

PROSPECTIVE SCIENCE TEACHERS' ATTITUDE: AN EFFECTIVE TOOL FOR CURRICULUM TRANSACTION

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Abstract: Prospective science teachers' thoughts are the new fertile zone where the seed like attitude could be germinated which inculcate the various approaches to science curriculum transaction. It is highly important for the students to be scientific, civic, and social conscious which enable them to carry leadership responsibilities successfully. This could be achieved if the desirable knowledge is transacted in the classroom with the intention of inspiring the learners to develop the scientific attitude. With this purpose, developing 'positive attitude' among prospective teachers become essential to be a powerful agent for strengthening the science curriculum transaction in order to make taught knowledge applicable. The Attitude of prospective teachers used as a functional tool which assists them to develop strategies and methods crucial for successfully transacting the content. To be certain about the attitude level of the science prospective teachers, data was taken from 250 prospective teachers across Chhattisgarh by using self-made tool 'SCTAS' scale. The data analyses evident that majority of the prospective science teachers possess a high level of positive attitudes towards science curriculum transaction. It also has been discussed that what action should be taken to make science curriculum transaction sound by changing the attitude of prospective teachers.

Keywords: Attitude, Prospective science teacher, Curriculum transaction, practice teaching

I. INTRODUCTION

Science is an essential area of learning in curriculum and instruction from primary level to higher level of education worldwide. International student achievement tests for instance PISA and TIMSS make a discussions on the quality of national education programs, as education stakeholders look for ways of improving their educational systems. In India science education has been found near the bottom of global ranking (PISA, 2009; Das and Zajonc, 2010). Students have such a limited scientific knowledge that it can only be functional to a few familiar situations. Students could be able to identify the scientific components of many multifaceted life situations, if apply both the scientific concepts and the knowledge about science to these situations, also can compare, select and evaluate suitable scientific evidences for responding to everyday life circumstances. At this level, students can use inquiry abilities, can connect knowledge appropriately and carry critical insights to situations (Educational Initiative; and ASER 2014, 2012, 2010).

Positive attitudes and actions employed by them can make positive changes on the lives and professional development of their students. According to Chastain (1998), teachers' positive attitudes, emotions, and feelings toward themselves, the class, the language, learners and culture of the language promote the quality of teaching and learning. Attitude is defined as a complex mental state involving beliefs and a tendency to react in a way towards a designed class of stimuli (Anastasi, 1957). In order to promote learners' positive attitudes and good feelings, teachers should respond to their various interests and needs, help them develop positive self- concepts and cooperative attitudes by listening to them. Additionally, they should provide clear feedback for them, help them comprehend what they are going to do in classes, encourage them to develop intrinsic motivation and discover their capabilities and take responsibilities to develop skills for learning. It is clear that only teachers employing positive attitudes and actions can make positive changes on the lives of their students.

1.1. Attitude as a functional tool for prospective teachers

The term "attitude" is defined as social psychology as the scientific study of attitudes (Thomas & Znaniecki, 1918) as a subjective or mental preparation for action. It is "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly and Chaiken 1993, p.1) or likes and dislikes (Bem, 1970) to an object or person. Attitude determine what an individual observe, hear, think and act. It may be positive (value) or negative (prejudice). They are imbedded in experience and do not become automatic routine conduct.

Social psychologists studied and identify three components of the responses: first one is *cognitive component*, which is the knowledge about an attitude object (judge accuracy). the second is *affective component*: feelings regarding the object; and the third one is *conative or psychomotor or action component*, which the action is taken towards the object.

These three components in most situations appears parallel to frame the curriculum transaction of any subject through the direct or indirect inaction between society, school and teachers. Cognitive component mint for understanding the knowledge level of students and demand of society so that the required science curriculum can be transacted in the classroom. Likewise affective domain can assist teachers to know the feeling of students, parents and society. Accordingly teacher must be trained to take action under the component of conative. Thus during the practice teaching prospective teachers' must be given training by keeping in mind of these three components. Such preparation of prospective teachers will tend to use their "attitude as a

tool" may lead toward strengthen the transaction of science curriculum. This will make knowledge functional at personal as well as social level. In this regard, Leite (1994) raised questions about how does society think the need for change, what are the demands of society, what is considered modern, and how do these beliefs influence teachers' views and behaviour in school. The expectations of prospective teachers, their sensitivity priorities and values contribute the quality of education, so the prospective teacher is the most important component of the quality of education. Teacher's competencies which has different facets of ways and strategies could give an understanding of behaviour of teachers during teaching. Attitude of teachers used as a tool because it plays a fundamental role (either +ve or -ve) in any educational setting and reform. Teachers' attitude competencies do not spontaneously ensure positive attitudes towards the teaching process. Therefore, there is needed such proper training to the future teachers that they could develop positive attitude towards transaction of science content. So they would be an efficient and effective science teacher. Consequently, students will be able to connect their past knowledge and experiences with new information (Santrock, 2004) which is the demand of today's society and education system. Thus teachers are not expected to pour knowledge into the heads of learners; rather, they assist learners in their construction of knowledge by creating experiences where students' old information can transact with new information to create meaningful knowledge (connecting old knowledge to the new situation). This approach is seen as students' ability to use this knowledge to solve real-world problems or to create products or performances that are valued in one or more cultural settings. These all prerequisites can be obtained if positive attitude develop into the future teachers.

II. METHODOLOGY

The present Study is descriptive in nature and survey has been adopted in which quantitative data were collected and analysed. In addition, desk researched method were adopted for knowing the attitude level.

2.1. Objectives and significance of the study

The main purpose of this study is to view the attitude of prospective teachers regarding science curriculum transaction in the classroom. Also look at the attitude level of prospective teachers pertaining to transaction of content by using difference approaches in order to make it functional. There are some representative studies defining the attitude of prospective teachers, as mentioned above, but this study differs from the others in the way that it may give us a possibility to find out the different level of prospective teachers toward SCT. By the mean of data collected from the trainees, we can have a chance of noticing the effectiveness of the courses that they take during their training. Concerning to this the following questions were articulated:

RQ1. What is the status (statistical) of science curriculum transactional attitude of prospective teachers?

RQ2. What is the attitude level of the prospective teachers towards science curriculum transaction?

RQ3. What are the attitudes of prospective science teacher toward science curriculum transaction?

2.2. Participants (sample)

The data were collected from 250 prospective teachers who were enrolled in B.Ed. programme across Chhattisgarh state. Data were collected through Stratified cluster random sampling technique.

2.3. Tool used for data collection

Science curriculum transaction attitude scale (SCTAS) a self-made tool was used in the study for the purpose of collecting quantitative data. It was a Likert-type attitude scale with 73 statements encompasses two main dimensions: the traditional approach of transactional attitude and the modern approach called student centred approach of transactional attitude. Negative items were also included.

2.4. Analysis and interpretation

Descriptive statistics, comparative bar diagram and range were analysed using the quantitative data by the help of Statistical Package for the Social Sciences (SPSS). Through this descriptive analysis qualitative interpretation was done by showing range, frequency tables and bar diagram.

III. RESULT AND FINDING

3.1. RQ. 1. What is the status (statistical) of science curriculum transactional attitude of prospective teachers?

First of all, the reliability of the statements was calculated, and found high ($\alpha = 0.920$). Further, statistics of total scores was computed and obtained the grand mean all items 269.10 with standard deviation 30.808 (shown in the table 1). This statistics of total mean scores indicated that all prospective teachers have almost consolidated positive attitude toward transactions of science contents or curriculum.

Table 1: Descriptive statistics of science curriculum transactional attitude of prospective teachers

N	Mean	SD	Md	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
250	269.1	30.808	275	949.114	-0.037	0.154	0.588	0.307

3.2.RQ. 2. What is the attitude level of the prospective teachers towards science curriculum transaction?

The following table 2 shows the descriptive statistics of different attitude level (High, Average and Low) of science prospective teachers. The prospective teachers (17.2 percent of total) who have high mean score that is 311.05 which SD 14.962 indicating to high level of attitude regarding science curriculum transaction. Whereas, the 58.8 percent prospective teachers having average level of attitude. Further it also revealed that 24 percent prospective teachers' attitude is low level towards transaction science curriculum. Therefore it may be said that 76 percent prospective teachers are having favourable and positive attitude towards science curriculum transaction. This level of attitude has also shown clearly in the fig.1 through bar diagram.

Table 2. Level of science curriculum transaction attitude of Prospective teacher

Descriptive statistics						
Level of SCT attitude	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	percent Statistics
High	43	299	339	311.05	14.962	17.2
Average	147	239	298	273.91	16.242	58.8
Low	60	206	238	227.27	8.584	24

Levels of SCT attitude of prospective teachers which are given in table 4.20 is calculated by following method-

Highest value = Mean + SD that is $(269 + 3080 = 299.8)$ i.e.299 and above scores = 43 respondents lie in this range. *Average value* = range between 298 to 239 scores = 147 respondents lie. *Lowest value* = Mean -SD that is $(269 - 30.80 = 238)$ i.e.238 hence at or below 238 scores = 60 respondents are Felled into this range

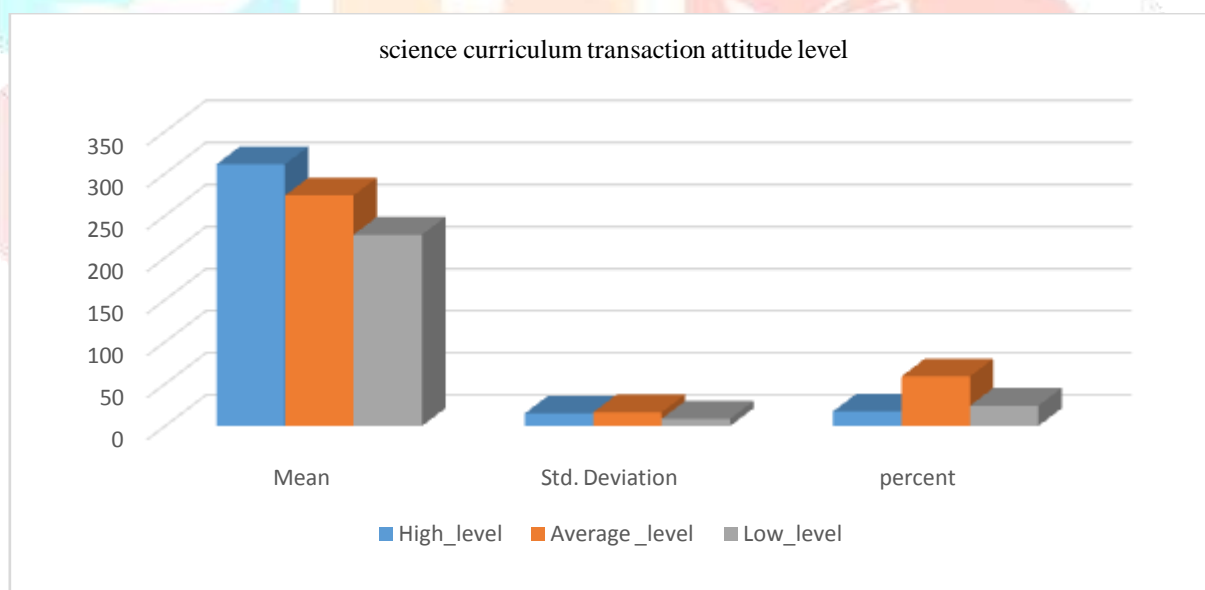


Fig. 1. Bar diagram presentation of SCT attitude level of prospective science teachers (PSTs)

3.3RQ3. What are the attitudes of prospective science teacher toward science curriculum transaction?

Table 3: Attitudes of prospective science teacher toward science curriculum transaction questionnaire (positive items*total 16)

SN	Positive items of prospective teachers towards SCT	SA	A	A%	N	N%	DA	SDA	DA%
1*	In science teaching lecture method is important because it convey maximum information in short period.	30	58	35.2	28	11.2	83	51	53.6
3*	Science teachers should focus mainly on the approaches to discourage and reduce rote learning.	121	72	77.2	19	7.6	12	26	15.2
4*	Laboratory is a place for observation and learning by doing of a given scientific problem.	13	22	14	12	4.8	51	152	81.2
6*	For effective science curriculum transaction, Project work can be given to secondary school students.	70	98	67.2	27	10.8	25	30	22
8*	Textbook centric approach of science teaching is not sufficient for over all development.	94	75	67.6	20	8	41	20	24.4
9*	Demonstration is needed before engaging the students in practical work.	12	10	8.8	14	5.6	74	140	85.6
13*	Through science teaching, students can be taught independent self -leaning skills.	31	23	21.6	36	14.4	106	54	64
14*	Reflective thinking can in reality be developed in students by problem solving method for arriving at a rational solution.	3	23	10.4	15	6	105	104	83.6
17*	If the science teacher wants to change the attitudes of students, lecture method becomes important.	33	43	30.4	26	10.4	107	41	59.2
18*	It is really not difficult to fulfil the aim of development of life skills through science teaching.	41	46	34.8	24	9.6	90	49	55.6
19*	A Single demonstration is more effective in elaborating concepts to students than simple lectures.	17	24	16.4	19	7.6	101	89	76
21*	Constructivist approach helps students to construct their own understanding and knowledge of the scientific world.	28	27	22	29	11.6	85	81	66.4
24*	Heuristic method can be used in every chapter of science teaching as per its own nature	8	27	14	37	14.8	89	89	71.2
25*	Following a single textbook does not helps students to gain particular knowledge more strongly and effectively	45	37	32.8	27	10.8	87	54	56.4
29*	Different new methods of science teaching give an essential background of knowledge for cultural development.	5	16	8.4	36	14.4	119	74	77.2
30*	Experience of life can construct the students' knowledge.	28	23	20.4	20	8	88	91	71.6

From Table 3, it shows that out of the responses gathered from the respondents, majority of the prospective teacher selecting strongly agree or agree that show that shows the intense of attitude and very few students disagreed with the given statements. Responses on Item no 4 (14 %), 9 (8.8%), 14 (10.4 %), 19 (16.4 %), 24 (14%) and 29 (8.4) show that prospective teachers are having negative attitude towards these types of transactional skills.

Table 4: Attitudes of prospective science teacher toward science curriculum transaction questionnaire (negative items, total 14)

SN	Negative items of prospective teachers towards SCT	SA	A	A%	N	N%	DA	SDA	DA%
2	Project work have limited role in developing independent decision making skills among students.	44	51	38	27	10.8	108	20	51.2
5	Activity centred Science curriculum is failure to make children to examine and analyse every day experiences.	35	49	33.6	25	10	59	82	56.4
7	In laboratory, school students can't think independently.	33	49	32.8	24	9.6	90	54	57.6
10	In actual classroom science teaching, the aim of developing concerns for democracy has no significance.	35	39	29.6	53	21.2	80	43	49.2
11	Demonstration does not motivate the school students for participating in science activities.	103	73	70.4	24	9.6	31	19	20
12	Reading textbook and practising more and more, is better for science learning than to do project and lab work for Indian classroom.	34	49	33.2	17	6.8	73	77	60
15	For real school teaching, integrating science with life is an unachievable aim.	42	40	32.8	35	14	86	47	53.2
16	Demonstrations are effective but not motivational	66	44	44	29	11.6	73	38	44.4
20	Teachers need not to do practice before going to demonstrate before students.	45	26	28.4	26	10.4	66	87	61.2
22	Science activities do not facilitate situation to develop students, interested in science	26	23	19.6	40	16	70	91	64.4
23	Demonstration is practically not feasible for developing right concepts in real Classroom.	39	33	28.8	27	10.8	113	38	60.4
26	Excursion as a part of curriculum can distract the students from their aim.	42	25	26.8	33	13.2	98	52	60
27	No matter how hard teachers try to teach, students can't understand science concepts.	40	23	25.2	41	16.4	83	63	58.4
28	The problem solving method is not at all a practically feasible.	42	39	32.4	44	17.6	89	36	50

Table 4, indicates that most of the prospective teachers are showing their attitude for curriculum transaction approaches by opting strongly disagree and agree. These indicates that they are having favourable attitude towards constructive mechanism of curriculum transaction. But few are having negative attitude i.e. agreed on negative questions. These are item no 11 (70.4%) and 16 (40 %).

IV. DISCUSSION

This study mainly is an analysis of the attitudes of prospective teachers toward science curriculum transaction. That attitude used as a tool to transact the content easily and meaningfully. The mean value of the grand total score show that most the prospective teachers have positive attitude level toward science curriculum transaction. That means as whole, teachers are having progressive attitude tended toward approaches of science curriculum. This finding is supported with a number of studies such as Yesil, 2011; and Gunelyli and Alsan 2009.

When moved one step forward, for examined their attitude, level wise, found that 24 percent prospective teachers has low level of attitude while 58.8 percent prospective teachers have average attitude and 17.2 percent hold higher attitude. So, it make clear that most of the prospective teachers are getting training in a right direction to be turn into favourable attitude. But this also point out that there need more improvement yet, to reach at higher level of attitude. This finding was stayed with some studies of Sener, 2015; Omolara and Adebukola, 2015 and Terzi and Tezci 2007. Science prospective teachers (SPTs) are supposed to be prepared to become highly motivated effective teachers but when the attitude differences of those SPTs need to identify and put special attention to make them efficient and attentive science teacher.

It was clear form result of question 2 (positive items) that PSTs are not prefers lecture method and majority of them want the rote learning should not be placed in the science teaching but some are in support and also some are still undecided. Instead of this, new approaches should be use. They are agreed that project work must be given for effective science teaching and understanding. Very few are agreed with laboratory method which is useful for learning by doing and observation skills. This indicate that they are having limited knowledge about laboratory role in science teaching. They are preferably support that text centric approach for science teaching is not well sufficient for overall development. Furthermore, result revealed that PSTs preferred demonstration approach before engaging the students in practical work but at the same time they did not find demonstration works well alone so there need some other methods too. It was also revealed that PSTs consider that problem

solving method develops reflective thinking and make rational solution to a problem. Moreover, PSTs were ready to apply different new and creative approaches for cultural development. While on constructive approach of science teaching they did not show deep interest. This could be because they are not that much aware of the approach.

Form negative items of questionnaire revealed as the result that about fifty percent of the PSTs agreed that project work have limited role in developing decision making skills. Similarly they support that democratic approach of teaching did not work well for science teaching. Further, majority of PSTs have attitude that demonstration does not motivate the students but it is effective for teaching. Fifty percent of them says that problem solving method is not at all a feasible at secondary level. Result also revealed that the PSTs want to use excursion, and science activates as a part of curriculum. They also supported that if teacher do hard work for preparing lessonplan, they would be surly able to make students understand the science concepts. Most teachers generally provides information rather than practical experience (Brown, 1982). Maximum teachers become failure because of using unplanned teaching approach; so they treat every students identically and have faith that students are ready to follow the similar type of instruction and methods. By this way, teachers show the lack of readiness about kinds of students' learning and thought, (Hallbawchs, 1975). In this smart teaching time, there is an epistemological gap between theory and practice. To bridging this attitude of prospective teachers need to raise utility of transaction of curriculum Ciscar (1990) and Ryu (1987). Prospective teachers do not practice and perform innovations of new curricula, methods and approaches. Partly due to deep-rooted trust about teaching science as telling science, instead of teaching as a process or way of thinking. Therefore, good practices in science curriculum transaction are expected to promote the approaches like critical thinking (Arons, 1990), problem solving abilities, data interpretation and good communication skills. Due to unclear methods of action, teachers' attitudes indicate the lack of confidence to implement innovative approaches. New methods, skills and technologies are rejected passively. Studies carried out in some countries (Garrido et al., 1991) indicate that teachers show little interest and lack of compromise towards innovation in school. This may be due to the lack of consistency between the teachers' classroom attitudes and their said belief on active methods of interaction. Koulaidis (1987) obtained in a study that most of the transactional strategies of science content which are given to prospective teachers is quite traditional. This lead only towards production of knowledge and abstract thinking. The conditions under which prospective teachers would going to work is professional so need to create new factors that define and redefine the attitudes prospective teachers.

V. CONCLUSION

Attitude is a tendency to respond in a certain way toward intended class of stimuli (Anastasi, 1957). In addition, it has an effect on teachers' efficiency and performance. As the quality of education is directly linked to the quality of teachers, we must consider the requirement of positive attitudes and try to develop teacher's favourable attitudes toward the curriculum transaction by taking some actions and developing some programs for best training.

This study revealed that, the prospective teachers' attitudes towards science curriculum transaction was investigated, and it was found that the overall attitude of prospective teachers toward science curriculum transaction were positive. But due to some factors like improper knowledge and unawareness they are unable to choose the appropriate teaching approaches or methods. So there is essential to pay attention towards those who are not aware of it. So they should be identified and concerned training must be given. Reflective thinking, life experience and new approaches were more preferred by the prospective teachers for transacting science content. As a final point, it essential that teacher training programmes need to provide prospective teacher with knowledge and experiences with cultural diversity. Demonstrate positive attitudes, and encourage them to be creative and take responsibility for their development. This way they would be able to enhance their ability and will pay effective role in education system efficiently.

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