

Effects of English as the Medium of Instruction on Science Learning and Teaching - A study in the secondary schools in Northern Province

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Abstract

This study compares science teaching and learning in English and Tamil as the medium of instructions for the secondary schools is implemented English as the medium of instruction from Grade six to G.C.E A/L classes in Jaffna peninsula, Sri Lanka since 2003. It explores the effects of using home language (Tamil) and second language (English) as the languages of learning and teaching Science. The policy stipulates only town and national schools of secondary schools which take in students with better academic and language abilities are allowed to use English the students second language and the others have to use Tamil as the medium of instructions. This study is conceived against the background of English as the means of social, economic and educational achievements and the marginalization of mother language in education and explores language policies which influence the hegemony of English language on the Asian continent especially in Sri Lanka. The present research is a longitudinal study that aims to explore the effects of the language policy on the science learning

of the English medium and Tamil medium students in the two years of secondary schooling in which class room observations, interviews and document analysis were used as key tools of investigation. The learning outcomes of the two streams of students were assessed by science achievement tests and a questionnaire on students' self-concept in science. The results obtained show that the English medium students were disadvantaged in science learning achievement and lower self-concept in science than those learned through Tamil. Based on the analysis of student's performance on the test's items their perception of classroom climate in science lessons and classroom and class room observations. The negative effects of learning science through English can be related to the limited English proficiency of the students and inadequate repertoire of instructional strategies used by the science teachers. These negative effects, however tended to become reduced with the increase in time of immersion, probably because the English medium students had become

more proficient in English language skills and more confident in learning through English. Recommendation on the implementation of the language policy and the teacher education programs, identifying goals and objectives of teacher training programs and intervention in further

developmental activities related to teacher training learning and research. Further learning procedures and teaching procedures using humanistic approach in education, learner centered teaching, various teaching methods, approaches that suit different learning styles and motivate students.

Keywords: Science Learning, Teaching, Secondary Schools

01. Introduction:

In countries with multiethnic societies need a tailor-made language policy addressing the local needs and promoting bilingualism is a core tool to promote co-existence among different communities and to safeguard the right to speak one's own language. Majority of the people in Sri Lanka cannot speak the language of the other community or English which could be a common link language. Lack of bilingual capacity limits interaction among different communities and increases the mistrust and fear about the other community which is seems to be a hindrance to the current reconciliation process. Education system of this country does not address this burning issue and schools and universities too do not pay adequate attention to develop bilingual skills among the students. Ethnicity / religion / language-based segregation of the schools, leaves no space for interaction among different communities. Thus, creating a bilingual society is an immense need for peace building in Sri Lanka.

In this context, since 2003, once again English as the medium of instruction has been introduced in Sri Lankan Secondary Schools from Grade Six to GCE Advanced Level classes From Grade six to GCE Ordinary Level is concerned, bilingual system of education where Science, Maths, Citizenship Education and Commerce are the subjects taught in English medium and the other subject are taught in their respective mother language i.e. In Sinhala for Sinhalese students and in Tamil for Tamil speaking students. Indeed, GCE A/L is concerned English medium education is an option where only those who wish to learn their subjects in English medium can Continue their G.C.E A/L education in the English medium once they complete .their secondary education in Bilingual, while others continue their G.C.E A/L subjects in their mother tongue. In this context, GCE A/L is concerned, there are parallel classes where one group of students are being taught all three subjects in English medium and the other group of students in their mother

tongue in the science mathematics and commerce streams exceptionally there are a few international schools in Sri Lanka, where English is used as the medium of instruction for all the subjects taught from grade one to London GCE A/L.

This study explores the effects of using learners' mother tongue (Tamil) and second Language (English) as the languages of learning and teaching science in secondary schools in the Jaffna Peninsula. Thus, this study is part of a broader project called the languages of instruction in the Jaffna peninsula which specially examines the effects of using English as the medium of instruction in science education.

This research also explores the various language policies which influence the hegemony of English in the Jaffna peninsula. It is an interactional theoretical framework and this study investigate the relationship between language competence and teacher-student interaction in science learning and teaching while English or Tamil is used as languages of instruction it shows the importance of appropriate language input in facilitating teaching and learning science in the classroom. The research shall follow a three-year longitudinal design in which achievement tests, student questionnaire classroom observations interviews and document analysis shall be used as key tools of investigation, though the findings of the past researches of this nature reveal that teachers and students perform better and show better confidence in their mother tongue than in English as a second language.

02. Literature review

The term "immersion" was first adopted in the 1960s for the school programmes conducted in Quebec in which native English-speaking children were taught through the medium of French (Lambert and Tucker, 1972). This term is now used to cover a variety of situations in which a second language is used as the medium of instruction for content (non-language) subjects. Examples are the French immersion programmes in Canada, the Catalan and Basque immersion programmes in Spain, the immersion programmes in English and other colonial languages in African countries, the English immersion programmes in Hong Kong and Singapore, and the various immersion programmes in Korean, Russian, Japanese and Spanish in the United States for native English-speakers (Swain and Johnson, 1997). A common aim of immersion programmes is to promote the development of a higher level of proficiency in a second language than that can be achieved when it is taught as a language subject.

The most school children receive their education through their home language, and learn a second language as a separate subject. This approach does not extend to producing fully bilingual and biliterate children (LeBlanc, 1992), and the great majority of students only develop a very limited form of fluency in the second language, which quickly degenerates after leaving school. On the other hand, by using L2 as the medium of instruction, children will have much greater exposure to L2 and are more likely to acquire the intended language skills through using it functionally and meaningfully in the context of a range of content subjects. With this approach, there will be a greater chance for children to succeed in achieving high levels of proficiency in second language.

Medawattegedera (2015) stated that the elitism associated with English is still being reproduced among students for whom it is neither a first language nor a language used at home with their families but a mere medium of instruction at school. teachers and administrators too Continue to invest the English language with a divisive role, colluding with students (by treating them differently) and thus seeming to signal that English is superior and has more value than the national languages. The fact that there is no consistent policy about and for selection of students to study in the bilingual classes is also a pertinent issue which needs to be resolved equitably.

Zeng (1997) explained why English is preferred as the medium of instruction for secondary schools, why and how the Hong Kong government implemented the policy while the dominant role of English as an international language becomes stronger and stronger, and what the interrelationship is between the policy and Hong Kong people's preference for English as the medium of instruction.

03. Objectives of the study

In relation to the research questions stated above, the study objectives are as follows:

1. To observe and compare the deviation of English medium student for science achievement and science self-concept compared to their peer Tamil medium students.
2. To observe and compare the degree of class room interaction between English medium and Tamil medium students with their respective teachers for science achievement and science self-concept.

04. Research questions

In this context, the study is guided by the formulation of the following research questions:

1. Are the students of English medium retrograde compared to their peer Tamil medium students in their science achievement?
2. Are the teachers of English medium fluent enough in English language to teach science and what are the measures to be taken to enhance the classroom environment?

05. Rationale

1. **Access to Global Scientific Knowledge:** English is considered the lingua franca of the scientific community. Using English as the medium of instruction allows students to access a vast amount of scientific literature, research papers, and resources published in English. It facilitates communication and collaboration with scientists, researchers, and students from around the world, broadening their understanding of scientific concepts and advancements.
2. **Enhanced Communication and Collaboration:** English proficiency enables students to effectively communicate and collaborate with peers, scientists, and researchers globally. It promotes the exchange of ideas, discussions, and debates, allowing students to learn from diverse perspectives and develop critical thinking skills. It also prepares them for future academic and professional opportunities where English proficiency is highly valued.
3. **Improved Career Prospects:** English is widely recognized as an important language for professional and academic success. Students who are proficient in English have a competitive advantage in the global job market, particularly in fields related to science, technology, engineering, and mathematics (STEM). English proficiency can open up opportunities for higher education, research scholarships, and international collaborations.
4. **Standardization and Quality Assurance:** English as the medium of instruction can contribute to standardizing scientific terminology and concepts, reducing ambiguity and ensuring consistency in scientific communication. It facilitates the dissemination of scientific knowledge across borders and enables effective peer review processes, which are essential for maintaining the quality and integrity of scientific research.

06. Materials and methods

6.1 Methods

The study used a cross sectional mixed method approach, combining quantitative and qualitative questions were used for data collection. The study was conducted in all 9 schools in which English Medium Classes are conducted in Jaffna district, Sri Lanka involving 40 science teachers, 202 Tamil medium students (using random sampling technique), 138 English medium students, 120 parents of both English and Tamil medium students. The study was conducted in 2022-2023.

6.2 Participants

The participants in this study were 40 science teachers and 340 students from English medium and Tamil medium students in Jaffna district, Sri Lanka. For the quantitative study, researcher used a self-administered questionnaire to collect data on teachers, students and the parents of both English medium and Tamil medium and their teaching learning process, and the student's self-concept and the academic ability to test achievement.

6.3 Procedure

Ethical approval was obtained from the Dean, Faculty of Graduate Studies, University of Jaffna; Northern Providence Director of Education; the relevant school principals and the participants.

The qualitative data collection for the involved three separate procedures for students, teachers and parents. For the student's data were collected through the surveys completed during their regular school classes in March 2023. The surveys too approximately two hours to complete and were administrated by two research assistants with a Master's degree and M.Phil. in education. Prior to distributing the surveys, the class teachers were asked to leave the class room to encourage honest answer from the students. The purpose of the study was explained to the students, emphasizing their participations was voluntary and confidential. After the completion of the surveys, data were collected by the research assistants.

For the teachers, the data collection procedure was liked that used for the students. Respondents were given the survey to complete in their own time and were asked to

seal it in the envelope provided. A week later, the envelopes were collected by the researcher.

6.4 Instrumentation

The format for all questionnaire items was a 4 point scale, ranging from 1 (strongly disagree) to 4 (strongly agree). All items were specific to chemistry components in Science class and written in Tamil and English. The students survey contained Chemistry unit achievement test in M.C.Q response.

6.4.1 Instrumentation used in this study

Two aspects of student learning outcome are investigated in this study: the students' achievement and self-concept in science. Science achievement refers to students' mastery of scientific knowledge and skills based on the Science achievement tests for two consecutive years 2021- 2022. Another important outcome of science learning is the development of self-concept in science. The students' self-concept in science is assessed by a student questionnaire which elicit students 'perceptions of their interest and competence in science.

The questionnaire also explores the class room climate to focus on the instructional activities and teaching strategies used in science classes. Class room observations will be made on the conduct of science lessons for a small number of schools selected from EMI and TMI schools to analyze of how different instruction medium may lead to the differential science achievement and science concept of the EMI students and TMI students.

6.5 Chemistry Teaching and Learning Process

The teaching and learning process in chemistry involves imparting knowledge about the fundamental principles, concepts, and applications of chemistry to students. It aims to develop their understanding, problem-solving skills, and ability to apply chemical principles to real-world scenarios.

Class Discussions: Engaging students in class discussions encourages active participation and helps to deepen their understanding of the subject. Students can ask questions, share their perspectives, and engage in problem-solving activities. Teachers facilitate these discussions and provide clarifications when needed.

Laboratory Work: Practical laboratory work is an integral part of learning chemistry. It allows students to apply theoretical concepts, develop experimental skills, and observe chemical phenomena firsthand. In the laboratory, students perform experiments, collect data, analyze results, and draw conclusions.

Problem Solving: Chemistry involves problem-solving, both in theoretical and practical contexts. Teachers provide practice problems and assignments to help students develop their analytical and critical thinking skills. They guide students in understanding problem-solving strategies and help them apply these strategies to chemical equations, calculations, and other related tasks.

Assessment and Feedback: Assessment methods, such as quizzes, tests, projects, and laboratory reports, are used to evaluate students' understanding and progress. Teachers provide feedback on students' performance, highlighting strengths and areas for improvement. This feedback is crucial for students to identify their weaknesses and work towards enhancing their knowledge and skills.

Teaching learning process scale was constructed by the modification of task evaluation questionnaire from intrinsic motivation inventory. The software SPSS version 25.0 was used for analyses. After checking for normal distribution of the data. Linearly of relationships between variables and computing the basic correlations between the different variables, reliability tests for all the scales used to measure the different variables were performed.

07. Results and Discussion

Descriptive Statistics

Most students (mean was 3.69) were said that if the study lessons were in their mother tongue that would be easier for them to study. They (mean was 3.70) said that teachers discussed things in English after checking their work sheets in the school. Most students (mean was 3.68) said that it was better if they could study G.C.E (A/L) in an English medium school. The (mean was 3.70) were liked to attend Science lessons in the school. The (mean was 3.67) said that GCE A/L English medium Science subject tuition were available in their village. Students (mean was 3.72) were keenly watch teacher demonstrations in laboratory in English medium. Further, the mean was 3.64, confirmed about availability of learning materials for science subject in the school. Further, most students (mean was 3.73) were found enough learning materials to study science at their home too. Students (mean was 3.77) were satisfied about the science learning environment in their school.

Regression analysis

Hypotheses

H₁ -There is a positive association between student academic ability and Science learning.

From the model summary, it is understood that the dependent variable student academic ability contributes 57% percentage of variation in the variation of the dependent variable Science learning. The ANOVA table shows that the F statistics is 270.513 is highly significant. The Beta co-efficient for student academic ability is .678 as the T value is significant which shows the hypothesis (H₁) is true that is the student academic ability and Science learning have a positive association.

- Then, the regression equation becomes as
- $Y = 1.223 + 0.675 X$
- Where Y = Science learning
X = Student Academic Ability

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	95	68.8	68.8	68.8
Female	43	31.2	31.2	100.0
Total	138	100.0	100.0	

Data analyses from Tamil medium students

138 Tamil medium students were participated to the study where medium of instruction of both English and Tamil Schools in Jaffna zone, Valikamam zone and Vadamarachchi zone. 68.8% of students who were studying in Tamil medium were males and 31.2% of students were females.

These students are in different religions.

Parents / Guardian know English

5.1% of students who study in Tamil said their both parents knew English. 10.1% of students were said that only one of their parents knew English. 84.8% majority of students were said that none of their parents knew English which might be the case

that most of these students were studying in Tamil medium instead of studying in English medium.

Religion

	Frequency	Percent	Valid Percent	Cumulative Percent
Hindu	102	73.9	73.9	73.9
Christian	19	13.8	13.8	87.7
Islam	17	12.3	12.3	100.0
Total	138	100.0	100.0	

73.9% of students were Hindus and 13.8% and 12.3% of students were Christians and Islam respectively.

Difficulties now you may face if you would be learning GCE A/L science in English medium

	Frequency	Percent	Valid Percent	Cumulative Percent
I do not understand the language properly	3	2.2	2.2	2.2
I am scared to learn science in English medium	13	9.4	9.4	11.6
I am not familiar with the scientific terms in English medium	18	13.0	13.0	24.6
I have to give more effort to study science in English medium when compared to Tamil medium	83	60.1	60.1	84.8
above all	21	15.2	15.2	100.0
Total	138	100.0	100.0	

Difficulties you may face if you would learn GCE A/L science in English medium

- 2.2% of student might not understand English language properly if they study GCE A/L in English medium.

- 9.4% of students were scared to learn Science in English medium for GCE A/L.
- 13% of students were not familiar with scientific terms in English medium and decided to study Science in Tamil medium.
- 60.1% of students were thought that they had to give more effort to study science in English medium when compared to Tamil medium.
- 15.2% of students were had all above problems to decide to study Science in Tamil medium

Get special support from family / parents / teacher to learning GCE A/L science in English medium

- ❖ 13% of students may get special support from their family members or parents or teachers to learn GCE A/L Science in English medium but other majority of 87% of students were not get special support.
- ❖ Therefore, those were the reasons for students to select Tamil medium to study GCE A/L Science.
- ❖ Students (mean was 3.68) felt that it was very easy them to understand lessons taught in their mother tongue.
- ❖ When teachers discussed the work sheets of Science subject in English made them hard to understand (mean was 3.81).
- ❖ Most students (mean was 3.70) were preferred to stud in Tamil medium school.
- ❖ They (mean was 3.67) could like to attend science lessons which taught in Tamil medium.
- ❖ Tamil medium tuition classes were available in their village to learn science subject (mean was 3.53).
- ❖ Students (mean was 3.54) were very keenly watch students demonstrated laboratory activities of science subject in Tamil medium when compared to English medium.
- ❖ Students (mean was 3.65) refer Tamil medium learning materials provided in the school.
- ❖ Further, learning materials were available for science subject at home were also in the Tamil medium (mean was 3.70).
- ❖ Students (mean was 3.54) expressed the satisfactory level science teaching environment in the school in Tamil medium.

Tamil medium students Regression analyses

H₂ There is a positive association between science learning and student academic ability.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.644 ^a	.415	.410	.45489

a. Predictors: (Constant), Student Academic Ability

ANOVA^b

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	19.926	1	19.926	96.295	.000 ^a
Residual	28.142	136	.207		
Total	48.068	137			

a. Predictors: (Constant), Student Academic Ability

b. Dependent Variable: Science learning

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.080	.265		4.077	.000
	Student Academic Ability	.705	.072	.644	9.813	.000

a. Dependent Variable: Science learning

The model summary shows that R squared value is 0.415. That is 41.5% variation is due to student academic ability in the variation of Science learning. From ANOVA table F statics is 96.295 and highly significant. The co-efficient for student academic ability is .705 and the T value is significant (from the co efficient table) this shows that the hypothesis H₂ is true. Then the regression equation becomes

$Y=1.08+0.705(\text{student academic ability will cause } 0.705 \text{ increase in Science learning.}$

Data analysis of responses of teachers

- ❖ Forty teachers were participated to the study who teach Science subject in a school.
- ❖ Among all the teachers who participated to the study that 45% of were male teachers and 55% of teachers were females.

Period of your service as an English Medium teacher

- ❖ 32.5% of teachers had less than five years' service as an English medium teacher. 27.5% and 40% of teachers had five to ten years and over ten years' service as an English medium teachers respectively.
- ❖ 22.5% of teachers were graduates and 30% of teachers were post graduate holders. 47.5% of teachers were having different other educational qualifications.
- ❖ Among these teachers that 45% of them were conducted their higher studies in English medium and 55% of teachers conducted the higher studies in Tamil medium.
- ❖ 55% of teachers were satisfied with learning materials provided to GCE A/L English medium science students.
- ❖ 30% of teachers were not satisfied with the learning materials provided by teachers for these students.
- ❖ 15% of teachers said that the student must receive more learning materials that were learning GCE A/L in English medium at school.
- ❖ 65% of teachers taught subjects while explaining in English medium and provided learning materials in English. But 35% of teachers taught subject while explaining subject in Tamil medium and provided learning materials in English medium.
- ❖ 25% of teachers made students participated for workshops to educate them about difficult areas of subject to students.
- ❖ 52.5% of teachers were received enough facilities from school to difficult areas of subject to students.
- ❖ 22.5% of teachers got help of other teachers to educate students regarding difficult areas of Science subject.

- ❖ 30% of teachers were said about there was a permanent resource room to keep materials for English medium science students but materials were not enough to use at once for all students.
- ❖ 30% of teachers were consent about enough materials availability in the resource room to study for English medium science student.
- ❖ 40% of teachers were said about not availability of resource room to access to English medium science students for study materials.
- ❖ 15% of teachers were not motivated to work in the future and wanted to stop service in the future.
- ❖ 27.5% of teachers were said that they could like to continue their service as a teacher even though they were not motivated to work.
- ❖ 25% of teachers were very happy to continue and improved their proficiency in English medium.
- ❖ 15% of teachers had enough confidence but facilities and motivations were limited.

Give learning materials to the students regularly

- ❖ 42.5% of teachers were given learning materials to students regularly.
- ❖ 30% of teachers were given learning materials sometimes and 27.5% of teachers were never given learning materials to students.
- ❖ 45% of teachers were said that students were shown keen interest in their subjects.
- ❖ 32.5% of teachers were said that students were interested in their subjects only in sometimes.
- ❖ 22.5% of teachers were said that students were never shown keen interest in their subject.

Get timely and appropriate information from your Zonal office

- 45% of teachers got timely and appropriate information from Zonal office.
- 45% of teachers sometimes got timely and appropriate information from Zonal office.
- 10% of teachers were never got timely and appropriate information from their Zonal office.

Regression Analysis of Teachers

- H₃ There is a positive association between classroom climate and instructional activities and Science learning.

From the model summary table R² is 0.339 which shows that 33.9% of variation due to class room climate and instructional activities is caused in the variation of Science learning. From the ANOVA table F Statics 19.506 and it is highly significance. From the co efficient table of coefficient for classroom climate and instructional activities is 0.567 and the T value is significance .Hence Hypothesis H3 is true .That is classroom climate and instructional activities and Science learning have a positive association .

Data analysis of Parents

Sixty one parents were responded to the study and their children learn GCE A/L Science in English medium. 57.4% of parents were males and 42.6% of parents were females. 1.6% of fathers were educated up to school level and 19.7% of fathers were educated up to university level. 23% of fathers were educated in Technical College. 55.7% of fathers had different other qualifications. 24.6% of fathers were completed their higher studies in Tamil medium and 75.4% of fathers were conducted higher studies in English medium. 6.6% of mothers had school level educational qualification. 18% had University level educational qualification. 11.5% of mothers were attending to technical college. 63.9% of mothers had different other several qualifications. 41% of mothers were done their higher studies in Tamil medium even though they selected their children to conduct GCE A/L in English medium. 59% of mothers were carried out their higher studies in English medium 49.2% of parents were sent their children to tuition centers other than in school. 11.5% of parents were coach their children at home after school or asked their children to do self – learning at home. 27.9% of parents were provided several materials related to English medium Science subject to support their children at home other than in school. 3.3% of parents were satisfied with learning materials used by their children. 52.5% of parents were not satisfied and 44.3% of parents were said about more requirement of learning materials for their children in order to study GCE A/L Science in English medium. 13.1% of parents were seen that they were getting learning materials to child regularly. 21.3% of parents were not noticed of getting learning materials regularly and 65.6% of parents were expected more learning materials for their children regularly from school. 52.5% of parents said that their child was shown a keen interest in Science subjects.

34.4% of parents were not seen much interest of their student for science subject. 13.1% of parents were expected more interest of their child to learn science subject. 47.5% of parents were talk with their children in English. 50.8% of parents were never talk with their children in English at home. 1.6% of parents were thought it was better if they could talk with their children in English at home.

These children (mean was 3.47) were started to talk with their parents even after started to learn science in English medium. Those parents (mean was 3.63) were said that there were enough opportunities to their children to use English at home. Parents (mean was 3.60) were noticed about improvement of proficiency in English every year. Parents (mean was 3.67) thought that proficiency in English made their child for better future. Those parents (mean was 3.72) were believed that it was better to make their child study in an International school. Further, the (mean was 3.54) said there was a learning environment available at home. Parents (mean was 3.54) confirmed about motivation was there to child learn things at home. Science tuition in English medium was available in their area (mean was 3.62). The (mean was 3.60) were seen that their child's friends circulate learning materials among each other.

Data analysis responses of Tamil medium student parents

Sixty parents were responded to the study and their children learn GCE A/L Science in Tamil medium. 51.7% of parents were males and 48.3% of parents were female. 3.3% of fathers had school education only. 10% of fathers had University level education. 23.3% of fathers had technical college qualification. 63.3% of fathers had different types of educational qualifications. 73.3% of fathers were completed their higher studies in Tamil medium and 26.7% of fathers were completed higher studies in English medium. 11.7% of mother's educational qualification finished at school level. 23.3% of mother's educational qualification was University level qualifications. 18.3% of mother's educational qualification was from technical college. 46.7% of mother's had several qualifications. 88.3% of mothers were done their higher studies in Tamil medium. 11.7% of mother's were completed their higher studies in English medium.

Child learn Science subjects other than in school

50% of parents said that their students learnt Science subject in tuition centers. 11.7% of parents were given their own coaching to learn Science subject other than in the school. 6.7% of parents were said that their children were doing self learning.

31.7% of parents were said that their Children use several materials to learn Science subject as extra sources for learning.

Child overcome difficult areas in learning the subject science

93.3% of parents were said that their children use tuition centers to learn difficult areas of Science subject. 5% of parents were provided own coaching for their children to teach difficult areas in the Science subject. 1.7% of parents said about use of materials to teach difficult areas of Science subject to their students. 21.7% of parents were satisfied with leaning materials which was provided to their children. But 36.7% of parents were not satisfied and 41.7% of parents were requested more learning materials.

Give learning materials to the child regularly

5% of parents were given learning materials to their child regularly. 10% of parents were not focused on giving learning materials to child regularly. 85% of parents were said that they required to give more learning materials to their children regularly. 26.7% of parents were said that their child was shown an interest on learning science subject. 40% of parents were not seen much interest of their child to learn science subject. 33.3% of parents were said that requirement of more interest among their children to learn science subject for GCE A/L. 25% of parents communicate with their child in English when they were at home. Since doing in GCE A/L in science subject in Tamil medium was fine with them. 15% of parents were not talk with their child in English at home. 60% of parents were thought to use English to talk with their parents.

Children (mean was 3.96) talk with their parents in English since it was not an essential requirement to learn English through studying science in English medium and it was fine with them to follow up GCE A/L studies of Science subject in Tamil medium. Most parents (mean was 4.00) said that their children had more opportunities to learn English at home. Most parents (mean was 3.81) were noticed about increment of proficiency in English every year. Parents (mean was 3.91) knew that proficiency in English might provide a better future to the child. Further, the (mean was 3.85) said that learning environment was available at home. There was a motivational environment to study Science at home (mean was 3.85). Science tuition in English medium was not much available in their area which was caused to pull back their children learning science in English medium and doing in Tamil medium (mean was 3.70).

08. Conclusion and Recommendations

This research has raised a number of issues and questions. Hence there is a need for further research of language policy implementation. One of the findings of this study teachers still make use of traditional teaching methods. Researcher recommended educational programs that focus on the teacher development to match alpha generation. The 21st-century skills classroom focuses. professional learning communities (PLCs), a new model of group mentoring. Teachers need access to the necessary equipment, teacher manuals, lesson plans, and other resources to deliver their students. Revising the cadre requirements of the organization based on a more logical and scientific foundation. Establishing the curriculum wing to support the curriculum reforms process. Empowering the curriculum developers with short term and long term CPD programs. Establishing a sustainable policy for professional development.

Innovative teaching methods

Interactive teaching strategies are more effective than transmission teaching

- The ministry of should provide schools with appropriate resources for teaching and learning.
- The politicians need to be involved in language in education issues.

Collaboration with institutions of higher education

- universities, college of Educations have research capacity. It is wise that the schools form partnership with these institutions to investigate problems relating to their teaching and learning.
- Developing a scientific teacher development framework considering the dynamics of each stage of the professional life cycle of teachers.
- Empowering principals, in- services advisors (ISAS).
- The school principals are provided with a special awareness on medium of instructions and how to implement the reforms to achieve the best results.

Schools, Classrooms and Other Resources

- Setting maximum standards for physical resources.
- The State Ministries responsible for acquisition, prioritizing, and mobilization of such resources to achieve the objectives.
- Establishment of innovations Hubs for students to acquire hands on skills.

- To improve STEAM related activities as well as other creative activities to improve their critical thinking, creativity and innovative mind set to make them ready for the demands of the industry.
- The students design the procedures of science experiments in English medium to improve the ability of using English language.
- Teachers ask Science subject in English to support the students to involve in English language learning.
- local cluster programs can develop Science teachers in the short term they can form clusters or associations in which they can share views in Science teaching.
- Classroom teaching to be transformed to collaborative, investigative and interactive learning.
- Digital learning (PHET) and Walterlwin as the student mature and digital facilities.
- An LMS can be developed with student learning resources (a good example in this respect is the Singapore Student learning space)
-

Provide Lap top and Desk top computers to the students for access.

- the assessment procedure should not be limited to usual classroom paper-pencil tests which measures mainly recalling ability of students.
- Assessments need to be developed and modified to assess students' higher order thinking skills such as analyzing, synthesizing and problem-solving skills related to affective and psychomotor domains.
- The in-service training has been carried.
- Teacher Professional Development, which will be given high priority, will form Specialized Professional Teacher Education Forums at Divisional Levels –. Example:, Science Teachers' Forum.
- A comfortable and attractive classroom in an environment which will be able to stimulate learning,
- The right methodology and teaching style by using Information Communication Technology to apply new technique in teaching and learning” (Mansor, et al 2011:130).

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