

# Factors Influencing Advanced Level Students' Choice of Technology Stream

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## ABSTRACT

“The Stream of Technology” was introduced as the fifth subject at the G.C.E. (A/L) in Sri Lankan schools in 2013, based on the concept of developing competent human capital for the modern workforce through technical knowledge. The primary objective of this introduction was to increase the number of students choosing technology stream while reducing those opting for arts stream. However, this goal was not met as anticipated. Consequently, this research has been conducted with the main aim of identifying the reasons behind this outcome. This study was conducted using a quantitative research approach and a descriptive survey design. The Batticaloa Education Zone in Batticaloa District, one of the districts in Sri Lanka, was selected for the study, and three schools with a technology stream at G.C.E. (A/L) were chosen. A total of 165 students were selected as samples using simple random sampling techniques. Data were collected through questionnaires and documents, and analyzed using descriptive statistical analysis methods. The study revealed that factors related to career and higher education opportunities have significantly influenced students' choices in the technology stream. However, a lack of guidance during G.C.E. (O/L) insufficient societal awareness, and minimal encouragement from parents and peers contribute to students' reluctance to pursue the technology stream. It is essential that adequate guidance is provided to both students and parents through the school career guidance unit at G.C.E. (O/L) Specifically, effective guidance should emphasize the importance of tertiary education and the N.V.Q. certificate. This approach will help dispel misunderstandings and misconceptions within society, including among students and parents, regarding the technology stream.

**Key words:** Technology Stream, Arts Stream, G.C.E. (A/L), G.C.E. (O/L).

## INTRODUCTION

In today's technological world of work, creating good citizens with competent human capital is vital. This requires continuous and sustainable development of technical and life skills among students (National Education Commission, 1997). In this context the technology stream was introduced as the fifth stream in G.C.E. (A/L) in the year 2013. The aims of the introduction of this stream are: eliminating the disparities in choosing G.C.E. (A/L) stream, creating a suitable labor force for the present labor market, providing technical skills which are necessary for day-to-day life to the students, providing the skills to the students in order to find technical solutions in contemporary issues, and moving students towards professional education according to the national vocational framework (Lenin, 2013). It is classified into two disciplines namely Engineering Technology and Biotechnology. Ordinary pass gained in mathematics and science subjects in G.C.E. (O/L) is considered as qualification to study in technology stream.

The long-term goals of the introduction of this new stream are: creating young people who can face challenges with technical skills and appropriate soft skills in order to reduce the unemployment rate among youth, reducing the lack of skills found among graduates in Sri Lanka, reducing the number of students who choose arts stream in G.C.E. (A/L). Technology stream was initially started in 1AB school of each educational zone in

the year 2013 and in the year 2015, the students appeared for G.C.E. (A/L) examination for first time. After that it was gradually started in many 1 AB schools.

In the following years, after the introduction of this new stream, the number of students choosing technology stream increased while the number of students choosing Arts stream decreased. However, in recent years; there was no increase in the number of students who choose technology stream as expected, and the number of students choosing arts stream did not increase as expected.

According to the statistics of the Examinations Department, Sri Lanka, the number of technology stream students who appeared for the G.C.E. (A/L) Examination in 2015 was 6%. It increased to 9% in 2016 and gradually increased to 11.3% in 2020. However, it decreased to an average of 9.9% from 2021 to 2023. Whereas the arts stream was an average of 42.4% in 2013 and 2014 when technology stream was introduced, arts stream decreased to 37.5% and 34.9% in 2015 and 2016 respectively. However, from 2017 to 2023, it has increased by an average of 39%.

Therefore, the statistics of the examination department revealed that the involvement of students in technology stream has not increased as much as expected and the number of students choosing for art streams has not decreased as much as expected. In this context, this survey has been conducted with the aim of finding out the reasons for this.

### **Objectives of the study**

1. To identify the current status of students who study in technology stream compared to other streams.
2. To explore the factors influenced in choosing technology stream
3. To find out the factors that influenced non-choice of technology stream by the students studying in the arts stream who have the academic qualification to choose technology stream
4. To propose suggestions to increase the involvement of students in the technology stream

### **LITERATURE REVIEW**

Technical education is very essential in today's modern world. The global economy depends on various sectors based on science and technology. Thus, students should be prepared to face global challenges and, in a manner suitable for modern technology. In order to reduce the youth unemployment rate, there is a need to develop youth who can face the challenges with technology and appropriate soft skills.

Low skills or lack of skills among our graduates is a hindrance to do their jobs well. There is a need to create competent youth to meet the ever-increasing demand in the labor market (Nithilavarnan, 2013). Although many developed countries are aware of the importance of technical and vocational education and training programs, students in developing countries do not realize its importance. Technical and Vocational Education Programmes should aim to produce well-trained, motivated, high-order skills, globally competitive and technologically competent youth. (Marope et al., 2015). Technical skills can undoubtedly be a foundation for employability (Parry2015). Also, admission to universities in the field of Electronics and Civil Engineering Technology, Agriculture, Food Science, Information Technology etc. is limited. Students who study in these field at G.C.E. (A/L) are able to acquire practical knowledge and get employment easily (Viyasekara 2013).

A student's choice in a particular stream and subjects in their General Certificate of Education (Advanced Level) has a major impact on their academic journey and future career prospects. There are various factors influence the selection of a particular stream and subjects. Community contributions had a moderately positive impact on General Certificate of Education (Advanced Level) exam results (Sivananthan & Wedikandage, 2023). Social factors such as distance between home and school, lack of private classes, poor transportation facilities, low family income, and students' living conditions also influence the choice of subject. (Rusika, 2019). Kinyota Mjege (2013) revealed in his study that students' exam results, self-skills, knowledge in career,

gender status, and resources of school have a great influence on the choice of subjects. Kandiko (2013) states that students' choice of course in advanced level education is mainly occurred through family as well as friends and school. Mindset of Students and their past knowledge are important in choosing subjects. (Javed 2018). OssiAuto (2011) mentioned that the students who opting for technology stream in higher education could not achieve the expected goals due to the lack of awareness about it until any student studies technology stream. He further emphasized that the relationship between teachers and students, classroom environment and parents of students play an important role in students' choice of technology stream.

Chandrasekharam & Nithilavarnan (2017) mentioned in their study that when students choosing stream in General Certificate of Education (Advanced Level), very few students were well aware of the technology stream. Most of the students were little aware about the technology stream. But a considerable number of students have chosen their courses without knowing anything about the technology stream. Rasa et al., (2017) in his study mentions that in Pakistan there is less connection between educational institutions and industries, very few students are involved in this course, there is a shortage of trained and qualified teachers, the curriculum is not reviewed, and mismatch between requirements and qualifications in getting employment. Basanti & Shrestha (2016) found that vocational and technical education courses did not meet the needs of industries, vocational training providers did not design their curriculum in relation to employment opportunities, curriculum for training are not developed to suit the industry, and lack of well qualified instructors are major issues in the development of vocational education.

Kemevor & Kassah (2015) also mentioned that Due to the large number of students in the classroom, there are hindrances in providing trainings. He also mentioned that equipment for technical training is very limited and more time is required for technical training rather than other subjects. Idris (2014) mentioned that in most of the schools, the lack of qualified teachers who can teach technical subjects has led to a decrease in interest of students.

Sri Lanka's National Educational Research and Evaluation Center (2017) mentioned that teachers and principals felt that students who have low knowledge in science and mathematics are the main barriers to entry into the technology stream, in addition to this, practical training and equipment were also identified as challenges. Amedorme (2013) in his study found that the existing technological institutes do not have the facilities and materials to impart various types of vocational training to the students. Also, technological schools are called as places where students are given not only theoretical knowledge but also practical experience. But the tools needed to achieve these are lacking or inadequate and also said that due to this, the training provided to the students is affected. In study, Azeem & Omar (2019) states that opportunities for students should be given to develop soft skills in technology and vocational education and training for them should be provided as workshops and internships, and these should be implemented through the school curriculum. In his study, Azeem & Omar (2019) states that social awareness should be improved to increase interest of students in technology and vocational education training, and students should be given proper career guidance advice.

## RESEARCH METHODOLOGY

This study has been carried out in quantitative research approach and in a descriptive survey design. Batticaloa Education Zone in Batticaloa District which is one of the Districts in Sri Lanka has been selected. Out of eight 1AB schools in Batticaloa Education Zone, 3 schools with technology stream at G.C.E. (A/L) have been selected. 85 students of technology stream, 80 students of arts stream including 165 students, were selected as samples using simple random sampling technics. Data have been collected through questionnaire and documents. Data were analyzed by descriptive statistical analysis method.

### Data analysis

Based on the research objectives, the data obtained were analyzed and related discussions are given below.

### Identifying the current status of students who study in technology stream compared to other streams.

Data regarding the number of students studying technology compared to other subjects, the gender wise data of students who study engineering technology and bio technology are obtained from the documents and analyzed below.

Table1: Details of students who have chosen streams in G.C.E. (A/L)

Year	Total Number of Students	G.C.E. (A/L) - Streams							
		Technology Stream		Arts Stream		Biology & Physical Science Stream		Commerce Stream	
		<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
2020	1415	161	11.4	537	38.0	401	33.6	242	17.1
2021	1555	149	9.6	640	41.2	402	32.2	266	17.1
2022	1405	44	3.1	611	43.5	395	32.8	289	20.6
2023	1454	100	6.9	621	42.7	419	35.9	211	14.5
2024	1613	126	7.8	676	41.9	440	33.7	274	17.0

(Source: Batticaloa - Zonal Education Office 2024)

According to Table 1, from 2020 to 2024, the number of students who chose technology stream gradually decreased from 11.4% to 6.9% in 2023 and 7.8% in 2024. The number of students who chose arts stream is 38% in 2020 and then slightly increased to 41.9% in 2024. The average number of students who chose mathematics and science stream is 33.6%. The average number of students who chose commerce stream is 17.6%. Therefore, it has been revealed that the number of students who chose technology stream has decreased and the number of students who have chosen arts stream has increased.

Table 2: Details of students who chose technology stream

Year	Engineering Technology					Bio Technology				
	Total	Male		Female		Total	Male		Female	
		<i>n</i>	(%)	<i>n</i>	(%)		<i>n</i>	(%)	<i>n</i>	(%)
2020	100	88	88.0	12	12.0	61	27	44.3	34	55.7
2021	100	68	68.0	32	32.0	49	21	42.9	28	57.1
2022	21	13	61.9	8	38.1	23	3	13.0	20	87.0
2023	76	70	92.1	6	7.9	24	9	37.5	15	62.0
2024	91	84	92.3	7	7.7	35	12	34.3	23	65.7

(Source: Batticaloa - Zonal Education Office 2024)

According to Table 2, from 2020 to 2024, an average of 67% of students studied in engineering technology and 33 percent in biotechnology. Among the students studied in engineering technology stream, males are on average 80 percent and females are 20 percent on average. Among the students studied in Bio technology

stream, males are on average 34 percent and females are 66 percent on average. Therefore, the number of students studied in the engineering technology stream is much higher than the bio technology stream. Whereas the number of male students in engineering technology stream is very high and the number of female students is very less and the number of female students in bio technology stream is very high and the number of male students is very less.

**Exploring the factors influenced in choosing technology stream**

Data related to the factors that influenced the choice of technology stream by students were obtained through the questionnaire using the Likert scale. On the Likert scale, very high is 3.5 – 4.00, somewhat high is 2.5 – 3.4, low is 1.5 – 2.4, and very low is 1.4 – 1.00. The mean and standard deviation of the scales obtained from the 85 students who studied technology stream in the G.C.E.A/L. are shown in the table below.

Table 3: Factors influencing selection of technology stream

Variable	N	Mean	SD
<b>Individual Factors</b>			
Self-will	85	2.6	0.954
Improving technological knowledge	85	2.8	0.921
G.C.E.O/L Results in Mathematics and Science Subjects	85	2.2	1.013
Guidelines in G.C.E O/L	85	1.7	0.978
High social status for the technical subject	85	2.0	0.926
<b>Nature of Subjects</b>			
Easy to learn in the technical stream.	85	2.7	1.002
Difficulty in learning the other stream	85	1.8	0.884
<b>Motivation of Others</b>			
Parental motivation	85	1.7	0.978
Motivation of the School management	85	2.8	0.937
Motivation of Teachers	85	2.8	0.937
Motivation peers	85	1.8	0.874
<b>Job Opportunities</b>			
Government sector job opportunity	85	1.4	0.679
Private sector job opportunity	85	3.3	1.005
Self-employment opportunity	85	3.5	0.839
Overseas job opportunity	85	3.6	0.777

Opportunities to earn an NVQ certificate	85	3.9	0.277
<b>Higher Education Opportunities</b>			
State university selection chances	85	2.7	1.073
Opportunities for Study at Technical University	85	3.4	0.725
Opportunities for Study at University Colleges	85	3.5	0.781
Opportunities for Study at Technical Colleges	85	3.6	0.697

(Source: Questionnaire)

According to Table 3, the mean scores of the 85 students for the variables self-employment opportunity, overseas job opportunity, opportunities to earn N.V.Q. certificate, opportunities for study at University Colleges, and opportunities for study at Technical Colleges exceed 3.5, with a standard deviation of less than 0.78. Consequently, these five variables had a very high influence on the students' choice of technology stream. The mean scores for the variables self-will, improving technological knowledge, ease of learning in the technical stream, motivation from school management, motivation from teachers, private sector job opportunities, chances of selection at state universities, and opportunities for study at Technical University fall within the range of 2.5 to 3.4, with a standard deviation of less than 1.1. Thus, these seven variables had a relatively high influence on the students' choice of technology stream. Additionally, the mean scores for the variables G.C.E.O/L results in mathematics and science subjects, guidelines in G.C.E O/L, high social status for the technical subject, difficulty in learning the other stream, and parental and peer motivation range from 1.5 to 2.4, with a standard deviation of less than 1.0. Therefore, these six variables had a low influence on the students' choice of technology stream. The variable ‘Government sector job opportunity’ has a mean of 1.4 and a standard deviation of 0.68, indicating it exerts a very low influence. In examining these variables, those related to career opportunities and higher education opportunities have had a very high influence.

**Finding out the factors that influenced non-choice of technology stream by the students studying in the arts stream who have the academic qualification to choose technology stream**

Data has been collected from 80 arts students who are eligible to pursue the technology stream but opted not to. Based on this data, the influential nature of these factors has been analyzed using the One-Sample Chi-Square Test, as shown in Table 4 below. The extent to which these factors are influential is presented in Table 5 below.

Table 4: Factors influencing on non-choice of technical stream by Arts stream students

<b>Null Hypothesis – H<sub>0</sub> (The following variable have no influence on non-choice of technical stream by Arts stream students)</b>	<b>Sig.<sup>a,b</sup></b>	<b>Decision</b>
Inadequate guidelines have been provided in G.C.E O/L	<.001	Reject H <sub>0</sub>
Poor English language knowledge	<.001	Reject H <sub>0</sub>
Limited technological literacy	<.001	Reject H <sub>0</sub>
Difficulty to learn in the technical stream.	<.001	Reject H <sub>0</sub>
A lot of practical exercises are included in technical stream	<.001	Reject H <sub>0</sub>
Socioeconomic factors as barriers to engaging in field training in the stream	<.001	Reject H <sub>0</sub>

Higher cost of studying in technical stream	.978	Retain H <sub>0</sub>
Failure to enhance previous performance in technical stream	<.001	Reject H <sub>0</sub>
The experience of the teachers teaching in the technical stream is limited	<.001	Reject H <sub>0</sub>
High social status for the technical stream	<.037	Reject H <sub>0</sub>
Availability of technical subjects only in certain schools	<.001	Reject H <sub>0</sub>
Private classes for technical subjects are limited	<.004	Reject H <sub>0</sub>
Parental motivation	<.001	Reject H <sub>0</sub>
Motivation of the School management	<.001	Reject H <sub>0</sub>
Motivation of Teachers	.729	Retain H <sub>0</sub>
Motivation peers	.094	Retain H <sub>0</sub>
Less Government sector job opportunity	<.001	Reject H <sub>0</sub>
High Private sector job opportunity	.261	Retain H <sub>0</sub>
High Self - employment opportunity	.063	Retain H <sub>0</sub>
High Overseas job opportunity	.801	Retain H <sub>0</sub>
Less state university selection chances	<.001	Reject H <sub>0</sub>
Less college of education selection chances	<.001	Reject H <sub>0</sub>
Less opportunities to fallow external degree	<.001	Reject H <sub>0</sub>
a. The significance level is .050.		
b. Asymptotic significance is displayed.		

Table 4 indicates that null hypotheses concerning 17 variables with values less than 0.05 were rejected, while null hypotheses regarding 6 variables with values greater than 0.05 were accepted. Consequently, 17 factors have been identified as reasons for students in the arts stream not choosing the technology stream, despite their eligibility to do so.

Table 5: Level of factors influencing on non-choice of technical stream by Arts stream students

Variable	N	Mean	SD
Inadequate guidelines have been provided in G.C.E O/L	80	3.7	0.644
Poor English language knowledge	80	3.1	1.051
Limited technological literacy	80	3.5	0.729
Difficulty to learn in the technical stream.	80	3.6	0.698

A lot of practical exercises are included in technical stream	80	3.5	0.871
Socioeconomic factors as barriers to engaging in field training in technical stream	80	3.1	1.000
Failure to enhance previous performance in technical stream	80	3.5	0.693
The experience of the teachers teaching in the technical stream is limited	80	2.9	1.023
High social status for the technical stream	80	2.3	1.111
Availability of technical subjects only in certain schools	80	3.7	0.660
Private classes for technical subjects are limited	80	2.9	1.065
Parental motivation	80	3.3	0.956
Motivation of the School management	80	3.3	0.941
Less Government sector job opportunity	80	3.2	1.052
Less state university selection chances	80	3.1	0.928
Less college of education selection chances	80	3.5	0.746
Less opportunities to fallow external degree	80	3.2	0.997

(Source: Questionnaire)

Table 5 indicates that 80 student responses regarding variables such as inadequate guidelines provided in G.C.E O/L, limited technological literacy, challenges in learning within the technical stream, the abundance of practical exercises in the technical stream, failure to improve previous performance in the technical stream, availability of technical subjects only in select schools, and fewer opportunities for college of education selection; the mean is greater than 3.5, and their standard deviation is less than 0.87. Consequently, these variables exert a significant influence on the decision of students studying in the arts stream to not choose the technology stream, despite their eligibility. Similarly, the means for poor English language proficiency, socioeconomic barriers to participating in field training within the technical stream, limited teacher experience in the technical stream, scarcity of private classes for technical subjects, parental motivation, school management motivation, fewer government sector job opportunities, and reduced chances for state university selection fall within the range of 2.5 – 3.4, with a standard deviation of less than 1.1. Thus, these variables have a somewhat higher influence on the decision of arts stream students to not pursue the technology stream, even though they are eligible. The mean for the variable high social status related to the technical stream is 2.3, with a standard deviation of 1.111, indicating it has very little influence.

Therefore, the most influential factors preventing students in the arts stream from choosing the technology stream, despite being eligible, include inadequate guidelines provided in G.C.E O/L, limited technological literacy, challenges in learning within the technology stream, the inclusion of numerous practical exercises, failure to improve previous performance in the technology stream, the availability of technical subjects only in certain schools, and reduced opportunities for selection in the college of education.

## **FINDING DISCUSSION & CONCLUSION**

In the past five years, there has been a decline in the number of students opting for the technology stream, while the arts stream has seen an increase in enrollment. At the same time, the number of students pursuing Engineering Technology significantly surpasses that of those studying biotechnology. In engineering



technology, the male student population is notably high, whereas female students are considerably fewer; conversely, in biotechnology, female students greatly outnumber their male counterparts.

Factors related to employment and access to higher education are more influential in choosing the technical stream. While individual factors, those related to the nature of the technical stream, and encouragement from others also have some influence. Individual factors, such as the guidance provided in G.C.E. (O/L) (Mean Value 1.7) and high social status associated with the technology stream (Mean Value 2.0), had less impact. Consequently, inadequate guidance in G.C.E. (O/L), a lack of societal awareness, and insufficient encouragement from parents and peers (Mean Value 1.8) have been identified as reasons students do not choose the technology stream. The findings of Muyanemaiza's (2013) research align with these factors, indicating that students' subject choices in higher education are primarily influenced by family, friends, and school. Additionally, the results of Chullaliyauravaza's (2011) study support the notion that students selecting the technology stream in higher education often fail to meet their expected goals due to a lack of awareness until they engage with the technology stream. It is also argued that the technology stream is perceived as more challenging compared to other subjects (Mean Value 1.8). Similarly, the limited government job opportunities for the technology stream represent another concern (Mean Value 1.8).

Lack of guidance in G.C.E (O/L), insufficient technical knowledge among students, the perception of technical subjects as difficult and more practical in the technology stream, declining past results in the technology stream, the limited availability of technology stream programs to certain schools, and fewer opportunities to study in colleges of education (Mean Value  $\geq 3.5$ ) are the most influential factors deterring students from the arts stream, despite their capability to pursue the technology stream. These reasons align with the findings of the study conducted by Chandrasekharam and Nithilavarnan (2017), which indicated that very few students are well-informed about the technology stream when selecting courses in G.C.E (A/L). Most students have limited awareness of the technology stream, yet a significant number chose their courses without adequate knowledge of it.

Due to the lack of guidance in G.C.E (O/L), the provided guidance is ineffective, leading to a lack of clarification and misconceptions among students and society, including parents, regarding the technology stream. As a result, they have opted for the arts stream instead of the technology stream.

## RECOMMENDATIONS

The study revealed that a lack of guidance in G.C.E (O/L), insufficient awareness in society, and minimal encouragement from parents and peers are reasons students do not choose the technology stream. Yunana Ru Chuayasa (2019) in his study states that to enhance students' interest in technology and vocational education training, social awareness must be improved, and appropriate career guidance should be offered to students. It is essential that adequate guidance is provided to both students and parents through the school career guidance unit at G.C.E. (O/L). Specifically, effective guidance should focus on the significance of tertiary education and the N.V.Q certificate. This approach will help eliminate misunderstandings and misconceptions within society, including among students and parents, regarding the technology stream. Consequently, it can decrease the number of students opting for the arts stream despite their capability to pursue studies in the technology stream, while simultaneously increasing the number of students choosing the technology stream.

## Abbreviations

G.C.E. (A/L) - General Certificate of Education (Advanced Level), G.C.E. (O/L) - General Certificate of Education (Ordinary Level), N.V.Q. - National Vocational Qualification.

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