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Iqbal's Shaheen Or Cramming Parrots: Assessing Students Capacity In Science

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Abstract

Philosophy provides grounds for educational aims at national level. Iqbal, being a prominent and poet and educational philosopher viewed that education should mold an individual into a dignified, brave, self-confident, creative and sharp like an eagle (Thesufi, 2016). In this technological eon, every nation hold expectations from its education, particularly, from the Science stream to produce highly skilled and competent individuals. Science education is started right from elementary levels as learners are anticipated to comprehend scientific notions from early life. Alongside, in the native scenario, English medium is seen as a symbol of wisdom and a highly required discipline. Presently, the course of Science has been offered in English medium for elementary classes as well. This investigation was initiated to establish the students' proficiencies in Science subjected delivered through English. Similarly, it was targeted to accumulate teachers' discernments regarding students' competencies in Science. It was a concurrent-mixed-method investigation. In the beginning, numeric informations were assembled via a locally developed bi-lingual test of leaners capabilities in Science. The items of the test were built on the initial three echelons of cognitive areas of Bloom's Taxonomy (1956) i.e. knowledge, comprehension and application. The test items were constructed both in Urdu and English versions so as to arbitrate the existence of any variations of learners' accomplishments in both. The learners were gaged in both formats concurrently. In the 2nd stage, the teachers were subjected to an open-ended interview regarding study aftermaths and their outlooks about students' comprehensions. The outcomes of the test yield that the learners exhibited superior means values in Urdu format. In addition, on echelons of comprehension and application, the students attained meaningfully better score in Urdu form in relation to English. The summary of the teachers' opinions established that native languages were far superior in acquisition, retention, communication and creating. Moreover, there has been English language bear certain adverse impacts such as propensity to cram, stereo-type maneuver of learning and inadequate conceptual development. In addition, lack of comprehension, results in lower motivation, curiosity, interest and self-confidence. This investigation recommended the adaption such medium for instruction and course content that facilitate learning superior cognitive levels, particularly for elementary classes such as Urdu or Pashto in this case.

Keywords: Science, English, Medium of Instruction, Cognitive domain, Mixed Method Research

Introduction

The process education is intended to nurture the potentials of an individual Iqbal viewed that education should be dynamic, creative and on-going process. The prime aims of education should be search for reality, ego development, enrichment of life, developing harmony between spiritual and real worlds, development of mental faculties and the attitude to conquer the universe (Bukhari et al, 2014). Iqbal's educational thoughts reveals that a learner should strengthen his individuality and sustained empirical and rational wisdom. In addition, the instruction should be based on creative and reflective oriented and abstained from plagiarized ideas and value-free strategies (Nudrat & Akhtar, n.d.). For these reason, Iqbal symbolizes a Muslim student with Shaheen (eagle) to high morale, optimism and high order thinking and expect the curriculum to develop these attributes.

The system of education in Pakistan is very complicated. There is diversity of institutes and modes of education to impart different study programs. In terms of schools, there are public and private institutes. Besides, there are institutes to impart religious education called madrassaha (Mahboob & Talaat, 2008). In the context of Pakistan, there are mainly three levels of schools: elementary, secondary and higher education. The elementary levels could be classified into primary (Nursery to 5^{th} classes) and middle (6^{th} to 8^{th} classes). The next two years are as secondary level. Similarly, two more years of education (11^{th} and 12^{th}) are labeled as higher secondary. It is then followed by graduation (Shahid, 2001).

Primary education is basic to forthcoming learning (Roberts, 1998). Every system of education and every country of the world attempts to provide such learning stuff that students could easily comprehend. Most of the countries of the world provide elementary education in their native language. In case of Pakistan, the scenario is different. The officials of education, and political power used to change and modify the curricula, including medium of instruction. Medium of instruction is a constant dilemma of Pakistani education system. The curricula fluctuate between mother tongue, national language and international language (Ahmed, 2011; Shaheen & Tariq, n.d; Parveen et al., 2006).

Science is a core subject at all stages of education. Majority of the countries instigate science education right from primary level. Mohanty (2004) described two reasons for inclusion of science. One reason is the growth of empirical attitude, inquisitive approach, rationality and criticality of the individuals. The other reason is to enable the individuals to resolve numerous problems in the society like poverty elevation, hunger, diseases and misuse of assets.

The worth of science have been widely accepted due to its utility and significance in everyday life (Faize, 2011). The prime aim of science education is to grasp the basic ideas, notions and generalization. It is followed by the capacity to employ the learned skills and knowledge is other situations (Ediger, 1999). Science is a process of thinking, perceiving and comprehending of knowledge by means of observation and conducting experiment (Rajendran, 2015). It reveal that perception and comprehension of the ideas and concepts are mandatory for science learning. Faize (2011) viewed that the objectives of science could aptly be achieved through a comprehensive instructional and evaluation procedures. It can be construed that perception, comprehension, analysis and application of scientific ideas and concepts are obligatory for science learning. All these elements are associated with the cognitive aspect of learning.

Cognition involves higher level of thinking like grasping, comparing, summarizing, inferring and reasoning (Rauf, 2002). The cognitive domain contain the learning output and

intellectual capacities and skillfulness of a learner (Linn & Miller, 2005). The cognitive domain is divided into various categories. These categories are ranged from simple uttering of information to a higher point of complex intellectual capacity (Linn & Miller, 2005; Rajendran, 2015).

Bloom (1956, as cited in Linn & Miller, 2005) has classified the learning outcomes associated with cognition into various categories. The first three levels of cognitive domain are: knowledge, comprehension and application.

- Knowledge: it is the bottom level of cognition. It simply reveal the recognition and/or reproducing of any piece of information.
- Comprehension: 2nd level of cognition, the capacity to comprehend, translate or elucidate meanings of verbal, written or imagery data.
- Application: it is a higher point of cognition than comprehension. It means to employ the learned material in the real world or newer situations (Linn & Miller, 2005; Rajendran, 2015).

The worth of any educational product is determined through assessment. The prevailing assessment procedures have also certain limitations. One of the major limitation the assessment procedures mostly judge the memory of learners and discount the applied facet (Faize, 2011). Which is the lowest level of cognition.

There are various elements associated with learning accomplishment and comprehension including language (Shaheen & Tariq, n.d.). Medium of instruction is critical in transformation and comprehension of knowledge, cultural values and personality growth. It is used in all subjects, courses and academic levels (Ahmed, 2011; Cuber, 1959 as cited in Shaheen & Tariq, n.d.). Further, literature on psycholinguistic indicate that intellectual and language developments occur concurrently (Mustufa, 2005). Research indicate that students are confronted with problems due to language of instruction, particularly using English as instructional medium instead of native languages (see, e.g. Lin & Morrison, 2010; Marsh, Hau and Kong, 2006; Yip, 2003). The aforesaid discussion indicate that medium of instruction has vital impact on students' capacity to comprehend and employ knowledge, ideas and concepts.

Instructional medium is significant to the cognitive and academic excellence of learners. Students should be instructed in such a medium that help them to easily understand concepts, views and ideas. In Pakistan, medium of instruction is a constant dilemma. Unluckily, the dilemma is still existed in the sixtieth independence-day. The suitable instructional medium is still to be decided (Parveen et al. 2006).

The issue of medium of instruction is more acute at elementary levels. At this level, students should be given such knowledge that they could comprehend and correlate it with their immediate environment. In the present curricula, there is high stress on English. Besides, a complicated course of English, the course of science has also been offered in English right from elementary classes i.e. class 2nd in the form of general knowledge and from it is called general science. It was assumed that students may face problems in grabbing scientific notions in English. This study is intended to judge the class 5th students' comprehension in science (offered in English) as they have passed through the experiences of learning the same in their previous

Objectives

- To determine students' accomplishments in Science through a bi-lingual test

- To summarize teachers responses regarding test outcomes
- To collect teachers views regarding medium of instruction
- To suggest a suitable selection of medium of instruction

Method and Procedure

Science is an important subject at all academic levels. Students are always expected to comprehend the basic notions of science. These days, the different course at elementary level are offered in English medium right from beginning. English as a medium of instruction is considered inevitable for quality enhancement.

This study is an attempt to highlight the students' capacities of 'comprehension' and 'application' in Science offered via English media. It was a sequential-explanatory design as identified by Creswell (2009). The strategy involved simultaneous gathering of quantitative – qualitative data. In the first instance, quantitative data were collected through a test. The outcomes of the tests were followed by the interview of the teachers of the concurrent class. The content of the test were taken from the 5th class Science course developed by KPK text book board.

The cognition of leaners were assessed by means of a bi-lingual test. The test was consist of 30 MCQs items from the science course of 5th class developed in English as the course was in English medium. The Urdu version of these items was also prepared. It was the end of their session, so the students had completed their course. The test items were grounded on the first three levels cognitive domain of Bloom's Taxonomy (1956) – knowledge, comprehension and application. The Urdu version of the same test were provided successively.

The researchers also designed an interview on the basis of the test outcomes to assemble qualitative information. It was an interview from the class 5th teachers about their judgments about inference drawn from the tests and students overall aptitude. Codes and themes were derived from the interview data. The inductive-deductive procedures were employed to analyze the qualitative data. Themes were obtained through inductive analysis whereas for gathering supplementary information about themes were collected through deduction. For the sake of brevity the detailed description of qualitative data has been ignored and only the summary of the qualitative findings is provided.

Data Analysis

Table 1 Percentage Performance in Bi-lingual Assessment

Cognitive Levels	Medium of Instruction	Levels of Performance		
		Poor	Fair	Good
Knowledge	Urdu	18.3%	30.5%	51.2%
	English	28.7%	25.0%	46.3%
Comprehension	Urdu	15.2%	59.1%	25.6%
	English	75.6%	18.9%	5.5%
Application	Urdu	22.0%	51.2%	26.8%
	English	86.6%	8.5%	4.9%

The percentage outcomes provided that students were better in Urdu in all levels of cognition. There is no big difference in the percentages of Urdu and English for 'knowledge. Since, it involve only remembering and reproducing of information. However on the levels of 'comprehension' and 'application,' great variations could be seen in percentages. Only, 5.5% students were good in 'comprehension' and 4.9% were good in 'application.' it could be deduced that it is very difficult for the elementary students to comprehend and employ scientific notions in English language.

Table 2 Means scores

Cognitive levels	Medium of Instruction	Mean	S.D
Knowledge	Urdu	2.33	.768
	English	2.18	.850
comprehension	Urdu	2.10	.633
	English	1.30	.567
Application	Urdu	2.05	.699
	English	1.18	.499

The mean outcomes divulge that highest mean score is held by the 'knowledge' aspect of cognition in Urdu. On the contrary, the 'application' aspect provided lowest mean value for English. In addition, the second lowest average value is obtained by 'application' aspect of cognition for English. It can be deduced that students are weaker in 'comprehension' of lessons and 'application' of scientific concepts, particularly in English.

Table 3 t-test analysis

		t	df	Sig. (2-tailed)
Knowledge	Equal variances assumed	1.703	326	.089
	Equal variances not assumed	1.703	322.699	.089
comprehension	Equal variances assumed	12.135	326	.000
	Equal variances not assumed	12.135	322.137	.000
Application	Equal variances assumed	12.917	326	.000
	Equal variances not assumed	12.917	294.772	.000

An independent on sample t-test was carried to establish the differences of accomplishments at various levels of cognitions in terms of media of instructions. The outcomes of t-test for 'knowledge' ($t(326) = 1.703$, $p = .089 > .05$) revealed that there were no meaningful difference of students'' accomplishments in both instructional media. Similarly, for 'comprehension' levels, the findings of t-test ($t(326) = 12.135$, $p = .000 < .05$) highlighted students' were significantly better in comprehension of scientific notions in Urdu as compared to English. Likewise, on 'application' the t-test results ($t(326) = 12.917$, $p = .000 < .05$) provided that learners were considerably better 'application' of scientific concepts in Urdu in

comparison to English. It could be inferred that the cognition levels of leaners were significantly better in Urdu.

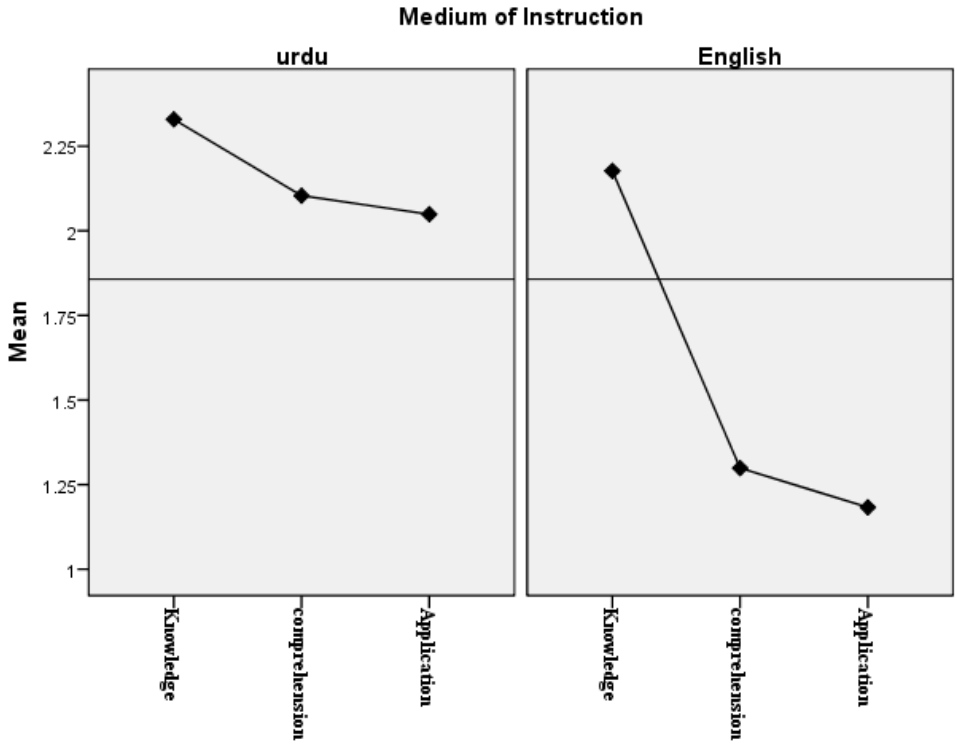

Figure 1. Medium of instruction and levels of cognition

It is evident from the Figure 1 that in Urdu the scores of learners on all three aspects of cognition are quite above line representing mean. Inversely, the scores of learners on 'comprehension' and 'application' in English in far below the mean line. Hence, students exhibited superiority on all three facets of cognitive domain in Urdu.

The teachers of 5th class were openly interviewed in the light of findings from the bi-lingual test. The data were thoroughly analyzed to derive codes and categories. Then the following themes were then emerged from the teachers' responses:

- Medium of instruction is a major barrier for students' capacities to comprehend and apply their knowledge.
- Students learn easily in native language /mother tongue
- They can easily remember, understand and employ their learned material
- Student can easily reproduce answer to a question
- Students can write in their own words
- Students can easily associate their learned stuff with their immediate environment
- English language needs dual effort on the part of teachers and students
- Alien/English language develops the habit of cramming. Students just reproduce or re-write what they have memorized.

- Science concepts taught through English are difficult for average and poor students to comprehend.
- Students' inability to 'comprehend and apply knowledge in science' lowers down their confidence, interest and motivation.

Discussion and Recommendations

The results of this investigation divulge that medium of instruction has vital role in acquisition of concepts and ideas. This issue is more sensitive at primary levels. In alien languages, learners made dual efforts. They attempt to learn the language as well as clarify their concepts. The problem becomes more sever in case of rigour scientific notions. The ultimate aims of education are production of learned individuals with capacity to employ their knowledge in diverse settings. The outcomes divulge that unfamiliar language becomes a major hurdle in this connection (Arshid, 1997; Sabri; 2007; Shaheed and Tariq (n.d.). Students' incapability to 'comprehend' and 'apply' the learning stuff leads to failure of promoting scientific culture and pragmatic society. Yip (2003) provided that students show poor accomplishment in science learning through English medium as compared to the leaners who acquired it through their native language i.e. Chinese. Though, English was implemented only to schools with better academic background. When students fail to comprehend an idea, they attempt to cram it and consequently develop wrong study habits. It is difficult for teachers to explain abstract notion to students in English (Bunyi, 1997). Hence, the output of entire instructional procedure is the production of 'cramming parrot' not Ibal's 'Shaheen.'

Iqbal has symbolized Muslim youth with an eagle (Shaheen). Like an eagle, Muslim youth should be courageous, hardworking, independent, struggling, enduring, persistent, esteemed, self-controlled and self-reliant. An individual can develop these capabilities when he has high learning abilities like analytical, critical and creative approaches (Mirza, 2011; Thesufi, 2016). But the outcomes of this investigation revealed that the prevailing system of education, particular medium of instruction, has crafted the students to be passive, vulnerable, inactive, apathetic and oblivious and could be symbolized as cramming parrots.

The researchers indorse the measures to strengthen students' abilities of 'comprehension' and 'application.' Similarly, the researchers recommend there should be such medium of instruction that facilitate the capacity to comprehend. When student understand something instead of remembering only then they are also likely to apply that learned scientific notions in a newer situation. It will also discourage the practices of rote memorization. In this regard, the researchers supports the views of Ahmed (2011), who hold that for primary levels, medium of instruction may be mother tongue. Similarly, from 6^{th} to 12^{th} classes, it may by Urdu and it may be English in onward classes. Yip (2003) has also drawn that introduction of English at later stages may be more beneficial. Early introduction of secondary language will also impact culture and ethnicity besides learning. Further, the cognitive domain of Bloom taxonomy may be considered in the development of curricula, textbooks and assessment procedures. Finally, the policy makers may synthesize the findings of researches on medium of instruction to decide a suitable instructional medium for various levels. It will enable the teachers to produced students having capabilities of an eagle (Shaheen) as identified by the Islamic Scholar Allama Iqbal. The production of cramming parrots will bring no benefit to the individual or to the overall community.

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