English medium science education at the junior secondary level of Sri Lanka: Problems and potential to assist through Information and Communication Technology (ICT)

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Abstract

Many countries in the world today notice the increase of English in Science in addition to its use in trade, international business and mass media. English medium education in the government schools of Sri Lanka started to be implemented more than ten years ago, along with the mother language education. Teaching science at the junior secondary level in the English medium was followed by many major government schools since then. However, notwithstanding the global trend, a decline in the number of students following science in the English medium at the Junior Secondary level of Sri Lanka has been observed in the recent past. This study was aimed at figuring out the reasons behind this trend of decline as well as the students' perspectives on it and finding the potential of assisting to improve this situation through Information and Communication Technology (ICT). A sample of hundred students from the junior secondary level was randomly selected from five leading government schools of three randomly selected districts of Sri Lanka. Data were collected through questionnaire surveys as well as interviews (of both students as well as teachers) and were analyzed through non-parametric methods. Many students were studying science in the English medium at the junior secondary level with the aim of continuing same at the upper secondary level and the tertiary level. Out of the total number of students and teachers interviewed, 52% mentioned that there should be more opportunities to access internet facilities at schools to learn science and 67% of the students were only using their science text book (provided at schools) as the main source of information to complete the given assignments. The use of ICT inspires the educators to apply new techniques in teaching and learning. Thus, steps are needed to further integrate such technology into classroom teaching-learning process. Improving the ICT infrastructure and students' access to them at the school level are also vital to improve this situation

Introduction

Role of English in education at the Junior Secondary Level of Sri Lanka

In the current pluralistic society, none can remain isolated. Everyone is interconnected, as the present day world is a very complex multicultural, multilingual entity. Hence, for better communication and interaction, a second language becomes imperative. English fits well into this necessity. In Sri Lanka, as in most parts of the world, it is taught a second language or a foreign language.

The British government introduced English as a medium of education in Sri Lanka, way back in 1831. Kannangara in his reports state that the English language became the second language when the vernacular languages were made the medium of instruction. In 1956, Sinhala was made the official language and antagonism towards English became significant at that time. But in 1990s once again English began to perform a major role in education in a society where international schools started functioning actively. In the educational reforms of 1997, English medium was suggested to be re-started, but its actual implementation began in 2001.

In the 'National Policy Framework' proposed by the National Education Commission (NEC) in 2003 it was stated that a bi-lingual policy in education should be introduced in junior secondary classes. It claims that all students, irrespective of socioeconomic and regional disparities, should have equal rights to enjoy bi-lingual policies. Although the teaching of Science, Mathematics, Information Technology, Health and Physical Education Environmental Studies and Social Studies in English medium was introduced initially in grades 6 and 7 in schools, it was limited to certain schools. It was intended to be extended to all schools through a five year phased programme from 2004 to 2008. After over fifteen years of implementation, English medium education in Sri Lanka, especially at General Certificate of Education – Ordinary Level (GCE. O/L) classes have shown little expansion, perhaps even a decline.

Role of Science in the present world

Modern civilization is accustomed to scientific trends. This is an age where the modern society is completely

drawn into the scientific environment and science has become an integral part of our life. In recent times, the world of science has been marked by rapid advancement in knowledge.

Major advancements in Science and Technology (S&T) and the use of these scientific achievements in promoting wellbeing of mankind through their applications in the fields of industry, communication, transport, engineering, agriculture, medicine, etc. has made science more important than ever before.

Learning of science provides training in scientific method and also helps to develop a scientific attitude of the mind in the learner.

English as a medium of instruction for S&T

Many countries of the world such as Tanzania and Namibia in Africa, European Union member countries and countries of South America, etc. value the increased adaptation of English in science in addition to its use in trade, international business and mass media. However, it is believed that because of the generalized emphasis on English being the language of scientific production and any scientific product in other languages must be translatable to English – can be a hindrance to scientific creation in non-English speaking countries.

S&T plays a prominent role in the emergence of knowledge societies of the world today and the use of English as a medium of instruction in delivering scientific and technological knowledge has earned great importance in such a context. All nations face the need of revamp their knowledge systems favourably to match the needs of globalization. Since knowledge is distributed through formal education, there is a tendency for school systems to be reformed to bring about the desired knowledge through science and technology, to participate in a globalized world. It has been argued that various aspects of the programmes of reform in education could range from curricular reforms favouring science and math based courses through cost recovery measures at upper secondary and at higher education levels to reforms in languages of instruction in a given context.

Use of the Information and Communication Technology (ICT) in Science Education

The use of the ICT can make substantial changes in education and training, mainly in two ways. Firstly, the rich representation of information changes learner's perceptions and understanding of content. Secondly, the vast distribution and easy access to information can change relationships between the teachers and students.

There are several benefits of ICT in Science. Students engage more in activities, show increased interest and demonstrate an extended attention span when ICT is used to teach Science. ICT can provide access to a huge range of resources that are of high quality and relevant to scientific learning. In some cases, these resources fill gaps where there are no good conventional alternatives; in other cases they complement existing resources. Multimedia resources enable visualization and manipulation of complex models, three dimensional images and movement to enhance understanding of scientific ideas. Also, ICT widens the range of material that can be used in teaching and learning to include text, still and moving images and sound and increases the variety of ways that the material can be used for whole class and individual learning. Further, many ICT tasks do not require the use of a specific classroom or laboratory. They can, therefore, extend learning beyond the teaching space and class content time, and place the use of ICT at the heart of the learning process rather than as an additional peripheral experience.

Objectives, Methodology and Limitations of the Study

This study was aimed at identifying the reasons behind the decline in students following Science in the English medium at the junior secondary level in Sri Lankan governmental schools, ascertaining students' and teachers' perspectives on it and also to determine the potential of ICT to improve the situation.

For this purpose, a sample of a hundred students following Science (English medium) GCE O/L curriculum in grades 10 and 11 along with five Science (English medium) teachers were randomly selected from five randomly selected government schools of three districts of the country. Data were collected through questionnaires, interviews and observations. Collected data were analyzed through descriptive as well as statistical methods of data analysis.

This study was limited to three districts of the country, namely; Colombo, Ratnapura and Kegalle. Had the time frame been more wide, island wide sampling could have been done while considering different categories of government schools such as provincial and national schools.

Results and Discussion

Many students had selected the English medium to learn Science for the GCE O/L thinking that it would make it easier for them to do their higher studies

locally (35%) and thinking that it would improve their English knowledge. A few had opted for English medium as it was more familiar to them than the Sinhala medium and some more were ready to take up the challenge of learning in the English medium and had selected it therefore. Of the total number of students interviewed, a majority (83%) of students wanted English medium science lessons to be explained not only in English but also where necessary in their mother tongue. Some students were of the view that 'Science was difficult' and that was one reason for their need to get science lessons explained, at least partially in their mother tongue.

A non-parametric statistical method, Wilcoxone Test, was carried out to determine students' perception on whether the language used in English medium science text books had a significant effect on understanding their content. While the results showed that students perceived no such significant effect, some very clearly mentioned that the content of the text books and the syllabuses should be reduced to make English medium Science education more popular. Further, it was noted that a majority of the students were not so familiar with the text books and depended greatly on the brief notes provided by teacher. It was noted that 50% of the students did not have any clear idea on the language used in the GCE O/L examination papers.

When questioned about their willingness to pursue Science in the English medium, the majority (65%) of the students were prepared to do so. Most of them were very familiar with the English medium, following it from grade 6 onwards and were confident that they could manage with Science subjects in the English medium. Those who were unwilling to continue in English were of the view that it may not be able to enter University, as the local 'General Certificate of Education – Advanced Level' (GCE A/L) examination was highly competitive, and good results would be easier by studying science in the vernacular languages, Some others felt that private tuition classes to assist in higher studies in Science were less good in the English medium. These negative perspectives also seemed to have some basis in the Sri Lankan context. It has been found that most students who are fluent in English in many schools opt to study in their mother tongue, because their sole intention is to get a good score at the GCE A/L examination and that they do not feel the need to use the GCE A/L Science syllabus to improve their English further.

A majority of teachers interviewed were of the view that English language skills that are necessary to learn science through the English medium of many students, need to be improved. Many agreed that the science syllabus at junior secondary level contained a lot of subject matter and most were of the view that if the English language skills of the students were at a higher level, the learning of the subject would become easier, discouraging the perception among students 'Science is difficult'. Thus, almost all of them agreed that the English language skills of the students have to be improved to better capture scientific concepts taught in the English medium. I

t was further mentioned by students during the survey that although there were school libraries, laboratories and science societies in each school, many had drawbacks associated with them. Libraries were accessible by students during allocated time periods, but most students (65%) were of the view that there were inadequate extra reading materials for Science in the English medium. According to many students and teachers, the average number of periods of 40 minutes duration allocated per week for science practical classes was 02 and that this was inadequate.

Further, according to the majority of students and teachers interviewed, school science societies lacked programmes to popularize science related activities among students following Science in the English medium and they mentioned that such activities should be conducted for all children in schools.

Another view of both students and teachers was that access to the school computer laboratory to access scientific information was very much limited. A high percentage (70%) of the students mentioned that their computer laboratory sessions at school were for the purpose of teaching concepts of ICT and there was not enough time to study scientific concepts *via* the World Wide Web. Further, when queried about sources used to gather information to complete assignments in science (English medium), many students (67%) mentioned that they refer mainly to the science text book. Most of the students and teachers viewed that it would be useful for Science (English medium) teachers to organize computer laboratory sessions to enable students to access more extra reading materials and better understand science subjects. Such a measure would help students to improve scientific knowledge as well as English at the junior secondary level. As it is very clear that the reading habit is poor among children, and since modern day children are more attached to digital technologies, it would be useful to consider the potential of interventions through ICT to improve the knowledge of English medium Science students. Another suggestion by students was to utilize more

ICT tools such as Power Point presentations, Internet, etc. to teach the subjects. It has been shown that the use of ICT inspires the educators to apply new techniques in teaching and learning. Thus, the necessary steps to improve methods of teaching should be taken on par with the global trends.

Teachers who were interviewed during this study mentioned that they needed time, hardware and software to get accustomed to guiding children to learn science in the English medium through ICT at the junior secondary level. They mentioned that brief training sessions along with the allocation of necessary resources would be beneficial.

Conclusion

Poor English language skills of students, heavy subject content, higher competitiveness in the national exams, lack of resources for science in the English medium, particularly extra reading materials in libraries, and the lack of access to ICT resources to improve scientific knowledge are some of the barriers that make the Science education in the English medium at government schools in Sri Lanka less popular, leading to a decline in the number of students following Science subjects in the English medium at junior secondary level. Providing more access to ICT resources under proper guidance to students and training teachers in using ICT resources to teach science in English medium, would be some of the key remedies among others, which could increase potential to improve this situation.

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