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# WHAT ARE UPPER PRIMARY SCHOOL STUDENTS' PERCEPTIONS OF SCIENCE? The Trinidad and Tobago Context

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In this study, 840 9- to 12-year-old upper primary students from schools across Trinidad and Tobago were surveyed to determine their perceptions of science, and to explore their views about the likeability of science. It was found that the students' perceptions of science were wide ranging, and that these perceptions were linked in large part to the way that science is delivered at the upper primary level. In general, students expressed high levels of liking for the discipline when it is delivered to them using practical hands-on approaches. This study also showed that there were differences in the perceptions held by boys and those held by girls, and that these differences were linked to certain science topics. It was also found that certain science topics were highly favoured by the students, and that the topics favoured varied with students' gender, age, and ability.

## Introduction and Background

The *Education Sector Strategic Plan 2011–2015* of Trinidad and Tobago (Trinidad and Tobago. Ministry of Education [MOE], 2012) identifies the achievement of a seamless education system as one of its primary goals. With this in mind, curriculum documents are planned, designed, and written to facilitate the scaffolding of content and instruction from the early childhood care and education (ECCE) level, through the primary level (7 years), to the secondary level (7 years) of schooling. At the ECCE level, the curriculum is broad-based; designed to allow young students to develop skills in the creative arts and information technology, but there is also a focus on the development of literacy and numeracy skills—all aimed at equipping the students with a holistic array of knowledge and skills in preparation for primary schooling.

At the primary level, the curriculum continues to be broad-based and spiralled along subject-specific lines, so that primary school students are exposed to learning in a range of subject areas, including, but not limited to, mathematics, English language, science, social studies, creative writing, health and family life education (HFLE), arts and crafts, and

music. In most instances, students spend a minimum of 7 years (Infants I and II, followed by Standards 1–5) in primary schooling. Promotion from one level to the next is based on academic performance on internal class tests at the end of each year, so that some students may remain in the primary system for longer than 7 years, but not more than 9 years. Each subject area has a detailed syllabus, which teachers use to guide their classroom teaching in the respective subject areas. The syllabus documents (in all subjects and at all levels) provide teachers with suggested teaching/learning strategies that they can employ when delivering classroom instruction, as well as a range of possible assessment tasks that can be utilized to evaluate classroom learning in the various topics taught. At the end of the primary school experience, students are required to sit a high-stakes (external) national examination called the Secondary Entrance Assessment (SEA). While the primary curriculum covers all the subject areas in each year of schooling, the SEA examination assesses only in the areas of mathematics, English language, and creative writing. The consequence of this has been that teachers at the fourth and fifth year levels focus primarily on these three subject areas, in a concerted effort to ensure maximum preparation of their students for the SEA examination. Subjects such as science and social studies are taught minimally, if at all, during these final two years.

It is important to note that at the lower levels of primary schooling—Infants and Standards 1–3—a fair amount of hands-on science teaching/learning occurs in most primary schools. Therefore, for the most part, students are familiar with the approach and would have learnt science in this way before (MOE, 2005).

With the heightened focus on the SEA examination in Standards 4 and 5, even in those schools where science is taught in the fourth and fifth years, traditional methods of delivery in the form of teacher telling through the use of textbook reading and note-taking are adopted. Very few hands-on activities and group interactions are encouraged in any science that is taught at these levels. Teachers perceive that this approach requires too much teaching/learning time being devoted to a subject that is not tested on the SEA examination.

Against this background, it is not difficult to understand why students, on exiting primary school and entering secondary school, show little interest in pursuing science at the secondary level. Very often, this level of disinterest persists during the early years in secondary school, to the extent that secondary school students opt not to select subjects in the science disciplines beyond their third year of secondary schooling; at which point science is no longer a compulsory subject on the secondary school curriculum. The result is that students in the 9- to12-year age

range are exposed to science in a way that portrays the discipline as a body of knowledge to be learnt, and not as a dynamic subject characterized by inquiry-based learning, hands-on engagement, and discovery learning.

This study seeks to investigate the perceptions of science held by upper primary school students in Trinidad and Tobago, and to identify students' perceptions of science in relation to their gender, age, and ability. In this study, 840 questionnaires, in which students recorded their favourite subject, their general views of science, and the science topic they liked best, were analysed. In addition to the questionnaires, evidence was gathered from oral discussions about science between students and their class teachers.

In light of this background and purpose, the specific research questions being addressed in this study are:

1. *What science topics are favoured among upper primary school students?*
2. *What relationship exists between topics favoured by students and their gender, age, and ability?*
3. *What are upper primary school students' perceptions of science?*
4. *What are upper primary school students' views on what they like about science?*

## Research in the Field

There has been growing concern in Trinidad and Tobago about the declining number of students who opt to pursue science in secondary school. While there is limited literature on the topic in the local context, several international researchers (Jenkins, 2004; Murphy & Beggs, 2001) have indicated that part of the reason for this is that children are "turned-off" by science at school when they are quite young. Most agree that the waning of students' interest in science occurs between the ages of 9 and 14 (Hadden & Johnstone, 1983; Murphy, Ambusaidi, & Beggs, 2006; Schibeci, 1984). During the last decade or so, the role of the primary school teacher in the delivery of science in the classroom has come into focus. Downing and Filer (1999) have cited problems linked to primary teachers' lack of confidence in teaching science and their weak scientific knowledge background as issues of concern. Other studies (Murphy, Beggs, Hickey, O'Meara, & Sweeney, 2001; Murphy, Neil, & Beggs, 2007) have criticized the level of the content covered in some areas of primary science, suggesting that it may be above the appropriate level of cognitive development for the students and therefore overly challenging

for upper primary school students. Ponchaud (2001) has also alluded to the fact that, in some instances, the quantity of science content knowledge presented to students at this level can be quite overwhelming, and could possibly promote the development of resentment to the subject among students.

These issues—teachers' weakness in the subject area, the advanced level of the content, and the quantity of science taught at the upper primary level—when taken together and weighed against the emphasis on high-stakes national tests, may be a major contributory factor to science being taught simply as a "body of knowledge" in the final two years of primary schooling. Murphy and Beggs (2001) suggest that the increased pressures placed on teachers in societies like Trinidad and Tobago, where the focus in high-stakes examinations is on numeracy and literacy, serve to militate against good science teaching. In this regard, Lavy (2007) and Dawson (2000) profess that the very limited attention and low priority given to science in Standards 4 and 5 is not surprising because, as they indicated in analysing teachers' behaviour, if the science is not being assessed, it will not be taught; and if it is in fact taught, it will not be taught well. With this being the case in Trinidad and Tobago and, as Ausubel (2000) suggests, in other parts of the world as well, many upper primary school teachers deliver science instruction through "rote methods" at these levels, deliberately opting to "ignore" the use of exciting, relevant, and engaging practical hands-on activities. They see these as being quite "time-consuming" and requiring "too much prior preparation." This, Ausubel (2000) argues, is another possible reason why students develop disinterest in science. In light of this final concern, Bruns, Evans, and Luque (2012) and Murphy et al. (2007) have pointed to the fact that science teaching and learning ought not to be a passive exercise. They have found, as Dawson (2000) and Linn, Clark, and Slotta (2003) have also found in contexts different from Trinidad and Tobago's; that if guided inquiry approaches are infused into science lessons, even the most critical and disinterested students are eager to engage in the learning because of the autonomy and the psycho-mental involvement this approach confers on the students.

What is known at this point about the local context is that science is not assessed on the external high-stakes examination, and that it is given low priority in the classroom compared to literacy and numeracy. We know also that on the occasions when science is taught to students at the upper primary levels, it is taught mainly through direct instruction and rote methods (Maharaj-Sharma, 2012).

The specific reason or reasons for the levels of disinterest in science by upper primary school students in Trinidad and Tobago is uncertain,

but in the context of the general practice alluded to above, there is speculation that it may be linked to either science not being assessed at this level, or the way science is taught at this level, or both. It is hoped that this work will provide some insight into the underlying reasons for the noted levels of disinterest among upper primary school students in Trinidad and Tobago. Specifically, it is also hoped that this work will identify upper primary school students' perceptions of science and the factors that influence their liking for the subject. At another level, this work attempts to reveal any possible relationship that may exist between students' preference for specific science topics and their age, gender, and ability.

## Method

In this study, 840 9- to 12-year-old primary school students from 40 schools across Trinidad and Tobago were surveyed by way of a 3-point-type questionnaire and informal teacher-student discussions. The gender distribution (53% female, 48% male) corresponds to the gender percentages in the entire population of 9- to 12-year-old students. In October 2009, the students completed the questionnaire. Most students were able to read the questionnaire themselves; students with literacy challenges completed the questionnaire with the help of their class teachers, who read out the questions to them.

To supplement the data from the questionnaires, the class teachers from each of the 40 schools recorded the verbal responses of a purposively selected subset of students from each class. This subset totaled 160 students—an average of 4 students from each of the 40 schools involved in the study. The students were selected from each class in order to achieve maximum diversity, in terms of age, gender, and ability. In these informal discussions, students responded to a series of questions regarding their feelings about science. The informal discussions were carried out in February 2010.

### The Questionnaire

The questionnaire consisted of two sections. The first section, which was close-ended, focused on perception items. The second section contained a list of topics in the primary school science curriculum and a free response section. The perception items were largely adapted from a survey of the comparative attitudes towards science of primary school students schooled in urban and rural settings (Maharaj-Sharma, 2007), in which the instrument validity and reliability checks are detailed. This

adapted version of the questionnaire was however piloted with 120 9- to 12-year-old students from eight primary schools not included in the main survey in this work. Students had no difficulties interpreting the questions and completing the questionnaires.

The topic list and free response section of the questionnaire were designed by a teacher-researcher (Joseph, 2008), who teaches upper primary science at a primary school in Trinidad. She has intimate knowledge of the primary school science syllabus document and of the range of topics taught to students at that level. She has both a bachelor's and a master's degree in science education.

The students were asked to indicate their responses to the perception items on a simple 3-point scale (*yes*, *not sure*, or *no*). For the section containing the list of science topics, students were asked to indicate whether or not they liked each of the topics by ticking *like* or *don't like*. Students then completed the free response section, in which they were invited to write freely about their liking for science and any reasons for their particular disposition in this regard.

**Informal Teacher-Student Discussions**

The sub-set of students selected for the informal discussions was mixed across gender, age, and ability. Four students from each of the participating schools were selected, in an attempt to provide views from a cross section of the students who participated in the study and from the range of schools participating. Discussions were held in a time period corresponding to a regular scheduled science teaching session, and the selected students and their teachers met either in the library or the audio-visual room for the discussions. In-class supervision was arranged for the other students in the class who were not participating in the discussions.

Class teachers were used to facilitate the informal discussions because the aim was to source students' perceptions in a comfortable and familiar setting. They were encouraged to respond openly and freely, and having the class teacher facilitate this interaction added a degree of authenticity; an aspect that may not have been fully captured if an unfamiliar person facilitated the discussion. These teachers had all attended an interviewing techniques workshop prior to the start of this study, and so were trained in effective interview techniques. Though recorded, the discussions were classified as informal since the discussion protocol was altered on occasion by the teachers, in order to probe students' responses in some instances, and at other times to keep the focus on perceptions when students' responses began to stray (Johnson & Christensen, 2007). Responses from the 160 students were recorded, transcribed, collated,

and compared with the data from the questionnaires in the analysis process.

### Ethical Considerations

Parental consent, as well as approval from the Ministry of Education, was obtained for all students participating in this study. Students completed the questionnaire anonymously, that is, they did not put their names on the written questionnaires. Each questionnaire, however, was assigned a code (before being administered) to reflect the school, the class, whether it was completed by a boy or a girl, and whether the particular student was in the older or younger age group (The older age group comprised students aged 11-12 years while those aged 9-10 years were labelled as belonging to the younger age group.) This allowed for structure in the data analysis procedures, and also for students' anonymity to be maintained to some extent. With this system, it was easy to go through the questionnaires and to select four students from each school, who represented the scope and diversity of the participants and the data (questionnaire), to participate in the informal discussions. Therefore, it was possible to align questionnaire responses from each category (as per age, gender, and ability) to discussion responses from the same group.

### Determination of Ability

Ability was determined by looking at the students' overall performance in science in the previous semester. Students with overall scores less than 50% were classified as low ability and those with overall scores more than 50% were classified as high ability. This is a common classification used in Trinidad and Tobago to rank students' ability.

## Results

### The Questionnaire

The sample comprised 840 students with approximately equal numbers of girls and boys. Of these, 55% (462) were in the younger age group (9-10 years) and 45% (378) were in the older age group (11-12 years).

*Science topics: How is topic preference related to age or gender?*

In the questionnaire, students were asked to indicate whether they liked or disliked each of 16 topics commonly encountered in primary school science. The topics were:

| | |
|---|---|
| The Human Body | Animal Characteristics |
| Hygiene | Plant Characteristics |
| Life Cycles | Solids, Liquids, and Gases |
| Materials | Rusting |
| Water Cycle | Care for the Environment |
| Reduce, Reuse, and Recycle | Forces and Friction |
| Electricity | Energy Consumption and Conservation |
| Sound and Hearing | Light and Seeing |

These topics are covered in the upper primary school science syllabus, some in greater detail than others. The topics cover areas in the biological, physical, and chemical sciences. For the purposes of this study, topic preference among the students were analysed descriptively, as a more comprehensive quantitative analysis is planned for subsequent work in this area.

In general, all the topics were liked more by the younger students (9-10 years) than by the older ones (11-12 years). Table 1 shows the difference between the age groups and between girls and boys for the six most liked science topics.

**Table 1. Topics Most Liked by Students According to Gender and Age**

| **Topics** | **Girl (Y) %** | **Girl (O) %** | **Boy (Y) %** | **Boy (O) %** |
|---|---|---|---|---|
| Hygiene | 80 | 55 | 78 | 48 |
| Life Cycles | 83 | 68 | 78 | 62 |
| Reduce, Reuse, and Recycle | 81 | 68 | 76 | 63 |
| Sound and Hearing | 88 | 55 | 79 | 52 |
| Care for the Environment | 90 | 80 | 85 | 75 |
| Energy Consumption and Conservation | 72 | 55 | 79 | 71 |

**Key:** Y – Younger age group (9-10 years)
O – Older ager group (11-12 years)

It is clear from Table 1 that the younger students liked the various science topics more than the older students; and that for these six topics, more girls than boys indicated that they liked the topics. Interestingly, the topic that was most liked by the students—girls and boys in both age

groups—was Care for the Environment. Among the girls, though, more of the younger girls (90%) than older girls (80%) liked the topic. Energy Consumption and Conservation was a highly favoured topic among the boys—young (79%) and old (71%)—and the younger girls (72%). For this topic, though, only 55% of the older girls indicated that it was a preferred topic for them. Sound and Hearing, as well as Reduce, Reuse, and Recycle were topics that were well liked among the younger students—boys and girls—but the strong liking for these topics was not seen among the older students.

*Age and gender difference in perception to science*

Descriptive analyses of responses to the perception items on the questionnaire indicated that 9- to 10-year-olds were more enthusiastic about school science than 11- to 12-year-olds; the younger students enjoyed and appreciated the study of science more that the older students. Table 2 summarizes this finding. It shows the distribution of students who responded in the affirmative to questions about enjoyment and appreciation of science. In both age groups, girls seemed to enjoy science more than boys and were more appreciative of the impact of school science on their lives outside school. Table 2 shows the relationship between age/gender and perception of science.

**Table 2. Enjoyment of and Appreciation for Science of Boys and Girls in Both Age Groups**

| Emerging Themes | Girls % | | Boys % | |
|---|---|---|---|---|
| Looking forward to science classes | 72 | 42 (Y) | 53 | 32 (Y) |
| | | 30 (O) | | 21 (O) |
| Enjoyment through engagement in experiments | 88 | 56 (Y) | 71 | 36 (Y) |
| | | 32 (O) | | 35 (O) |
| Appreciation due to better understanding of the environment | 69 | 39 (Y) | 60 | 38 (Y) |
| | | 30 (O) | | 22 (O) |
| Appreciation due to increased knowledge about the body | 86 | 46 (Y) | 58 | 33 (Y) |
| | | 40 (O) | | 25 (O) |

**Key:** Y – Younger age group (9-10 years)
O – Older age group (11-12 years)

The emerging themes were all worded to be skewed toward an expression of positive perception to make the data presentation consistent. It should be noted, however, that the questions used in the data collection process were **not** skewed in this way. From the responses

given by students, it was clear that in each of the themes larger numbers of younger students than older ones expressed positive perceptions. With respect to this finding, it might be speculated that at the Standard 4 level (younger students) some focus on science still occurs in the classroom. However, this may be significantly reduced, or even eliminated, at the Standard 5 level (older students), in the final run-up to the SEA examination, which consists of assessment components in mathematics, language arts, and creative writing, with no assessment component in science.

**Informal Teacher-Student Discussions**

The discussions between 160 students and their teachers revealed the specific aspects of science that the students enjoyed (or did not enjoy); why they felt science was important; and what they felt was most difficult about science. A summary of some of the questions and responses follows.

***What do you enjoy best about science?***

The most popular response was *experiment* from almost all the students, regardless of age, gender, or ability. Responses included the following (b = boy, g = girl; 9, 10, 11, or 12 = age; H = high ability, L = lower ability):

*"…doing experiments is fun … it lets you find out how things work … I like doing experiments…"* (b,9,H)

*"I have fun when I am learning … with the experiments…"* (g,9,L)

*"The experiments are the best thing for me…"* (b,11,H)

*"… I remember the things when I remember what I did in the experiment …"* (g,11,H)

*"I enjoy learning when I can do things…"* (g,9,H)

***What part of science do you not enjoy?***

The younger students were again more positive in their responses; 70 of the 80 students in the younger group said that they liked all science. Only 25 of 80 students in the older group liked all aspects of science. Typical responses from students in the older group who did not like certain aspects of science included:

*"I didn't like the topic on the flower … there were too many parts to remember….and the names were hard to spell …"* (b,11,L)

*"… writing over the notes from the textbook is boring … I don't like doing that…"* (g,11,H)

***Why do you think science is <u>important</u>?***

Across the board, students indicated that they felt science was an important subject, indicating mainly that it is a subject that can help them to "*understand how the outside world works*." The following were some of the responses given by students:

*"…learning about the eye and seeing made me understand why my sister has to wear glasses…"* (g,10,H)

*"I know now that I should eat less salty snacks…"* (b,12,L)

*"… plants and animals depend on the environment…. So we must not litter… this destroys the environment."* (b,9,H)

*"I know now how a caterpillar becomes a butterfly…"* (g,9,L)

Other similar responses indicate that students realize the importance of science to their lives, either to them personally or to the wider community, country, and world in which they live. Two such examples are as follows:

*"…knowing about ways to care for the environment could make Trinidad a cleaner place…"* (g,10,H)

*"…doing the experiments … made me feel like a famous scientist…"* (b,10,L)

***What is the most <u>difficul</u>t thing in science for you?***

Many students claimed that content detail was the most difficult thing for them. Labelling the parts of the ear (b,8,L) and explaining the difference between melting and dissolving (b,8,H) were two examples cited by students as topics illustrating the difficulties associated with content detail. Interestingly, while practical activities were best liked by many of the students in this study, a few students indicated that some aspects of practical work were the most difficult part of science for them. Examples to support this claim included "*circuits … not knowing exactly where to connect the red and black wires…"* (g,9,L) and *"… how to tell if a simple machine is a first, second or third class lever…"* (g,9,H)

However, most students, across age, gender, and ability, indicated that even though science might be a "*difficult subject*" that they would be "*excited*" about "*learning about the world*" if their teachers "*did things in the class*" to make it "*easier for them to understand it* [science]."

## Conclusions, Discussion, and Implications

The results showed that, generally, greater numbers of older students (11-12 years) had negative perceptions about science, and that more of the younger ones (9-10 years) had positive perceptions. The reduced popularity of certain science topics among the older students was clearly illustrated in this article, with older boys having even less liking for certain science topics than the older girls. In work done by Morrell and Lederman (1998), it was found that even though older primary school students have an overall less positive attitude toward science than their younger colleagues, the older students had highly positive attitudes towards schooling in general. While students' attitudes toward school were not the focus of this study, its findings, in the context of those of Morrell and Lederman (1998), compel one to ask: What is it about science in the senior primary years that is putting students off? This article suggests that several factors seem to work collectively to turn students away from science. These include, among others, methods of science delivery, methods of assessment in science, and science curriculum content.

### Hands-on Engagement

The informal teacher-student discussions revealed deeper insights into what students thought about science. The response by most students to what they liked best about science was "*doing experiments*," and the reasons offered for this view centred on experiments being fun and the feeling of enjoyment they experienced when they learned by doing. One of the boys from the older age group, whose response was reflective of many others in this group, remarked that doing experiments helped him to remember new things. Many of the girls from this age group indicated that hands-on activities helped them to better understand how things worked.

A number of students from the younger age group suggested that doing experiments helped them to understand how things around them worked. In light of these responses, it is clear that students are sending a powerful message—practical activity is not only important for effective and meaningful learning in science but it is also critical in crafting positive perceptions of science.

The findings of this study, which are in agreement with reports by Campbell (2001) in which upper primary science students indicated that "doing experiments" was the best part of science for them, indicate quite convincingly that students like to learn by being active participants in the science learning process. Campbell suggests further that if in fact

students are indirectly asking for more practical activities to be included in their science lessons, teachers have an obligation to ensure that they not only teach the allotted and prescribed science at the upper primary level, but that they do so with a more hands-on approach. Murphy and Beggs (2001) suggest that sacrificing content in one curriculum area for content in another curriculum area may not be just educational erring, but moral inefficacy as well. In that context, therefore, and to address some of the concerns this study raises about students' perceptions about science at the upper primary level, teachers must be encouraged to find ways to execute the primary science curriculum, to allow for more frequent, and perhaps longer-term, experiments and investigations in science lessons.

**The Tests**

The heavy emphasis on the SEA examination seems to be one factor that is turning students off from science. This notion is supported by the following quotation from one student in the study, who reflected similar views held by other students:

> *"… sir only does mathematics and language with us to prepare us for the exam … we have to read the science for ourselves … and make notes … and this is very boring…"*

According to Murphy and Beggs (2001), this "transfer science" approach is in fact "boring and repetitive," and in the Trinidad and Tobago context, where the focus at the upper primary level is on preparing students for the examination—which comprises mathematics, language, and creative writing only—science is done merely in passing, so that students are not provided with exciting and engaging practical activities in their classroom science experiences.

**Curriculum Content**

In addition to the focus on the national test, as work by Harlen (1997) shows, this study indicates that it may be the curriculum content itself that leads to the reduced interest shown by students at the upper primary level. Topics such as Forces and Friction, and Rusting and Plant Characteristics were topics described by students as "*difficult*," "*hard to understand*," "*not important*," and "*not interesting*." Osborne and Simon (1996) have explained that, often, at the primary school level, science students are exposed to an overloaded science curriculum; attempts are made to cover many areas of science; and the suggested depth of coverage, as per the guiding syllabus documents, is much too cognitively

challenging for upper primary school students. A close examination of the science curriculum document for Standards 4 and 5, against criteria outlined by Osborne and Simon (1996), seems to suggest that this may be a valid concern in Trinidad and Tobago.

With this in mind and based on the current findings, it is quite possible that students' less than favourable perceptions may not have resulted from a lack of exposure to hands-on learning alone. Furthermore, the issue of teacher confidence, as articulated by Downing and Filer (1999), when called upon to deliver an overloaded curriculum which may contain some topics that the teachers are not fully competent in, may indirectly impact students' perceptions of those topics. While this aspect is not a part of the current study, it does suggest that there is need to re-examine science teacher preparation programmes to determine what could be included or altered to help teachers develop their confidence and competence in areas of science that might be challenging for them.

**Gender Difference**

In general, girls were more positive than boys about the study of science, in terms of enjoyment, appreciation for the environment, and appreciation for personal health and well-being. In respect of the topics liked by boys and girls: generally, girls favoured topics in the life sciences while boys preferred topics in the physical sciences. Works by Woodward and Woodward (1998) and Johnston, McKeown, Cowan, McClune, and McEwen (1999) support this finding, suggesting that it might be important for teachers to consider this fact and therefore deliberately cater for gender-preferred topics in their science teaching. Given that the topics taught at this level are mandated by the syllabus document, teachers have very little choice in the content they are asked to deliver. However, noting the relationship between topic preference and gender emerging from this study, teachers could revisit their teaching methods to cater for this gender difference. One way this can be done in the local context is to treat each student as an individual by acknowledging each perspective, regardless of gender, and incorporating these, in an unbiased manner, into the discussions and activities being used to teach the topic.

**Most Favoured Science Topic**

The science topics discussed/presented in this article were generally more liked by the younger students. However, Care for the Environment was the topic liked most by both age groups and by girls and boys alike.

Topics such as Reduce, Reuse, and Recycle; Life Cycles; Hygiene; Energy Consumption and Conservation; and Sound and Hearing were also well-liked topics, with just over 60% of the total sample indicating that these were their favourite topics. Electricity; Rusting; Forces and Friction; and Materials were selected by 32% of the students, mostly boys, as their most favoured topics. Interestingly, Plant Characteristics and Animal Characteristics were selected as the most favoured topics by only 5% of the total sample. The immediate implication here is that there is need to look closely at the relevance of what is being taught in these topics, and perhaps to revisit the way content in these areas is delivered to students.

**Perceptions of Science**

This article shows that students at the upper primary level have wide-ranging perceptions about science, and that these perceptions may be linked, in large part, to the methods by which science instruction is delivered at this level. To a lesser extent, it would seem that teachers' content knowledge, which determines the degree of confidence with which they teach science, can also impact on students' perceptions. In other words, if a teacher is very knowledgeable and comfortable with a science topic, he/she would deliver that topic with greater ease and confidence than a topic for which content knowledge is relatively weaker. In this context, it is easy for students to develop positive perceptions of a topic that is passionately delivered and negative perceptions of another topic that is not delivered with equal passion. Additionally, this article suggests that concerns linked to an overloaded, content-challenging science curriculum may have a bearing on students' perceptions of science.

**Views About Science**

Upper primary school students agree that science is a hands-on discipline, and they seem to suggest further that when science is taught to them via this method it is most meaningful, enjoyable, and beneficial to them. They appreciate the relevance of science to their everyday lives and recognize the value of the knowledge of certain science topics to understanding their bodies, their environment, and the world in which they live. In general, upper primary school students see science as an important subject, but they seem to indicate that the methods of delivery are not always palatable to them. Their implicit suggestion is that classroom instruction ought to be revisited to deliver science in a more appealing manner.

In conclusion, therefore, this article suggests that it is time for science teachers, and particularly primary school teachers, to take careful note of what students are saying and to make concerted efforts to adopt classroom practices and institute instructional measures geared at improving the primary science experience of students at that level. As was revealed by previous works, this article also shows that students' overall perceptions of science are linked to method of delivery, quantity and level of the content taught, and teachers' confidence in delivering science instruction. All these factors, combined or individually, would have contributed to the students' perceptions reported in this article. In conclusion, this article has revealed that:

1. certain science topics are more favoured by upper primary school science students;
2. topics favoured varied among students by gender, age, and ability;
3. younger students had more positive perceptions of science and, in general, girls had more positive perceptions than boys;
4. students generally liked science because they saw its meaningfulness to their everyday lives; and
5. even though the hands-on practical approach is not a frequently used strategy in upper primary science teaching, primary school students are familiar with the approach and it is this aspect of science teaching/learning that seems to appeal most to students.

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