Linking Teachers' Conceptions to Students' Achievement: A Study Involving High School Teachers and Students in Pakistani Context

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Abstract

The study under view explored high school teachers' conceptions and their effect on students' scores. Descriptive correlational survey design was employed to carry out the study. A total of 597 teachers working in the public high schools of Lahore division participated in the study. Conceptions of learning scale was utilized to discover teachers' held conceptions of learning. In order to measure students' achievement, their scores in the subjects of English and Urdu were collected from their respective schools. Collected data was analyzed using descriptive and inferential statistics through SPSS and AMOS. Results discovered teachers' strong agreement towards all conceptions of learning irrespective of the subject taught by the teachers. A moderate level of relationship was explored among various conceptions of learning. Overall, results revealed that teachers' conceptions of learning classified as memorization and application of the learned material were the most significant predictors of students' success in board exams both in the subject of Urdu and English. The major recommendation of the study included the need of training regarding the exposure to higher order conceptions of learning through in-service and pre-service teacher trainings courses.

Keywords: Conceptions; memorization; application; academic achievement; secondary level

Introduction

Exploration of students' academic learning outcomes is a worthwhile endeavor as it helps in reflecting the significance of knowledge possessed by the people of a nation. Educational institutes have always been evaluated based on the nature of learning exposure provided to their students in all domains encompassing cognition, behavior or attitude. Similarly, economists have also explained the quality of human assets based on their assessment scores since a link has been observed between the

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scores and individual earnings. Consequently, policy makers have started considering quality of the output produced by institutions in the form of higher learning outcomes (The World Bank Group, 2013). It is a valid fact that majority of young children reside in third world countries who are trying hard to increase their student enrollment in schools since 1960, hence are still away from the targets. These countries have not controlled the dropout rate of school going children. One of the many factors would behind this phenomenon would be to shift their focus on nature of learning rather than mere enrollment (Glewwe & Kremer, 2006). This has led researchers concentrate on factors influencing student achievement. In the given scenario, evidence has been shown by scholars discovering the impact of characteristics related to teachers on students' learning outcomes. Unfortunately, the results shown have not been found consistent while showing the significant relationship among the constructs (Goe, 2007).

In view of scholars, teachers behavior would be a more significant factor behind students' learning rather than the characteristics (Araujo, et al., 2014), since behaviors are the reflections of our held beliefs. Thus, beliefs would have a significant impact on students' learning. Considering the worth of teachers' beliefs, it is inferred that teachers' beliefs are stronger enough that they may shape their behaviors in academic contexts as well and influence students learning results. In view of academicians teachers conceptualization and practices of teaching effectiveness are based on his or her view of teaching (Biggs, 2012). Therefore, it is a valid explanation that teachers' teaching behaviors are affected by their hidden perceptions for different segments of teaching, learning, assessment, and self-efficacy (Brown, 2003).

Scholars have cited that literature showed the influence of held beliefs for teachers as well as the students (Thompson, 1992; Reid & Petocz, 2002). Therefore, researchers focused their attention towards the exploration of such links between conceptions and behaviors since studies have found impact of teachers' perceptions on varied educational aspects. It was also found that specific perceptions of teachers influenced students achievement in particular manner (Gow & Kember, 1993) because effective conceptions of teachers are expected to create varied exposures of learning for students, as a result linking effective thinking to practice would be useful for the integration of teacher candidate characteristics (Villegas & Reimers, 1996). Studies to identify the relationships between conceptions and practices found positive linkages but at a smaller level particularly between self-efficacy beliefs and academic performance of students (Akbari & Allvar, 2010; Britner & Pajares, 2006; Pajares, 1996). Furthermore, links were also revealed between the constructs of teachers' conceptions of assessment and students' learning outcomes (Brown & Hirschfeld, 2008). However, the evidence found are not enough to conclude any sound results. Therefore, it is rationalized to develop the field by carrying out studies on such phenomena.

Such conceptions are not useless but lead ones' behavior to the completion of ones objectives. Seemingly, researchers have argued that teaching approaches and evaluative techniques practiced by teachers are as well the outcomes of their understandings by teachers (Brown, et al., 2009). The links between these constructs is not direct as teachers' approaches would influence students learning styles that would impact their learning outcomes (Beausaert, et al., 2013). It is a well-established fact that a teachers' use of student centered approach would direct effective learning of the students. Thus, to produce better students' learning it would be necessary to change teachers' teaching practices from ineffective to effective ones. If it is the need of the time to transform teachers' educational practices, it would require their thinking and the factors influencing their thinking patterns. Such change would lead to the change in students' academic results (Martín, et al., 2014).

Studies have found that conceptions are developed as a result of teachers' exposure to learning tasks in their life. Consequently, a variety of factors impact their development including student life, culture of school, assignment of learning tasks by the administration and the level of teaching as well. In order to explore these conceptions, it is required to explore the phenomena in different contexts. It was also submitted that the research carried on conceptions of teachers and influence on students' learning remained restricted to western cultures. This confinement was also focused inquiries at higher level (Gao & Watkins, 2002). Consequently, present study was planned to explore the conceptions of teachers at school level focusing their possible effect on students' scores in board exams in Pakistani public school system.

Statement of the Problem

In order to identify the contributing factors in the achievement of students, researchers have always been engaged in carrying out studies. Efforts have also been made to introduce various interventions such as physical facilities and teacher trainings to bring positive increase in students' learning outcomes. Developing countries have also tried to follow the tradition even with limited resources. However, not a big change has been reported. This phenomena might be due to the inherent conceptions of teachers effecting the success or failure of any educational reform. Therefore, it is justified to carry out the studies while looking for links between teachers' held conceptions and students' achievement.

Such investigations would be useful to explore the constructive as well as mistaken conceptions working behind the success or failure of our students. It would as well help to bring those constructive conceptions into light and change the mistaken ones with more useful ones through teacher trainings. For the purpose of exploring this phenomenon, the present study was carried out through surveying teachers' conceptions regarding learning. Furthermore, the study included teachers engaged in the teaching of Urdu and English in public high schools at secondary level. Along with surveying

teachers' conceptions, students' scores in the particular subjects announced by board of secondary education were taken from respective schools whose teachers were part of the study and analyzed to find any inherent links between the constructs of conceptions and achievement scores.

Objectives of the Study

Following were the objectives set to measure as a result of this study;

1. To explore public sector high school teachers' conceptions of learning.
2. To discover the mutual relationship of high school teachers' conceptions of learning.
3. To identify the effect of high school teachers' conceptions on students' academic achievement scores in the subject of Urdu and English.
4. To compare the variation for the effect of teachers' conceptions of learning on students' academic achievement in the subjects of Urdu and English.

Research Questions

Following were the research questions of the study:

1. What is nature of conceptions of learning possessed by high school teachers?
2. Are high school teachers' conceptions of learning mutually related?
3. Do high school teachers' conceptions of learning affect students' academic achievement at secondary level?
4. Do similar conceptions of learning held by teachers influence students' academic achievement in the subjects of Urdu and English?

Methodology

Procedure of the Study

Descriptive correlational survey design was used to carry out the study. Sample of teachers was taken using multistage purposive sampling. In the first stage, 296 schools were selected conveniently from a total of 703 schools located in four districts (Kasur, Lahore, Nankanasahib, Sheikhupura) under the jurisdiction of Lahore division (School Education Department, 2011). For the purpose of having a representative sample, 50% schools from each district were selected. In the second stage, 597 high school teachers of Urdu and English were selected. Only two teachers were selected from each school to fill out the survey form. For the academic achievement of students, the subject scores of students in board exams whose teachers participated in the study were collected from their respective schools.

Data Collection and Analysis Procedure

The survey forms were filled by the teachers after soliciting their prior permission through consent forms. Teachers were briefed about the purpose and nature of questions asked in the survey forms. Formal permissions from DPI and DEO schools

were also taken before collection of data. Schools situated in remote areas were approached with the help of research assistants. Collected data was analyzed using mean, standard deviation, correlation and regression analytic techniques through SPSS and AMOS.

Instrumentation

For the purpose of measuring teachers' conceptions of learning, various instruments were reviewed. For example, one instrument developed by Chan and Elliot (2004), focusing teachers' conceptions of learning with traditional or constructivist view of learning was reviewed. This instrument was not found appropriate as the conceptual framework of the present study included conceptions of learning based on the model of Boulton-Lewis, et al. (2001), for school teachers at secondary level. Another instrument developed by Trigwell and Ashwin (2006), was reviewed but this scale was designed focusing situated conceptions of learning among teachers. Similarly, Lee et al., (2008), worked on an instrument measuring conceptions of learning of students at secondary level. Seemingly, another instrument developed by Purdie and Hattie (2002), was reviewed but was not selected, since this scale was designed for students, so the items were developed from students' point of view rather than teachers' perspective. Another instrument reported by Donche and Petegem (2007), was also reviewed. This particular scale was based on four conceptions of teaching and learning. None of these available scales fulfilled the objective of measuring high school teachers' conceptions of learning. Therefore, it was decided to construct a new scale to measure school teachers' conceptions of learning. For the purpose of developing new scale of conceptions of learning, the items were constructed while consulting the literature. Some of the statements were developed while reading the quotes of school teachers regarding learning reported in qualitative studies. Furthermore, some of the items were constructed using Bloom's taxonomy of educational objectives representing the desired domain of learning encompassing understanding, application or analysis.

Validation of the Instrument

Before administering the scale in the field, it was checked for validity and reliability measures. Considering the content validity of the scale, it was reviewed by experts having experience of teacher education and educational research at university level. Items were modified as a result of feedback given by experts. All the recommended modifications were incorporated before testing it in the field. The developed instrument was administered in the field on a smaller level in order to pilot test it. Survey forms were filled out by 40 respondents initially. Data was entered into the computer for reliability analysis. Reliability values ranged between 0.595-0.707.

Table 1
Values of Reliability Analysis for the conceptions of learning scale

Factor	No of items	Reliability
Gaining information	4	0.658
Remembering information	3	0.632
Understanding	4	0.580
Transformation	4	0.707
Application	4	0.595

The values of Cronbach's alpha were found adequate for the exploration of phenomena of conceptions of learning.

Format of the Instrument

Overall instrument was divided into two parts. The first part was based on the demographic information of respondents. It included the information about background of the respondent. In the second part, items related to teachers' conceptions of learning were presented. Likert type response scale ranging from 1 to 6 (1 = strongly disagree and 6 = strongly agree) was used to provide a range of responses to participants. The response scale consisted of six categories, among which two were negative and the four were positive ones. The scale was based on 19 items as the items having low correlation to other items of its main factor were removed from the analysis. The total scale covered five conceptions of learning encompassing gaining information, memorizing or reproducing, application, understanding and transformation of the learned information.

Findings

The first objective of the study was to explore the nature of conceptions regarding learning possessed by teachers at secondary level. Overall results of the study showed teachers' positive attitude towards various conceptions of learning. The values obtained for the learning conceptions were found clustering around the value showing most agreement towards the conception. It helped in inferring the results that teachers view the necessity of all conceptions of learning.

Table 2
Descriptive statistics for teachers' conceptions

Conceptions	Mean	*SD*
"To Gain information"	4.5	.8
"Remembering"	5	.90
"Understanding"	5	.8
"Transformation"	5	.9
"Application"	5	.7

The values shown in table 2 described overall conceptions of learning possessed by high school teachers. It is obvious from the table values that teachers possessed positive attitude towards different conceptions of learning. One can observe from the table that the values for each conception are above 4 that is closest to mostly agree response scale. For the conception of learning as understanding was found highly agreed by the teachers followed by learning as application and transformation. Only a marginal difference was observed for the conception learning as gaining information as compared to other conceptions of learning.

Interconnections between Conceptions of Learning

Another objective of the study was the identification of relationships among various conceptions of learning. The possible relationships among various conceptions of learning were explored through Pearson correlation coefficient.

Table 3

Correlation Analysis for teachers' conceptions of learning

Names of the conceptions	Mean	*SD*	1	2	3	4	5
Learning Gaining Info	4.3590	.82652	1				
Learning Remembering Info	4.5217	.69698	.491**	1			
Learning Understanding	4.7284	.64220	.417**	.542**	1		
Learning Transformation	4.5815	.66581	.506**	.599**	.529**	1	
Learning Application	4.66	.71	.42**	.50**	.47**	.51**	1

The values obtained for the calculation of correlation coefficient for the conceptions of learning shown in table 3 described that the conception of learning as gaining information was positively related to all other conceptions. Although, the relationship between learning as gaining information and learning as transformation was the highest among values of correlation obtained for other conceptions (r = .50). Similar trend was observed having significant relationship between the conceptions of "gaining information" and "remembering" (r = .49), as well as "gaining information" and "understanding" and "application" of the learned information (r = .4).

A moderate correlation was found for the conceptions of learning as "remembering information" and learning as "understanding". It also showed a positive and significant relationship between the variables. Seemingly, a significant relationship was observed for the conceptions of learning "remembering information" and "transformation" with the value of r = 0.599, p < 0.01. Similar pattern of result of correlation was found for "remembering" linked to "application" having value of r = 0.424, p < 0.01. To measure the link between "understanding" and other conceptions of learning, values of Pearson correlation showed a moderate level of relationship (r = 0.529, p < 0.01) between learning as understanding and learning as transformation. It was found that "understanding" and "application" were also significantly related to

each other. Likewise, the relationship between conception of learning "transformation" and "application" was also found positive and significant having values $r = 0.514$, $p < 0.01$. It was also revealed that all of the conceptions did not depict high or perfect relationship that could be problematic for the regression analysis procedure.

Measurement of the Effect of Conceptions on Students' Academic Achievement

In this study we explored the relationship between conceptions of learning irrespective of their preference or order. Multiple regression method was the appropriate one to explain and predict the possible influence of conceptions on students' scores.

In order to explore the phenomena of linkage between teachers' conceptions and students' achievement, teachers of English and Urdu were taken as the participants of the study. First of all, method of regression analysis using Maximum Likelihood method through AMOS was run to explore the effect of teachers' conceptions regarding learning for the subject of Urdu. The main variables of the study consisted of teachers' conceptions of learning measured through survey forms and students' academic scores in the particular subject (Urdu) that were collected and converted into averages. Finally, regression model based on structural equation modelling in the AMOS was run to identify the effect.

The linkage of all conceptions of learning with students' academic achievement in Urdu are shown in figure 1. In the figure 1, one side head arrows describe the linear dependencies. The values shown on the path (one side head arrows) from each conception of learning to students' achievement (dependent variable) explains beta (estimate) that is the effect of that particular conception on the dependent variable (achievement scores). The value shown on dependent variable describes R^2, which describes the nature of variation in the model because of the effect of all conceptions of learning or independent variables. Overall, 08% of the variance of dependent variable can be devoted to all of the five conceptions of learning that is evident in the model presented below.

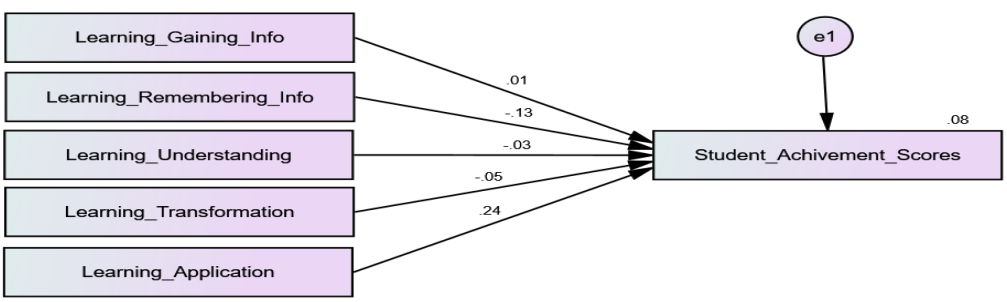

Figure 1. Model of teachers' conceptions and students' academic achievement scores in Urdu

Table 4
Regression weights for conceptions and students' scores in Urdu

			Estimate	*C.R.*	*P*
Students' Scores in Urdu	←	Conception of Learning "Gaining Information"	.00	.11	.90
	←	Learning as "Remembering Information"	.12	-2.28	.02
	←	Learning as "Understanding"	-.03	-.56	.57
	←	Learning as "Transformation"	-.05	-.90	.36
	←	Learning as "Application"	.24	4.30	***

Values presented in the Table 4 describes the results found through regression analysis using maximum likelihood method in AMOS. The results based on the values showed that the conceptions of learning encompassing gaining information, understanding and transformation have insignificant effect on students' academic achievement. Based on the regression weights, it was inferred that students' achievement was positively affected by teachers' conceptions of learning "remembering information" and learning "application" as the values are less than 0.05 level of significance.

Students' Scores as Effected by Teachers' Conceptions in English

The Figure 2 describes the linkage of all conceptions of learning to students' achievement scores. The regression values and their interpretations as stated above was used in this model as well, therefore, it is not required to repeat the same here. Overall, 12% of the variance in the dependent variable can be attributed to the independent variables (learning conceptions).

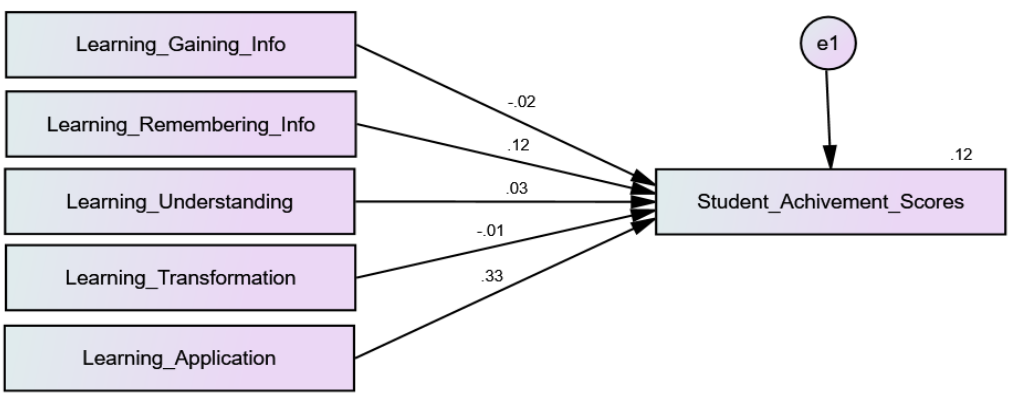

Figure 2. Model of teachers' conceptions and students' achievement scores in the subject of English

Even in this model, results revealed that conceptions of learning "remembering information" and "application" of the learned information created significant effect on students' academic achievement. The alpha values shown in the table were less than 0.05 level of significance. The results found for the effect of conceptions of learning in both of the subjects were quite similar. Therefore, it is inferred that similar conceptions of learning are prevalent among teachers while having their significant influence on students' achievement scores. It explains the possible influences of school policies, exams format and learning mechanism at secondary level.

Table 5

Regression Weights for conceptions and students' scores in English

			Estimate	*C.R.*	*P*
Students' Scores in English	←	Conception of Learning "Gaining Information"	-.023	-.415	.67
	←	Conception of Learning "Remembering Information"	.116	2.124	.03
	←	Conception of Learning "Understanding"	.026	.473	.636
	←	Conception of Learning "Transformation'	-.012	-.216	.829
	←	Conception of Learning "Application"	.325	5.977	***

Based on the regression weights, it is inferred that conceptions "remembering information" and "application" effect students' achievement scores in the subject of English. Therefore, significant effect was observed for teachers' conceptions both for the subjects of Urdu and English. Another surprising finding was the effect of similar conceptions to get good grades in board exams in both of the subjects.

Discussion

Focusing the first objective of the study, the findings obtained through this inquiry found that teachers were mostly agreed to the five conceptions of learning. Overall, results were found aligned to the literature showing teachers' and students' agreement towards different conceptions of learning (Peterson, et al., 2009; Purdie & Hattie, 2002). Results were also in congruence to the studies confirming the effect of maturity on the possession of higher order learning conceptions. The results also confirmed that conceptions of learning are influenced by the age, experience and working environment of the person (Saljo, 1979; Boulton-Lewis, et al., 2001; Brown, et al., 2008). The findings confirmed that multiple conceptions are perceived and utilized based on the need of tasks (Trigwell & Ashwin, 2002).

Present study also confirmed the results found for available studies claiming the requirement of lower as well as higher level learning conceptions for the successful completion of academic tasks (Entwistle & Peterson, 2004; Purdie & Hattie, 2002). The

nature of relationship found in the present study was found aligned to the available literature. Similarly, the findings reported in the present study were aligned to the results described by Brown, et al. (2008), where participants showed strong agreement towards lower as well as higher level conceptions regarding learning. This positive relationship among conceptions of learning was also found in the study carried out by Roman and Bran (2015).

The study's major aim was to discover the effect of conceptions on students' academic achievement scores. In order to achieve this objective regression analysis using Maximum Likelihood method was utilized. The effect was explored separately for the subject of Urdu and English using regression analysis technique. In the first phase teachers teaching the subject of Urdu and their students' scores in the subject of Urdu were taken and analyzed. The results inferred that conceptions of learning "remembering" and "application" are having significant effect in the success of students in board exams. The results were found aligned to the ones reported in the studies of Donche, et al. (2007) and Gow and Kember (1994).

However, results of present study did not align to the findings obtained by Brown and Irving, (2010), and Donche et al. (2007) as their study found students having conception of learning as a duty to perform less in their exams whereas students' having conception of learning as a continuous process performed better. In contrast to the finding of these studies, the results of present study showed a different pattern of results as teachers' conceptions of learning remembering and application proved helpful in their students getting higher scores. The contrast found for the results might be due to the variation in the academic environment found in developing vs developed countries. Yang and Tsai's (2010), study's results were not found aligned to present work's findings as their study found students having cohesive learning conceptions being more progressive in their classes. This dissimilarity can be explained in the light of the differences existed between the contexts. Their study was carried out on college students who were higher in maturity as compared to the present context of secondary level where students are encouraged to use lower order learning processes to have success in exams.

Comparing the results of present study to the studies carried out in Pakistani context showed a different pattern of alignment. A study carried out in Pakistan by Rehman and Khan (2011), described that examination system of Pakistan does not test students comprehensively from different aspects as the main focus of exams have been on the memorization of the contents being taught by the teachers. Academicians have also suggested transforming the examination system at secondary level (Sultana, 2001). Seemingly, the teachers having higher level of conceptions could not make a significant effect on students' academic achievement.

The studies carried out in Pakistani context reported the learning environment in public schools emphasizing the memorization (Afzal, 2013; Malik, 2012). The results might be due to the nature of subject being linguistic that requires application more than other subjects. Urdu is the national language that is mostly spoken in Pakistani schools. In doing so it gets practiced by students as well. Consequently, the materials learnt in classes are being applied and practiced. This subject has extended scope of application as compared to other subjects. Therefore, application of the topics learned help in acquiring good grades in exams as well.

The study by Nasreen and Naz (2011), as well argued that teachers showed agreement for the use of more practical nature of activities in order to teach social studies. According to theory of Vygotsky (1978), of language learning, a child learns a language more accurately and efficiently if gets involved in interaction with people being experts in that language. Consequently, the student gets the ability to solve problems independently. Seemingly, this rule is applied to the learning of language where one finds the adults as experts correcting the beginners and helping them to acquire the language.

In the next phase, same phenomena was explored with teachers teaching the subject of English, and the possible effect their conceptions might have on their students' achievement scores in the subject of English. The most significant factors impacting students' achievement were found to memorize and apply whatever is learned by the students. The findings obtained are inline to the prevalent practices in Pakistani public schools where students are preferred to utilize surface level learning requiring the memorization of the contents.

Assessment system at secondary level also encourages the use of learning domains categorized as memorization or application. In such scenario, teachers and students are encouraged to keep their learning limited to the domains assessed during exams. The findings validate the claim that conceptions are context specific and different factors influence their development encompassing the assessment systems, policies and social norms etc. (Harris & Brown, 2009). The findings of present study were found well aligned to the facts found in Pakistani context. The study by Iqbal and Ahmad (2015) discovered the positive effect of Hifze Quran on the learning abilities of students in medical field. They found that such students performed better in exams and scored well as compared to other students without such experience. Similarly, the studies carried out at secondary level also found the use of teaching strategies requiring memorization and application of learned skills. It is obvious through the most prevalent method of teaching in the subject grammar translation method (Muhammad, et al., 2018; Awan & Hiraj, 2016; Fehmi, 2015; Awan & Shafi, 2016; Nawab, 2012). Therefore, the research studies carried out in Pakistani context were quite aligned to the present work.

The study explaining the significant effect of teachers' conception particularly application oriented learning conception on students' achievement can be explained by the stance of Vygotsky (1978). According to the author a person is guided to acquire a language while utilizing the zone of proximal development (ZPD). Where individual require the help of some adult as expert in the use of that language. Seemingly, the teachers using ZPD help in students solving problems as language expertise demands interaction with the people around. Therefore, teachers and students interacting with each other help learning a language (Jhon-Steiner & Mahn, 1996; Ahmad & Rao, 2013). Similarly, the significance of learning as application is also supported by Rubin (1981), as cited in Lederman and O'Malley, (1990), who described that in linguistic subjects' application, is the major cause for successful learning.

Conclusion

Results of the study revealed that teachers held positive attitude towards various conceptions regarding learning irrespective of the level being higher or lower. The consistent higher values for all conceptions of learning showed teachers' exposure to the variety of learning experiences. Conceptions of learning were found to be mutually related. The results showed the positive relation between lower level and higher level learning conceptions as mutually related. Therefore, it affirms the notion that conceptions do not work independently but are interdependent. Thus, individuals possess a variety of learning conceptions and work depending on the nature of tasks. The study revealed that remembering and application oriented learning would help in getting good grades in board exams. Therefore, it is inferred that in public school systems, learning is emphasized to remember and apply the learned contents in the class. Results showed the teaching and learning mechanism operated in public high schools being confined to the memorization and application based learning experiences.

Implications of the Study

1. Considering the results found through this study, we came to know the significance of teachers' conceptions while impacting students' achievement. It shows the dilemma of teaching mechanism in Pakistani public high schools where lower order learning conceptions are found having significant effect for better performance. It is therefore suggested that teachers may be exposed to a variety of learning conceptions during workshops and in-service trainings.
2. Similarly, measures may be taken at pre-service teacher training programs where curriculum can be enriched having topics of conceptions, their development and possible effects as well.
3. It is also suggested to carry out mixed method studies in future to discover the complexity of teachers' conceptions along with observations of teaching practices in the classrooms.

4. The variables of students' learning achievement can also be enhanced while measuring the effect of conceptions on learning outcomes and approaches to learning opted by students.

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