Irritating Behaviors of Secondary School Students as Perceived by Teachers: A Q-Study

Dr. Vijay Kumar Grover

Associate Professor

DAV College of Education, Abohar, Punjab

Abstract

This paper is an attempt to deal with issue of teacher's perceptions regarding secondary school students' irritating behaviors. As the issue is of subjective nature, investigator thought to employ Q-methodology developed by William Stephenson (1902-1989). Methodology is contrast of R-methodology which is instrument of positivistic research. In Q-methodology it is inter-person correlation put to factor analysis instead of inter-item correlation as in case of R-methodology. Investigator finalized thirty nine items supposedly covering the concept under investigation. Data was collected by using ipsative choice method of Q-sorting, which involves placing items/irritating behaviors (written on cards) in seven piles (having 1, 3, 5, 9, 15, 9, 5, 3, and 1items) on a continuum from least approved to most approved. These items are scored from 1 to 7 in respect of piles moving from least approved to most approved measures. This 60x60 matrix was put to find inter-person correlation. Depending on inter-correlation values groups of persons were discovered. For each group responses by the members for all the items were averaged to find rank order for items. These items are then placed back in the Q-distribution to understand most approved and least approved irritating behaviors for a group. Study revealed that at least five factors (corresponding to each group) are running under the concept of irritating behaviors of students. Finally it is concluded that teachers mainly approve negative personality, bad conduct and poor performance as domains of irritating behaviors of students. In terms of hypotheses testing study accepted all the hypotheses relating to existence of distinct groups, groups have different perceptions, teachers agree on number of irritating behaviors and methodology has been effective for dealing the subject under investigation.

Key words: irritating behaviors of students, Q-methodology, Q-sort, R-methodology, inert-person correlation

Introduction

Quality of a teacher and teaching can be assessed on number of parameters ranging from personality of the teacher to professional indices. There can be hundreds of factors associated with effective classroom teaching. But if reduced to minimum it comes out to be only two: task master and relation with students. Here we are concerned with second one i.e. relation with students. Behavior when broken in to small episodes it becomes plural and we define it as behaviors. The benefit and compulsion of doing so is we need to generate a treatable data for making some interpretations and hence drawing conclusions. These behaviors can be positive as well as negative, for former teacher is full of praise for the learners, whereas latter become reason for criticism of the learners. For one more reason the concept of behaviors is for better than behavior as latter is a complex entity, difficult to define and evaluate. Behavior can only be assessed in context rather than generalizing for all situations and roles. Further the small observable dialogues or monologues make it more quantifiable as we need to bring it under positivistic research. The best way to assess it is evaluating the same against the expected role for a designation. Here learner is a designation and teacher and society expect a role which is more or less known to everyone. When a learner shows opposite of the expected behavior teacher gets irritated and such episodes we define as irritating behaviors. Irritating behaviors of learners is a huge determinant of classroom social and academic atmosphere. Lesser the number and frequency of irritating behaviors from students greater will be the efficiency of classroom performance; vice-versa is also true. For taking stoke of irritating behaviors shown by learners in classroom, teachers are the best source. Thus the problem was designed in present format.

Emergence of the problem

If we want to assess teaching for its effectiveness we can enumerate number of factors. If reduced to minimum we get two parameters of effective teaching namely mastery over subject matter and relation with the students. Subject mastery one learns from stock of knowledge and experience. Relation with the students revolves around the behavior of the teacher as well as learners. The behavior when broken in to small segments can be termed as behaviors. These behaviors can be negative as well as positive. The negative behaviors of the learner are termed as irritating behaviors. Irritating behaviors practiced by the learner results in poor teacher taught relations, thus negating one of the essential parameters of effective teaching. As the irritating behaviors of learners can be innumerable and perceived different by different teachers. Thus the subject under investigation is subjective in nature. It came to the mind of the investigator to identify and classify the irritating

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories

International Journal in Commerce, IT & Social Sciences

http://www.ijmr.net.in email id- irjmss@gmail.com   Page 2

behaviors of the learners. The Q-technique is most suitable instrument to deal with such subjective issues.

Methodology

Q-Methodology

Q-methodology was devised by Stephenson "to characterize a set of philosophical, psychological, statistical and psychometric ideas oriented to research on the individual" (Stephenson, 1935). It is a method of Q-sorting which calls for a person to rank order a set of stimuli according to a well-defined rule. The operation of rank ordering though a subjective matter yet it uses the ipsative or forced choice sorting of cards into a set of well-defined categories. An individual is asked to sort the items into a number of piles in accordance with some criterion. The sorter is instructed to place varying number of cards in given number of piles using approval/ disapproval (or some other) criterion, the whole making up a distribution called as Q-distribution which can be quasi-normal, normal or even symmetric one. This Q-sort distribution is a rank order continuum from most desirable (most approved or the like) to least desirable (least approved or the like) with varying degrees of desirability (approval) between the two extremes.

R-Methodology

R-technique is concerned with correlation analysis of tests. Every human action was grasped by Karl Pearson as a vast matrix, cemented together by correlation (Stephenson, 1953). The correlation of tests (R) is considered to be the basis of the belief of man in different abilities, capacities, potentialities and other traits associated with human personality. R-methodology came into existence in 1930s when factor analysis technique was developed by L.L. Thurstone in U.S.A., Thomson at Edinburgh and Cyril Burt in London. In R-methodology tests and scales are administered on samples of persons which are then scored objectively using normative methods of scaling and the main purpose of R-methodology is to study individual differences as the tests are used to measure abilities by way of individual differences. The whole positivistic research revolves around R-methodology.

Q-Methodology versus R-Methodology

Steps of Q-methodology are:

1. Working out a "concourse" to develop statements (developing a Q-Set) 2. Sampling of P-Set (participants/ persons) 3. Q-Sorting uses ipsative measures 4. Finding the inter-person correlations 5. Factor analysis to find groups of persons 6. Working out underlying structure of items.

Steps of R-methodology are:

1. Concept development 2. Determining operations 3.Development/selection of tests sample and administration of tests 4.Finding the inter-item correlations 5. Factor analysis to work out the underlying structure of items

How does the present investigation proceed?

In the present investigation Q-methodology has been used for finding groups of persons. The data is analyzed by inter-person correlations of the responses given by the subjects. The groups of persons were formed on the basis of high correlations among the persons. Form the groups mean scores in respect of all the 51 items were found out. The highest mean score items represents their priority for irritating behaviors of students as per perceptions of the teachers. These items were compared for the priorities for the same subject. On the basis of the nature of high priority items name of the groups were dubbed to show their independent existence.

Development of Research Tools

The tool for investigation has been Q-sort, subject being matter of perceptions, statements representing concourse of the concept 'Irritating behaviors of learners' are written on 4"x6" cards. Items were collected from literature and experts in the field. There were 51 cards to be distributed by the participants in seven piles having distribution of 1, 3, 5, 9, 15, 9, 5, 3 and 1 card respectively.

Sample for the study

Fifty teachers of secondary schools constituted the sample. The sample was snow ball type in which a chain of participants was build up. Initially investigator selected a teacher who agreed to participate in data collection i.e. Q-sorting. Then he the teacher was told to refer two more acquaintances who could participate in the process. Then those two were further told to refer two more teachers and so on.

Data collection (Q-sorting) and scoring

Data was collected in face to face situation. After revealing the purpose of the investigation, investigator asked the participant to carefully read the items on the cards s/he needed to place the given 51 cards (each card containing an irritating behavior) in the given seven piles with 1 card in the first pile (most approved), 3 cards in the second pile (slightly less than most approved), 5 cards in the third pile (somewhat less than most approved), 9 card in the fourth pile (less than most approved), 15 cards in the fifth pile (equidistant from most approved to least approved), 9 cards in the sixth pile (greater than least approved) 5 cards in the seventh pile (somewhat greater than least approved), 3 cards in the eighth (slightly greater than least approved), and 1 card in the ninth pile (least approved). The Q-sorting done by the participants and data was recorded in the data sheet in terms of the serial number written on the cards. After sorting of fifty one irritating behaviors in to nine piles by fifty teachers, the investigator

scored the piles as follows. The most approved behavior i.e. Pile 1 (1 item) was scored 9, slightly lesser than most approved i.e. pile 2 (3 items) was scored 8, somewhat lesser than most approved measure i.e. pile 3 (5 items) was scored 7 for each item, lesser than most approved behavior i.e. pile 4 (9 items) scored 6 for each item, equidistant pile from approved to least approved i.e. pile 5 (15 items) scored 5 for each item, greater than least approved behavior i.e. pile 6 (9 items) scored 4 for each item, somewhat greater than least approved behavior i.e. Pile 7 (5 items) scored 3 for each item, slightly greater than least approved behavior i.e. pile 8 (3 items) was scored 2 and least approved behavior i.e. Pile 9 (I item) was scored as 1.

Schematic representation of Q-sort (piles of cards i.e. irritating behaviors) sorted by a participants (an illustration)

Score	1	2	3	4	5	6	7	8	9
	Least approved								**Most approved**
	33	16	22	2	8	44	47	11	7
	1 card	9	28	42	32	17	27	37	**1 card**
		23	35	1	48	38	50	19	
		3 cards	10	40	24	4	18	**3 cards**	
			30	15	45	25	12		
			5 cards	34	3	49	**5 cards**		
				21	13	36			
				46	6	51			
				26	29	31			
				9 cards	43	**9 cards**			
					5				
					39				
					14				
					41				
					20				
					15 cards				

Finding inter-person correlation

The data obtained form for 51 items of 50 teachers was put to inter-person correlation. The calculations were performed on using XL M S Office 2010. It is observed that correlation values ranged from 0 to 1. Quite a good number of correlations have been found to be significant at 98 degrees of freedom.

Making of groups of person

The groups are formed on the basis of the inter-person correlations appearing in the correlation matrix of persons. The minimum correlation value selected for qualifying to form a group is .35. Minimum four members were necessary to constitute a group. The procedure of forming groups goes like this

- All the correlation values less than .35 are deleted from the 50x50 inter person correlation matrix.
- Starting from person one (P_1) the person correlated having significant values are written supposing this as a group.
- Now take the second person in the group and move in the group for significant correlation with other persons.
- The persons with insignificant values are omitted from the group.
- Procedure continues to end up with a group of persons with significant 'r' values for every other member.
  On the basis of this procedure 13 groups could be discovered which are presented in table 1.

Table 1: Preliminary Groups of Persons (Teachers)

Group	Number of Teachers	Identity of Teachers
Group 1	22	1, 6, 10, 18, 19, 20, 23, 24, 25, 29, 30, 31, 33, 36, 38, 39, 41, 43, 44, 45, 48, 49
Group 2	25	3, 5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 24, 28, 34, 35, 36, 37, 40, 42, 46, 47
Group 3	37	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 30, 33, 34, 35, 36, 39, 40, 41, 42, 44, 46, 47, 48, 49
Group 4	43	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49
Group 5	40	9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Group 6	40	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Group 7	36	14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Group 8	35	15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Group 9	32	17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Group 10	20	18, 19, 20, 23, 24, 25, 29, 30, 31, 33, 36, 38, 39, 41, 43, 44, 45, 48, 49
Group 11	19	19, 20, 23, 24, 25, 29, 30, 31, 33, 36, 38,39, 41, 43, 44, 45, 48, 49
Group 12	18	20, 23, 24, 25, 29, 30, 31, 33, 36, 38, 39, 41, 43, 44, 45, 48, 49
Group 13	18	22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39

These thirteen groups contain too many teachers common to more than one group. These groups were further reduced in number using procedure given below.

- A particular person found in more than one groups was retained in the group where it finds highest value of correlation.

- A person has same significant correlation value in more than one groups was retained in both the groups (item no. 9, 20, and 21)

- A smaller group if found wholly contained in a bigger group, smaller group loses identity i.e. it was deleted altogether.

- Groups containing members less than four were rejected to be considered as identifiable groups and the association is considered as matter of chance only.

In this way thirteen preliminary groups were reduced to only five groups as given in table 2.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories

International Journal in Commerce, IT & Social Sciences

http://www.ijmr.net.in email id- irjmss@gmail.com   Page 7

Table 2: Final Five Groups of Persons (Teachers)

Group	Number of Teachers	Identity of Teachers
Group 1	17	1, 4, 8, 13, 18, 19, 20, 24, 25, 27, 33, 35, 38, 41, 46, 48, 50
Group 2	14	20, 23, 26, 28, 29, 30, 31, 32, 36, 42, 43, 44, 45, 49
Group 3	9	3, 9, 10, 14, 15, 17, 34, 37, 40
Group 4	6	11, 12, 16, 19, 39, 47
Group 5	5	5, 6, 7, 9, 22
All Groups	51	Id. No. 9 &20 are common in two groups

We observe from the table 2 that

- Groups have considerable size.

- This grouping has included maximum number of participants (49 out of 50 teachers).

- Only two participants (Id. No. 2 & 21 could not be included in any of the groups), either these participants fall in groups having members less than four (which were rejected) or they formed there groups of individuals. This means that their perceptions are unique and do not match with other participants or we could not include the items in the choice domain which they might be considering as irritating behaviors of secondary school students.

- Only two participants (Id. No. 9 & 20) have been found to be in common i.e. included in two groups due to high correlation values in both the groups.

The raw scores (Q-Sort codes) for persons in the groups are placed together and means are calculated for each of the items of the Q-Sort. The means values are then rank ordered in respect of item numbers. These are again placed in the Q-distribution of items as per the ranking of the items from right to left. The items in piles 7, 8, & 9 (on right tail) containing 9(1+3+5) items are the most irritating behaviors of secondary school students as perceived by the teachers I that group. These items are then decoded to find out the corresponding original items taken in the Q-Sort. By studying the nature of items factors (groups) were dubbed for irritating behaviors of learners. This procedural illustration has been shown in the following tables for Group 1. The procedure has been repeated for all the five groups framed in previous section.

Table 3: Rank order of Items for Group 1

Rank	Item No.	Av. score	Rank	Item No.	Av. score
1	19	8.0000	27	21	5.0000
2	13	7.9412	28	46	4.9412
3	20	7.2353	29	47	4.9412
4	27	7.0588	30	29	4.8235
5	32	6.8824	31	23	4.7647
6	12	6.7059	32	38	4.6471
7	17	6.2941	33	39	4.6471
8	31	6.2941	34	14	4.5882
9	18	6.2353	35	25	4.5882
10	43	6.0000	36	40	4.5294
11	48	5.9412	37	1	4.4706
12	50	5.8824	38	26	4.4706
13	33	5.7647	39	41	4.4118
14	44	5.6471	40	37	4.1765
15	6	5.4706	41	35	4.1176
16	49	5.4706	42	5	3.8824
17	16	5.4118	43	36	3.8824
18	24	5.4118	44	11	3.5882
19	42	5.4118	45	34	3.3529
20	30	5.3529	46	15	3.2353
21	2	5.2941	47	10	3.0588
22	28	5.2941	48	8	2.7059
23	3	5.2353	49	9	2.4706
24	7	5.2353	50	22	2.4706
25	45	5.1765	51	4	2.0000
26	51	5.0588			

These items are arranged in the Q-distribution as given below.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories

International Journal in Commerce, IT & Social Sciences

http://www.ijmr.net.in email id- irjmss@gmail.com   Page 9

Q-distribution of items (irritating behaviors) as perceived by Group1

Least approved

Most approved

4	8	36	14	42	43	32	13	19
	9	11	25	30	48	12	20	
	22	34	40	2	50	17	27	
		15	1	28	33	31		
		10	26	3	44	18		
			41	7	6			
			37	45	49			
			35	51	16			
			5	21	24			
				46				
				47				
				29				
				23				
				38				
				39				

Due to paucity of space all the items approved by group member could not be presented here. However titles given to the group of items (based on group of persons) along with other details are presented in table 4.

Table 4: Titles/factors/constructs of the concept irritating behaviors

Group of Items	No. of Persons	Title	Domain
Group I	17	Acting out egoistic learner	Personality
Group II	14	Acting out slow learner	Performance
Group III	9	Acting out careless learner	Personality
Group IV	6	Acting out talkative learner	Conduct
Group V	5	Acting out maladjusted learner	Personality

These titles could be further be classified in to domains of personality, conduct and performance. For teachers negative personality of the students is the biggest concern as far as irritating behaviors are concerned, followed by their conduct and performance as well.

Hypotheses Testing

Hypotheses testing in the study are more or less qualitative type and will not be tested on statistical levels of significance. These will be proved on the basis of procedural outcomes and synthetic view point of the results obtained in the previous chapter.

Testing of Hypothesis H_1: There exist distinct groups of teachers who have unique perceptions of irritating behaviors of secondary school students

Findings in previous section revealed that there are at least five distinct groups as far as their perceptions about irritating behaviors of students is concerned. This proves that hypothesis stands accepted on empirical ground and summative evaluation of the outcomes of the study.

Testing of Hypothesis H_2: Irritating behaviors identified by different groups have unique dimension to identify a construct of the concept

The items included in these groups are on the basis of ranking produced on the basis of perceptions of the groups. The highest nine ranked items are distinctly different in majority cases from others, which suggested a unique title/factor for the group of items. This proves that the perceptions are different for uniquely constituted group of teachers. In other words we accept the hypothesis on the basis of the qualitative outcome of the results.

Testing of Hypothesis H_3. There are some common behaviors which run in more than one groups.

If we look at the behaviors obtained for different groups, we find number of behaviors concerning acting out spirit is common to more than one groups. This indicates that all teachers have some common concerns. This is also seen in the graph given below the item no. 19, 13, 20, 32 & 17 are most approved items when we rank the irritating behaviors for whole sample irrespective of the group to which they belong.

These items are also prevalent in the eight groups, which prove the existence of common items irrespective of group. In conclusion we accept the hypothesis that some irritating behaviors are perceived by almost all the teachers.
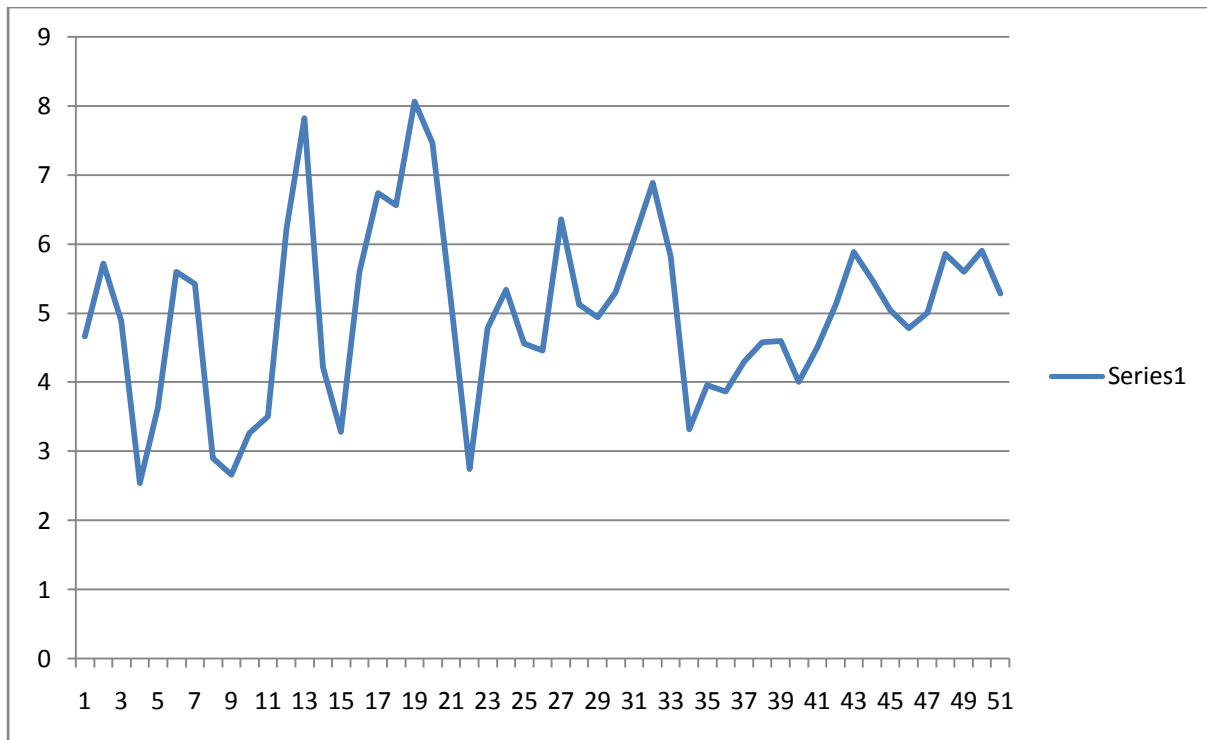
Graph1: Q - Frequency vs. Item Number

Testing of Hypothesis H$_4$ Q-Technique is successful in dealing with subjective issues like one under investigation

The result obtained in this study should substantiate the fact that technique could resolve the issue quite successfully. But the investigator believes that data and results are open to the readers and reviewers and one is free to interpret in his/her own way and decide whether this hypothesis should be considered as accepted or rejected.

Finally we believe the study should fall under the category of Triangulation which is a combination of quantitative and qualitative techniques. Investigator has tried to do justice with the issue under investigation on one hand and the availability of resources at the other.

Educational Significance of the Study

Although, the investigator conducted present study on a small sample, but then the beauty of the Q-technique lies in its ability to draw significant information on a subjective issue using small samples. The technique is very good at drawing factors (constructs) of a subjective concept like irritating behaviors based on subjective perceptions of the participants. By doing this the investigator learns the art of handling subjective issues in an objective manner. The factors revealed during the study have thrown some light on the concerns of the teachers regarding behavior of the students in the classroom. They do not like their learner to be acting out, egotist, talkative, slow-

learner, careless and maladjusted. The results can be utilized to make learners aware of the teachers' concerns and disliking about their behavior. In this way a learners can establish healthy relation with his/her teachers.

Suggestions for Further Study

There can be number of dimensions which can emerge from this study for furthering research in this area. Study can be replicated with better statistical techniques like factor analysis in combination with array method suggested by Stephenson (1953) and Sontag (1968). Issues like behavior, values, ethics, emotions, character and the like can be studied very effectively using Q-methodology. A study can be thought for comparing results obtained by using ipsative and normative methods of research. These obtained behaviors can also be used to develop a normative instrument for studying the same issue in respect of attribute variables.

References:

Aitken, J. E. (1990). Using Stephenson's Q-methodology in teaching communication theory, (ERIC Document Reproduction ServiceNo. ED324719).

Block, J. (1961). *The Q-sort method in personality assessment and* psychiatric research. Springfield*,* IL: Thomas.

Brown, S. R. (1972). A fundamental incommensurability between objectivity and subjectivity: In S.R. Brown and D.J. Brenner (Eds.). *Science, Psychology and Communication: Essays Honoring William Stephenson,* (pp.57-94). New York : Teachers, College Press.

Brown, S. R. (1980). Political subjectivity: *Application of Q-methodology in political science.* New Haven, CT: Yale University *P*ress, net source

http://reserves.library.kent.edu/courseindex.asp. Accessed on June 22, 2006.

Brown,S.R.(1993). A primer on Q-methodology. *Operant Subjectivity,18*, 1-16.

Brown, S. R. (1996). Q-methodology and qualitative research. *Qualitative Health Research, 6,* 561-567.

Brown, S. R. (1997). The History and principles of Q-methodology in psychology and social sciences, *British Psychological Society,* symposiumon "A quest for a science of subjectivity: The life work of William Stephenson," University of London, and conference on "A celebration of the life and work of William Stephenson (1902-1989)" University of Durham, England. Net source,*Q-Archive:http//facstaff.www.edu/cottlec/ qarchine/qindex.htm.*

Burt, C. (1937). Correlation between persons, *British Journal of Psychology, 28,* 56-96.

Burt, C. (1940). The factors of mind: *An introduction to factor analysis in psychology.*

London:University of London Press.

Burt, C. and Stephenson, W. (1939). Alternative views on correlation between persons *Psychometrika, 4*, 269-281.

Carr, S. C. (1989). The use and interpretation of Q-technique factor analysis (ERIC Document Reproduction ServiceNo. ED 306297).

Carr, S.C. (1992). A primer on the use of Q-technique factor analysis. *Measurement and Evaluation in Counseling and Development, 25*, pp.131-138.

Cramm, J. M. (2006). Determinants of (non-)compliance with treatment for people with tuberculosis in eastern cape; a Q-methodological study, Net source http*: oaithesis.nl/ ir/repub/asset/3942/crammjm.pdf.* Accessed on Jan. 12, 2008.

Exel, Van and Graff, G. de (2005). Q-methodology: A Sneak Preview, *www.jobvanexel.nl.* Accessed on Jan. 9, 2008.

Gibbs, Cecil. (1955). Classroom behaviour of college teachers. *Educational and Psychological Measurement*, *15*,Spring, pp 254-263.

Gooding, C.T. and Wilbur, P. H. (1971). Q-technique as an effective measure of teacher attitudes*. Journal of Teacher Education, 22*,1, pp.44-47.

Halterman, R. J. (1969). A q-technique study of effective science teachers (ERIC Document Reproduction Service No. ED 041779).

Herbart, J. F. (1904a). *Outlines of educational doctrine*, New York: McMillan Co.

Hyman, R. T. (1967). *Contemporary Thoughts on Teaching,* New Delhi: Prentice-Hall, Inc*.*

Ignatovich, F. R. (1979). Value/ belief patterns of teachers and those administrators engaged in attempt to influence teaching, Research Series No. 43 (ERIC Document Reproduction Service No. ED181007).

Kerlinger, Fred.N. (1956). The attitude structure of the individual: A Q – study of the educational attitudes of professors and laymen, *Genetic Psychology Monographs* , LIII, pp 283 – 329.

Kerlinger, Fred. N. (1986) *Foundations of behavioural research*, (3ʳᵈ Ed.). New York: Holt Rinehart and Winston.

Singh, Prabhakar (1988). Teaching behaviour of science teachers: A factorial study: *Indian Educational Review*, *23*,4, pp.18-29 NCERT, New Delhi.

Sontag, M. (1968). Attitudes toward education and perception of teacher behaviours, *American Educational Research Journal*, 5, 3, pp.385-402.

Stephenson, W. (1952). Some observations on Q-technique*. Psychological Bulletin, 6,* pp483-486.

Stephenson, W. (1953). *The study of behaviour*. Chicago: University of Chicago Press.