



Research Article

An Investigation into Competencies of High School Teachers Teaching Agriculture in Azad Jammu and Kashmir (AJ and K)

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Abstract | The Azad Jammu and Kashmir (AJandK) is a state territory of Pakistan; it is located at the foot hills of the Himalayas, North East of Pakistan, between longitude 70°–75° and latitude 33°–35°. The AJandK large population around 80% lives in rural areas and they are dependents on agriculture directly or indirectly. The government of AJandK has started agricultural education program for the students at the school level. The current study was carried out to examine and evaluate agriculture teachers' competencies levels that are teaching agriculture subject at school level in different parts of the state. For this purpose, 250 agriculture teachers were selected from ten districts of Azad Jammu and Kashmir by using sampling technique and well-structured interview schedule of 5-point likert scale was prepared in light of the study objectives. In addition, SPSS software V. 20.0 was used to analyze the research data. Principal Component Analysis (PCA) test was conducted to overcome the multidimensionality and multicollinearity issues in the data to produce valuable components. Results showed that among teaching competencies, 15 variables were analyzed through PCA and five components were extracted. In these components "job management" explained 19.48% variance; four variables of teaching methodological competency were loaded on "job management" component which means that agriculture school teachers possessed high level of competency in job management. Likewise, Technical skill explained 18.05% variance has the second position in possessed competencies and job evaluation explained 11.44% variance, it has third position in possessed teaching methodological competencies. Similarly, all these five components explained 67% of variance in data set of teaching methodological competencies. PCA analysis also showed that high age, more service length and diploma holder category of agriculture school teachers has negative significant correlation with teaching methodological competencies. It is concluded that the AJandK education department may positively be considered Refresher courses and new teaching staff in the agriculture education system of education department.

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Introduction

Agriculture is the largest sector of Pakistan's economy. It contributes 18.9 % in GDP of the country. Engaging 38.5% of national labor force and employing 66% of rural people directly. Agriculture plays a role in development of Pakistan by supplying food to its huge population and also supporting economic growth. Agriculture growth is 2.67% annually, but Government has set the target of 3.5% growth. As agriculture is the main stay of this country, constantly escalating population for food stuff and other agriculture related needs. It was noted that there was no significant impact of COVID-19 on the agriculture sector, still there was negative growth of 6.92 % and 0.44 % in cotton and sugarcane was observed while positive growth of about 2.90 % in major crops was observed which was due to an increase in production of wheat, rice and maize at the rate of 2.45%, 2.89% and 6.01%, respectively (GoP, 2019-20).

AJ and K has a diverse climate, ranging from sub-humid subtropical to temperate, depending upon altitude and rainfall. The altitude ranging from > 1000 meters to 5000 meters and annual rainfall from 800 mm to 1800 mm. The wide range of altitude and rainfall lend unique status to AJ and K from Agricultural point of view, which should be exploited for planning and appropriate policy for agriculture (AJ and K, DG Agriculture Report, 2014).

Cultivated area of Azad Jammu and Kashmir is 0.16 million hectares (13% of total area). In cultivated area 92% is rain fed area. Another hindrance in agriculture production is small landholding, 845 households having one to two acres of cultivated land, similarly mostly farmers have 1.2 hectares of farm size. Wheat, maize and rice are the major crops whereas vegetables, gram, pulses and oil seeds are the minor crops. Similarly, major fruits are apples, pears, apricot and walnuts (GoP, 2019-20).

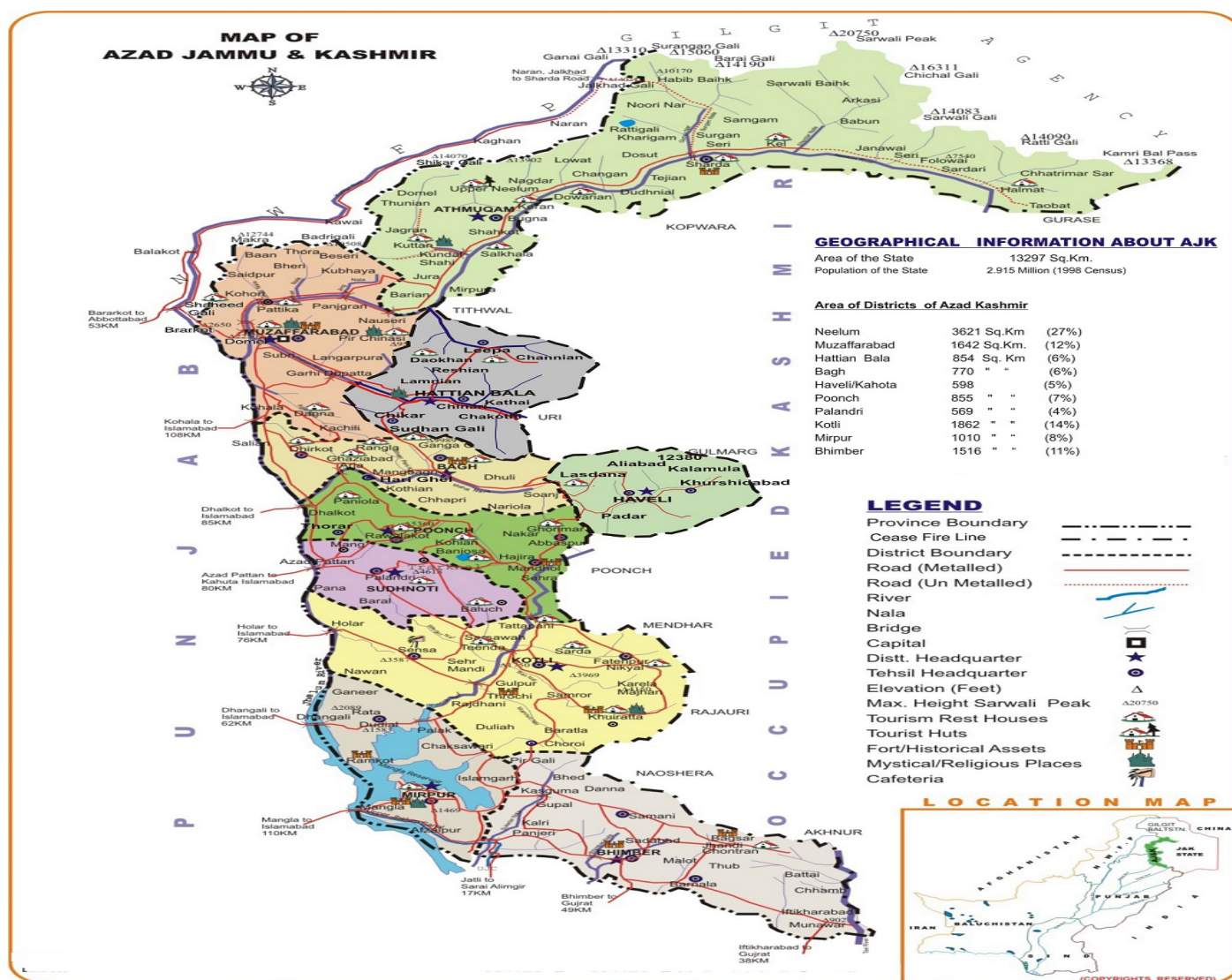


Figure 1: Map of AJ&K.

In Azad Jammu and Kashmir Agriculture school teachers are mostly educated in agriculture from different universities of agriculture or different institutions or faculties of agriculture. Some of these teachers are highly qualified as M. Phil or Master degree holder in agriculture in different disciplines of agricultural education. As these teachers remain mostly in their own localities so they have better interactions with their societies, better knowledge of their societies about their agriculture activities, they have better position to distribute agriculture innovative knowledge in their own localities due to better reputation and respectable status. So they could be better communicators and distributors of innovative technologies and knowledge to local people by educating their children at schools and helping parents at their farms (Govt. AJ&K, 2018).

The present study was designed to explore teaching methodological educational competencies of agriculture school teachers in Azad Jammu and Kashmir.

Materials and Methods

This research study is a process of investigation to examine competencies of agriculture school teachers in Azad Jammu and Kashmir. Total 279 agriculture school teachers were selected, out of which 29 chosen as pilot and remaining 250 for overall study. Data were analysed using SPSS Package 20.0 Cronbach's Alpha Test of reliability and Principal Component Analysis. Principal Component Analysis is variable reduction technique that shares many similarities to exploratory factor analysis. It generates artificial variables from original variables called "Principal Components" which account for most of the variance in the original variables. Each component is a potential "cluster" of highly inter-correlated items. These principal components want to discover the pattern of inter-correlations among variables (Bartels *et al.*, 2005).

Justification of PCA

Selecting a technique (F-1)

Results and Discussion

The results and discussion indicates the data acquired from agriculture school teachers in Azad Jammu and Kashmir regarding teaching methodological competencies. Five point likert's scale was used to weigh the responses toward competencies. Reliability

test gives us Cronbach's alpha value which indicates the percent of reliability and consistency of the scale (Mangan *et al.*, 2006).

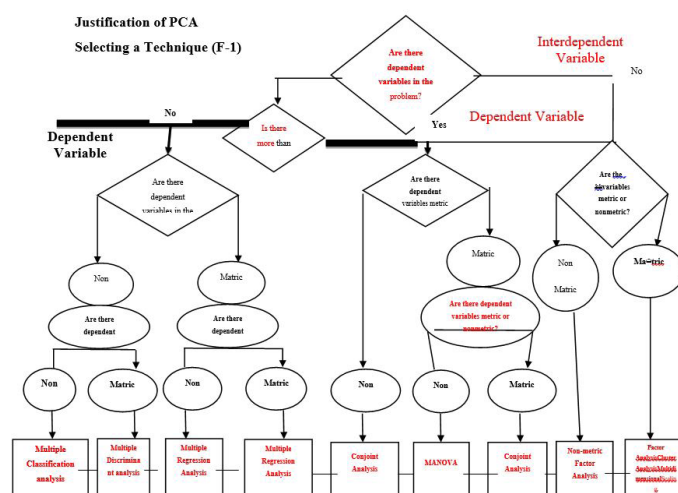


Figure 2: *Justification of PCA selecting a technique (F-I).*

Table 1 shows that Cronbach's alpha value is 0.766 which indicates that scale is 76.6% reliable and consistent to measure teaching methodological competencies. Lacobucci and Duhachek (2003) showed in their research that index of reliability are extremely important to find out the internal consistency of scale.

Table 1: *Reliability statistics for teaching methodological competencies.*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of items
.760	.766	15

Individual variable reliability test (α)

Each variable shows reliability (α) value in this test which shows correlation of the item/variables toward scale if these items were deleted. Similar study was conducted by (Lynn and Harris, 1997) produced easy and short administer instrument that measure reliability and validly by measuring individual alpha values of variables.

The column corrected item total correlation of the [Table 2](#) shows that three variables gave the values like 0.099, 0.102 and 0.001, respectively. These variables include: Individual teaching methods, situation analysis effectively and manage and arrange class effectively that gave the values of 0.099, 0.102 and 0.001 respectively, these three variables show

low correlational values with the scale to measure teaching methodological competencies of teachers. Another column cronbach's alpha if item deleted which indicates overall scale Cronbach's alpha values if these items deleted, here again above three variables values show the values of alpha 0.772, 0.770 and 0.779, respectively.

Principal component analysis (PCA)

KMO and Bartlett's test measures the sampling adequacy and sphericity of the data set of Teaching Methodological Competencies; KMO value should be more than 0.50, which is desirable for adequate sample and Bartlett's test value should be significant.

Table 3 shows Kaiser Mayer Olkin measure of sampling adequacy value which is 0.752, which shows that overall data set is adequate for PCA analysis, Bartlett's test of Sphericity is also significant (p value is 0.000).

Anti-image correlational matrix

Anti-image is the mirror image of the correlation; high correlation value is always desirable while Anti-

Image Correlation value near 0.01 or 0.02 in upper and lower triangle from diagonal of symmetrical matrix is always desirable. Value on the Principal diagonal indicates sample adequacy for each variable which is greater than 0.5 is always desirable and shows more adequacy of the sample.

Table 4 indicates anti-image correlation value of each variable, in this matrix data of lower triangle and upper triangle of the Principal diagonal is symmetrical, which is very near 0.01 to 0.02 which is desirable while on principal diagonal values of sampling adequacy is more than 0.5, except three cases whose values are 0.485, 0.466 and 0.385.

Multicollinearity in data set

Multicollinearity is correlation of one variable with more variables, it could be assessing or determine by checking determinant value in descriptive statistics of SPSS PCA dimension reduction, if the value is above 0.00001 then there is multicollinearity in the sample data set. (Field et al., 2012). In this research data set determinant value is 0.004 which shows multicollinearity in variables.

Table 2: Detailed reliability statistics teaching methodological competencies.

Variables of teaching methodological competencies	Item-total statistics				
	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Squared multiple correlation	Cronbach's Alpha if item deleted
Individual teaching methods	36.68	23.711	.099	.299	.772
Problem solving methods	36.70	23.012	.219	.123	.760
Situation analyzation effectively	36.69	23.804	.102	.301	.770
Appreciation to the students	36.70	20.908	.602	.724	.725
Reinforcement	36.69	21.298	.528	.568	.731
Appropriate and relevant material	36.66	21.679	.432	.406	.740
Contemporary knowledge	36.68	20.588	.629	.601	.721
Questioning skills	36.64	21.588	.455	.412	.738
Evaluation techniques	36.66	21.727	.439	.462	.739
Higher academic qualification	36.70	21.480	.485	.471	.735
Ability to perform effectively	36.66	22.144	.349	.392	.748
Evaluation data to improve job situation	36.69	21.306	.539	.610	.731
Manage and arrange class effectively	36.61	24.503	.001	.059	.779
Manage discipline in classroom	36.64	23.445	.157	.097	.765
Direct interaction with my students	36.66	21.332	.533	.762	.731

Table 3: Sample adequacy and sphericity (KMO and Bartlett's Test).

1.	Kaiser Meyer olkin measure of sampling adequacy	0.752
2.	Bartlett's test of sphericity	Approx. Chi-Square
	Df	105
	Sig.	0.000

Table 4: Anti-image correlation matrix for teaching methodological competencies.

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1	.485 ^a	.054	-.520	.024	.105	-.031	.054	.082	-.034	-.114	-.029	-.035	.022	.012	-.083
V2	.054	.867 ^a	.005	-.038	-.018	-.058	-.136	-.002	.057	-.069	-.016	.083	-.010	-.075	-.028
V3	-.520	.005	.466 ^a	-.125	-.035	.026	-.060	-.016	-.076	.102	.035	.029	-.020	-.046	.141
V4	.024	-.038	-.125	.702 ^a	.006	-.161	-.354	.106	.253	-.134	-.121	.089	.116	-.003	-.683
V5	.105	-.018	-.035	.006	.837 ^a	-.150	.126	-.079	-.092	.006	-.096	-.415	-.103	.005	-.237
V6	-.031	-.058	.026	-.161	-.150	.819 ^a	-.095	-.097	-.026	-.172	-.285	.107	-.079	.068	.132
V7	.054	-.136	-.060	-.354	.126	-.095	.796 ^a	-.053	-.238	-.339	-.107	-.244	.004	.051	.164
V8	.082	-.002	-.016	.106	-.079	-.097	-.053	.825 ^a	-.395	-.031	-.031	.002	-.046	-.102	-.160
V9	-.034	.057	-.076	.253	-.092	-.026	-.238	-.395	.729 ^a	.137	-.163	-.057	-.046	-.066	-.190
V10	-.114	-.069	.102	-.134	.006	-.172	-.339	-.031	.137	.816 ^a	-.148	-.044	-.012	-.172	.081
V11	-.029	-.016	.035	-.121	-.096	-.285	-.107	-.031	-.163	-.148	.781 ^a	.006	.051	.122	.228
V12	-.035	.083	.029	.089	-.415	.107	-.244	.002	-.057	-.044	.006	.819 ^a	.117	-.065	-.317
V13	.022	-.010	-.020	.116	-.103	-.079	.004	-.046	.053	-.012	.051	.117	.358 ^a	-.075	-.103
V14	.012	-.075	-.046	-.003	.005	.068	.051	-.102	-.066	-.172	.122	-.065	-.075	.646 ^a	.016
V15	-.083	-.028	.141	-.683	-.237	.132	.164	-.160	-.190	.081	.228	-.317	-.103	.016	.689 ^a

Correlational matrix of the variables

Pearson Correlation matrix of the methodological competencies variables shows the relationship between variables, its high value is always desirable with positive or negative sign, and positive sign values show the direct relationship in one Positive direction while negative sign shows the inverse relationship between variables. Multicollinearity of the correlation is desirable in principal component analysis.

Table 6 indicates significant Pearson correlation between variables at 0.01 and 0.05 level of significance with “**” and “*” respectively except one variable, V13 “I manage and arrange class effectively”. There is multicollinearity in the data set. So this data fulfills the assumption of PCA.

Significant outlier

SPSS Statistics for PCA analysis recommends determining outliers from the data set because these outliers put our means and standard deviations away from the required which directly influence our component scores.

Figure 2 indicates that all the responses of the teaching methodological competencies are in the range of 1-5 which is Likert’s scale range, all the data has been spreaded between the ranges of 1-4 only few responses are out of this range near to 5. So figure shows there is no significant outlier in the data set which is desirable to run PCA.

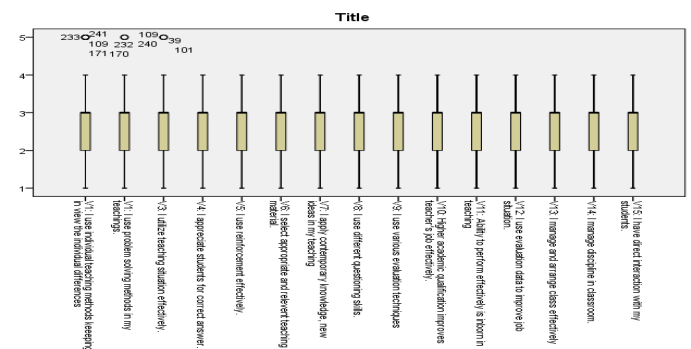


Figure 2: Box plot of responses of teaching methodological competencies.

Deriving factors and assessing overall fit number of factors extracted

Scree test criterion/latent root criterion: Scree plot shows the graph of components based on Eigen value, those component having Eigen value more than “1” (by default in SPSS Statistic analysis) are loaded. Purpose of Scree plot is to identify the number of components retained in our analysis. Similarly, latent root criterion retains those components having Eigen value more than “1”. These components show maximum variance (more than 60%) in the data.

Figure 3 indicates as many components as there are variables in the data set but on the basis of Eigen value more than “1” there are five components which have Eigen values more than “1”. Component No.1 having Eigenvalue 4.45, Component No. 2 shows Eigen value nearly 2 and remaining components indicate Eigen values less than 2 in the test of Scree plot.

Table 6: Statistical distribution for Pearson correlations of the variables.

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1	1	-.040	.519**	.068	-.065	.044	.053	-.057	.030	.093	.048	.006	-.040	.010	.012
V2	-.040	1	-.017	.233**	.082	.216**	.285**	.071	.017	.263**	.162*	.058	.008	.084	.108
V3	.519**	-.017	1	.058	-.042	.026	.075	-.010	.067	.010	.030	-.026	-.016	.037	-.044
V4	.068	.233**	.058	1	.439**	.351**	.584**	.223**	.158*	.449**	.249**	.483**	-.059	.073	.710**
V5	-.065	.082	-.042	.439**	1	.222**	.287**	.419**	.410**	.177**	.157**	.673**	.084	.115	.633**
V6	.044	.216**	.026	.351**	.222**	1	.454**	.217**	.175**	.461**	.513**	.123	.028	-.021	.102
V7	.053	.285**	.075	.584**	.287**	.454**	1	.298**	.331**	.597**	.436**	.416**	-.065	.071	.333**
V8	-.057	.071	-.010	.223**	.419**	.217**	.298**	1	.574**	.161*	.179**	.383**	.071	.177**	.395**
V9	.030	.017	.067	.158*	.410**	.175**	.331**	.574**	1	.089	.226**	.409**	.005	.135*	.360**
V10	.093	.263**	.010	.449**	.177**	.461**	.597**	.161*	.089	1	.418**	.234**	-.030	.141*	.179**
V11	.048	.162*	.030	.249**	.157*	.513**	.436**	.179**	.226**	.418**	1	.109	-.069	-.071	-.005
V12	.006	.058	-.026	.483**	.673**	.123	.416**	.383**	.409**	.234**	.109	1	-.034	.152*	.673**
V13	-.040	.008	-.016	-.059	.084	.028	-.065	.071	.005	-.030	-.069	-.034	1	.084	.045
V14	.010	.084	.037	.073	.115	-.021	.071	.177**	.135*	.141*	-.071	.152*	.084	1	.129*
V15	.012	.108	-.044	.710**	.633**	.102	.333**	.395**	.360**	.179**	-.005	.673**	.045	.129*	1
N	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250

** : Correlation is significant at the 0.01 level (2-tailed); * : Correlation is significant at the 0.05 level (2-tailed).

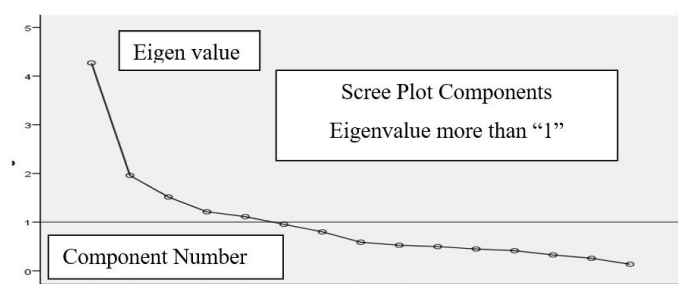


Figure 3: Representation of components on scree plots based on eigenvalue 1.

Proportion of variance criterion

Extraction of component based on variance proportion is also used to retain the components in SPSS Statistics analysis, those components retain in the analysis which show 60-70% of total variance explained by these components.

Table 7 shows five components which explain 67.099 % of variance of total variance of the data set. Component No.1 having initial Eigen values 4.268 and 28.456 % of variance without rotation of components. (Variance % (28.456) = [Initial Eigen values (4.268) / by total variables (15)]*100. When these components are rotated then component No. 1 showed initial Eigen values as 2.923 and variance % 19.483 of total variance explained by the variables. Similarly, all five components show initial Eigen values and Variance % on the basis of unrotated components matrix and rotated components matrix. In unrotated components matrix components show cross loading problem, i.e.

variables show correlation with more components to remove this problem varimax rotation is carried out and rotated component matrix is obtained.

Unrotated components matrix

Unrotated components matrix shows correlation between variables and components. High correlation of variables with one of the components is always desirable but correlation of variables with more components is not acceptable, if this problem persists in data set than rotation of components is required to eliminate this cross loading problem.

Table 8 indicates the unrotated matrix of the components. This unrotated component matrix shows the correlation between variables and the components. Variables V5, V6, V10, V11, and V15 show high correlation with component No.1 and component No. 2. Similarly, variables V4, V8 and V9 show high correlation with component No.1 and component No. 4 while V1 and V3 show high correlation with only component No. 3. Similarly, V2, V13 and V14 show high correlation with only component No.5.

Rotated component matrix

To overcome the problem of cross loading Varimax rotation is carried out and matrix is obtained, this matrix only shows high correlation of one variable with one component and other correlations of one variable with other components are eliminated. Varimax rotation is carried out when component correlational

matrix off diagonal values are below than 0.32.

Table 9 shows rotated component matrix with Varimax rotation and suppressed the correlational values below 0.46 so that cross loading problem of factors is overcome. Now variables V4, V5, V12 and V15 are loaded on component No.1, variables V2, V6, V7, V10 and V11 are loaded on component No. 2, variable V8 and V9 are loaded on component No. 3, variable V1 and V3 are loaded on component No. 4

and variable V13 and V14 are loaded on component No. 5. All these variables having correlational value more than 0.5 which is desirable except one variable “V2” which has value below 0.487 which is also acceptable in such huge data. Initial Eigen values shows the total correlational values of one factor with all variables, in table 4.18 factor/component No. 1 has Eigen value 2.92 which has been calculated by the following method: Eigen value $(2.92) = (0.90)^2 + (0.80)^2 + (0.75)^2 + (0.70)^2$.

Table 7: Indication of the components retained in SPSS analysis.

Components	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1. Job evolution	4.268	28.456	28.456	4.268	28.456	28.456	2.923	19.483	19.483
2. Job performance	1.958	13.053	41.509	1.958	13.053	41.509	2.707	18.049	37.532
3. Job skills	1.516	10.105	51.615	1.516	10.105	51.615	1.717	11.444	48.977
4. Job abilities	1.211	8.076	59.690	1.211	8.076	59.690	1.551	10.339	59.316
5. Job managements	1.111	7.408	67.099	1.111	7.408	67.099	1.167	7.783	67.099
6	.954	6.362	73.460	Total variance explained Extraction method Principal component analysis Components					
7	.799	5.329	78.790						
8	.586	3.910	82.699						
9	.524	3.496	86.196						
10	.496	3.306	89.502						
11	.447	2.981	92.483						
12	.413	2.752	95.234						
13	.325	2.166	97.400						
14	.256	1.706	99.106						
15	.134	.894	100.000						

Table 8: Indication of unrotated component matrix and communalities matrix.

Variables (Teaching methodological competencies)		Components					Communalities	
		1	2	3	4	5	Initial	Extrc.
V4	I appreciate students for correct answer	.756			-.468	PCA	1.000	.796
V7	I apply contemporary knowledge, new ideas in my teaching	.743				Unrotated compo- nents matrix	1.000	.684
V12	I use evaluation to improve job situation	.729					1.000	.735
V15	I have direct interaction with my students	.723	-.448				1.000	.845
V5	I use reinforcement effectively	.704	-.408				1.000	.668
V8	I use different questioning skills	.585			.508		1.000	.683
V10	Higher academic qualification improves teacher's job effectively	.579	.515				1.000	.655
V9	I use various evaluation techniques	.559			.557		1.000	.741
V11	Ability to perform effectively is inborn in teaching	.452	.558				1.000	.691
V6	I select appropriate and relevant teaching material	.523	.523				1.000	.621
V3	I utilize teaching situation effectively			.827			1.000	.750
V1	I use individual teaching methods keeping in view the individual differences			.817			1.000	.752
V14	I manage discipline in classroom.					.689	1.000	.567
V13	I manage and arrange class effectively					.595	1.000	.444
V2	I use problem solving methods in my teachings.					.401	1.000	.433
G.T	Initial eigen value (variance)	4.268	1.958	1.516	1.21	1.11	Five factors	
%	Variance explained %	28.46	13.05	10.10	8.08	7.41	= 67.10%	

Table 9: Factor loading of rotated component matrix of variables.

Variables	Component					
	1	2	3	4	5	
V15 I have direct interaction with my students.	.905					Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser normalization a. Rotation converged in 6 iterations.
V12 I use evaluation data to improve job situation.	.801					
V4 I appreciate students for correct answer.	.753					
V5 I use reinforcement effectively.	.704					
V10 Higher academic qualification improves teacher's job effectively.		.768				
V6 I select appropriate and relevant teaching material.		.759				
V11 Ability to perform effectively is inborn in teaching		.731				
V7 I apply contemporary knowledge, new ideas in my teaching		.714				
V2 I use problem solving methods in my teachings.		.487				
V9 I use various evaluation techniques			.809			
V8 I use different questioning skills.			.733			
V1 I use individual teaching methods keeping in view the individual differences				.865		
V3 I utilize teaching situation effectively.				.863		
V14 I manage discipline in classroom.					.732	
V13 I manage and arrange class effectively					.644	
G.T Initial eigen value (variance)	2.92	2.70	1.72	1.55	1.17	Total
% Variance explained %	19.48%	18.05%	11.44%	10.34%	7.78%	67.10%

Table 10: Component correlational matrix for methodological competencies.

Component Correlation Matrix					
Component	1. Job evaluation	2. Job performance	3. Job skills	4. Job abilities	5. Job managements
1. Job evaluation	1.000	.277	.015	.168	.140
2. Job performance	.277	1.000	.043	.028	.054
3. Job Skills	.015	.043	1.000	-.006	-.053
4. Job Abilities	.168	.028	-.006	1.000	.002
5. Job Manag.	.140	.054	-.053	.002	1.000
Extraction method: Principal component analysis. Rotation method: Oblimin with kaiser normalization.					

Varimax rotation

Varimax rotation is conducted to overcome cross loading problem of variables with factors; it has been done in this analysis so that correlational values of variables with the factors have been rotated on 90° to remove cross loading. Varimax rotation is carried out when there are component correlational matrix's non-diagonal values are below 0.32, if these values are more than 0.32 than other types of rotation can also be carried out like Direct Oblimin and Promax rotation.

Table 10 indicates that off-diagonal values of component correlational matrix are less than 0.32 which show that Varimax rotation is the due rotation for the rotated component matrix.

Labeling/ summarization/ explanation of components

Principal component 1: Job management: It accounts for 19.483% of the observed total variance and it contains ten variables. Those that receive higher loading are: V4= Appreciation to the student (sig. = 0.753), V5= Use of reinforcement effectively (sig. = 0.704), V12 = evaluation data to improve job (sig. = 0.801) and V15 = I have direct interaction with my students (sig. 0.905) are regarded as very necessary competencies for any teachers to flourish in the education institution. This finding support the position of [Westcott and Burnside \(2003\)](#) that “management is a key area, which education and training can help to address”. In addition to provision of “teaching professional services” management consultancy type services can raise the profile status of school teachers

teaching agriculture which can provide better paid services.

Component 2: Technical skills: This component accounts for 18.049 % of the total observed variance and contains five high loading variables which are regarded as technical skills. These variables are: V2 = I use problem solving method in my teaching (sig. 0.487), V6 = I select relevant and appropriate teaching material (sig. 0.759), V7= I apply contemporary knowledge, new ideas in my teaching (sig. 0.714), V10 = higher academic qualification improves teachers' jobs effectively (sig. 0.768) and V11= ability to perform effectively is inborn in teaching (sig.0.731). These are regarded as basic technical skills in teaching. Before a teacher can perform his core duty these above mentioned skills are very important for him. The importance of technical skills agrees with the findings by [Humphrey and Stokes \(2000\)](#).

Component 3: Job evaluation: This component accounts 11.44% of the total observed variance and contains two items. These items are: V8 = I use different questioning skills (sig. 0.733) and V8 = I use various evaluation techniques (sig. 0.809). Without any difficulty it was named as job evaluation. Evaluation is vital to improve job, evaluation of the job situation makes the job success or failure. To meet up that evaluation challenge school teachers should be enough competent to get these techniques which make him successful.

Component 4: Abilities to perform the job: This component accounts 10.34% of the total observed variance and contains two variables. These variables are: V1 = I use individual teaching methods keeping in view the individual differences (sig. 0.865) and V3 = I utilize teaching situation effectively. (sig. 0.863). Abilities to perform a job are increasingly becoming important. [Dogbegah et al. \(2011\)](#) "the traditional philosophy of the success of the project having great emphasis on the ability to plan and execute it". This continued emphasis on ability to plan and execute the project or programme. Hence its importance cannot be overemphasized.

Component 5: Management the discipline: The final component is categorized as management the discipline. This component accounts 7.78% of total observed variance and contains two items. These items are: V13 = I manage and arrange class effectively

(sig.0.644) and V14= I manage discipline in class room (sig. 0.732). Management the discipline in any educational institute is preliminary to deliver the lesson which teacher wants to deliver. Management the discipline is consistence with the findings of the study conducted by [Dogbegah et al. \(2011\)](#) Management the discipline in any of the project is preliminary importance "principal component factor".

Association of teaching methodological competencies with age, education and experience: The rotated component solution of PCA five extracted components, input variables and the correlation between the initial variables and the components in table below, this rotated component matrix was used as a starting point to describe a typology of agriculture school teachers that have different characteristics, knowledge attributes, and also have different approaches toward knowledge to improve competencies. In the table there is a set of values under each component that has the strongest correlation with the input variables. These are important in the task of identifying and categorizing the different competence level of agriculture school teachers.

[Table 11](#) shows the interpretation of the variation and association of variables with the components at varying degree, these correlational values provide the basis for stating that agriculture school teachers loaded on any component with high correlational scores have the attributes of that component. Thus, on the basis of the strongest correlation under each component following association were found between age, education (diploma/ degree) and length of service (experience). Briefly describing that component no. 3 highlights long length of service, older age and diploma holder category of agriculture school teachers. This component reveals that this category of teachers' scores relatively low (negatively correlated) on valuation of these competencies variables like; I use problem solving methods in my teachings, I utilize teaching situation effectively, I use reinforcement effectively, I manage and arrange class effectively, I have direct interaction with my students, I apply contemporary knowledge, new ideas in my teaching and I use different questioning skills, while they are quite satisfied with the competencies; I use individual teaching methods keeping in view the individual, Ability to perform effectively is inborn in teaching and I use evaluation data to improve job situation. This makes a sense that this category

Table 11: *Association of teaching methodological competencies with age, education and experience.*

Variables		Rotated component matrix				
		Component				
		1	2	3	4	5
A1	Age of respondents i.e. Agriculture School teachers	-.017	.024	.887	-.044	.081
D1	Diploma holder respondents	.022	.167	.883	-.010	.031
D2	Degree holders respondents	-.013	-.118	-.841	-.153	.208
L1	Length of service in department of education	.039	-.078	.729	.073	.362
V1	I use individual teaching methods keeping in view the individual	-.014	-.155	.172	.948	-.035
V2	I use problem solving methods in my teachings	-.176	.161	-.092	-.162	-.860
V3	I utilize teaching situation effectively	-.075	.047	-.042	.959	.170
V4	I appreciate students for correct answer	.175	.952	.047	.045	-.118
V5	I use reinforcement effectively	.867	.198	-.002	-.062	.323
V6	I select appropriate and relevant teaching material	.175	.952	.047	.045	-.118
V7	I apply contemporary knowledge, new ideas in my teaching	.160	.957	-.004	-.033	-.166
V8	I use different questioning skills	.907	.238	-.075	-.008	.107
V9	I use various evaluation techniques	.926	.111	.097	-.078	.238
V10	Higher academic qualification improves teacher's job effectively	.073	.983	.079	-.094	.046
V11	Ability to perform effectively is inborn in teaching	-.109	.741	.210	-.181	.427
V12	I use evaluation data to improve job situation.	.889	.147	.295	-.020	.161
V13	I manage and arrange class effectively	.675	-.122	-.256	-.148	-.132
V14	I manage discipline in classroom	.966	.062	.074	.025	-.080
V15	I have direct interaction with my students	.843	.041	-.050	.156	-.331

of teachers is competent in job management and evaluations. These teachers' score relatively low or modest in the valuation of their own competencies in different subfields like; I use various evaluation techniques effectively, I manage discipline in classroom, higher academic qualification improves teacher's job effectively I select appropriate and relevant teaching material and I appreciate students for correct answer. They realize the limitations of their own competencies on the above mentioned low and modest category of competencies. This may also be a result of low attention toward these teachers in the above mentioned competencies to improve through refresher courses by the authorities, department and Government.

Conclusions and Recommendations

Following are conclusions on the basis of results: In teaching methodological competencies has been found very basic in high rank, while other were low in rank possessed by agriculture school teachers. Similarly, those competencies which are low in rank were complex or technically sound in knowledge. The competencies possessed by agriculture school teachers at lower level are complex or needs relevant

and technical knowledge. All competencies included in the study are required by the agriculture school teachers to accomplish their job descriptions and responsibilities. A wide range of training and refreshing were identified. On the basis of the results, statistical inferences some of the practical recommendations were made which are as follows: There is a dire need to provide in-service training and refresher courses for the agriculture school teachers in the identified areas for the adequate acquisition of relevant competencies to boost agriculture education in Azad Jammu and Kashmir.

Novelty Statement

Prime objectives of this study are to evaluate agriculture teachers' competency levels teaching agriculture subject in the schools. Outcomes of this research identified new recommendations for policy makers to introduce more relevant courses and trainings for agriculture school teachers to boost their competency levels in Azad Jammu and Kashmir.

Author's Contribution

Ghulam Qadar: Principal author, design research,

collected data and wrote this paper.

Khalid Nawab: Major supervisor, who provided technical guidelines in the whole study.

Conflict of interest

The authors have declared no conflict of interest.

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