Assessing Prospective Teachers' Individual Innovativeness

Abstract

If the teachers had not innovativeness then how can they motivate his/her students towards innovation? How our schools will be a center of innovation? And finally how our nation will be an innovative nation? So, the main objective of the study is to measure individual innovativeness of prospective teachers in the context of their gender, study stream, educational qualification and study level. Total 327 prospective teachers were selected in the sample by random cluster technique. Adopted version of individual innovativeness scale by Hurt; Joseph & Cook (1977) was used to collect the data in the research. Descriptive analysis, F-test and t-test were employed to analyze the data. The results revealed that most of prospective teachers had 'early majority' level of individual innovativeness. There was no significant difference in individual innovativeness of prospective teachers in the context of their gender, educational qualification and study stream. There was significant difference in individual innovativeness of prospective teachers in the context of their study level.

Keywords: *Measurement, Prospective teacher, Individual innovativeness*

Kothari Commission pointed that the destiny of India is being shaped in the classroom (Report of the Education Commission, 1964-66, p. 2). Then it is expected from the teachers and prospective teachers that they would be more innovative than other professionals. The destiny of India that is shaped in our classroom should be innovative, productive, creative and constructive – It is the demand of the society. For the fulfillment of the demand it is very important that our teachers should be full of innovativeness. If the teachers do not have innovativeness then how can they motivate his/her students towards innovation ? How our schools will be a center of innovation? And finally, how our nation will be an innovative nation? Teachers are real builders of the nation (Okeke, 2004). Progress and development of any nation is the reflection of teachers' caliber. No nation can rise or develop without the right caliber of teachers (FGN, 2004).

It is also said in our National Policy on Education (1986) that quality of citizens cannot be better than the quality of their education. The quality of any nation depends on its citizen; the quality of citizen depends on the quality of his education and quality of education depends on its policy makers, administrators, educators; especially on its teachers (Varsheny & Joshi, 2014). That's why both developed and developing countries of the world continue to do research to train quality teachers.

According to NCTE (2009), the changing political, social and economic situation, the expectations from teacher or from the school vary time to time. In terms of demand from school and society, teachers need to be strong in every aspect by innovation and experiment. The researcher is working in teacher education institute; he had curiosity to know if the prospective teachers have individual innovativeness. What is the level of prospective teachers' individual innovativeness? This question motivated the researcher to conduct the present research.

Theory of Rogers (2003) on Individual innovativeness

Rogers (2003) states that there is always new information within the social system and this new information is processed by adopters (Rogers, 2003). In the process of adaptation, adopters act upon their perceptions regarding the characteristics of the innovation. Although there are a number of contextual factors, some findings are influential on adopters' decisions regarding adaptation to innovation. In other words, individuals are likely to have certain perceptions regarding new

technology that they have met in their social environments. These perceptions are quite important in terms of innovativeness. It is seen that individuals have different degrees of adaptation to innovation. In general, the population distribution of adaptation to innovation is expected to have almost normal distribution (Jackson, Yi and Park, 2010). However, Rogers (2003) states that there is no normal distribution due to different determiners such as resistance to technology and material dimension regarding the innovation distribution; that in a society, there are not many innovative individuals; and that there is a bell-shaped distribution. Graphical presentation of the distribution is presented in Figure-1.
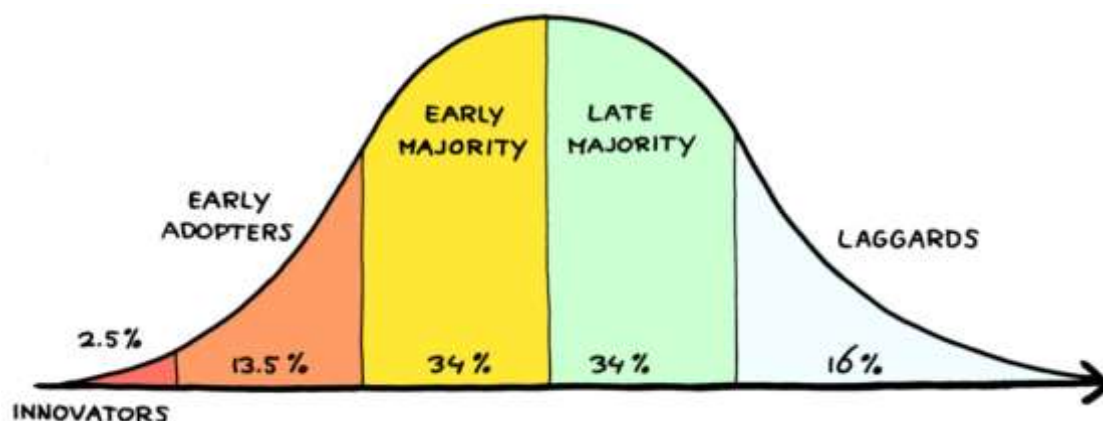
Figure-1 Categories of individual innovativeness (Rogers, 2003)

As showed in Figure-1, Rogers (2003) stated that people demonstrate different responses to innovation depending on their personality traits. In line with these responses, Rogers (2003) divides individual innovativeness into five different categories from earliest to latest: innovators, early adopters, early majority, late majority and laggards. In addition, the researcher determines the distribution of individuals in a society belonging to each category. Accordingly, among all the individuals in a society, only 2.5% of them are in the category of innovative, 13.5% of them are in the category of early adaptors, 34% of them are in the category of early majority, 34% of them are in the category of late majority and 16% of them are in the category of laggards. Rogers (2003) explains the characteristics of people in this group as under;

- **Innovators**- the risk takers willing to take the initiative and time to try something new. (What is it?)
- **Early Adopters** - tend to be respected group leaders, the individuals essential to adoption by whole group. (What problem will it potentially solve?)
- **Early Majority** - the careful, safe, deliberate individuals unwilling to risk time or other resources. (What problem will it solve now?)
- **Late Majority** - those suspect of or resistant to change. Hard to move without significant influence. (Does it work?)
- **Laggards** - these are those who are consistent or even adamant in resisting

Review of related research

Oloruntegbe (2011) conducted study which was designed to investigate Nigerian science teachers' involvement, commitment and innovativeness in curriculum development, implementation and change. The results revealed that teachers often show resistance and lack of commitment to implementation of curriculum reforms because they are seldom involved in the development and even how best to implement them.

Adiguzel (2012) examined relation between candidate teachers' moral maturity levels and their individual innovativeness characteristics. Positive and low level relation was determined between the students' level of individual innovativeness and their level of moral maturity.

Coklar (2012) examined individual innovativeness of educational administrators. Results of the study showed that most of educational administrators had early adaptor level individual innovativeness.

Erkoc & Kert (2013) conducted a comparative study on entrepreneurship tendencies and individual innovativeness perceptions of pre-service teachers. Results showed positive relationship between the individual innovativeness and entrepreneurships tendecies of the pre-service teachers

Atali & Sertbas (2013) determined innovativeness levels of football referees in the context of their age, education and term of refereeing. The results revealed that most of referees had 'early majority' level individual innovativeness. Moreover, no significant difference was found between the individual innovativeness and the variables of age, education and term of refereeing.

Celik (2013) studied individual Innovativeness and self-efficacy levels of student teachers. Results of the study revealed that the student teachers had moderate level innovativeness and there was no significant relationship found between individual innovativeness and self-efficacy levels.

Laurance, Zhi-Fei, & Cheng-Chieh (2016) investigated the innovativeness and the self-evaluation of educational technology standards of the elementary school teachers. The results of the study showed that there is a significant correlation between the innovativeness and the self-evaluation of educational technology standards of the elementary school teachers.

Yapıcı (2016) studied individual innovativeness levels of the pre-service biology teachers. Findings of the study indicated that the pre-service biology teachers' individual innovativeness level was high. And the females were more innovative than the males.

Coklar & Ozbek (2017) analyzed the relation between teachers' individual innovativeness level and their self-efficacies. The results showed positive relationship between them.

Ozturk-Yurtseven & Aldan-Karademir (2017) examined individual innovativeness levels and lifelong learning tendencies of pre-service teachers. There was no significant difference in context of theier gender.

There were many research conducted on the issue of innovativeness and its relationship with different variable. But the researcher did not find any research, which studied individual innovativeness level of prospective teachers in the context of Indian culture. The researcher also did not find any tool in Gujarati language to measure the individual innovativeness level of prospective teachers. Thus, the researcher conducted the present research.

Objectives of the study
1. To measure individual innovativeness of prospective teachers.
2. To examine individual innovativeness of prospective teachers in the context of their gender, study stream, educational qualification and study level.

Variables of the study

Details of variables and its levels are given in Table – 1.

Table-1
Variables and its level

Dependent variable	Independent variables	Levels
Individual innovativeness	Gender	Male
		Female
	Study stream	Arts Commerce Science
	Educational qualification	Under graduate
		Post graduate
	Study level	B.Ed.
		M.Ed.

Hypotheses of the study

Keeping in mind above mentioned objectives following null hypotheses were formulated:

H_{01} There will not be significant difference between mean scores obtained on individual innovativeness scale by the male and female prospective teachers.

H_{02} There will not be significant difference between mean scores obtained on individual innovativeness scale by the prospective teachers of arts, commerce and science study streams.

H_{03} There will not be significant difference between mean scores obtained on individual innovativeness scale by the prospective teachers having under graduate and those having post graduate educational qualification.

H_{04} There will not be significant difference between mean scores obtained on individual innovative scale by the prospective teachers who studied in B.Ed. level and who studied in M.Ed. level.

Operational definitions of the terms

Prospective teachers: The students who are studying at graduate or post graduate level in the faculty of education are considered as prospective teachers.

Individual innovativeness: The total score obtained on individual innovativeness scale by the prospective teacher is considered as individual innovativeness.

Delimitation of the Study

The study was limited to the teacher education institutes of Maharaja Krushnakumarsinhji Bhavnagar University, Bhavnagar and Gujarat Vidyapith, Ahmedbad only.

Population and Sampling

Total 630 B.Ed. and M.Ed. students studying during the year 2016-17 in teacher education institutes affiliated to Maharaja Krushnakumarsinhji Bhavnagar University, Bhavnagar and Gujarat Vidyapith, Ahmedbad were the population of the study. First of all, list of teacher education institutes was prepared. Each institute conducted two-year teacher education programme. The whole class (year) was selected for the sample using lottery method. All the students, who were present at the time of data collection in the selected class, were included in the sample. Thus, the random cluster sampling technique was used. Table-2 shows the characteristics of the sample.

Table-2
Characteristics of the sample

Characteristics		Total	Grand Total
Gender	Male	112	327
	Female	215	
Study stream	Arts	223	327
	Commerce	25	
	Science	69	
Educational qualification	Under graduate	226	327
	Post graduate	101	
Study level	B.Ed.	277	327
	M.Ed.	50	

Table-2 shows that total 327 prospective teachers were in the sample of study. Among the 327 students; 112 were male and 215 were female; 223 were from arts stream, 25 were from commerce stream and 69 were from science stream. Among them 226 students were under graduate and 101 were post graduate students. 277 students were studying in B.Ed. and 50 were studying in M.Ed.

Tool of the Study

Hurt, H.T.; Joseph, K. & Cook, C.D. (1977) constructed Individual Innovativeness Scale. The researcher adopted the scale in Indian context. The five point Likert type scale was used for the collection of data. There were 20 items for measuring individual innovativeness. 12 items were positive and 8 items were negative. Each item had five options indicating the degree of agreement. The degree of agreement was 'strongly agree', 'agree', 'neutral', 'disagree' and 'strongly disagree'. The respondent had to tick mark ($\sqrt{}$) in one of the suitable options. The reliability of the tool was established using three methods. Cronbach's Alpha value was 0.80, Spearman Brown Coefficient value was 0.84 and Guttmann Split Half Coefficient value was 0.79. The Cliffs Consistency Indices – 'C' value was 0.42 which shows the validity of the tool.

Data Collection and Analysis

The individual innovativeness scale was administered to collect the data in a normal classroom condition. The respondents were given guidance regarding responding to the items. There was no time limit for responding. After data collection, the researcher proceeded to data analysis as per the objectives and hypotheses. Descriptive analysis, F-test and t-test were employed to analyze the data.

Results

Calculation of descriptive statistics based on the scores on Individual Innovative Scale is given in Table – 3.

Table – 3

Descriptive statistics based on the scores on Individual Innovative Scale

N	327		Minimum	49.00
Mean	66.99		Maximum	88.00
Std error of mean	0.380		Skewness	-0.148
Std deviation	6.868		Std error of skewness	0.135
Median	67.00		Kurtosis	0.140
Mode	67.00		Std error of kurtosis	0.269

Table-3 shows that the Mean, Median and Mode were respectively 66.99, 67.00, 67.00; Std error of mean was 0.380 and Std. Deviation was 6.868. The value of skewness was -0.148. It shows slightly negative skewness of the data. It means the frequency of the high scorer were more than that of the low scorer in respect of mean score of the data on individual innovativeness scale. So it concluded that the level of individual innovativeness of prospective teachers was high and fairly above than the average score. Standard error of skewness was 0.135 and kurtosis was 0.140; standard error of kurtosis was 0.269. This indicated that the frequency of distribution was almost normal. Histogram of obtained scores frequency distribution on individual innovativeness scale is presented as Figure-2.
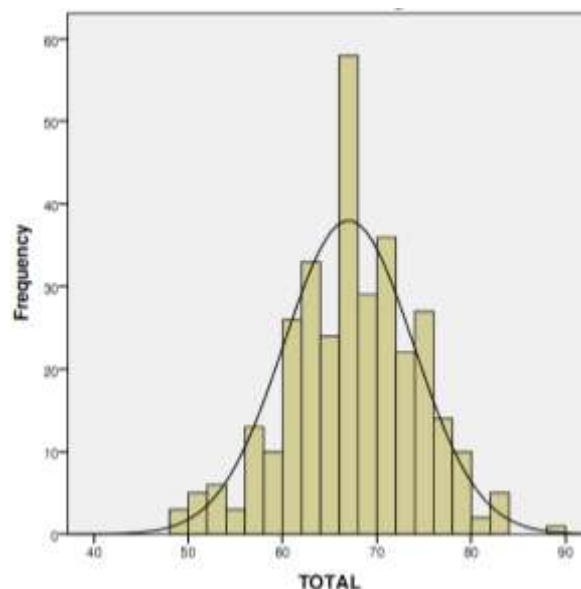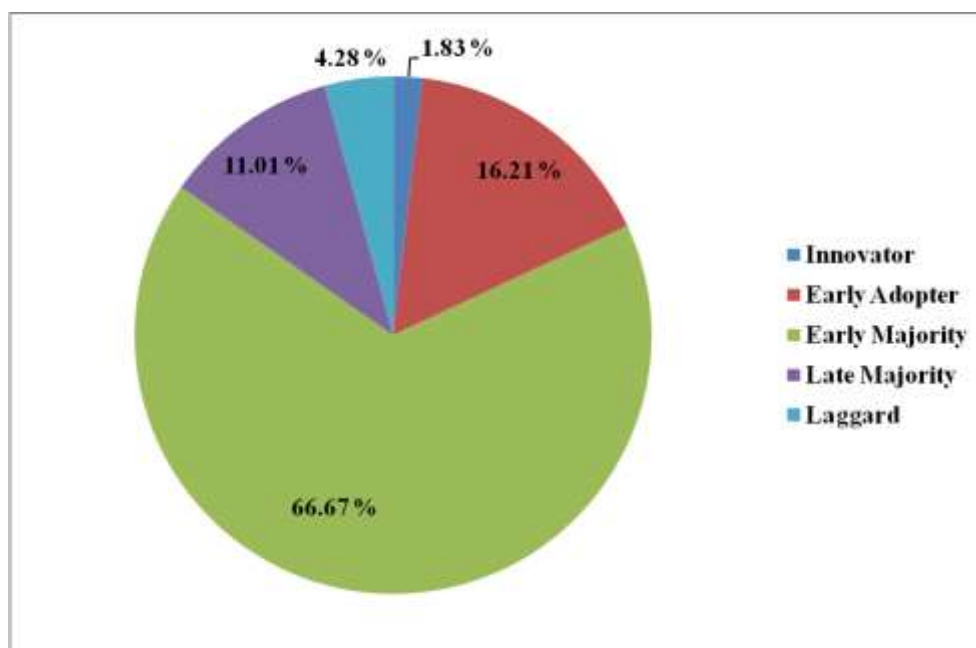
Figure-2
Histogram of Obtained Scores Frequency Distribution On
     Individual Innovativeness Scale

The first objective of the study was to measure individual innovativeness of prospective teachers. The maximum possible score on individual innovativeness scale was 100 (20 x 5). The obtained minimum and maximum scores were respectively 49 and 88. To categorize the individual innovativeness of prospective teachers, Mean +/- sd formula was applied. The results are presented in Table – 4.

Table - 4
Individual innovativeness of prospective teachers

No	Individual innovativeness level	score	No of students	percentage
1	Innovator	>80.72	6	1.83%
2	Early Adopter	73.85 to 80.72	53	16.20%
3	Early Majority	60.12 to 73.85	218	66.66%
4	Late Majority	53.25 to 60.12	36	11.00%
5	Laggard	< 53.25	14	4.28%
Total			327	100 %

Table – 4 shows that, only 1.83% prospective teachers had 'innovator' level; 16.20 % had 'early adopter' level; 66.66 % had 'early majority' level; 11 % had 'late majority' level and 4.28 % had 'laggard' level individual innovativeness. The results revealed that most of prospective teachers had 'early majority' level individual innovativeness. Graphical presentation of the results is shown in Figure – 3.

Figure-3 Individual innovativeness level of prospective teachers

The second objective of the study was to examine individual innovativeness of prospective teachers in the context of their gender, study stream, educational qualification and study level. Keeping in mind the objectives there were four hypotheses formulated.

Hypotheses Testing
The results of the first hypothesis testing are presented in Table - 5

Table - 5
Individual innovativeness and gender relationship

Gender	N	Mean	Std. Dev.	Std. Error Mean	Mean Diff	t-value	df
Female	215	67.21	6.605	0.452	0.590	0.736	324
Male	112	66.63	7.349	0.694			

Table - 5 shows that there were 215 female and 112 male students. Means were 67.21 and 66.63; standard deviations were 6.605 and 7.349; standard error of means was 0.452 and 0.694 of respectively for male and female students. Mean difference was 0.590 and t-value was 0.736. Results showed that there was no significant difference between female (M=67.21, SD=6.605) and male (M=66.63, SD=7.349) prospective teachers' individual innovativeness (t = 0.736, df = 324, p = 0.279). Therefore the null hypothesis was not rejected. There was no significant difference found in individual innovativeness of prospective teachers in the context of their gender.

The results of the second hypothesis testing are presented in Table - 6

Table - 6
Individual innovativeness and educational qualification relationship

Educational qualification	N	Mean	Std. Dev.	Std. Error Mean	Mean Diff	t-value	df
UG	226	67.07	6.506	0.443	0.191	0.231	324
PG	101	66.88	7.644	0.764			

Table - 6 shows that there were 226 prospective teachers who had under graduate level qualification and 101 prospective teachers who had post graduate level qualification. Means were 67.07 and 66.68; standard deviations were 6.506 and 7.644; standard error of means was 0.443 and 0.764 respectively of under graduate and post graduate qualified prospective teachers. Results showed that there was no significant difference between UG (M=67.07, SD=6.506) and PG (M=66.88, SD=7.644) prospective teachers' individual innovativeness (t = 0.231, df = 324, p = 0.063). Therefore the null hypothesis was not rejected. There was no significant difference in individual innovativeness of prospective teachers in the context of their educational qualification.

The results of third hypothesis testing are presented in Table-7 and Table- 8.

Table - 7
Descriptive statistics for the third hypothesis

Study stream	N	Mean	Std Dev	Std error of mean
Arts	223	66.62	6.541	0.429
Commerce	25	68.56	7.450	1.490
Science	69	66.67	7.661	0.922

Table -7 shows that there were 223 prospective teachers from arts stream, 25 from commerce stream and 69 from science stream. Means were 66.62, 68.56 and 66.67; Standard deviations were 6.541, 7.450 and 7.661; Standard error of means was 0.429, 1.490 and 0.922 respectively for the arts, commerce and science stream prospective teachers.

Table – 8
Individual innovativeness and study stream relationship

Source of Variance	Sum of Squares	df	Mean Squares	F-value
Between groups	125.453	2	61.246	1.333
Within groups	15250.498	324	47.035	
Total	15375.951	326		

Table-8 shows that Sum of squares between groups was 125.453 and within groups were 15250.498. Mean squares between groups were 61.246 and within groups were 47.035. Results showed that there was no significant difference among arts (M = 66.62, SD = 6.541); commerce (M = 68.56, SD = 7.450) and science (M = 66.67, SD = 7.661) study stream prospective teachers innovativeness (F = 1.333, p = 0.265). There was no significant difference found in individual innovativeness of prospective teachers in the context of their study stream.

The results of fourth hypothesis testing are presented in table – 9.

Table – 9
Individual innovativeness and study level relationship

Study level	N	Mean	Std. Dev.	Std. Error Mean	Mean Diff	t-value	df	Sig level
M.Ed.	50	66.57	6.520	0.413	1.888	2.121	324	0.01
B.Ed.	227	68.45	7.745	0.863				

Table - 9 shows that there were 50 prospective teachers who studied in M.Ed. and 227 prospective teachers who studied in B.Ed. Means were 67.57 and 68.45; standard deviations were 6.520 and 7.745; standard error of means was 0.413 and 0.863 respectively of M.Ed. and B.Ed. prospective teachers. Results showed that there was significant difference between M.Ed. Level (M=67.57, SD=6.520) and B.Ed. Level (M=68.45, SD=7.745) prospective teachers (t = 2.121, df = 324, p = 0.063). Therefore the null hypothesis was not accepted. There was significant difference found in individual innovativeness of prospective teachers in the context of their study level. Prospective teachers who studied in B.Ed. had more individual innovativeness than M.Ed. Students.

Discussion

The results revealed that most of prospective teachers (66.66%) had 'early majority' level individual innovativeness. The result is in line with the results of the studies conducted by Adiguzel(2012), Atali & Sertbas (2013), Çuhadar et al (2013), Çoklar & Özbek (2017) and Erkoç & Kert (2017). The result was in contrast with the result of the study by Coklar (2012); Celik (2013); Laurance; Zhi-Fei & Cheng-Chieh (2016). Only 1.83% prospective teachers had 'innovator' level individual innovativeness. That means the prospective teachers are very slow in adopting innovation. The reason of moderate level individual innovativeness of prospective teachers is due to one or more of these barriers: individual barriers, institutional barriers and social barriers. Individual barriers against individual innovativeness are considered as factors such as individual beliefs and attitude towards innovation and change, level of education, risk-taking tendency, socioeconomic and socio-cultural condition. Values, norms, policies, and family structure belonging to the society that the individual lives in constitute the social barriers (Kılıçer, 2011). Therefore our practices, programmes, activities and teaching strategies in teacher education institutes should aim at enhancing individual innovativeness. Moreover candidates' individual innovativeness should be considered as one of the criteria in the entrance test or practice teaching in teacher education institutes. This is the way to provide innovative teachers to our society. Prospective teachers should be encouraged to adopt more innovative techniques and applications from/for in-class activities and practice teaching.

There was no significant difference found in individual innovativeness of prospective teachers in the context of their gender. This result confirmed the result of the study by Çuhadar et al (2013) and Laurance; Zhi-Fei & Cheng-Chieh (2016). The result was in contrast with the result of the study by Yapıcı (2016), Yorulmaz et al (2017) and Yuksel (2017).

There was no significant difference found in individual innovativeness of prospective teachers in the context of their educational qualification. The result was in line with the result of the study by Atali & Sertbas (2013).

There was no significant difference in individual innovativeness of prospective teachers in the context of their study stream. The result confirmed to the result of the study by Öztürk-Yurtseven & Aldan-Karademir (2017).

There was significant difference found in individual innovativeness of prospective teachers in the context of their study level. Prospective teachers who were in B.Ed. had more individual innovativeness than the students who were in M.Ed. Therefore it is important to pay more attention towards M.Ed. level prospective teachers. Further research should be conducted to find out the causes behind this situation.We should organize special programmes for M.Ed. level prospective teacher to increase their individual innovativeness.

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