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Investigating Pre-service Science Teachers Attitude towards Science in Ghana

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Abstract: ***The study investigated the attitudes of pre-service teachers towards science teaching at the basic school level in Ghana. Descriptive survey design was used in this study. Cluster sampling was done to select 200 pre-service science teachers from 38 public colleges of education in Ghana. Science teaching attitude scale (STAS) was designed to measure pre-service basic school teachers' attitudes towards science teaching. The finding from this study indicates the pre-service science teachers' have a positive attitude towards science and science teaching. It was recommended that teacher educators in the Colleges of Education in Ghana should continue to use various strategies that will motivate students and improve their conceptual understanding in science.***

Keywords: Attitude, Instructional Approach, Lecture method, Pedagogical Knowledge

1. Introduction

In recent times attention has been directed towards research on how attitudes toward science affect learning and science teaching. Attitude toward science may be expressed as peoples' like or dislike for science as a subject. Such attitudes toward science often denote a general positive or negative feeling toward the formal study of science or science as an area of research (Koballa & Crawley, 1985). The study of attitudinal change towards science has gained prominence in recent times due to a number of reasons. First, attitudes toward science are thought to fulfil basic psychological needs of students, such as the need to know and the need to succeed. Second, attitudes toward science are also thought to influence future behaviours, such as an interest in working on a science project and scientific activities. In a much broader sense, a student's attitude toward science conveniently summarizes his or her emotional response to basic beliefs about science. In addition to the fact that attitudes toward science serve as convenient summaries of our beliefs about science, they are important for other people for other reasons-they help others predict the kinds of science related behaviours we are likely to engage in more accurately than almost anything else we can tell them (Koballa & Crawley, 1985). Being aware of teachers' attitude toward science is one of the major influences on students' attitude toward science.

Türkmen and Bonnstetter (1999) studied Turkish pre-service science teachers' attitudes toward science and science teaching by using a Turkish version of Science Teaching Attitudes Scale (STAS II) developed by (Moore & Foy, 1997). The results of this study indicated that pre-service Turkish science teachers have positive attitudes toward science and science teaching. Studies conducted by Tekkaya, Çakıroğlu and Özkan (2002), revealed that pre-service teachers had a positive attitude towards science teaching.

In Ghana, Colleges of Education tutors use a mixture of instructional approaches, but with some more predominant than others (Akyeampong, 2003). Tutors more often use the lecture method in teaching their students (Akyeampong, 2003). Pre-service teachers hardly engage in practical activities but are occasionally asked questions for clarification. Tutors who used this approach predominantly justified it by explaining that it ensured good coverage of the syllabus, in view of the limited college time available to complete teaching it before the external examinations. Pedagogical knowledge is transmitted through the lecture method interspersed with questions and answers, and occasionally by a demonstration of a teaching apparatus by the tutor.

2. Statement of the Problem

According to Akyeampong (2003), classroom observation in three colleges indicated that pre-service teachers' professional learning focused mostly on pedagogical content knowledge, with very little or no discussion on issues relating to the contextual application of teaching strategies and what potentially different teaching situations might require of the teacher. Learning to teach seems to mean building up a repertoire of teaching strategies to convey concepts in primary and junior high school subjects. The impression created is that of mastering a set of teaching strategies defined by the professional identity of a classroom teacher. According to Feiman-Nemser and Remillard (1996), whereas lack of knowledge and skill may limit what teachers can do, having them does not guarantee their wise use (p. 71). What the pre-service science teachers learn in school is what they practice when they graduate. This has necessitated the need to investigate the pre-service science teacher's attitudes towards science in Ghana.

Purpose of the Study

The study investigated the attitudes of pre-service teachers towards science teaching at the basic school level in Ghana.

Research Question

What are the attitudes of pre-service teachers' in Colleges of Education towards science teaching in basic schools?

3. Methodology

Descriptive survey design was used in this study. The target population chosen was second year pre-service teachers' in Colleges of Education in Ghana because of their common binding characteristics or traits. Cluster sampling was done to select 200 pre-service science teachers from 38 public colleges of education in Ghana. Five colleges from Ashanti and Central region of Ghana were randomly selected with each providing 40 students.

Science teaching attitude scale (STAS) was designed to measure pre-service basic school teachers' attitudes towards science teaching and consisted of 20 items on a five-point Likert scale. In this study STAS was adopted to measure pre-service science teaching attitude.

4. Findings

A five point category response scale that tested attitudes of the pre-service teachers towards science teaching comprised 20 items. Items in the teaching attitude scale required respondents to express their perceptions about teaching science. The respondents' scores on the science teaching attitude scale were analysed by descriptive statistics and results presented as shown in Table 1. The minimum mean score is 1 (negative attitude) and a maximum mean score is 5 (positive attitude) with scores approaching the midpoint (i.e. 3) indicating neutral.

Table 1: Pre-service Teachers' Responses on the STAS

Items	Agree	Neutral	Disagree	Sample	Mean	SD	Cronbach Alpha
1) * I will feel uncomfortable teaching science.	30(15.0)	19(9.5)	149(74.5)	198	3.91	1.210	0.765
2) The teaching of science of science process is important in the basic classroom.	173(86.0)	10(5.0)	15(25.5)	198	4.19	0.914	0.778
3)* I fear that I will be unable to teach science adequately.	38(19.0)	17(8.5)	143(71.5)	198	3.77	1.124	0.761
4) I will enjoy lab/ hands on time when I teach science.	138(69.0)	36(18.0)	19(9.5)	194	3.93	3.010	0.841
5) I feel comfortable with the science contents in the basic school curriculum	130(65.0)	27(13.5)	41(20.5)	198	3.55	1.138	0.782
6)* I have a difficult time understanding science.	49(24.5)	33(16.5)	116(58.0)	198	3.45	1.160	0.764
7) I will be interested in working on an experimental science curriculum	145(72.5)	31(15.5)	22(11.0)	198	3.82	0.975	0.779
8)*I dread teaching science.	50(25.0)	52(26.0)	87(43.5)	189	3.30	1.115	0.781
9)* I do not look forward to teaching science in my basic classroom.	41(20.5)	11(5.5)	145(72.5)	197	3.77	1.202	0.769
10)* I am afraid that students will ask me questions that i cannot answer.	39(19.5)	17(8.5)	142(71.0)	198	3.75	1.149	0.764
11) Enjoy manipulating science equipment.	162(81.0)	16(8.0)	18(8.5)	196	4.02	0.909	0.775
12)* In the classroom, i fear that science experiments will not turn out as expected.	54(27.0)	26(13.0)	117(59.4)	197	3.45	1.192	0.773
13) I hope to be able to excite my students about science.	181(90.5)	6(3.0)	10(5.0)	197	4.26	0.828	0.777
14) I plan to integrate science into other subject areas.	151(75.5)	26(13.0)	18(9.0)	195	3.88	0.933	0.784
15) Science would be one of my preferred subject areas to teach if given a choice	138(69.0)	23(11.5)	36(18.0)	197	3.81	1.266	0.759
16) Science is as important as reading, writing and mathematics	184(92.0)	5(2.5)	8(4.0)	197	4.48	0.836	0.778
17)* Teaching science takes too much effort.	140(70.0)	18(9.0)	39(19.5)	197	2.22	1.139	0.789
18)* Teaching science takes too much time.	123(61.5)	25(12.5)	48(24.5)	196	2.41	1.171	0.786
19) I am willing to spend time setting up equipment for lab.	151(75.5)	22(11.0)	24(12.0)	197	3.85	1.014	0.770
20) I will enjoy helping students construct science equipment for a lab	140(70.0)	31(15.5)	26(13.0)	197	3.72	0.968	0.767

Note* scoring reversed for these items and figures in brackets represent percentages

In Table 1, the analysis of pre-service teachers' responses on their attitudes towards science teaching has been presented. Data from Table 1 shows that students have a positive attitude towards science teaching as indicated by mean scores of most of the items. The mean score on the item 1 (3.91) implies that most of the respondents agreed that they would feel comfortable teaching science. The mean scores on the Item 2 which is 4.19 asserted that teaching of science process is important in the basic classroom as 3.77 of the mean scores on Item 3 also implies that they do not fear science and would be able to teach science adequately. Further, the mean score on the Item 4 which is 3.93 indicated that they will enjoy lab/hands on time when teaching science. Also 3.55 of the mean scores on the Item 5 claimed that they feel comfortable with the science content in the basic school curriculum as 3.45 of the mean scores on the Item 6 asserted that they would not have a difficult time understanding science. Further, the mean score on the Item 7 which is 3.82 claimed that they will be interested in working on experimental science curriculum and 3.30 of the mean scores on the Item 8 asserted that they would not dread teaching science. About 3.77 of the mean scores on the Item 9 indicated that they do look forward to teach science in their basic classroom. Also 3.75 of the mean scores on the Item 10 claimed that they are not afraid that students will ask questions they cannot answer. The mean score on Item 11 which is 4.02 claimed that they enjoy manipulating science equipment as 3.45 of the mean scores on the Item 12 asserted that they would not fear that science experiments will not turn out as expected in the classroom. Further, 4.26 of the mean scores on the Item 13 asserted that they hope to be able to excite their students about science, whilst 3.88 of the mean score on the Item 14 agreed that they plan to integrate science into other subject areas. About 3.81 of the mean scores on the Item 15 claimed that science would be one of their preferred subject areas to teach if given the choice. The mean score 4.48 on the Item 16 agreed that science is as important as reading, writing and mathematics, whilst 2.22 of the mean score on the Item 17 agreed that teaching science takes too much effort. About 2.41 of the

mean scores on the Item 18 also asserted that teaching science takes too much time. Further, the mean score 3.85 on the Item 19 agreed that they will enjoy helping students construct science equipment for a lab. Also 3.72 of the mean scores on the Item 20 also agreed that they are willing to spend time setting up equipment for the lab.

From the results it can be concluded that the pre-service teachers' have a positive attitude towards science teaching. The result of this study is consistent with the study by Türkmen and Bonnstetter (1999) which indicated that pre-service Turkish science teachers have positive attitudes toward science and science teaching. Tekkaya, Çakıroğlu and Özkan (2002), revealed that pre-service teachers had a positive attitude towards science teaching.

5. Conclusion

Analysis of the results indicates that pre-service science teachers in Ghana have a positive attitude towards science and science teaching. It is recommended that teacher educators in the Colleges of Education in Ghana should continue to use various strategies that will motivate students and improve their conceptual understanding in science.

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