



A statistical study on students' selection of G.C.E. advanced level streams

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Abstract

The General Certificate of Education Advanced Level [G.C.E. (A/L)] examination plays a crucial role in determining students' higher education and career paths. This study aims to analyze the selection of streams among students and identify the factors influencing their choices. By using statistical methods, we explore trends, gender-based preferences, regional disparities, and socio-economic impacts on subject selection. Preliminary analysis indicates that Commerce and Technology are the most preferred streams, followed by Arts and Mathematics & Science. The study employs both primary and secondary data sources. Primary data were collected through surveys conducted among A/L students from various schools, while secondary data is obtained from official reports from the Department of Examinations and the Ministry of Education. Multistage Cluster Sampling was used to ensure a representative sample of 370 students from different schools and different socio-economic backgrounds. Chi-square test and multinomial logistic regression were utilized to analyze the data and findings revealed that the male students are more likely to choose Commerce stream, while those engaged in extracurricular activities tend to prefer the Arts stream. Parental education level and sports participation do not significantly impact stream selection. Students with lower Sinhala scores are more likely to choose Commerce, while those with lower Mathematics scores tend to select for the Arts. Many Arts students aspire to become lawyers, while others aim for managerial, business, or IT-related jobs. Male students are more inclined toward ICT than the Arts, whereas female students prefer the Arts over ICT. Additionally, most students lack awareness of job opportunities in their chosen fields and do not consider job availability if their future ambitions are not met. Career guidance programs should be strengthened to help students make informed choices based on their interests and abilities rather than societal expectations.

Keywords: G.C.E.(A/L), multinomial logistic regression, students stream selections, students' higher education

Introduction

Education is a purposeful activity aimed at achieving specific objectives, such as transmitting knowledge and fostering skills and character traits. It is a fundamental human right for every individual. According to the 17 Sustainable Development Goals (SDGs), quality education is one of the primary goals. The education system in Sri Lanka is well-structured and follows a centralized framework governed by the Ministry of Education. It provides free education from primary to university level, ensuring access for all students. The system is divided into several stages. Pre-Primary education from age 3 years to 5 years which this education isn't compulsory but widely available through government and private preschools and this education mainly focuses on early childhood development and basic social skills. Primary education from age 5 to 10 years which free and compulsory for all children. By end of this education Sri Lankan government held grade 5 Scholarship Examination, which determines eligibility for admission to prestigious schools. Secondary education can be divided into two parts Junior secondary education from age 11 to 14 years which the students need to learn the subjects like Mathematics, Science, Social Studies, and Languages. Senior Secondary education for the students who from 15-16 years old and through this education prepares the students for the General Certificate of Education Ordinary Level (G.C.E. O/L) examination including subjects like Mathematics, Science, English, Sinhala/Tamil, History, Religion and optional subjects.

Advanced Level Education for the students who from age 17-19 years. In Sri Lanka, the G.C.E. Advanced Level (A/L) examination is a crucial milestone in the education system,

offering students various streams, including Mathematics, Science, Commerce, Arts, and Technology. The choice of stream plays a significant role in shaping students' future academic and professional opportunities. The students open up the university admission based on their G.C.E. (A/L) result. According to the school Census report in 2020, there were 421,114 in students in Advance Level stage and there are 44974 students in Colombo district. After passing the G.C.E. (O/L) examination, students must choose one of five mainstreams; Mathematics, Science, Commerce, Arts, or Technology for their G.C.E. (A/L) studies. Various factors influence this decision, and some students make their selections without proper awareness, leading to challenges in their future careers. This study aims to analyze the distribution of students across different streams and explore the factors that influence their choices.

A study conducted by Rusika (2019) [4] examined the social, family, and school factors influencing A/L stream selection among students in the Mullaitivu District in Sri Lanka. A sample of 749 individuals, including 120 students from 25 schools, was studied using a simple random sampling method and findings indicate that family factors, such as low income (80% of the sample), high tuition fees for Science and Mathematics, lack of family support, and poor living conditions, significantly impact stream selection. Additionally, social factors like school distance, lack of private tutoring, and limited transport facilities influence subject choices. Also, the study highlights the urgent need for government intervention to improve educational standards in the Mullaitivu District. Recommendations include enhancing educational infrastructure and providing better financial and logistical support to students. According

to Wejesingha and Ranasuriya (2021), student-related factors such as interest, priorities, talents, skills, O/L exam results, and job prospects play a significant role in G.C.E. (A/L) stream selection. Social environmental factors, including influence from parents, siblings, friends, peers, and teachers, also impact decisions. Institutional factors, such as aspirations for higher education, were found to be significant. The study recommended implementing seminars and awareness programs in schools to guide students in making informed A/L stream choices.

Sivanathan *et al.*, (2024) ^[5] carried out a study on factors influencing advanced level students' choice of technology stream using 165 students across three schools in the Batticaloa education zone and claimed that the higher education opportunities influence students' choices, but a lack of guidance at the G.C.E. (O/L) level, low societal awareness, and minimal encouragement from parents and peers discourage students from choosing for the technology stream. The study suggests improving career guidance and raising awareness about tertiary education and the N.V.Q. certificate to address misconceptions and boost enrolment. A study conducted by Mjege (2013) ^[3] examined students' perceptions of factors influencing their choice between Science and Arts streams in ordinary-level secondary schools, as well as the support and guidance they receive before making these decisions. Using a mixed-method approach, data were collected from 101 students, 13 science teachers, 4 school heads, and 1 District Educational Officer in Morogoro through questionnaires, interviews, focus groups, and document reviews. The findings revealed that students' examination scores, self-efficacy in science, career knowledge, gender, and school resources significantly influence stream selection. However, most students had limited awareness of career opportunities related to their subject choices. The study recommends improving students' performance in science and mathematics, enhancing career guidance services, and revising subject streaming processes to ensure informed decision-making. Also, the researcher claimed that the special attention should also be given to improving female participation and performance in science and mathematics, as this remains a significant issue. Javed (2018) ^[2] explored the factors influencing students' subject selection at the secondary school level in Pakistan, as this decision plays a crucial role in shaping their higher education and career paths. Data were collected from 200 students, 50 teachers, and 25 parents in Southern Punjab using questionnaires and interviews for this study.

According to Javed, that the students' subject choices are influenced by their potential, prior knowledge, parents' profession, and financial status. Additionally, students tend to prefer subjects they find easier and more interesting. The study recommended that students receive proper guidance for subject selection, while teachers and parents should provide support to help them make informed choices aligned with 21st-century demands.

Methodology

The school students who were studying at grade 12 and 13 in leading state schools selected for this study. Out of the 30 schools in Colombo South Education Division, three leading states were randomly selected as the sample. Multistage Cluster Sampling was utilized to select 370 individuals aged between 17 and 18. The necessary primary data were collected through well-structured questionnaire while secondary data too gathered to achieve the objective of the

study. There are five major streams for the General Certificate of Advanced Level [G.C.E.(A/L)] namely; Science Stream (A students want to do Medicine, Biology, Biological Sciences or Agriculture), Mathematics Stream (A student who want to follow degree programs in Engineering or Physical Sciences), Commerce Stream (A student want to follow degree programs in Commerce, Management, HR, Marketing, Finance, Accountancy), Art Stream (A student want to follow degree Programs in Humanities, Social Science, Languages, Law), Technology Stream (A student want to follow new Technology degree programs). It is note that the students who were in two streams Mathematics and Science combined together since insufficient number of students in each category in selected sample for this study. Remain considered as it is. The study focused to describe the factors that affect selection of stream for G.C.E.(A/L). Since students' selection are not in particular order, the Multinomial Logistic Regression was applied to describe the factors that affect for their stream selections. Those affected factors and characteristics of sections of three major streams; Commerce, Mathematics & Science, Information Communication Technology (ICT) were explained with respect to the students who selected Art stream for their G.C.E(A/L). The study employs descriptive statistics to explore the fundamental data, serving as the basis for quantitative analysis. Chi-square analysis was performed to test the association between subject selection and demographic and socio-economic factors of students. This was used in the initial exploratory phase of understand relationships between variables.

Result and Discussion

Based on the descriptive statistics of the demographic characteristics, it is found that the 54 % of the students are female while rest of the students are male. Most of the students in the sample are Sinhalese (86%) and Buddhist (79%) whereas, 7% of the students are Muslim while rest of the others are Tamil (6%) and Burger (1%). Out of total students, 39% of students' monthly family income below to Rs 50,000/- while 32 % and 29% of the students' family income in between Rs 50,000/- and 70,000/- and above to Rs 70,000/- respectively. It is noted that the 6% of the Fathers and 5% of the mothers of the students have studied up to grade 8 only, while 19 % of fathers and 34% of Mothers have studied up to G.C.E.(O/L), moreover, 54% of the Fathers and 46% of the mothers got passed G.C.E.(A/L) while rest of the parents are graduated and the corresponding percentages are 21% and 14% respectively. of the total, 44% students in the sample got "C" pass for the Mathematics at the G. C. E (O/L) while 23% of the students achieved "B" pass and rest (33%) of the students achieved "A" passes for the mathematics. Grade distribution for the subject Science is bit more different with respect to the grade diminution of the subject mathematics.

It is revealed that the 59% of the total students got "C" or below to C pass for the Science while only 16% and 25% received "B" and "A" passes respectively. Moreover, only 26% of the students got "C" pass or below to "C" pass for the subject "Sinhala" (Mother Language of Sinhalese). It is revealed that the 21% of the students received "B" passes while 53% of the students got "A" passes for the subject Sinhala at their G, C, E, (O/L) examination. It is noticed that the 33% of students pursued Information and Communication Technology (ICT) for their G.C.E (O/L). Out of the total, 38% of the students are not engaged in any

sport activities while there are doing G.C.E.(A/L). When considering the future ambition of the students, it is found that the out of the total students 15% would like to be a Lawyer, 17% of the students future ambitions were Engineer, Doctor, Mathematician or a Scientists, 14% of the students would like to be teacher or a lecturer while highest percentage of the students (28%) would like to be businessman, manager, or Accountant whereas the 11% of the students future ambitions are lit different from others

and those are varies as Policemen, Fitness guide, tourist guide etc.

According to the figure 1, highest percentage (33%) of the students selected Commerce stream for their G.C.E. (A/L) while least number of students' (15%) choice were Science or Mathematics. Moreover, second highest (29%) popularity of the students was ICT and 23% of the students decided to do their G.C.E(A/L) from Arts Stream.

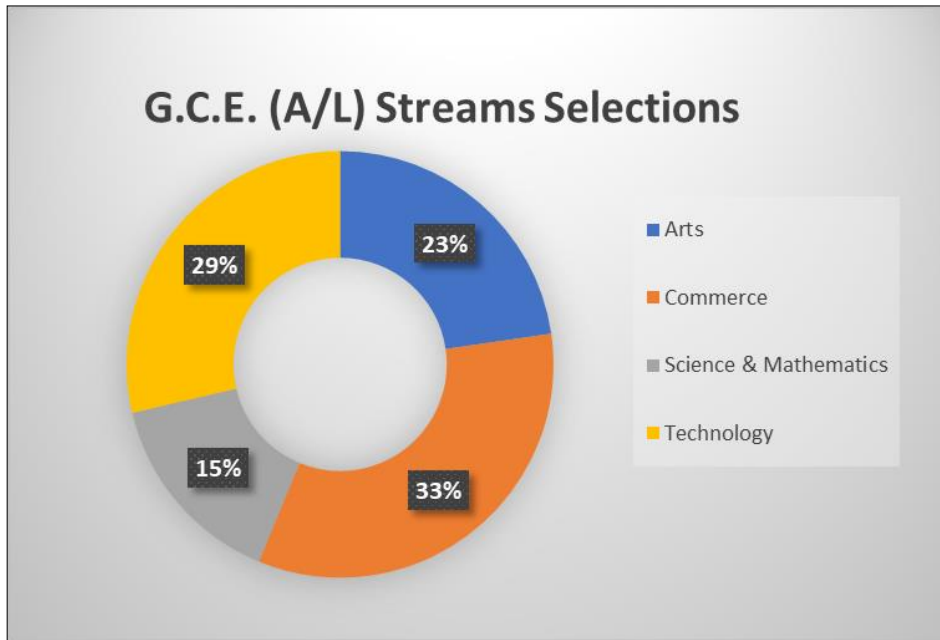


Fig 1: G.C.E (A/L) stream selections

Based on the responds which the students have given, for the factors that affect for the stream selection, it is revealed that the 88% students in the sample give importance to their preference when they selecting the stream for their G.C.E.(A/L). Out of the total, 66% of the student considered their parents advices when they were doing their selections. Moreover, 55% of the students considered their teaches advices before making the stream selection for their G.C.E (A/L). It is noted that the 80% of the students did their selection based on the awareness of the job availability in the selected stream. However, 66% of the student responded that the result of the G.C.E(O/L) also been a factor when selecting the streams for the G.C.E.(A/L). It is also noted that the 84% of the students made their selection based on the future highest studies too. It is revealed that the 59% of the students made their selection by targeting to have high Z score and get entered for the National University in Sri Lanka.

According to the result of Chi -square analysis, it is depicted that there is no significant association between selection of streams and the many demography and socio -economic factors as gender, monthly family income of the students, level of education of mother. However, in contrast, according to the result of the Table 1, it is implied that the there is a significant association between father's level of education, result of mathematics, result of science and result of Sinhala. Moreover, the students who followed the ICT do not significantly association with the selection of the streams and the whether the engage in sports do not affect to the selection of streams at their G.C.E. (A/L). It is revealed that the most of the students made their selection of streams based on their future ambition and there is a significant association between the student's future ambition and their selection.

Table 1: Chi-square analysis of association between factors and the selection of streams

Variable	Pearson Chi-square	
	Value	P-Value
Gender	1.285	0.733
Monthly Family Income	3.775	0.707
Lev_Edu_Father	17.022	0.048
Lev_Edu_Mother	9.682	0.377
Mathematics Result at G.C.E (O/L)	33.05	0.000
Science Result at G.C.E (O/L)	26.867	0.000
Sinhala Result	23.879	0.001
ICT	1.750	0.626
Sport	1.503	0.682
Future Ambition	49.053	0.000

The students' subject selection has been not in a particular order. Since the dependent variable of this study is the student's subject selection for their G. C. E. (A/L) examination which contains unordered categories which fit

with the multinomial scale data. Multinomial logistic regression was utilized to achieve the objective of the study. The following tables indicated that the result of the multinomial logistic regression analysis.

Table 2: Model Fitting Information

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	919.859	931.599	913.859			
Final	915.294	1197.066	771.294	142.565	69	.000

The model fitting information table indicates that the full model represents a significant improvement in fit over the null model since χ^2 value = 142.565 and the P-value = 0.00, which is less than the 0.05 level of significant.

does indicate good fit since the both P values are greater than 0.05 means the there is no evidence to reject the null hypothesis which is models does indicate the good fit.

Table 3: Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	800.785	834	.790
Deviance	665.393	834	1.000

According to the goodness of fit table both the Pearson Chi-Square test and the Deviance Chi-Square test, the model

Table 4: Pseudo R-Square

Cox and Snell	.346
Niekerk	.371
McFadden	.158

However, based on the statistics indicated that the Table 4, 37.1% of the total variation of the dependent variable only explained by the predictor variables.

Table 5. Likelihood Ratio Tests

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	877.004	1123.554	751.004 ^a	.000	0	.
Gender	880.547	1115.357	760.547	9.543	3	.023
Ext_Cu_Ac	881.013	1115.824	761.013	10.010	3	.018
Fut_High	872.639	1107.449	752.639	1.635	3	.651
Avb_Job	877.356	1112.166	757.356	6.352	3	.096
Sports	871.708	1106.518	751.708	.704	3	.872
Edu_Fth	881.687	1093.017	773.687	22.684	9	.007
Edu_Mtr	877.383	1088.712	769.383	18.379	9	.031
Math_Res	879.208	1102.278	765.208	14.204	6	.027
Res_Sinh	878.710	1101.779	764.710	13.706	6	.033
Fut_Amb	903.648	1091.496	807.648	56.644	15	.000

Likelihood Ration Test result indicates the overall contribution of each independent variable to the model. Based on the statistics above illustrated, al the considered above variable combinations are significantly contributed to the model at 0.05 level of significant except variables; whether the student engaged in Sports activities, considering the job availability and the field of future highs studies.

Table 6: Parameter Estimation

Sub_Stream ^a	B	Std. Error	Wald	df	Sig.	Exp(B)
Gender	-.872	.376	5.371	1	.020	.418
Ext_Cu_Ac	-.242	.117	4.226	1	.040	.785
Fut_High	-.005	.183	.001	1	.978	.995
Avb_Job	.258	.500	.267	1	.606	1.294
Sports	-.124	.341	.133	1	.716	.883
[Edu_Fth=1.00]	1.263	.891	2.008	1	.157	3.535
[Edu_Fth=2.00]	.699	.590	1.406	1	.236	2.013
[Edu_Fth=3.00]	-.295	.460	.411	1	.521	.744
[Edu_Mtr=1.00]	.631	.973	.420	1	.517	1.879
[Edu_Mtr=2.00]	-.818	.567	2.082	1	.149	.441
[Edu_Mtr=3.00]	.183	.529	.119	1	.730	1.200
[Math_Res=.00]	-.537	.425	1.595	1	.207	.585
[Math_Res=1.00]	.577	.525	1.205	1	.272	1.780
[Res_Sinh=.00]	-1.342	.488	7.556	1	.006	.261
[Res_Sinh=1.00]	-.062	.454	.018	1	.892	.940
[Fut_Amb=1.00]	-1.700	.670	6.438	1	.011	.183
[Fut_Amb=2.00]	-.118	.715	.027	1	.868	.888

	[Fut_Amb=3.00]	-.481	.642	.561	1	.454	.618
	[Fut_Amb=4.00]	-.194	.611	.100	1	.751	.824
	[Fut_Amb=5.00]	.384	.774	.246	1	.620	1.468
Mathematics & Science	Intercept	3.467	1.183	8.593	1	.003	
	Gender	-.589	.443	1.770	1	.183	.555
	Ext_Cu_Ac	.080	.141	.320	1	.572	1.083
	Fut_High	-.103	.200	.266	1	.606	.902
	Avb_Job	-.963	.556	2.996	1	.083	.382
	Sports	-.337	.406	.688	1	.407	.714
	[Edu_Fth=1.00]	-20.230	.000	.	1	.	1.638E-9
	[Edu_Fth=2.00]	-.646	.713	.819	1	.365	.524
	[Edu_Fth=3.00]	-.694	.498	1.945	1	.163	.500
	[Edu_Mtr=1.00]	2.838	1.185	15.732	1	.517	1.084
	[Edu_Mtr=2.00]	.302	.693	.191	1	.662	1.353
	[Edu_Mtr=3.00]	.407	.632	.415	1	.520	1.502
	[Math_Res=.00]	-1.485	.530	7.842	1	.005	.227
	[Math_Res=1.00]	.256	.603	.180	1	.671	1.292
	[Res_Sinh=.00]	-1.763	.609	8.367	1	.004	.172
	[Res_Sinh=1.00]	-.210	.538	.153	1	.696	.810
	[Fut_Amb=1.00]	-1.036	.721	2.066	1	.151	.355
	[Fut_Amb=2.00]	-.533	.789	.456	1	.500	.587
	[Fut_Amb=3.00]	-1.111	.746	2.215	1	.137	.329
	[Fut_Amb=4.00]	-1.931	.758	6.484	1	.011	.145
[Fut_Amb=5.00]	-2.302	1.089	4.467	1	.035	.100	
ICT	Intercept	-.140	1.172	.014	1	.905	
	Gender	-1.109	.381	8.476	1	.004	.330
	Ext_Cu_Ac	.018	.119	.023	1	.879	1.018
	Fut_High	.139	.185	.566	1	.452	1.149
	Avb_Job	-.514	.480	1.144	1	.285	.598
	Sports	-.154	.343	.203	1	.653	.857
	[Edu_Fth=1.00]	1.474	.931	2.508	1	.113	4.369
	[Edu_Fth=2.00]	1.349	.613	4.843	1	.028	3.855
	[Edu_Fth=3.00]	.289	.485	.356	1	.551	1.335
	[Edu_Mtr=1.00]	.871	1.051	.687	1	.407	2.389
	[Edu_Mtr=2.00]	.109	.613	.032	1	.858	1.116
	[Edu_Mtr=3.00]	.915	.576	2.525	1	.112	2.497
	[Math_Res=.00]	-.438	.438	1.002	1	.317	.645
	[Math_Res=1.00]	.463	.544	.726	1	.394	1.589
	[Res_Sinh=.00]	-.802	.482	2.776	1	.096	.448
	[Res_Sinh=1.00]	.196	.462	.180	1	.671	1.217
	[Fut_Amb=1.00]	-.936	.652	2.065	1	.151	.392
	[Fut_Amb=2.00]	1.350	.717	3.540	1	.060	3.856
	[Fut_Amb=3.00]	-.221	.667	.110	1	.740	.801
	[Fut_Amb=4.00]	-.130	.643	.041	1	.840	.878
[Fut_Amb=5.00]	1.631	.794	4.216	1	.040	5.109	

According to the information listed in the parameter's estimation table, when compare with the students who are doing arts stream and the commerce stream subject, it is clear that the gender of the student significantly affects their selection, moreover, the female students more like to selects arts stream subject than the male students. More male students are like to do commerce stream subjects. There is a significantly difference between the students who doing extra curriculum activities. The students who selected arts stream are doing extra curriculum activities than the students who are studying commerce stream. It is noted that the education level of Father or Mother do not significantly affect stream selection either Arts stream or the Commerce Stream. Based on the above statistics, students who selected Arts stream for their G. C. E (A/L) are not significantly different with the students who selected Commerce stream with respect to the doing sports activities, field of future high studies as well as the future job availability, their mathematics result. However, the students who have low results for the subject "Sinhala" being more likely to select

Commerce stream than the Arts stream. The students who want to be a Lawyer as their future job carrier selected Art stream than Commerce stream.

The students who got "C" pass or below for the subject mathematics as well as for the subject "Sinhala" indicate significant differences when making their selections. The students who got low result for the mathematics and Sinhala more likely to select Art streams than students who selected mathematics and science streams. The students who are following arts streams and like to do the different types of jobs at their near future would like to working as a manger or move to the business field or a IT related works than the students who are doing mathematics or the sciences for their G.C.E.(A/L). The gender of the student significantly affects their selection, moreover, the male students more like to selects ICT stream than the Art stream. The female students are less like to select ICT stream subjects than the Art stream subjects. The students whose fathers studied up to G.C.E. (O/L) more tend to do ICT subject than the Art

stream. It is obvious the students who are following ICT are more like to be a Software engineer or IT related job than the students who are perusing art stream subjects.

Conclusion and Discussion

Male students more likely to select commerce stream than the art stream. The students who are preferring to do the extra curriculum activities are more likely to select art stream than the commerce stream. The education level of parents does not significantly affect stream selection of arts stream or the commerce stream. The stream selection either "arts" or "commerce" is not changed based on the student sports engagement. There is no significant difference between the students of art stream and commerce stream who made their selection based on the future high studies field and future job availability from the selected field. The students who have low result for the subject "Sinhala" being more likely to select commerce stream than the art stream. Most of the students who selected the art stream would like to be a lawyer. The student who has low result for the mathematics as well as Sinhala are more likely to select art stream than the mathematics and science. The students who selected art stream and willing to do different jobs would like to do the managerial position, run a business or to do IT related job rather than the students who selected mathematics or science stream. Based on the significant result, male students more likely to do the ICT than the art stream while female students more likely to do the art stream than ICT for their G.C.E. (A/L). Most of the students do not have a much good awareness of job opportunity of selected field. Also, they do not consider the job availability of the selected field once they could not achieve their future ambition.

Reference

1. Statistical Branch of Ministry of Education of Sri Lanka. Annual School Census of Sri Lanka Final Report, 2020. Department of Education. Available from: <https://moe.gov.lk/wp-content/uploads/2020/08/cenreport.pdf>.
2. Javed M. Investigating factors affecting students' subject selection at secondary school level. *Int J Inf Educ Technol*,2018;8(11):815-820.
3. Mjege K. Students' perceptions of factors influencing choice of science streams in Tanzania secondary schools, 2013. Available from: <https://scholarworks.umass.edu/entities/publication/8de8c88e-5740-4a06-8e75-bd59b54a7b41>.
4. Rusika T. The factors influencing G.C.E. (A/L) stream selection: Socio-sociological research based on Mullaithivu district. 9th International Symposium 2019 on 27th - 28th November, 2019. South Eastern University of Sri Lanka, University Park, Oluvil, Sri Lanka.
5. Sivananthan P, Vijayaratnam AP, Jamil MIM. Factors influencing advanced level students' choice of technology stream. *Int J Res Innov Soc Sci*,2024;8:3810-38119.
6. Wijesingha AWKG, Ranasuriya LHDL. Study on the social factors influencing the selection of A/L stream in G.C.E. (A/L) Examination: An exploratory study. In: Proceedings of the SLIT International Conference on Advancement in Science and Humanities, 2021, 154-161.