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IMPACT EXTENT OF TEACHER PROFESSIONAL DEVELOPMENT ON TEACHING MATH IN PREP-YEAR -UNIVERSITY OF HAIL

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ABSTRACT

Developing teacher practice is very important for the students achievements .Developing of teacher practices falls under the auspices of professional development [7], a broad umbrella that includes ,workshops ,individual reading ,informal dialogue with colleagues , conferences ,qualifications programs [17] ,observation visit , network of teaching [13] , research. The impact extent of these professional development activities vary according to many factors from place to place [9] , from this angle we have explored in this paper the impact extent of these professional activities from the point of view of MATH teachers in the Preparatory Year in University of Hail. A questionnaire was employed to measure the construct, 'employee motivation', which consisted of six questions. The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.823.

KEYWORDS: Professional development, teaching and learning, preparatory -math

INTRODUCTION

Many studies were focus on teacher's professional development. A set of nine "design principles for effective professional development", that reflects the shift from form to substance that has taken place over recent years was provided in [16]. Long –term professional development have been shown with a positive effects on teachers in [3,12]. Kennedy [12] , found ten research studies over the previous 20 years that specifically examined the impact of professional development programs on student learning[13] . These programs varied in terms of their impact on student learning and the permanence of the effects on teacher practices. Kennedy teases out the presumed links between teacher and student learning for each program (the program 'logic') and the factors that might explain why the strength of the links varies between programs As she looked across the ten programs, Kennedy [12] ,found that differences in program form did not account for differences in effects on student achievement. During the 1990s, some experts began to suggest that these traditional forms of teacher professional development lacked the focus, intensity, and continuity needed to change classroom practices [6]. According to [15, 16], professional development should reflect student and teacher needs. Although there have been relatively few rigorous evaluations to date, there are some suggestive findings indicating that professional development that meets the high-quality criteria as described in [12,13] may change teacher learning and classroom practice and that these changes, in turn, may affect the academic performance of students [2]. It is found in [17] teachers who gave priority to pupils acquiring a collection of standard arithmetical methods, over establishing understanding and connection, produced lower numeracy gains. Lower numeracy gains were also produced by teachers who gave priority to the use of practical equipment rather than developing effective methods, and delayed the introduction of more abstract ideas. In [17] also found that teachers' beliefs and understandings of the mathematical and pedagogical purposes of classroom practices were more important than their actual practice.In [13] it is found that expert teachers draw on a richer and deeper knowledge structure than novice teachers. Novices had less well developed 'schemata', due, probably, to having had less experience. This finding is also similar to that reported by [6] and [8] , who noted that expert teachers had 'scripts for change' stored mentally, and these could be quickly accessed and implemented.

When teachers receive well-designed professional development, an average of 49 hours spread over six to 12 months, they can increase student achievement by as much as 21 percentile points as mentioned in [14]. On the other hand, one-shot, "drive-by," or fragmented, "spray-and-pray" workshops lasting 14 hours or less show no statistically significant effect on student learning [3] . Above all, it is most important to remember that effective

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professional-development programs are job-embedded and provide teachers with critical elements that enhance teaching practices as in [1] and [13].

In this paper we are going to explore the impact extent of nine teacher's professional development activities on teaching MATH from the point of view of University of Hail Preparatory MATH teachers.

POPULATION

The population of the study comprised 35 MATH teachers in the Preparatory Year –University of Hail those who obtained a professional development programs , all the participants has experience in teaching MATH in the Preparatory Year for more than three years .

METHODOLOGY

A questionnaire whose base is Likert 4 Scale ([4] ,[5])was designed to collect information on teachers professional development ,covering development activities ,development's needs , feedback, the importance of feedback consideration and its effect on teaching and learning [2], to what extent it effect the teacher job [1] .In this paper we are going to limit ourselves by studying the impact extent of nine professional development activities. Using Minitab 16 some statistical tests were used to analyze the survey these include: frequency distribution-Descriptive statistics –Item analysis –Hypothesis test.
After we examine our data distribution by the frequency and the percentages table we shift to check the internal consistency between the variable through Conbach's number [5] , and finally we test the following hypothesis for each activity by sample t-test on Minitab:

The Null hypothesis H_0: The mean of responses of activity number (1……,9) is not statistically significant greater than 2 on Likert Scale.

The alternative hypothesis H_1: The mean of responses of activity number (1……,9) is statistically significant greater than 2 on Likert Scale.

To study and analyze our data we use three statistical means, frequency distribution, item analysis, hypothesis testing.

A frequency table is a simple way to display the number of occurrences of a particular value or characteristic .can also help to identify obvious trends within a data set and can be used to compare data between data sets of the same type.

Item analysis can tell how well a set of questions (or items) measures one characteristic (or construct) and helps to identify questions that are problematic. and finally we test hypothesis through t-sample test.

Frequency Distribution and Percentage

			Small ,Moderate & Large Impact					Activity
Question Number	No impact	Percentage	Small inpact	Moderate impact	Large impact	Impact	Percentage	
1	6	17.14%	12	15	2	29	82.86%	Course/worksh op
2	13	37.14%	6	12	4	22	62.86%	Conferences/se minars
3	11	31.42%	9	4	11	24	68.58%	Qualification program
4	15	42.85%	2	13	5	20	57.15%	Visit to other Prep-Year
5	13	37.14%	4	**16**	2	22	62.86%	Network of teachers

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6	10	28.57%	4	9	12	25	71.43	Collaborative research
7	14	40%	7	7	7	21	60%	Peer observation
8	8	22.85	10	7	10	27	77.15	Reading in literature
9	5	14.28	12	13	5	30	85.72	Dialogue with colleagues

Table 1. Impact of Activities on teacher's Developments

In table 1. Teachers were asked to what extent the mentioned activities impact upon their development on a four-point Likert scale where "1=no impact", "2=small impact", "3=moderate impact" and "4=large impact"..The average points for each item was mentioned in the time table above ensuring that all the activities arranged in the table has a positive impact –above average (2.4) upon teachers development.- the highest percentage indicating impact is (85.72%) for activity number 9 –dialogue with colleagues , then activity number 1 –Courses/workshops with (82.86%) then activity number 8 –reading in literature with (77.15%),then activity number 6 – Collaborative research with (71.3%) .42.85% seeing that visiting to other Prep-Year-activity number 4- has no impact , 40% of the MATH teachers in the Preparatory Year reported that there is no impact for activity 7 which is about peer observation , more effort needed to raise the impact of these two activities as suggested in [11] ,[15].

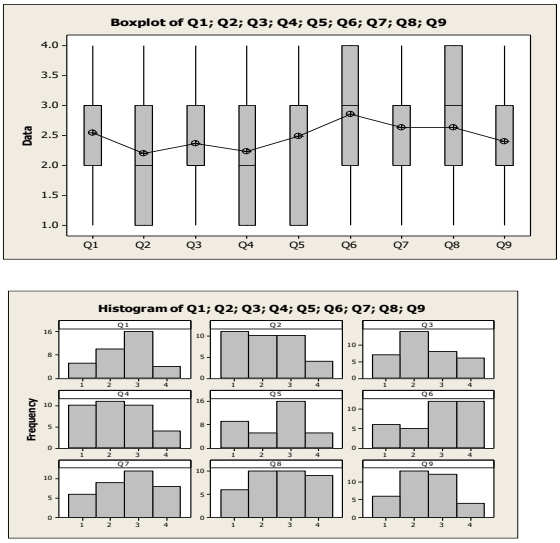

Figure1. Boxplot for the distribution of the responses

From figure 1 , The shape of the graph shows central tendency, and variability .The graphs shows that for all the responses there is no outliers ,the upper 25% of the distribution is equal except for item 6 and item 8.The lower 25% of the distribution is equal for items 1,3,6,9. interquartile range box: middle 50% of the data is equal for items 1,2,3,4,5,7,8,9..Also we see that there are no missing values , no outliers , central tendency range [2.2 , 2.857]

Item Analysis

Item Analysis of Q1; Q2; Q3; Q4; Q5; Q6; Q7; Q8; Q9

Correlation Matrix

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q2	0.526							
Q3	0.316	0.564						
Q4	0.098	0.455	0.370					
Q5	0.361	0.406	0.456	0.576				
Q6	0.275	0.709	0.301	0.591	0.414			

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Q7	0.576	0.585	0.384	0.522	0.509	0.477		
Q8	0.647	0.794	0.541	0.299	0.417	0.597	0.582	
Q9	0.597	0.336	0.502	0.364	0.477	0.107	0.455	0.455

Table 2 : Pearson correlation

From table 3 : It is clear that there is a positive correlation between all of the survey items that all the items are in the same direction measuring professional development impact .

Cronbach's Alpha = 0.8845

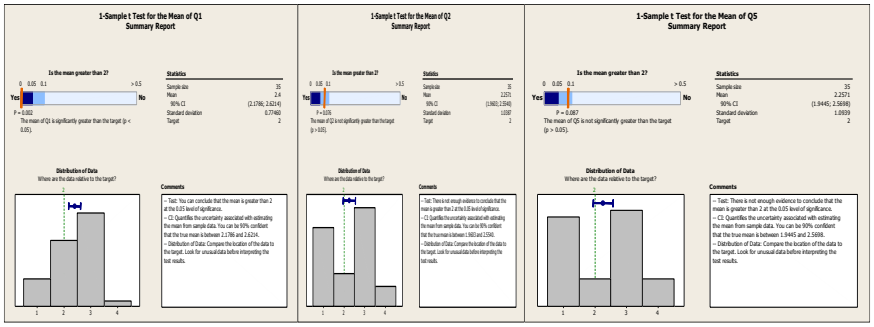
Omitted Item Statistics

Omitted Variable	Adj. Total Mean	Adj. Total StDev	Squared Item-Adj. Total Corr	Multiple Corr	Cronbach's Alpha
Q1	19.257	6.223	0.5760	0.6800	0.8774
Q2	19.400	5.857	0.7802	0.7676	0.8592
Q3	19.114	6.062	0.5804	0.5106	0.8762
Q4	19.543	6.118	0.5767	0.6746	0.8764
Q5	19.400	5.972	0.6141	0.4797	0.8737
Q6	19.229	5.872	0.6066	0.6933	0.8760
Q7	19.400	5.842	0.7044	0.5778	0.8656
Q8	18.800	5.815	0.7574	0.7489	0.8606
Q9	19.114	6.201	0.5390	0.6221	0.8793

Table 3:Conbach's Alpha for the Items (Q1-Q9)

From the item analysis in table 2 above where all the 9 items measure different aspects of quality on a Likert scale (1 is no impact , 4 large impact). For the most part, respondents who rated Question 1 high also rated Question 2 high. And, those who rated Question 1 low tended to rate Question 2 low. This correlation suggests these questions measure the same characteristic, and so comprise a reliable survey , this trust on reliability was ensured in table 3 , with Cronbach's alpha (0.8845) , assuring that there is a trusted internal consistency ("reliability").

Hypothesis Testing



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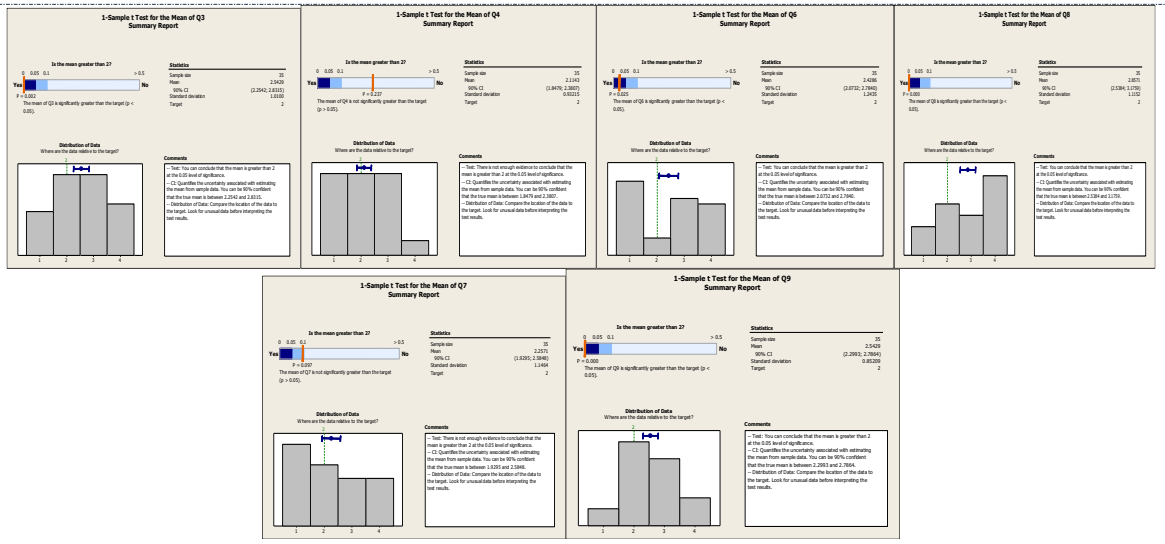

Figure 2 : 1-Sample t Test for the Mean of the Items (Q1-Q9)

From figure 3 we can summaries the hypothesis test in the table below :

Item	Mean	90% CI	SD	Hypothesis
Q1	2.4	(2.1876,2.6214)	0.77640	H0 is rejected , we accept the alternative hypothesis H1 The mean in item1 is significantly >2 in Likert Scale
Q2	2.2571	(1.963, 2.854)	1.0387	H0 can not be rejected . The mean in item2 is not significantly >2
Q3	2.5429	(2.2542,2.8315)	1.0100	H0 is rejected , we accept the alternative hypothesis H1 The mean in item3 is significantly >2 in Likert Scale
Q4	2.1143	(1.8479,2.3807)	0.8767	H0 can not be rejected . The mean in item4 is not significantly >2
Q5	2.257	(1.9445,2.5698)	1.0939	H0 can not be rejected . The mean in item5 is not significantly >2
Q6	2.4286	(2.0732,2.7840)	0.07654	H0 is rejected , we accept the alternative hypothesis H1 The mean in item6 is significantly >2 in Likert Scale
Q7	2.2571	(1.9295,2.5848)	1.1464	H0 can not be rejected . The mean in item7 is not significantly >2
Q8	2.8571	(2.5384,3.1759)	1.1152	H0 is rejected , we accept the alternative hypothesis H1 The mean in item8 is significantly >2 in Likert Scale
Q9	2.5429	(2.2993,2.7864)	0.85209	H0 is rejected , we accept the alternative hypothesis H1 The mean in item9 is significantly >2 in Likert Scale

Table 4 :Summaries of hypothesis test on (Q1-Q9)

CONCLUSION

Teacher professional activities impact on teaching practices was explored using reliable and highly trusted survey as pointed by Cronbach's alpha (0.8845).Preparatory MATH teacher responses on nine different activities was analyzed using Minitab through : Frequency distribution , Item analysis , hypothesis test , we concluded that there is a statistically significant that , the mean of each of the following is greater than 2 : Course/Worksheet , Qualification Program , Collaborative Research ,Reading in Literature , Dialogue with Colleagues . these five activities according to the analysis has impact ranging from small to large on teaching practices . There is no enough evidences that the mean of the following activities is greater than 2 : Conferences /Seminars , Visit to

other Preparatory Year in other Universities , Network of teachers , Peer Observation . Some rearrangements based on research findings are necessary to make these activities significantly effecting teaching practices.

REFERENCES

[1] Accomplished California Teachers (2012). Promoting Quality Teaching: New Approaches to Compensation and Career Pathways.
[2] Blank, R.K., de las Alas, N., and Smith, C. (2008). Does Teacher Professional Development Have Effects on Teaching and Learning?: Evaluation Findings from Programs in 14 States .
[3] Blank, R.K., and de las Alas, N. (2009). Effects of Teacher Professional Development on Gains in Student Achievement: How Meta-Analysis Provides Scientific Evidence Useful to Education Leaders .
[4] Boone, H.N., & Boone, D.A. (2012). Analysing Likert Data. Journal of Extension, 50(2). Retrieved from http://www/joe/2012april/tt2/php
[5] Gliem, J. A., Gliem, R. R., Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coef. for Likert-Type Scales, http://pioneer.netserv.chula.ac.th/ppongsa/ 2013605
[6] Gallimore, R., Ermeling, B.A., Saunders, W.M., and Goldenberg, C. (2009). Moving the Learning of Teaching Closer to Practice: Teacher Education Implications of School-Based Inquiry Teams .
[7] Guskey, T.R., and Yoon, K.S. (2009). What Works in Professional Development? Phi Delta Kappan, 90(7), 495-500.
[8] Hill, H.C., Rowan, B., and Ball, D.L. (2005). Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement . American Educational Research Journal, 42(2), 371-406.
[9] Jaquith, A., Mindich, D., Wei, R.C., and Darling-Hammond, L. (2010). Teacher Professional Learning in the United States: Case Studies of State Policies and Strategies. Oxford, OH: Learning Forward.
[10] Leithwood, K., Seashore Louis, K., Anderson, S.E., and Wahlstrom, K. L. (2004). Review of Research: How Leadership Influences Student Learning . University of Minnesota and University of Toronto.
[11] Lewis, C., Perry, R., and Murata, A. (2006). How Should Research Contribute to Instructional Improvement? The Case of Lesson Study . Educational Researcher, 35(3), 3-14.
[12] Mary M.Kennedy (2016) , How does professional development improve teaching , Review of Educational Research , Vol(86) issue 4.
[13] Meyers, C., and Brandt, W.C. (2010). A Summary of External Program Evaluation Findings for the eMINTS (enhancing Missouri's Instructional Networked Teaching Strategies) Program from 1999–2009 .
[14] Nye, B., Konstantopoulos, S., and Hedges, L.V. (2004). How Large Are Teacher Effects? . Educational Evaluation and Policy Analysis, 26(3), 237-257.
[15] Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. (2015). Teacher Collaboration in Instructional Teams and Student Achievement. American Educational Research Journal, 52(3), 475-514.
[16] Tuba G. (2015) , Teachers' evaluation of professional development in support of national reforms. Issues in Educational Research, 25(4)
[17] Vescio, V., Ross, D., and Adams, A. (2. Teaching and Teacher Education, 24(1), 80-91.