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Exploring the Effect of Pedagogical Beliefs and Practices during Classroom Instruction on Students Learning at Secondary School Level in District Gujrat

Muhammad Arif, PhD Scholar, Department of Education, University of Lahore
Dr. Muhammad Hameed Nawaz, Professor, Department of Education, University of Lahore

Abstract- Exploring the effect of pedagogical beliefs and practices during classroom instruction on students' learning in tehsil Sarai Alamgir, district Gujrat was the key purpose of the present research. It was exploratory research and survey design in nature with mixed method data collection technique. Data was collected from 46 secondary school science teachers and 460 students of 10th class who were selected by using simple random sampling technique. The researcher used three self-developed tools (questionnaire to measure pedagogical beliefs, checklist to observe practice of pedagogical beliefs during classroom instruction, and test to measure students' learning) to glean data. Statistical Package for Social Sciences (SPSS) software (20.0) was used to analyze arrange, and coded data by applying inferential statistics. It was found after analysis that there is strong association between pedagogical beliefs and practices during classroom instruction and students' learning, practices of pedagogical beliefs during classroom instruction. The results also reveals that gender and qualification wise no difference was found in the degree of pedagogical beliefs except the science teachers who had above than 20 year teaching experience had high degree of pedagogical beliefs. So for as the concern of practices of pedagogical beliefs is male sciences teachers practice more than the female and the teacher who were enjoying M.A/M.Sc. their qualification and had above than 20 year teaching experience practices more pedagogical beliefs during classroom instruction then the others teachers. The results reveals that the teachers who had high degree of pedagogical beliefs and practiced perfectly/ great extent pedagogical beliefs theirs students had level of learning and performed "excellent", the teachers who had moderate degree of pedagogical beliefs and practiced some extent pedagogical beliefs theirs students had medium level of learning and performed "good", and the teachers who had low degree of pedagogical beliefs and practiced not at all pedagogical beliefs during classroom instruction, theirs students had low level of learning and majority of them performed "average" in test.

Key words: pedagogical beliefs, practices of pedagogical beliefs during classroom instruction, students' learning

I. INTRODUCTION

For effective teaching and learning, the teachers' pedagogical beliefs are strong indicators. For teaching and learning, these beliefs can be understand as a guiding principles for teachers to be true. Pedagogical beliefs serve for teacher as lenses because he/she learn new experiences. As teachers believes that if something is true, same time they are being supported by that belief (Pajares W., 2012). When teachers perform in the classroom, it is to be said that he/she is being governed by what they believe. To make teaching decisions and assessment these beliefs play a vital role (Cantu Q., 2011). It is found in many researches that teachers have hug rang of multifarious beliefs regarding pedagogical issues. It is necessary by knowing the selections and judgement of the teachers which will make in the classroom, to accept the role and nature of these believe in this regard. It has been understand since long time that pedagogical beliefs of the teachers play an essential role in their teaching practices (Herrington H., 2013) where these beliefs showed in the instructional technique, decision-making, in selecting activities and courses, and assessment in the classrooms. (Borowg M., 2013)

Kouwlan & Torranto S., (2013) have faith in that there is very important to define the theory of the beliefs of teachers but due to the different views of intellectual and researchers regarding these beliefs, it has become very complex to recognize a clear definition of teacher's beliefs. Ghaith (2014) found that teaching and educational beliefs of teachers generally regarding teaching profession, especially for curricula has become holistic conception according to its numerous measurements which form the "education culture", Such beliefs of the teacher's effects by the pedagogical purposes and standards. After reading the definition of beliefs earlier researches, it is conclude that the beliefs of the researcher are a group of thoughts comes from mental and psychological gratified of the teacher which shows essential role in coaching the teaching behavior of the teacher.

When beliefs established in the personality of the teacher, as a result, it has found in some researchers that it become as solid, work as a regulator and resistant to change for every new information. These beliefs once established in teacher, it not allow him to change teaching practice (Stege C.,lbauer A., 2011).

According to Richardson (2006) there are three sources of the beliefs of teacher as teacher's grip on school courses, experience of teacher as a students, and teacher's personal and teaching experiences. Lortie (2005) stated that these experiences symbolizes the achievement of the profession of teaching via direct observation for providing knowledge regarding teaching occupation to the teacher. These experiences also provide assistance to the teacher in generating specific hypotheses to improve teaching profession which help teacher to improve students' learning. Tsui (2013) pointed out that the observations and beliefs the teachers get from these experiences directly encourage teacher for their pedagogical beliefs. Fang (2014) stated that other factors such as background and ability of the students, colleagues' behaviour, and the support from the administration, atmosphere and discipline of the school factors helps the teacher for the development of pedagogical beliefs.

However, Chen H., (2008) found that there is no statistically association occur among pedagogical practices and beliefs of the teacher, and students' learning as well. Moreover, he explained that other factors such as limited of non-suitable knowledge, and debating beliefs developed contradictions between pedagogical beliefs and classroom practices. Thus, the above mentioned scenario the study was designed to explore the effect of pedagogical beliefs and practices during classroom coaching and students learning.

Problem Statement

To explore the effect of pedagogical beliefs and practices during classroom instruction on students learning at secondary school level in district Gujrat.

Objectives of the Study

i. To describe the degree of pedagogical beliefs and practices of science teachers regarding their demographic variables (gender, qualification and experiences)

ii. To explore the association between degree of pedagogical beliefs and practices of teachers and students' learning

iii. To find out the effect of degrees wise pedagogical beliefs and practices during classroom instruction of teachers on students' learning

Research Hypothesis

i. No statistically significant difference exist among degrees of pedagogical beliefs and practices of science teachers regarding their demographic variables (gender, qualification and experiences)

ii. No statistically significant association exist among degrees of pedagogical beliefs and practices during classroom instruction and students' learning

iii. No statistically significant degrees of pedagogical beliefs and practices during classroom instruction wise effect on students' learning

II. RESEARCH METHODOLOGY

Research design

It was exploratory research and survey design in nature.

Population

There were 23 (boys=12, Girls=11) government secondary schools in tehsil Sarai Alamgir, district Gujrat at the time when researcher conducted research. Therefore, population for present study comprised all (23) government secondary schools which were situated in tehsil Sarai Alamgir.

Sample

All 46 (Male=24 and Female=22) secondary school science teachers of the 23 government secondary school and 460 students (Boys=240, Girls=220) of 10th class from tehsil Sarai Alamgir were randomly chosen as a sample for present study.

Research Instruments

The researcher used two self-developed tools for the collection of information from the respondents. The researcher developed questionnaire to measure set of pedagogical beliefs of science teachers and secondly, researcher developed checklist to observe practices of these set of beliefs during classroom instruction. A test was developed from science Punjab text book board to measure students' learning.

Development of Research Instruments

Through literature review related to pedagogy of the teachers, researcher came to know lots of domains of the pedagogical beliefs which teachers practices in the classroom while teaching. The researcher tried to finger out four domains (organization, dealing with behaviour, control and discipline, and lesson preparation) of pedagogical beliefs among them in the present research. The questionnaire which researcher developed to measure pedagogical beliefs of the teachers in teaching science subject, consisted two sections. The first section consisted demographic information about secondary school science teachers such as gender, qualification, and experience. The second section consisted statements regarding domains (organization, dealing with behaviour, control and discipline, and lesson preparation) of

pedagogical beliefs of the science teachers. There were 10, 10 statements regarding each domains based on five points Likert Scale e.g. strongly agree, agree, neutral, disagree, and strongly disagree. To observe practices of these four (organization, dealing with behaviour, control and discipline, and lesson preparation) pedagogical beliefs in the classroom, the researcher prepared a check list. There were 5, 5 items to observe each domain in the check list regarding pedagogical beliefs that was based on four points Likert scale e.g. perfectly, to great extent, to some extent, and not at all. Students' learning was measured in the form of achievement score in test. A knowledge level test from science subjects (Physics, Chemistry, and Bio) of the Punjab text book board of the tenth class was developed from chap 3 of based on MCQs. There were 30 items in the test and each item carry one marks.

Pilot Testing of the Research Tools

After the development of the research instrument, it was validated by 10 secondary school science teachers (Male=5, Female=5) and 40 students who were from out of the sample but had the same characteristics as the sample teachers had. On the bases of their response, some changes were brought in the questionnaire. 6 items were deleted and added new one. The words which were created ambiguity in the statement, were changed. After making changes in the questionnaire, the final Cronbach's alpha reliability of the questionnaire was .89 which was computed with help of SPSS software, which shows items in the questionnaire were highly correlated.

Procedure of the Data Collection

For the collection of data from the selected secondary school, the researcher first of all, contacted to CEO of education department of district Gujrat, for seeking permission to collect data for selected secondary schools of the tehsil Sarai Alamgir. List of the situated secondary schools in tehsil Sarai Alamgir was downloaded from the website of Punjab schools education department. After seeking permission from CEO, researcher personally visited every selected secondary school to meet headmaster/principal for collecting data. Headmaster/principal of each school called their science teachers and introduced researcher. The researcher explained the objectives of the conducting research in their school and procedure of collecting data. The researcher delivered questionnaire to each science teacher to fill it which was regarding to measure their pedagogical beliefs. After that the researcher personally observed teacher by sitting his/her classroom during classroom instruction to know what extent teacher practices these set of pedagogical beliefs whatever they beliefs in, during classroom instruction. In this way, the researcher visited twice in each school for data collection.

Data Analysis

Collected information from the secondary school science teachers and students, was ordered, coded, and put into computer for statistical treatment. Data was statistically treated by applying inferential statistics e.g. Independent sample t-test, one way ANOVA, Chi-square, and Pearson's correlation with help of Statistical Package for Social Sciences (SPSS). As shown in the following table:

III. RESULTS

Degree of pedagogical beliefs of science teachers regarding their demographic variables (gender, qualification and experiences)

It is indicated in the following table that the computed t-values of gender wise science teacher is (-.1440) less than the table value (3.526) and computed sig value (.157) is greater than critical value (0.05). The computed F-values of qualification wise science teacher is (1.188) less than the table value (19.970) and computed sig value (.315) is greater than critical value (0.05). So, accepted the null hypothesis.

The computed F-values of teaching experience wise science teacher is (8.067) greater than the table value (5.688) and computed sig value (.000) is less than critical value (0.05). So rejected null hypothesis.

It is concluded that gender and qualification wise no statistically significant difference exist in the degree of pedagogical beliefs in science teachers. On the other hand whatever the degree of pedagogical beliefs do science teachers possessed, had the same degrees but teaching experience wise statistically significant difference exist in the degree of pedagogical beliefs among science teachers. Further, to determine, teacher of which teaching experience had different degree of pedagogical beliefs, post-hoc test was applied in the following table No. 1b.

Table No. 1a: Independent sample t.test for the analysis to gender wise and ANOVA for the analysis to analyze qualification and experience wise difference in the degree of pedagogical beliefs of science teachers

Demo Variables		N	Mean	Std.D	t	Sig.
Gender	Male	22	2.91	.750	-1.440	.157
	Female	24	2.25	.847		

Demo Variables		N	Mean	Std.D	t	Sig.
Qualification		**SS**	**df**	**MS**	**F**	**sig**
	Between Groups	1.552	2	3.265	1.188	.315
	Within Groups	28.100	43	.405		
	Total	29.652	45			
Experience		**SS**	**df**	**MS**	**F**	**sig**
	Between Groups	13.059	4	15.788	8.067	.000
	Within Groups	16.593	41	21.531		
	Total	29.652	45			

Gender df =44, The mean difference is significant at the .05 level

Post Hoc analysis to analyze experience wise difference in the Degree of pedagogical beliefs of science teachers

The following table (1b) shows that science teacher who had above than 20 year teaching experience had high degree of pedagogical beliefs than the other science teacher who other bracket of teaching experiences.

Table No.1b: Post Hoc analysis to analyze experience wise difference in the Degree of pedagogical beliefs of science teachers

(I) Experience	(J) Experience	MD(I-J)	Std. Error	Sig.
Above than 20 Year	Less than 5 Year	1.456(*)	.292	.000
	6-10 Year	1.500(*)	.348	.000
	11-15 Year	.838(*)	.256	.002

Association between Pedagogical Beliefs of teachers and Students' Learning

The following table disclose that the computed r-value (.775) is statistically significant at critical value (0.05) level of significant. It shows that significant association exist between pedagogical beliefs of secondary school science teachers and students' learning. Hence, rejected the null hypotheses. It is concluded that there is strong association between pedagogical beliefs of secondary school science teachers and students' learning.

Table No. 2: Pearson's associational analysis to find out the association between pedagogical beliefs of teachers and students' learning

Variable	r	Sig
Pedagogical Beliefs Students' Learning	.775*	.000

**P ≤ 0.05, **P ≤ 0.01*

Effect of the degrees of Pedagogical beliefs of science teachers on students' learning in science subjects

The following table disclose that the computed $\chi 2=47.743$ is greater than (7.815) and computed sig value=0.000 which is less than the critical value (P=0.05). It reveals that statistically significant difference exist between the degrees of pedagogical beliefs and students' learning. Therefore, rejected the null hypothesis. It is concluded that the science teachers who were enjoying high degree of pedagogical beliefs, theirs' students had high level of learning and majority of them performed "excellent" in test. The science teachers who were enjoying moderate degree of pedagogical beliefs, theirs' students had medium level of learning and majority of them performed "good" in test and the teachers who were enjoying degree of pedagogical beliefs, theirs' students had low level of learning and majority of them performed "average" in test.

Table No. 3: Chi-square analysis to analyze the effect of Pedagogical beliefs of teachers on students' learning in science subjects

Degrees of PB	Frequency	Learning					Total
		B. Avrg	Avrg	Good	V. Good	Excellent	
High	Count	0	10	0	50	110	170
	% within Level of Pedagogical Beliefs	.0%	5.9%	.0%	29.4%	64.7%	100.0 %
	% within Learning	.0%	5.3%	.0%	83.3%	100.0%	37.0%
	% of Total	.0%	2.2%	.0%	10.9%	23.9%	37.0%

Degrees of PB	Frequency	Learning					Total
		B. Avrg	Avrg	Good	V. Good	Excellent	
Moderate	Count	20	80	60	0	0	160
	% within Level of Pedagogical Beliefs	12.5%	50.0%	37.5%	.0%	.0%	100.0 %
	% within Learning	50.0%	42.1%	100.0%	.0%	.0%	34.8%
	% of Total	4.3%	17.4%	13.0%	.0%	.0%	34.8%
Low	Count	20	100	0	10	0	130
	% within Level of Pedagogical Beliefs	15.4%	76.9%	.0%	7.7%	.0%	100.0 %
	% within Learning	50.0%	52.6%	.0%	16.7%	.0%	28.3%
	% of Total	4.3%	21.7%	.0%	2.2%	.0%	28.3%
Total	Count	40	190	60	60	110	460
	% within Level of Pedagogical Beliefs	8.7%	41.3%	13.0%	13.0%	23.9%	100.0 %
	% within Learning	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %
	% of Total	8.7%	41.3%	13.0%	13.0%	23.9%	100.0 %

χ^2 = 47.743, sig=.000 at P=0.05

Frequency of the practices of pedagogical beliefs of science teachers regarding their demographic variables (gender, qualification and experiences)

It is indicated in the following table that the computed t-values of gender wise science teacher is (-2.293) less than the table value (3.526) and computed sig value (.027) is also less than critical value (0.05). The computed F-values of qualification wise science teacher is (3.355) greater than the table value (5.688) and computed sig value (.044) is less than critical value (0.05). The computed F-values of teaching experience wise science teacher is (13.671) greater than the table value (5.688) and computed sig value (.000) is less than critical value (0.05). So, rejected null hypothesis.

It is concluded that gender, qualification, and teaching experience wise statistically significant difference exist in the frequency of practicing pedagogical beliefs during classroom instruction. The table No.4a disclose that male practicing more pedagogical beliefs than the female during classroom instruction. To determine qualification and teaching experience wise teacher of which qualification and experience practice more pedagogical beliefs during classroom instruction, post-hoc test was applied in.

Table No. 4a: Independent sample t.test for the analysis to gender wise and ANOVA for the analysis to analyze qualification and experience wise difference in the Degree of pedagogical beliefs of science teachers

Demo Variables		N	Mean	Std.D	t	Sig.
Gender	Male	22	1.86	1.125	-2.293	.027
	Female	24	2.67	1.239		
Qualification		**SS**	**df**	**MS**	**F**	**sig**
	Between Groups	9.357	2	4.679	3.355	.044
	Within Groups	59.969	43	1.395		
	Total	69.326	45			
Experience		**SS**	**df**	**MS**	**F**	**sig**
	Between Groups	39.621	4	9.905	13.671	.000
	Within Groups	29.706	41	.725		
	Total	69.326	45			

** The mean difference is significant at the .05 level*

The following table (4b) disclose that science teachers who enjoying M.A/M.Sc., their qualification and had above 20 year teaching experience practicing more pedagogical beliefs during classroom instruction than the others bracket of qualification and teaching experiences.

Table No.4b: Post Hoc analysis to analyze qualification wise difference in the frequency of the practices of pedagogical beliefs of science teachers during classroom instruction

(I) Demo variable	(J) Demo variable	MD(I-J)	Std. Error	Sig.

Qualification	**Qualification**			
M.A/M.Sc.	B.A/B.Sc.	1.456(*)	.292	.000
	M.Phil.	1.500(*)	.348	.000
Experience	**Experience**			
Above than 20 year	Less than 5 Year	2.256(*)	.391	.000
	6-10 Year	2.500(*)	.466	.000
	11-15 Year	1.825(*)	.343	.000

** The mean difference is significant at the .05 level*

Association between Practicing Pedagogical Beliefs during classroom instruction and Students' Learning

The following table disclose that the computed r-value (.843) is statistically significant at critical value (0.05) level of significant. It shows significant association exist between practices pedagogical beliefs during classroom instruction and students' learning. Hence, rejected the null hypotheses. It is concluded that there is strong association between practicing of pedagogical beliefs during classroom instruction and students' learning.

Table No. 5: Pearson's associational analysis to find out the association between practices of pedagogical beliefs during classroom instruction and students' learning

Variable	R	Sig
Practices of Pedagogical Beliefs Students' Learning	.843*	.000

**P ≤ 0.05, **P ≤ 0.01*

Effect of the practices of Pedagogical beliefs during classroom instruction on students' learning in science subjects

The following table disclose that the computed $\chi 2=57.516$ is greater than table value (9.488) and computed sig value=0.000 which is less than the critical value (P=0.05). It point out that statistically significant difference exist in the practices of pedagogical beliefs in the classroom and its effect on students' learning. Therefore, rejected the null hypothesis.

It is concluded that the science teachers who were perfectly or great extent practicing set of pedagogical beliefs during classroom instruction, theirs' students had high level of learning and majority of them performed "excellent" in test. The science teachers who were great extent practicing set of pedagogical beliefs during classroom instruction, theirs' students had medium level of learning and majority of them performed "good" in test and the science teachers who never/ not at all practicing set of pedagogical beliefs during classroom instruction, theirs' students had low level of learning and majority of them performed "Average" in test.

Table No. 6: Chi-square analysis to analyze the effect of practicing pedagogical beliefs during classroom instruction on students' learning in science subjects

Frequency of the Practices of PB	Frequency	Learning					Total
		B Avrg	Avrg	Good	V Good	Excellent	
Perfectly	Count	0	0	0	40	100	140
	% within frequency of Practices of PB	.0%	.0%	.0%	28.6%	71.4%	100.0%
	% within Learning	.0%	.0%	.0%	66.7%	90.9%	30.4%
	% of Total	.0%	.0%	.0%	8.7%	21.7%	30.4%
To great Extent	Count	0	0	0	0	10	10
	% within frequency of Practices of PB	.0%	.0%	.0%	.0%	100.0%	100.0%
	% within Learning	.0%	.0%	.0%	.0%	9.1%	2.2%
	% of Total	.0%	.0%	.0%	.0%	2.2%	2.2%
To some Extent	Count	30	50	60	10	0	150
	% within frequency of Practices of PB	20.0%	33.3%	40.0%	6.7%	.0%	100.0%
	% within Learning	75.0%	26.3%	100.0%	16.7%	.0%	32.6%
	% of Total	6.5%	10.9%	13.0%	2.2%	.0%	32.6%
Not at all	Count	10	140	10	0	0	160
	% within frequency of	6.3%	87.5%	6.3%	.0%	.0%	100.0%

Frequency of the Practices of PB	Frequency	Learning					Total
		B Avrg	Avrg	Good	V Good	Excellent	
	Practices of PB						
	% within Learning	25.0%	73.7%	16.7%	.0%	.0%	34.8%
	% of Total	2.2%	30.4%	2.2%	.0%	.0%	34.8%
Total	Count	40	190	70	50	110	460
	% within frequency of Practices of PB	8.7%	41.3%	13.0%	13.0%	23.9%	100.0%
	% within Learning	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	8.7%	41.3%	13.0%	13.0%	23.9%	100.0%

Chi-square= 57.516, sig=.000 at P=0.05

IV. Conclusion and Recommendation

Exploring the effect of pedagogical beliefs and practices during classroom instruction on students learning at secondary school level in tehsil Sarai Alamgir district Gujrat was major purpose of conducting present research. After analysis it was found that gender and qualification wise no difference was found among science teachers in the degree of pedagogical beliefs. On the other hand male and female of any level qualification (B.a/B.Sc., M.A/M.Sc. or M.Phil.) whatever do they possess degrees (high, medium, or low) of pedagogical beliefs, had the same degrees but teaching experience wise statistically significant difference was found in the degrees of pedagogical beliefs among science teachers of secondary school level. The science teachers he/she who had above than 20 year teaching experience, were enjoying high degree of pedagogical beliefs. Ertmer A., (2015) in his research found that female science teachers possess high degree of pedagogical beliefs as compare to male. In the present study, it was also found that there is strong association between pedagogical beliefs and students' learning. It should also be because teachers' decision in the classroom are likely to be leaded by these beliefs of that is suitable and imaginable in classroom setting as compare to instructional theories. So, such challenges become the finding of most effective way to change these beliefs according to students' need that is why the more emphasize pedagogical beliefs the more students learning would be occurred (windschilt, 2013). The results of the present study disclose that the science teachers he/she who had high degree of pedagogical beliefs, their students were enjoying high level of learning and they performed "excellent" in test. The science teachers he/she who had moderate degree of pedagogical beliefs, their students were enjoying medium level of learning and they performed "good" in test, and the science teachers he/she who had low degree of pedagogical beliefs, their students were enjoying low level of learning and they performed just "average" in test. The results of the present research found statistically significant string association between practices of pedagogical beliefs and students' learning. Statistically significant difference in the practices of pedagogical beliefs during classroom instruction by gender, qualification, and teaching experience wise science teachers was also found. Barron W., (2014) found that there is strong relationship between practices of pedagogical beliefs and student academic achievement. The result reveals that male science teachers whatever degrees of pedagogical beliefs do they possessed practiced more than the female during classroom instruction. The science teacher who were enjoying M.A/M.Sc. their qualification practiced more than the science teachers who had other level of qualification, and the science teachers he/she who had above 20 year teaching experience, were enjoying high degree of pedagogical beliefs and were practicing these beliefs perfectly during classroom instruction and got plausible result from the students. The science teacher he/she practiced perfectly/ great extent pedagogical beliefs during classroom instruction, their students were enjoying high level of learning and majority of them performed "excellent" in the test. The science teacher he/she practiced some extent pedagogical beliefs during classroom instruction, their students were enjoying medium level of learning and majority of them performed "good" in the test, and the science teacher he/she practiced not at all pedagogical beliefs during classroom instruction, their students were enjoying low level of learning and majority of them performed "average" in the test.

Keeping in view the results from the conclusion, the recommendation was mad that it is a need of the time that schools continually produce skilled full nation, and they acquire more and better knowledge, would depend on the skill which teachers possess and able to use. It is generally responsibly of government especially education department, should select that teacher who had high level of pedagogical beliefs. It is foremost duty of education department to revisit that science teachers who reported low degree of

pedagogical beliefs and practices and trained them to improve their capacity so that fruitful result can be achieve in future.

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