

understanding (siddiqi,2007;EdQual,2007;; Hillel, 2005; Malik, 2002; Afolabi & Akinyemi, 2009) There are wide variety of interacting factors **that** give input to the acquisition of learning outcomes, for example, the student **brings** intellectual, social and emotional frame of thoughts from home and the surrounding environment to the school environment of certain peculiar attributes just as a product of interaction of students, teachers, management and activities (UNESCO, 2002). The parents' education positively improves the students' achievements (Govt. of Pakistan, 2002). Improved learning environment, method and characteristics of teacher proved helpful in promotion of critical thinking among students (Balsiri, 2010).

Concept is defined as: a set of rules to categorize and group events, an abstraction of series of experiences (carol ,1964), an idea of an object or event (Huitt, 2003,Boune,1966), the characteristics which classify together or set apart two things(Dresel,1960).Concept formation is: to make mental classes(Bruno 1986),a consciously applied plane(Goodnow and Austin, 1956),taking place in sequence (Garone,1960),insured when one can apply it (Robello&zolman ,2005 ;Safder, 2010) ,depending on the capacity to learn and can be affected by environment(Huitt,2003),a result of interaction with society,home,and community(woolfolk,2008),foundation in learning achievement(Collette &chiappetta,1989).When the student can apply the concept in a varying context, then it is claimed that the student has understood the concept. Misconception is the flawed view of how the world works (Rebello & Zolman, 2005). The information can be recalled but cannot be applied, and cannot relate the real and model, named as "inert knowledge" (White, 1998). Concept as unit of knowledge in science has a unique role to explain natural phenomenon" (Nedim, 2010)

Physics interpret the world around us in a specifically known language at three thought levels, the macro, the micro, and the symbolic. Sometime it becomes difficult for students to work at the three levels simultaneously, and hence, they are compelled towards memorization. The main thing in the study of Physics is the concept development. In the context of Physics, by concept we mean the contents which make Physics distinguishable. Students are mostly based on intuitive knowledge and alternative conception as well as misconception towards the facts of Physics, contrary to the expert view and true image. Therefore, students should be given the opportunity to construct their knowledge themselves regarding the interpretation of Physics' inventions and facts. Conceptual understanding is very rare when the instructions in Physics focuses on drilling a standard problem in fixed order, the sign is learned instead of the concept and a gap is produced between scientific practice and science as a subject of formal nature (Dayal, Bhut & Ray, 2007).Student get Physics and the world between their own way of thinking and what the teacher as well as the text say (Brian, 2009)

Method and Procedure

This was a descriptive, evaluative, comparative as well as causal comparative study. Multistage random sampling was used to choose sample of SSSS(N=1840)from all the secondary level public and private , girls and boys secondary schools in the sampled 5 districts out of 25 districts of Khyber Pakhtunkhwa, Pakistan. Medium of instruction, text and examination is in English in the private schools while the same are in Urdu in the public schools. The students' physics application abilities were measured on concept application ability test (CAA test) which included 30 items of MCQ, information grid type and short answers supply type Questions. About 50% of the items of the CAA test were adopted by Al- Ahmadi (2008) and the remaining items were developed by the researcher. The test was validated by experts' judgment and its Cronbach's alpha reliability coefficient was 0.7. The test was personally administered by the researcher among all the randomly chosen schools, sixteen from each district in the sampled five districts, Malakand, Mardan, Peshawar, Kohat, and DI Khan. The score for each item on CAA test was not uniform and was converted into one for analysis. Questionnaire was distributed among 50% of SSSS participated in the test in order to investigate the influencing factors related to their home facilities, parents' education and occupation, and other demographic variables. The CAA test score was analyzed by mean and independent sample two-way t-test. The students' related influencing factors were analyzed by percentage and significance of percentage differences (Garret, 1966). The students' questionnaire data codes were considered as score for the exploration of relationship between CAA test score and the influencing factors. Multiple regression analysis was used to explore the relationship between students' physics concepts application abilities score and their home facilities, parents' education, occupation, and number of siblings.

Results

Table 1 Score of Secondary School Science Students on CAA test

| N | Total Test score | Mean | Std. Deviation | T | P |
|------|------------------|------|----------------|--------|--------|
| 1846 | 30 | 10.1 | 3.4 | -60.75 | < 0.01 |

The major purpose of the study was to assess the students' concept application abilities in Physics at secondary stage. The SSSS mean score performance, 10 out of 30 on C & T test shown in table 1 reveals that the students can apply the Physics concepts in problem situation up to 33 percent which is significantly less than the average.

Table 2: Sector and gender wise score of SSSS on Concept application ability test

| Sector | N | Mean | Std. Deviation | Mean Difference | P |
|---------|------|------|----------------|-----------------|--------|
| Public | 910 | 9.4 | 3 | -1.5 | < 0.01 |
| Private | 936 | 10.9 | 3.7 | | |
| Boys | 1401 | 10.2 | 3.7 | 0.27 | n.s |
| Girls | 445 | 9.9 | 2.6 | | |

With reference to educative facilities and administrative setups, the public and private sector schools are two different systems. According to table 2 the comparison **between** the SSSS' score obtained on C & T test reveals significantly better performance in favor of private school systems. The boy SSSS comparatively show better performance on the C & T test and the difference is non significant. It is highly appreciable that the girl students can apply Physics concepts in the capacity comparable to boy students.

Table 3: Facilities available at home to Secondary School Science Students

| All as % (NPublic = 566, NPrivate = 508, NBoys= 829, NGirls = 245) | Total | Public and Private | | | | | Boys and Girls | | | | |
|--|-------|--------------------|---------|----------------|----------------|------|----------------|-------|----------------|----------------|------|
| | | Public | Private | Standard Error | Critical Value | P | Boys | Girls | Standard Error | Critical Value | P |
| Room for study | 65 | 60 | 70 | 2.92 | -3.42 | 0.01 | 64 | 68 | 3.47 | -1.15 | n.s |
| scientific calculator | 53 | 43 | 64 | 3.05 | -6.88 | 0.01 | 52 | 54 | 3.63 | -0.55 | n.s |
| TV | 53 | 44 | 64 | 3.05 | -6.56 | 0.01 | 24 | 29 | 3.15 | -1.58 | n.s |
| dish antenna | 11 | 6 | 16 | 1.89 | -5.29 | 0.01 | 16 | 23 | 2.77 | -2.53 | 0.05 |
| computer | 50 | 44 | 57 | 3.06 | -4.25 | 0.01 | 17 | 21 | 2.79 | -1.43 | n.s |
| science dictionary | 25 | 16 | 36 | 2.66 | -7.51 | 0.01 | 48 | 70 | 3.63 | -6.06 | 0.01 |
| parents support in Physics | 17 | 16 | 19 | 2.32 | -1.29 | n.s | 10 | 14 | 2.27 | -1.76 | n.s |
| science textbook | 71 | 73 | 69 | 2.77 | 1.44 | n.s | 25 | 17 | 3.07 | 2.61 | 0.01 |

| | | | | | | | | | | | | |
|--------------------|----|----|----|------|-------|------|--|----|----|------|-------|------|
| time for homework | 77 | 80 | 77 | 2.51 | 1.20 | n.s | | 48 | 56 | 3.64 | -2.20 | 0.05 |
| tuition facilities | 23 | 14 | 34 | 2.59 | -7.72 | 0.01 | | 68 | 82 | 3.29 | -4.25 | 0.01 |
| Internet | 18 | 10 | 28 | 2.37 | -7.58 | 0.01 | | 73 | 90 | 3.07 | -5.54 | 0.01 |
| physics dictionary | 15 | 12 | 18 | 2.17 | -2.76 | 0.01 | | 15 | 14 | 2.58 | 0.39 | n.s |

The table 3 shows that majority of the facilities at home are available to the students who study in the private sector schools. The only two things; possession of science textbooks and availability of time for home work are on credit to the students in public sector schools and the difference is non significant. The public sector students had the time for study at home but they are not utilizing it properly as they could not show better performance on CAA test as compared to private sector students. This may be due to lack of parents support in Physics. Availability of the facilities indicate that the private sector students belong to high income class ,may be one of the reasons of better performance of private sector students on C & T test of this study. Significantly high percentage of girls students with reference to facilities reflect the cultural climate of the society, where the girls education ratio is low distinguishably in the low income classes, it also shows that the girl students come to schools mostly belong to high income class.

Table 4 Causal relations between facilities available to SSSS and their score on CAA test

| Predictors | Std. Error | Beta | t | Sig. | R | R-Square | F | Sig. |
|----------------------------|------------|-------|-------|------|------|----------|------|-------|
| Room for study | 0.24 | -0.05 | -1.35 | 0.18 | 0.26 | 0.07 | 5.42 | 0.000 |
| scientific calculator | 0.23 | 0.17 | 5.03 | 0.00 | | | | |
| TV | 0.23 | 0.04 | 1.15 | 0.25 | | | | |
| dish antenna | 0.37 | 0.01 | 0.17 | 0.87 | | | | |
| Computer | 0.24 | -0.02 | -0.49 | 0.62 | | | | |
| science dictionary | 0.29 | 0.05 | 1.30 | 0.19 | | | | |
| parents support in Physics | 0.30 | 0.07 | 2.05 | 0.04 | | | | |
| science textbook | 0.25 | -0.10 | -2.86 | 0.00 | | | | |
| time for homework | 0.27 | 0.02 | 0.70 | 0.49 | | | | |
| tuition facilities | 0.27 | 0.05 | 1.45 | 0.15 | | | | |
| Internet | 0.30 | 0.08 | 2.28 | 0.02 | | | | |
| physics dictionary | 0.35 | -0.09 | -2.56 | 0.01 | | | | |

Dependent Variable: Test Score (30)

Table 4 indicates that the R-Square of 0.07 implies that the mentioned 12 predictors accounted for 7 percent in the variation of students' score on C & T test. $F(12, 1074) = 5.42, p = 0.00$ means that the overall facilities available to SSSS significantly contributed to students' achievements in terms of concept application abilities in Physics. The availability of science textbooks and Physics dictionary and room for study negatively affect the score on C & T test of SSSS. The science textbooks are almost available to all students but all of them are not good to comprehend. Majority of the students do not possess separate room for study, computer and physics dictionary and they are not good in studies.

Table 5 Family demographics of Secondary School Science Students

| All as % (NPublic = 566, NPrivate = 508) | | 0 | 1 | 2 | 3 | 4 | >4 |
|---|---------|----|----|----|----|----|----|
| How many Brothers and Sisters do you have? | Public | 5 | 2 | 4 | 7 | 18 | 65 |
| | Private | 2 | 3 | 7 | 13 | 28 | 48 |
| | Total | 3 | 3 | 5 | 10 | 22 | 57 |
| How many older brothers and sister do you have? | Public | 22 | 20 | 20 | 13 | 9 | 17 |
| | Private | 27 | 22 | 18 | 13 | 9 | 11 |
| | Total | 24 | 21 | 19 | 13 | 9 | 14 |
| How many are at university? | Public | 74 | 17 | 7 | 2 | | |
| | Private | 57 | 30 | 10 | 4 | | |
| | Total | 66 | 23 | 8 | 3 | | |
| (NBoys = 829, NGirls = 245) | | | | | | | |
| How many Brothers and Sisters do you have? | Boys | 4 | 3 | 5 | 10 | 22 | 56 |
| | Girls | 2 | 2 | 4 | 8 | 24 | 59 |
| | Total | 3 | 3 | 5 | 10 | 22 | 57 |
| How many older brothers and sister do you have? | Boys | 26 | 19 | 20 | 12 | 9 | 15 |
| | Girls | 20 | 24 | 17 | 16 | 10 | 13 |
| | Total | 24 | 20 | 19 | 13 | 9 | 14 |
| How many are at university? | Boys | 68 | 22 | 6 | 3 | | |
| | Girls | 58 | 27 | 14 | 2 | | |
| | Total | 65 | 23 | 8 | 3 | | |

Table 5 makes it clear that the percentage of students in public sector schools with no siblings as well as with reference to number of brothers and sisters more than four is higher as compared to private sector students. The overall percentage of both sector's students regarding the number of **siblings more than 4 are the highest of all**. This may be one of the major reasons about lacking of quality in education in the rapidly growing populous country like Pakistan. The percentage of students with respect to no **siblings** and single brother and sister is higher for private sector students. The number of elder brothers and sisters more than four is again in favor of public sector students. The percentage of the SSSS whose brothers and sisters **studies** in universities are significantly high in the private sector students. The number of brothers and sisters of girls students are greater as compared to boys. The percentage with no brothers and sisters is also greater in girls students. Consistently, girls students have more number of brothers and sisters who study in university and it again proved their high status.

Table 6 Parents' education and occupation of Secondary School Science Students

| All as % (NPublic = 566, NPrivate = 508) | Total | Public and Private | | | | | Boys and Girls | | | | |
|--|-------|--------------------|---------|----------------|----------------|------|----------------|-------|----------------|----------------|------|
| | | Public | Private | Standard Error | Critical Value | p | Boys | Girls | Standard Error | Critical Value | p |
| Did your father study at university? | 23 | 13 | 34 | 2.57 | -8.17 | 0.01 | 20 | 32 | 3.05 | -3.94 | 0.01 |

| | | | | | | | | | | | |
|--------------------------------------|----|----|----|------|-------|------|----|----|------|-------|------|
| Did your mother study at university? | 6 | 3 | 10 | 1.49 | -4.71 | 0.01 | 6 | 9 | 1.82 | -1.65 | n.s |
| Father Occupation | | | | | | | | | | | |
| Teacher | 10 | 8 | 14 | 1.90 | -3.16 | 0.01 | 10 | 12 | 2.23 | -0.90 | n.s |
| Engineer | 2 | 1 | 2 | 0.74 | -1.36 | n.s | 1 | 3 | 0.87 | -2.30 | 0.05 |
| Govt. Service | 14 | 10 | 21 | 2.19 | -5.01 | 0.01 | 11 | 27 | 2.57 | -6.22 | 0.01 |
| Private Job | 3 | 2 | 4 | 1.03 | -1.94 | n.s | 3 | 2 | 1.19 | 0.84 | n.s |
| Farming | 11 | 14 | 9 | 1.96 | 2.55 | n.s | 14 | 4 | 2.34 | 4.28 | 0.01 |
| Business | 6 | 1 | 13 | 1.53 | -7.87 | 0.01 | 5 | 10 | 1.75 | -2.86 | 0.01 |
| Unemployed | 1 | 1 | 1 | 0.61 | 0.00 | n.s | 1 | 0 | 0.64 | 1.57 | n.s |
| Doctor | 3 | 1 | 6 | 1.10 | -4.54 | 0.01 | 2 | 7 | 1.27 | -3.94 | 0.01 |
| Other | 44 | 62 | 31 | 3.05 | 10.16 | 0.01 | 51 | 36 | 3.63 | 4.13 | 0.01 |
| Mother Occupation | | | | | | | | | | | |
| Teacher | 5 | 2 | 11 | 1.48 | -6.08 | 0.01 | 4 | 10 | 1.64 | -3.66 | 0.01 |
| Other | 4 | 13 | 6 | 1.81 | 3.87 | 0.01 | 3 | 10 | 1.52 | -4.60 | 0.01 |
| Housewife | 73 | 95 | 84 | 1.85 | 5.95 | 0.01 | 93 | 80 | 2.18 | 5.97 | 0.01 |

Table 6 illustrates the percentage of university education among the parents of SSSS is discouragingly small, particularly in case of the parents of students studying in public sector. Like facilities and family demographics with reference to university education of brothers and sisters, the girls students are on significantly better position on the basis of father's university education. Keeping in view the overall picture we see that the percentage of parents' in better occupation favor the students who study in the private school system. The percentage of students whose parents are teachers is significantly greater in the private sector schools, a considerable fact. The percentage of mother occupation of secondary school students in general and that of public sector students is specifically low. The percentage of father's occupation of girls students remained higher in doctor, engineer, business and government service while that of boy students is better in farming, unemployed and other categories. The percentage of girls students with respect to mother's education is higher as compared to boy.

Table 7 Causal relations between family demographics, parents' education and occupation of SSSS and their score on Concept application ability test

| Predictors | Std. Error | Beta | t | Sig. | R | R-Square | F | Sig. |
|--|------------|-------|-------|------|------|----------|------|-------|
| No of Brothers and Sisters | 0.11 | -0.02 | -0.56 | 0.58 | 0.19 | 0.04 | 3.71 | 0.001 |
| No of elder Brothers and Sisters | 0.08 | 0.04 | 0.88 | 0.38 | | | | |
| No of Brothers and Sisters in university | 0.18 | 0.01 | 0.17 | 0.86 | | | | |

| | | | | | | | | |
|-----------------------------|------|-------|-------|------|--|--|--|--|
| Father University Education | 0.31 | -0.02 | -0.58 | 0.57 | | | | |
| Mother University Education | 0.52 | 0.02 | 0.42 | 0.67 | | | | |
| Father Occupation | 0.10 | 0.14 | 3.74 | 0.00 | | | | |
| Mother Occupation | 0.25 | 0.10 | 2.62 | 0.01 | | | | |

Dependent Variable: Test Score (30)

Table 7 portrays that the increased number of brothers and sisters negatively while number of elder brothers and sisters, and the number of brothers and sisters studying in university are positively related with students' score on CAA test. The father's university education negatively and mother's university education positively affect students' achievement on CAA test. The parents' occupation showed significantly positive effects on their children achievements on CAA test. According to R-Square of 0.04, collectively all the predictors shown in table 7 accounted for 4 percent in variation on achievements in terms of concept application abilities. $F(7, 1074) = 3.71$, $p = 0.001$ means that all these predictors contributed significantly in the concept application abilities of the students in terms of score on CAA test.

Discussion

The secondary school science students' performance regarding application abilities of Physics concepts in problem situation, every day life or natural phenomena was found 33% on CAA test. The implemented National curriculum (2000) for Physics grade 9&10 reserved 10% contents for the development of application abilities and 55% for knowledge contents (Tahir&ullah). Al-Ahmadi (2008) concluded that scientific thinking is not possible to develop at the secondary level even in higher classes with out targeted teaching. The results of the study in hand reveal that private sector students obtained remarkably better score on CAA test as compared to public sector students and there was no significant difference between girls and boys students with respect to their score on CAA test gone against the finding, the Knowledge of Physics concepts of boys is significantly lower than girls (Adeoye, 2010). The private sector students and girl students of both sectors belong to such families who possess more facilities at their homes and comparatively, the percentage of private sector students with reference to number of brothers and sisters study in university is significantly high. Apart from the high status of parents with reference to university education and occupation the private sector students, study sciences including Physics in English medium which is a foreign language for them. The private sector school teach grade 9 sciences including Physics in tow years, start it in 8th grade while the public sector schools complete that courses in Urdu medium, only in grade 9, in one year. The findings of this **study are** that home facilities, parents education and occupation status, number of brothers and sisters and number of brothers and sisters study in university significantly affect students' performance in terms of Physics concepts application ability is agreed with the results of the previous studies which related these factors with learning (yucel,2007;Schibeci&Riley,1986;Valanlons,Fonsece&Esocares,2004;Kirmani,2008;Friedel,gabel and Samuel,1990;Linna,Malin & Tanbe,2004;Yildirim & Eryilmaz.1999;Govt of Pakistan,2002 ;Demir Kilic & Depren,2009 ;Akhtar & Niazi ,2011;Kiamanesh &Kheirich,2001).

Conclusion. The secondary school science students particularly public sector students showed significantly low performance when their abilities, to which they can apply Physics concept in problem situations, were tested on Concept application ability test conducted by the researcher. In gender wise comparison, mean score on the Concept application ability test was in favor of boy students, with no significant difference. The private sector Secondary school science students and the girl students in both sectors were found in better status with reference to the influencing factors, home facilities, parants education and occupation, and the number of brothers and sisters study in university. According to multiple regression analysis, the influencing factors as predictors significantly contributed to students application abilities of physics concepts in form of score on Concept application ability test. So, it is concluded that home facilities, parants education and occupation, no of brothers and sisters, no of brothers and sisters study in university affect students' conceptual understanding which is ensured when the students can apply the concept in problem situation.

Recommendation. Looking into the results of the study with reference to the lack of education and nature of occupation of the parents of SSSS particularly of public sectors students, it is mandatory to train the parents through parent-teacher council in the matters they deal and motivate their children toward study, related to importance of education and population dynamics .The essential facilities like books, calculators and dictionary should be provided to students who need it, by Govt or school. The public sector Teachers and heads of schools should be made more responsible and resourceful to ensure the quality and conceptual understanding in education.

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