Research and Innovation. (1986). New Information Technologies. Paris: Organisation of Economic Co-operation and Development.
- Coe, M. (1996). Ways to use technology in the classroom. In M. Coe, & A. O'Neill (Eds.), *Integrating technology into the curriculum* (pp. 123 -128). New Jersey: Simon & Schuster Custom.
- Dillenbourg, et al., Intelligent Learning Environments, Available online <http://tecfa.unige.ch/tecfa/research/memolab/report93-title.html>
- Draper, S. W., Brown, M. I., Henderson, F. P., & McAteer, E. (1996). Integrative evaluation: an emerging role for classroom studies of CAL. *Computers & Education*, 26(1-3), 17-32. Retrieved June 9, 2004, from <http://www.psy.gla.ac.uk/~steve>
- Dool, P. C. van den, & Kirschner, P. (2003). Integrating the educative functions of information and communications technology (ICT) in teachers' and learners' toolboxes: a reflection on pedagogical benchmarks for ICT in teacher education. *Technology, Pedagogy and Education*, 12(1), 161-179.
- Eggen, P., Kauchak, D., & Harder, R. (1979). Strategies for teachers. New Jersey: Prentice Hall.

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ind Development.
, & A.
pp. 123 -128). New Jersey
- nts, Available online
il
(1996). Integrative evaluation
& Education, 26(1-3), 17-31
e
tive functions of information
rs' toolboxes: a reflection of
Technology, Pedagogy and
s. New Jersey.
- Elliott, S., Kratochwill, T., Littlefield, J. & Travers, J. (1996). *Educational psychology (2nd ed.)*. Madison: Brown & Benchmark.
- Ernst Von Glasersfeld, An Exposition of Constructivism: Why Some Like it Radical
Available online: <http://www.oikos.org/constructivism.htm>
- Ernst Von Glasersfeld, Learning as Cognitive Activity, 1983
- Faseyitan, S., Njock, J., & Hirschbuhl, J. (1996). An in-service model for enhancing faculty computer self-efficacy. *British Journal of Educational Technology*, 27(3), 214-226.
- Hoodbhoy, P. (Ed.). (1998). *Education and the state: Fifty years of Pakistan*. Karachi: Oxford University.
- Hoodbhoy, P. (2004). Pakistan's education system its greatest threat. Pakistan Facts. Retrieved Jan 10, 2006, from <http://www.Pakistan-facts.com/article.php/20041017195851719>
- Jalalzai, M. K. (2005). *The crisis of education in Pakistan: state education and the text-books*. Lahore: Al-Abbas international.
- Jones, A., & Moreland, J. (2003). Developing classroom-focused research in technology education. *Canadian Journal of Science, Mathematics and Technology Education*, 3(1), 51-66.
- Joyce, B., Weil, M., & Calhoun, E. (2000). *Models of teaching (6th ed.)*. Boston: Allyn & Bacon.
- Kazilbash, H.H. (1998). Teaching teachers to teach. In Hoodbhoy, P. (Ed), *Education and the state: fifty years of Pakistan*. Karachi: Oxford University Press.
- Kleiman, G. (1984). *Brave new schools*. Virginia: Prentice-Hall.
- Lorsbach, A.W., Jinks, J.L., & Wendelin, R. (2002, August). Using a technological innovation to advance science learning and pedagogy for preservice and inservice teachers in a K-8 Professional Development School. *Presentation to the Association for Teacher Education Summer Conference*. Williamsburg, VA.
- Nicole Flores, Jerome Bruner's Educational theory, available online: <http://www.newfoundations.com/GALLERY/Bruner.html>
- Private Sector to help in computer literacy plan. (2001, June 27). *Dawn*, p. 18.
- Qazi, W, Integration of Technology in Education, Grassroots Vol.No. XXXV, 2007, pp# 47-70
- Shaikh, F. (2004a). An investigation of the opinions of government school teachers versus private school teachers regarding the factors inhibiting the enhancement of secondary school students' learning outcomes through computer assisted learning. Unpublished the Master's Thesis, University of Karachi, Karachi, Sindh, Pakistan.
- Shaikh, F. (2004b). Action research on benefits of using computer assisted learning to enhance the learning outcomes of secondary school science students. Unpublished the Master's Thesis, Australian Catholic University, Melbourne, Australia.
- William Clency, Observation of work practices in natural settings,
AvailableOnline:http://www2.sims.berkeley.edu/academics/courses/is290-3/s05/papers/Clancey_Expertise_Handbook_4.pdf
- Woolfolk, A. E. (1998). *Educational Psychology (7th ed.)*. Boston: Allyn and Bacon.