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## **LANGUAGE AND LEARNING: IMPACT OF A LANGUAGE ON COGNITIVE DEVELOPMENT OF SECONDARY SCHOOL CHILDREN**

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### **ABSTRACT**

*Language, being a tool of communication, allows people to say things to each other and express their communicative needs. The influence of language and culture on learning and cognitive development has been investigated by several researchers and educators. In our schools more emphasis is given on the development of cognitive domain rather than others, especially at secondary level. But passing of knowledge and skills properly is only possible when medium of instruction is acceptable and is according to the mental level of the learners. In past and present medium of instruction has been the burning issue in many countries of the world. Similarly, in Pakistan it has been an unresolved issue due to overwhelming of other local and native languages in different provinces. The use of English as a medium of instruction, in some schools, has given room to a long debate whether English does better than any of the native languages especially to develop the learner's cognitive level at Secondary Schools. Therefore the aim of writing this article is to investigate the impact of language on cognitive development and learning of children at secondary school level. Data was collected through achievement test, interview schedule and by observing the classes. In the light of key findings and discussion, the study recommended that the education should be imparted only in the medium of instruction which is familiar to the learner. This is the only way to enhance cognitive development and sound learning among learners.*

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## INTRODUCTION

Like so many other countries in the world Pakistan is also a multi lingual country. Besides, Urdu, being national language, there are some other languages that are used as the medium of instruction at country, provincial and regional academic levels. Though Urdu is the national language of the country, but mostly all official correspondence is made in English at educational institutes, courts, police stations, banks, industries etc. Hence the importance and status of English language can never be denied in the country. . As far as Cognitive development is concerned, it is a broad term that has been referred as the mental development which is observed through comprehension, understanding, memorization, and thinking patterns of an individual.

At present English is considered as the asset as well as the legacy of the British rule in the sub- continent. As a medium of instruction English language has a very weak case at school level. Simultaneously, there, undoubtedly, is the importance of the study of English as a mean of communication. Since independence many schools have been practicing English as medium of instruction but not all the schools of the country. The followers of this tradition claim to have achieved success greater than the schools with a native language as medium of instruction. This has given room to a long debate whether the English medium of instruction is performing and achieving better or the schools with native languages. Keeping in view the influence of medium of instruction on the cognitive development of the students, present paper intends to analyze whether primary language i.e., mother tongue, as a medium of instruction, leaves more influence or English i.e., secondary or even some cases tertiary language for the people in Pakistan generally and people in Sindh, particularly on cognitive development of the learners at school level. Therefore, this study has been specifically designed to prove or reject the following hypotheses.

### Hypotheses

1. It is easier to make students understand the concepts of science subjects in their own mother tongue rather than in English.

2. The use of mother tongue as a medium of instruction at the secondary school level has made the teaching of science easier than it would have been taught in English.

### Review of Related Literature

Urdu is the national language of Pakistan and serves as the lingua franca or “link language” for all the regions. The origin of Urdu can be traced to the Muslim invaders who came to the sub continent speaking first Turkish later Persian. As far as Sindhi is concerned it is one of the oldest languages of Pakistan and is spoken in Sindh and small portion of Baluchistan. There are certain dialects in Sindhi language known as Vicholi, Thari, Lari, Lassi, Saraiki, Kachchhi and Jogali. (Sarwar, 2004).

**Table 1: Percentage Distribution of Households by Language usually Spoken in Region / Province of Pakistan - 1998 Census**

Region	LANGUAES						
	Urdu	Punjabi	Pushto	Sindhi	Balochi	Saraiki	Others
Pakistan	7.6	44.1	15.4	14.1	3.6	10.5	4.7
Punjab	4.5	75.2	1.2	0.1	0.7	17.4	0.9
Sindh	21.1	7.0	4.2	59.7	2.1	1.0	4.9
NWFP	0.8	1.0	73.9	----	----	3.9	20.4
Baluchistan	1.0	2.5	29.6	5.6	54.8	2.4	4.1
Islamabad	10.1	71.7	9.5	0.6	0.0	1.1	7.0
FATA	0.2	0.2	99.1	----	----	----	0.5

Source: Population census organization 2004

### Language and Learning

English, being one of the widely used and flexible languages in the world, in the sense that everyday it is evolving new vocabulary on one hand and replacing archaic words to fulfil the requirements of the modern times to be able / beneficial in multidiscipline particularly in science. It has an unusual rich vocabulary particularly in science and technology and is considered the key to explaining scientific concepts more clearly (Buck, A., Dent, E.B., & Umpleby, S.A 2000). According to Moulton (1968) when a student sets out to learn a new language, he is willing intellectually to accept the fact that it is different and

that he must learn some new and unfamiliar sounds to speak it properly. Further more he says that at the same time he is so imprisoned within the world of his native English that learning these new sounds can be a very formidable task indeed. So, this way he mentally prepares himself to overcome this language problem to carry on his studies properly. Cognitive development is a complex and difficult area. It may be differently interpreted by different individuals. However, for the purpose of the study, cognitive development has been defined in relation with the well-known Jean Piaget classification that reads as under:

The cognitive domain is divided into hierarchy of six intellectual functions. From the lowest to the highest level there are six abilities as:

<i>Knowledge:</i>	The simple recall of specific methods and structures.
<i>Comprehension:</i>	Understanding which does not include the ability to see its fullest implication.
<i>Application:</i>	The ability to use generalization or rules in specific situation.
<i>Analysis:</i>	The ability to divide a communication in to a hierarchy analysis organizing its component ideas.
<i>Synthesis:</i>	The ability to arrange and continue a number of unstructured elements into organizing a whole.
<i>Evaluation:</i>	The arrangement of monitoring, methods, appraisals and predictions.

Ormond (1998) says that the development of cognitive abilities and the development of language are closely intertwined. Cognitive development is critical for the development of language: children can only talk and write about the things they can first *think* about. Further he adds that yet language is equally critical for children's cognitive development: it promotes their social interaction, provides a set of symbols through which they can mentally represent their world, helps them to make associations among various pieces of information, and enables them to internalize the problem-solving strategies that adults verbalize. Further he quotes Dale (1976) that children during

preschool years become capable of forming increasingly longer and more complex sentences. By the time they begin the school, at five or six years of age, they use language that seems adult like in many respects. Yet students' language capabilities continue to develop and mature throughout the school years. Ormond quotes Nippold (1988) who comments that one obvious change in students' language during the school years is the increase in their vocabulary. It has been estimated that the average high school graduate knows the meanings of at least 80,000 words and expressions. Further Nippold adds that children learn some words through direct vocabulary instruction at school, but they probably learn many more by inferring meaning from the context in which the words are read.

### **The State of Education in Pakistan**

The education system of Pakistan has its roots in the educational history of the sub-continent. According to Khalid (2000) indigenous type of schools, Makatabs, Madarssahs and Dharamshalas existed in India before the establishment of the British Empire. Education in these institutions consisted of oriental languages and religious instruction. Languages included Persian, the court language on which the special emphasis was laid, Arabic and Sanskrit the sacred languages of Muslims and the Hindus respectively. In 19<sup>th</sup> century British Government held the responsibility of educating the people of the sub-continent. But their motto was just to create the persons who could support them in running the government machinery rather than the prosperity and progress of the people of the sub-continent. This responsibility lasted till they were kicked out from the soil of sub-continent. In 1947 Pakistan came into existence, according to the wishes of the Muslims. This new nation struggled hard for its survival, progress and prosperity and the new system of education was to be introduced with right aims and objectives which could meet the individual and collective needs and aspirations of the people. This educational system should suffice the development of positive attitudes towards manual work and vocations and create the sufficient man power in the required fields that could help in developing the newly born country.

The educational ladder in Pakistan consists of three stages, Elementary, Secondary and Higher Secondary.

Elementary education consists of classes from 1<sup>st</sup> to VIII<sup>th</sup>. It includes two stages of education i.e. Primary 1<sup>st</sup> to V<sup>th</sup>, and Middle, from VI<sup>th</sup> to VIII<sup>th</sup>. The greatest number of the country's population attends the primary stage.

Secondary and Intermediate education is also called pre-university education covering post primary education below university level. It consists of stages, namely Secondary and Higher Secondary or Intermediate. Classes IX<sup>th</sup> and X<sup>th</sup> constitute the former and classes XI<sup>th</sup> and XII<sup>th</sup> belong to the later stage.

Secondary and higher secondary stages are very important in the ladder of education. Its duration coincides with the physical developmental stage called 'adolescence' which is a very delicate and critical phase of development and requires sympathetic guidance of the understanding adults around them. They are in need of more independence than ever before. They are also anxious about the jobs and careers they are going to adopt in near future. Many of them drop their education after the completion of secondary level and go back to support their families. This is a stage, which caters for pupils who will enter a variety of careers and have a variety of talents. Education here should enable them to earn a living in order that they may live as respectable citizens of the country. Here the quality of the future of the university students is also determined.

**Table 2**  
**The Stages of Education in Pakistan**

<i>S.No</i>	<i>Stage</i>	<i>Class</i>	<i>Duration</i>	<i>Age Group</i>
1.	Elementary Education	I - VIII	08 years	6 - 13
2.	Secondary Education	IX-XII	04 years	13 - 17
3.	Higher Education	Class XII onward	Depending upon the nature of the degree	17 +

### **The Importance of Language for Concept Development**

To communicate our ideas effectively to another person, we need to consider the characteristics of the person receiving our message. For example, the person's age will affect the level of vocabulary we use, the person's prior knowledge about the subject matter will affect the starting point or our explanation, or the language which we use whether it is the speakers' primary language or secondary and how much the speakers are fluent and frequent in using these language(s) will obviously affect on the quality and quantity of arguments and so on. If the speakers and/or listeners are less frequent of language, it not only affects on their developing and establishing rapport between them but also hinder to generate new ideas. It has also been found the strong correlation between the language and thought processes. Interestingly, it has also been noted in the history of world that many of hardships of mankind are also resulted due to ineffective and inefficient use of language or the abuse of language. Evidence presented in the literature suggests that the element of language is a fundamental medium through which all aspects of conceptual development are mediated. The act of introducing new concepts cannot be initiated without the support of language. Vygotsky (1986) argues that everything is learned through interaction with an individual's existing mental structure. For him, social interaction plays a fundamental role in the development of cognition and language is a critical component of this social interaction.

Unlike other social, emotional and cognitive skills language development occurs gradually and we often take it granted (Borich, G.D., and Tombari, L.M. 1995). And it is commonly observable that children develop and reach their sensible and meaningful language starting with babbling and non-sense sounds. The rules of language are no way taught in the same manner as the teachings of other knowledge and skills. But the case is quite different when teaching/ learning a second language.

## METHODOLOGY

### Population

The population of the study consists of all the government secondary schools (boys & girls) and private sector secondary schools (boys & girls), Class X of the province of Sindh excluding Karachi.

### Sample

Random sampling technique has been applied to choose the schools as well as students. Total 10 schools have been selected (five public and five private schools) having English / Urdu / Sindhi medium of instruction.

### Delimitations

This research study has been delimited to the following:

- a. Only the public and private schools (boys & girls) of the Hyderabad city have been included in the study.
- b. Only the subject of Physics has been taken for observing the cognitive development of the students.
- c. Only Class Metric is focused to gather the data.

### Instruments

Following tools have been used to conduct the present study:

- a) *Achievement test:* a self-developed test conducted on sample population before and after the lecture, to see the impact of medium of instruction.
- b) *Interviews:* Interviews, from the teachers as well as students, are conducted in both mother tongues Sindhi/Urdu as well as in English language that support the results taken from the achievement test.
- c) *Observation:* Some classes of subject of Physics are also observed and field notes taken to see the impact of language in general.



### Procedure

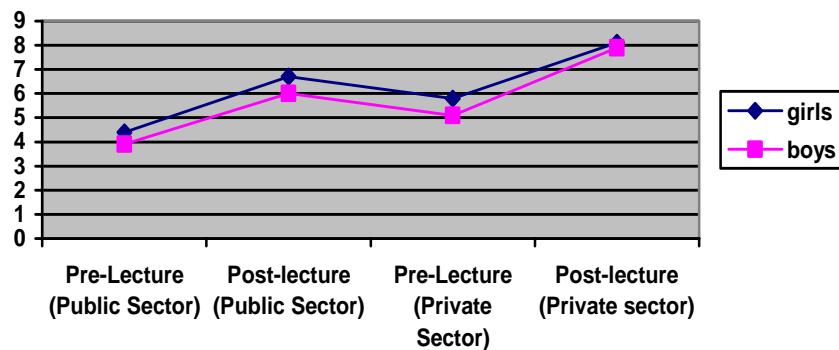
The test has been conducted in two parts i.e. Pre and Post from the lecture delivered in the class. The lectures, of the subject of physics, are borrowed from the Virtual University in CDs that have been played with the help of computer or multimedia in the classes. The CD's of already discussed topics, of the teacher of that particular school, are played to see the impact of that lecture along with the impact of the medium of instruction. Finally Pre and Post tests were compared for getting the result. The results are also verified through other measures such as interviews and class observation. Open-ended Interviews from the teachers were conducted to get feed back about the difficulties they have had and/ or come across while delivering their lectures. The obtained data were analyzed statistically to test the hypotheses of the study.

### Data Analysis and Key Findings

Results of the mean score of students' performance pre and post delivering the lectures has been measured in order to see the effects of medium of instruction on their cognitive development, which could easily be seen through their achievement results. The results are shown in Table 1, (Graph A) and (Graph B).

**Table 1**  
**Mean Score of Students' Performance Pre and Post delivering of the Lectures**  
**(Lecture delivered in Urdu/ Sindhi and Test conducted in Urdu/ Sindhi)**

Mode of the School	Mean Score	Pre-lecture evaluation		Post-lecture evaluation	
		Girls (N=43)	Boys (N=58)	Girls (N=43)	Boys (N=58)
Public	Mean Score (Total Marks=10)	4.4	3.9	6.7	6.0
Private	Mean Score (Total Marks=10)	5.8	5.1	8.1	7.9

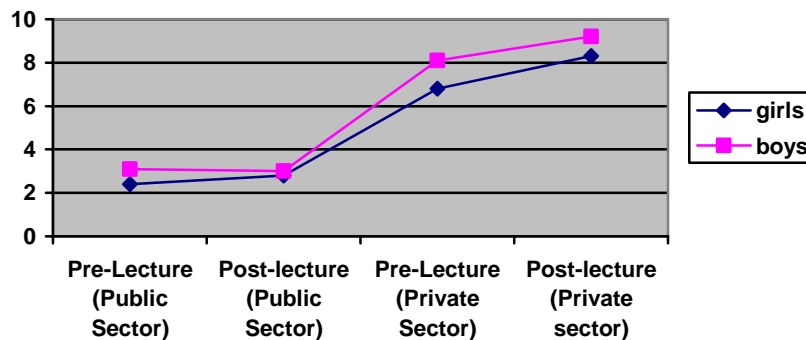


Table#01 show the achievement scores of boys and girls when the lectures were delivered in their mother tongue i.e. Sindhi and/ or Urdu. Pre-lecture or pre-demonstration score shows that girls achieve the scores of 4.4 and 5.8 while the boys achieve 3.9 and 5.1 out of 10, on average, from Public and Private schools, respectively. This shows the strength of their knowledge. It means they have had some understandings even before the lecture have been delivered or demonstrated. While the post lecture or post demonstration findings show girls hit 6.7 and 8.1 and on the other hand boys reach to the scores of 6.0 and 7.9 out of 10, on average, from public and private schools, respectively. It means, if we quantify the cognitive development of school children and see it through their achievement score, it shows girls improved 2.3 points, on an average, in Public as well as private schools while the boys progressed 2.1 and 2.8 points, on an average, in public and private schools, respectively. The score also discloses the difference between the two setups of schooling, one of which is public holding meagre facilities and other is Private having comparatively better material facilities and for which parents spend a lot.

**Table 2**  
**Mean Score of Students' Performance Pre and Post delivering of**  
**the Lectures**

**(Lecture delivered in English & Test conducted in English)**

Mode of the School	Mean Score	Pre-lecture evaluation		Post-lecture evaluation	
		Girls (N=24)	Boys (N=35)	Girls (N=24)	Boys (N=35)
Public	Mean Score (Total Marks=10)	2.4	3.1	2.8	3.0
Private	Mean Score (Total Marks=10)	6.8	8.1	8.3	9.2



Table#02 shows the achievement scores of boys and girls when the lectures were delivered in non-mother tongue i.e. English. Pre-lecture or pre-demonstration score shows that girls achieve the scores of 2.4 and 6.8 while the boys achieve 3.1 and 8.1 out of 10, on average, from public and private schools, respectively. This shows the difference of two different styles of schools. One group of students, studying in public sector schools, performed below average and the other group, studying in Private sector, performed exceptionally well even before the lecture has had delivered. The post lecture or post demonstration findings show girls hit 2.8 and 8.3 and on the other hand boys reach to the scores of 3.0 and 9.2 out of 10, on average, from public and private schools, respectively. The quantitative difference or

cognitive development (as far as our research design is concerned) between pre and post demonstration of school children shows girls improved 0.4 and 1.5 points, on an average, in Public and Private schools, respectively. While the boys declined 0.1 points which shows deterioration and development of misunderstandings or misconceptions and 1.1 points, on an average, in public and private schools, respectively.

### **Discussion and Recommendations**

This study was undertaken with a goal to understand the impact of medium of instruction on cognitive development generally and on achievement specifically. Actually, people feel at home if they have been using the language in which they are frequent and fluent. This not only gives them comfort in expression of their own point of view but also to comprehend the opposite's view point. Language is more than just communication; it is rather the primary method by which we do things together. Language is the accumulation of shared meaning-of common ground. A language, mainly, serves these four purposes: Communication (One-way communication as in sending/receiving the message etc.), Conversation (Two-way Communication so that both sides feel understood), Collaboration (such as thinking, planning, decision making etc.) and the fourth is Co-creation (Joint activity, making, doing etc.). If the language is alien to either the instructor or to the learners or to the both then the process of teaching/ learning will be hampered, at large. This could be seen in decreasing the over-all standard of education in our country.

It is interesting to note that there are mean differences in achievement scores of the students in public and private sector schools when the lectures and tests were conducted in English (non-Mother tongue language) while the differences diminish when the lectures delivered in Urdu/ Sindhi and tests also conducted in the very language (Table# 01, 02). Scores also reveal that boys stick to slighter higher achievement level where the medium of instruction were either Urdu or Sindhi, while scores seem overlapping when the medium of instruction is English.

Interestingly in this pattern of Study girls show slightly greater achievement. It means their scores were improved more on post-test results as compared to boys' scores.

The results support our first hypothesis that teaching/ learning of scientific disciplines, particularly, in one's own mother-tongue or in the language to which one is fluent and frequent helps one to develop cognitively. The observation findings disclose that teachers feel at home, and this also have been reported in the interviews with teachers, when they have been given room to generate examples from their everyday life and this requires the removal of language barrier to which neither they by themselves nor their audience/ listeners (in this case students) are fluent and frequent. This last supports our second hypothesis as well.

In summary, one of many purposes of education is to have an understanding or the cognitive development. While the schooling is a formal setup where one interacts in order to facilitate this interaction and hence having greater chances of development of thought, understanding and cognition (Plotnik, 1999). And this process could be enhanced if our education be imparted in the medium familiar not only to the teacher but students as well.

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