

RADIO SCIENCE RESEARCH PAPER

(Draft: Comments are welcome)

8-17-89
File
R/Sci
Reports

COMMUNITY SCHOOL SCIENCE: A DIFFICULT SUBJECT?
Some Teachers Views on Science and Science Teaching in
East Sepik and Western Province.

by Roland Katak

There is a general belief that science is a difficult subject to teach and learn. This misconception has influenced many people to entertain the view that science is a difficult subject for most children in Papua New Guinea (PNG) community schools (CSs) and this results in many children not liking the subject. Not only is the belief that science is a difficult subject for children but it is also a difficult subject for many teachers to teach and that many teachers are more sure of themselves when they teach subjects other than science.

This paper discusses what 49 teachers in East Sepik and the Kiunga District of Western Province thought of these views. Their responses suggest that the above views are falsely held because there are hidden factors which contribute to the teaching and learning of science. Their responses indicate that much of the difficulties children face in learning science and teachers face in teaching science result from lack of science resource materials and teachers planning and preparation of science lessons.

Twenty-four teachers from 24 CSs in East Sepik and 25 teachers from 18 CSs in Kiunga were given a science questionnaire. They were required to respond to certain statements about teaching and learning of science in CSs. The teachers in East Sepik filled in the questionnaire at the end of 1988 while those in Kiunga filled in the questionnaire in June 1989. In both locations 62% of the teachers were between the age of 21 and 35 years and 73% of the teachers have taught for 6 years and more.

The teachers responded to each statement by selecting one of the five set responses (concomitant with their view of the statement): strongly agree (SA); agree (A); uncertain (U); disagree (D); and strongly disagree (SD). They were also required to give brief reasons supporting their response.

In this paper we tabulate and discuss the teachers responses to the following nine statements:

1. "Most children like science."
2. "Science is too difficult for most students."
3. "Children like mathematics more than science."
4. "I feel good when I teach science"
5. "It is easy to teach science."
6. "I feel more sure of myself teaching science than any other subject."
7. "It is more difficult to teach science than any other subject."
8. "I feel more sure of myself when I teach Community Life than when I teach Science."
9. "I take more time to prepare a health class than a science class."

Statements 1 to 3 are teachers views of how children view and learn science. Statements 4 to 9 are teachers own views about science and how they teach science.

The rest of the paper will be presented in three parts. The first part is a summary discussion of the teachers responses and reasons to the nine statements given above. The last two sections are the tabulations and discussions of each of the statements. They are the The children's preference for science and the level of difficulty of the subject for children' and 'Teachers confidence and preparation to teach science and their preference for science over other subjects.'

SUMMARY DISCUSSION OF TEACHERS MAIN RESPONSES

Community school teachers in East Sepik and Kiunga are aware of their roles and teaching functions within the education system. They are expected to plan for, prepare and teach any nationally prescribed subject as well as other extra curricular subjects. It was highlighted by these teachers that all subjects were useful and as far as practicable no subject should be given preference (in time, planning and preparation) at the expense of another.

The East Sepik and Kiunga teachers also highlighted two important areas of concern in education in this country. The first is the availability of teaching materials and resources with which the teachers must be able to use usefully in their lessons. The second is the planning and preparation of lessons. The teachers in this sample were concerned that not enough planning and preparation, including improvisation and simplification, of lessons were done by teachers.

According to the teachers in this sample no subject is any more difficult, for teachers to teach and children to learn from, than another. They disagreed with the belief that science is a difficult subject, pointing out that the difficulty of science is a result of material shortage and teacher's preparation and teaching. These teachers also contended that any trained teachers should be capable of teaching any subject, and children can learn even the most difficult subject provided there are adequate materials available and that teachers know how to use these materials to simplify, prepare and present the lesson to the best of their abilities.

In teachers views most children do like science because science is one of the few subjects which give children opportunities to be engaged in hands-on activities, thus learning by experiments. Also science isn't too difficult for most children since the difficulty of any school subject depends on other factors such as teachers and materials.

Most children do not prefer other subjects to science. A child's preference for any one subject depends on teachers, their teaching styles and materials. Comments by some teachers in this regard can be put in the following way: Children, even in the classrooms, are influenced by adults and their (children's) preference to a subject is more or less shaped by the teachers. In the early stages if a teacher is enthusiastic about a subject and teaches well prepared lessons in a language and style that would capture the children's imagination and interest, and if the children are active participants in the lessons, then the child's 'like' for a subject is established.

It makes a difference if teachers favorite subject is science. In their responses to "It is easy to teach science" and "I feel good when I teach science" they mentioned that they planned for, prepared and taught better science lessons because science was their favorite subject. Teachers felt good teaching science if they understood what they were teaching, particularly if there were adequate materials to teach with.

Most teacher's sureness about themselves when teaching is similar for all subjects. Moreover they do not spend any more time in preparing a lesson for one subject and not for another. Treating all subjects equally they believed that each subject has its particular usefulness for the children and society. Teachers however felt that because of the many experiemnts required in order to best teach science, it (science) took more time to plan for and prepare than other subjects.

The overall conclusion from teacher's responses to science and science teaching in Kiunga and East Sepik is that science can be taught as well as any other subjects. And children have no more preference to learning science over other subjects. Perhaps the largest drawback to making science an easy subject can be traced to the availability of science materials and the teachers. Those responsible for the education of children in this country would do well to be concerned about teaching-learning materials (development, distribution, and storage) and teacher training in both inservice and pre-service.

CHILDREN'S PREFERENCE FOR SCIENCE AND LEVEL OF
DIFFICULTY OF THE SUBJECT FOR THEM

Table 1

Location by responses to "Most children like science" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	12	29	6	2	0	49
Kiunga	20	25	4	2	0	51
Total	32	54	10	4	0	100

The majority (86%) of the teachers agreed that most children did like science. The most prevalent reason given with the agreement was that children enjoyed doing experiments and learned best by self-discovery. A few teachers were uncertain because, as summed up by one teacher, of "individual children's like and dislike (about each subject) and aptitude for science".

Table 2

Location by responses to "Science is too difficult for most students" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	6	16	2	21	4	49
Kiunga	6	10	6	16	10	48*
Total	12	26	8	37	14	97

* 3% of the teachers did not respond in Kiunga.

Fifty-one percent or half the teachers disagreed with the statement. They believed science was not too difficult for most students. On the other hand nearly 40% of the teachers believed science was difficult and nearly 10% weren't sure. Teachers were divided over their responses to this statement because about half of them agreed and the other disagreed or were uncertain.

The main reasons for those who disagreed related to teachers and materials. A summary of these reasons would be as follows: If the teachers simplify, prepare and present the science lesson well, provided there are enough science materials available, then science isn't a difficult subject for children to learn and also for teachers to teach. Science is also not too difficult as children are able to do hands-on activities and learn by self-discovery and by experiments.

The availability of and proper use of materials were also the reasons given by those who believed that science was a difficult subject. A few teachers believed that the subject was difficult because of the difficulty in understanding and teaching some of the science concepts.

Table 3

Location by responses to "Children like mathematics more than science" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	8	0	8	25	3	49
Kiunga	8	12	8	21	2	51
Total	16	12	16	46	10	100

Over half or 56% of the teachers disagreed with the statement. They believed that children did not prefer math to science. However nearly 40% of the teachers entertained the opposite view while 16% were uncertain.

The reasons given by those who disagreed included the number of lessons and time allowed for the two subjects; the different kinds of materials used; and the children's own aptitude and preference for the subjects. A common reason was that math was taught daily while science was allotted only 40 minutes each week. Teachers also stated that although math had its share of the experiments it was nevertheless a subject which can be taught with less experiments than science. For student materials, a significant factor was that the students had their own math workbooks, and it was easier to give homework in math than in science. The teachers preparation and approach to teaching both subjects and the children's talents for either or both subjects were also important.

Similar reasons to the above were given by teachers who agreed with the statement. And for the teachers who were uncertain the prevalent reason was about the student's aptitude and talents for either subjects. And as one teacher wrote: "My children haven't complained they like both math and science".

TEACHERS' CONFIDENCE AND PREPARATION TO TEACH SCIENCE AND THEIR PREFERENCE FOR SCIENCE OVER OTHER SUBJECTS.

Statements 4 to 9 (see page 2) were about teachers and their teaching of science. For instance, was science an easy subject to teach and learn? Did teachers feel sure about themselves and felt good teaching science? Or was it a difficult subject to teach and would teachers spend more time preparing and teaching a subject other than science? Some interesting although similar responses and reasons were given by teachers for these statements.

Table 4

Location by responses to "I feel good when I teach science" and totals in percentages.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	16	19	8	4	2	49
Kiunga	8	27	6	8	2	51
Total	24	46	14	12	4	100

Seventy percent of the teachers certainly felt good when they taught science. Sixteen percent didn't feel good about teaching science and 14% were uncertain.

To support their responses the teachers gave many different reasons. However the five most important reasons (in order of the number of teachers who wholly or partly wrote these as their reasons) were: science was a most interesting subject; science was the teacher's favorite subject; teachers who felt good about teaching science if they understood what they had to teach; the use and availability of materials; and that teachers learn at the same time they teach certain science lessons.

Table 5

Location by responses to "It is easy to teach science" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	10	16	4	17	2	49
Kiunga	2	14	6	25	4	51
Total	12	30	10	42	6	100

Nearly half or 48% of the teachers disagreed or felt that science was an easy subject to teach while 42% felt it wasn't. Ten percent of the teachers were uncertain. Teachers appeared divided over this statement and only their reasons can give some indications to support their responses.

The availability of materials, teachers' understanding and use of these materials, and pre-lesson preparations were the most important reasons given by almost all the teachers who both agreed or disagreed with the statement. It is quite evident that materials and preparation are most important as they make science easier to teach.

8

In support of teachers who find it easy to teach science and who feel good when they taught science, they (teachers) were asked to respond to whether they felt sure of themselves teaching science than any other subject. Table 6 and the ensuing discussion relate to this.

Table 6

Location by responses to "I feel more sure of myself teaching science than any other subject" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	2	10	14	23	0	49
Kiunga	4	19	10	16	2	51
Total	6	29	24	39	2	100

Forty-one percent of the teachers disagreed with feeling more sure of themselves teaching science over another subjects. They felt equally sure of themselves when they taught science and any other subject. Just over a third or 35% of the teachers agreed or felt more sure of themselves when teaching science than other subjects and nearly a quarter or 25% of the teachers were unsure.

Many reasons were given to support the responses. The most common reasons were two: as trained teachers they are sure (with a little planning and preparation) of teaching all subjects and all subjects are useful for children and should therefore be given equal attention and time. Of course the availability of science materials and the teacher's pre-lesson planning and preparation were also mentioned as important.

Teachers were also asked to respond on the statement "It is more difficult to teach science than any other subject." Table 7 shows the teachers responses on this.

Table 7

Location by responses to "It is more difficult to teach science than any other subject" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	0	6	2	33	8	49
Kiunga	2	14	2	23	10	51
Total	2	20	4	56	18	100

By disagreeing with the statement nearly three quarters or 74% of the teachers felt that it is no more difficult to teach science than any other subjects. On the other hand a little over 20% of the teachers agreed that science was, more than other subjects, difficult to teach. And only 4% of the teachers were uncertain.

Two main reasons were given by both the teachers who agreed and those who disagreed: the availability of materials and the planning and preparation of science lessons. Many in both groups also felt that science was a more difficult subject chiefly because of lack of materials, very little pre-lesson preparation and because the science background of many teachers was poor. A few teachers also felt that their scientific knowledge, interest and dedication to imparting this knowledge and interest to children was an important consideration.

Having considered whether science was or wasn't a difficult subject the teachers responded to "I feel more sure of myself when I teach Community Life than when I teach Science." In addition it was interesting to see if teachers took more time to prepare for a class other than science when they had to responded to "I take more time to prepare a health class than a science class." Tables 8 and 9 show the teachers' responses to these statements.

Table 8

Location by responses to "I feel more sure of myself when I teach Community Life than when I teach Science" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	6	10	0	31	2	49
Kiunga	8	12	10	12	6	48*
Total	14	22	10	43	8	97

* 3% of the teachers did not respond.

Fifty-one percent of the teachers disagreed. They felt equally sure of themselves teaching both Community Life and Science. On the other hand just under 40% felt more sure of themselves when they taught Community Life than Science, 10% were uncertain, and 3% did not respond.

Both Community Life and Science are nationally prescribed subjects. Therefore teachers consider both subjects equally important. Teachers are no more sure of teaching Community Life as they are in teaching Science. As far as teachers are concerned both subjects should be planned for, prepared for, and taught to the best of each teacher's ability. These were the main reasons given by nearly everyone who disagreed or were uncertain with the statement.

Many different reasons were however given by teachers who agreed and they gave two main reasons. Firstly, materials for Community Life were much more readily available and were easier to understand and use than materials for Science. Secondly, and this was the opposite to the first was the paucity of science materials in schools.

Table 9

Location by responses to "I take more time to prepare a health class than a science class" and totals in percentage.

Location	Responses					Total
	SA	A	U	D	SD	
East Sepik	2	0	4	39	4	49
Kiunga	0	2	6	35	8	51
Total	2	2	10	74	12	100

Nearly everyone or 86% of the teachers disagreed. They felt that they do not take any more time to prepare a health class than a science class. Very few teachers agreed or were uncertain with the statement.

The most important reason given by those who disagreed was similar to the majority of the teachers who felt equally sure of themselves teaching both Community Life and Science: Both health and science were equally important to children and as such they (17 teachers) do not take any more time to prepare a health class than a science class. The next reason (given by 12 teachers) was the opposite to the statement in that it actually takes more time to plan for and prepare a science class than a health class. Pre-lesson planning and preparation and the availability of materials were also reasons. There were no significant reasons given by the teachers who agreed with the statement and those who were uncertain.

12