Factors Influencing High School Students' Subject Choices in Relation to Class and Board of Study

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Abstract

The purpose of this research is to evaluate the factors affecting subject choices according to the class and the board of study based on 8 factors, i.e., educational aspirations, practical application, enjoyment of the subject, scoring, self-motivation, teachers, parents and friends. The research is centered on a sample of 250 Indian high school students from three boards: Central Board of Secondary Education, International General Certificate of Secondary Education and International Baccalaureate Diploma Programme. Data was collected through a questionnaire and the questions were constructed using a 5-point Likert Scale. The study concluded that 'English' is the most preferred subject. Simultaneously, as we escalate towards higher classes, science is comparatively less popular, while economics and business studies become more popular. It was further found that while opting subjects, 'educational aspiration' was the primary reason amongst 9 and 10 graders. Whereas, 'enjoyment' outranked other reasons amongst 11 and 12 graders. In addition to it, 'self-Motivation' has the greatest impact in the majority of situations for the same. However, the effect of teachers and friends is relatively less significant. Lastly, we conclude that by enhancing student's enjoyment, efficacy, grades and increasing subject's value may lead to better subject choices and a better career choice.

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Introduction

High school is a pre-eminent phase in the lives of students and parents. They are stressed about abundant things. Smith and Feldwisch (2006) found that amongst high school students, sports and academics are the two most popular things. Goldberg and Chandler (1992) found academics as slightly more predominant in the minds of students. In the present world, academics does not only constitute grades but it also consists of a vital decision; choosing the right subjects. However, it's often intricate and confusing because a range of external factors influence the students' subject choices. Some students tend to choose a particular subject because more efforts/resources are put in for these (Perryman, Ball, Maguire and Braun, 2011).

Till now, much research has been done to analyse the subject choices of high school students but all of them lack one key element— how the factors affecting the subject choices differ according to various variables. Nevertheless, the present research aims to fulfil this gap.

The paper evaluates the subject choices of high school students based on eight key factors, i.e., educational aspirations, practical application, enjoyment of the subject, scoring, self-motivation, teachers, parents and friends. The first four are intended to understand why a student prefers to study a specific subject and the latter four are intended to understand who influences a student's subject choices.

Hence, the research question is 'How do the factors affecting the subject choices differ according to the class and the board of study?'

Background Literature

One of the studies discussed about 'The Traditional Curriculum Hierarchy' (Bleazby, 2015) in high school. The study compared the ideology of the society towards different subjects and it discovered that Mathematics and Physics are more appreciated as compared to subjects associated with concrete experience, practicality and the body, such as physical education and vocational subjects.

Green, Martin and Marsh (2007) investigated the 'Motivation and Engagement in English, Mathematics and Science High School Subjects'. It evaluated the domain specificity of multidimensional motivation and engagement based on three key objectives: educational aspirations, class participation and enjoyment of subject.

Furthermore, another study was conducted to investigate that why many students are reluctant towards opting science in their final years of high school. To understand the problem, the present research explored the 'relative importance of the factors that students consider in choosing their subjects for their final years of school' (Palmer, Burke and Aubuss, 2017). Its findings were based upon 21 factors and the responses were analysed through the 'BWS' method.

Although many researches argue the influence of guidance counsellors on the subject choices of high school students. The present research didn't consider it as a factor because there are unequal opportunities for guidance and counselling. Many students are not able to afford counsellors. Thereby, the counsellor's ability to stimulate their students' choices depends on a student's financial status (Lee and Ekstrom, 1987). Hence, the data collected would have been biased towards wealthy students.

All these researches have helped the present research to identify the eight key factors which are broadly categorised as scholastic and influencers. It has also opened avenues towards the aspect of data collection and analysing the same.

Based on the review, the following conceptual framework has been used to derive meaningful insights for the research undertaken:

Need and Significance of the Study

Subject choices play a critical role in shaping the academic journey of students and also determines to an extent their future career path. Understanding these factors is essential for all the stakeholders who play a key role in influencing the future of students. The significance of this study lies in the exploration of eight factors affecting the subject choices. The inferences drawn from the research provides valuable information to educators, counsellors, policy makers and parents, so that they can help students take informed decisions regarding their academic and career choices.

Research Method

Students often study a variety of subjects in high school, some of which are compulsory too, and they can have a neutral attitude towards some subjects. Thus, to have more

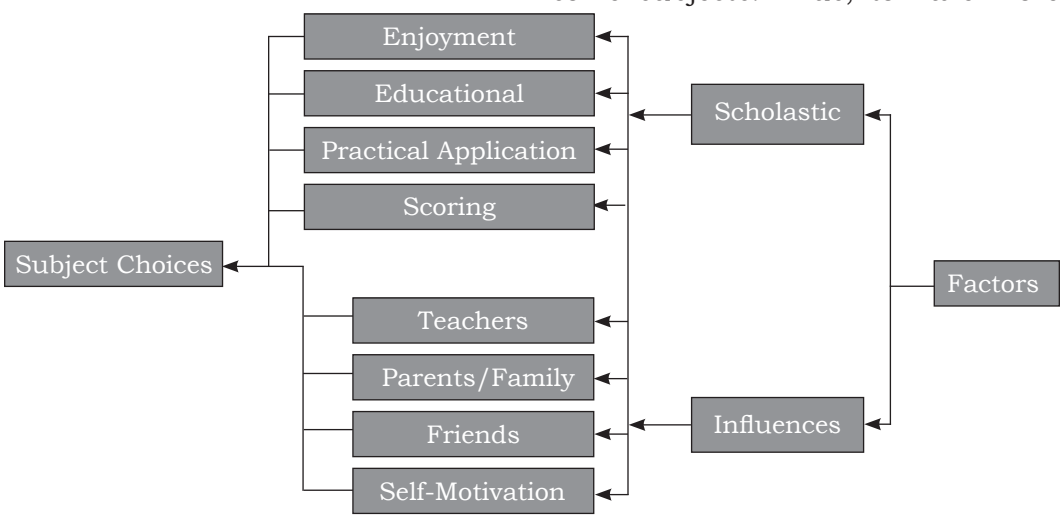


Figure 1: Factors influencing the subject choices of high school students

accurate results, the present research uses 5-point Likert Scale.

Many researchers have argued that the Best-Worst Scaling method is more reliable than the Likert Scale. However, researches show that the BWS approach helps to validate priorities from a customer perspective by achieving better discrimination among attributes, while the Likert Scale approach is useful for comparing group differences (Heo et al., 2022). Hence, as the present research intends to distinguish amongst different factors that affect the subject choices the Likert Scale has been used.

Universe

The universe of this research is those students studying in CBSE, IBDP and IGCSE. The sampling frame of the research is Indian high school students and the data was collected through a questionnaire. Out of these students, 76.8 per cent of them study in the Central Board of Secondary Education (CBSE), 12.8 per cent in the International General Certificate of Secondary Education (IGCSE), 8 per cent in the International Baccalaureate Diploma Programme (IBDP) and the rest 2.4 per cent of them in other boards.

Sample

The study employed a Snow Ball Sampling method, selecting a sample size of 250 high school students in India. Referral process was based on educational boards, including CBSE, IGCSE and IB. The coverage encompassed 9 to 12 graders, ensuring representation across diverse academic levels. The study excluded non-high school students and other educational levels, aiming for a focused analysis within the high school context.

Following table depicts the Chain Referral Process adopted for the purpose of data collection:

Stage	Number of Participants	Description
1.	5	Initially these many students were selected based on accessibility and relevance to the study.
2.	18	Gained cooperation from the initially selected students.
3.	22	Stage two students referred additional high school students who met the study criteria.
4.	62	Next wave of participants referred by the above set of participants.
5.	68	Subsequent waves of participants, expanding the sample size through referrals.
6.	75	Final sample size of 250 achieved due to insufficient resources for broader outreach.

Data Collection:

Data for the purpose of this research has been collected using a structured questionnaire. Before floating the questionnaire to respondents, it was subjected to the validation process comprising experts' review for clarity and relevance. The reliability was ensured through pilot testing with a small sample.

The questionnaire consisted of three questions:

(a) Which subjects do you prefer to study?

Candidates had to choose each subject and grade its preference on the scale of 1–5 where 1 being the most preferred and 5 being the least preferred.

(b) Why do you prefer to study those subjects?

Following 5 options were identified and given for each subject. Students were allowed to choose multiple options:

- Enjoyment
- Educational aspiration
- Practical application
- Scoring
- Not applicable (if the candidate hasn't opted that particular subject or doesn't prefer to study it).

(c) Who influences your decision in selecting subjects?

The present research selected the following four different variables (influencers or influences) and asked the respondents to grade these variables on a Likert Scale where 1 being the highest influencer or influence and 5 being the least influencer or influence:

- Teachers
- Parents or family
- Friends
- Self-motivation

The factors affecting the subject choices of high school students are classified as scholastic and influencers/influences as discussed below:

1. Scholastic

- Enjoyment: While opting subjects, enjoyment is one of the factors considered by students. It develops 'interest', which is both a psychological state of attention and effect toward a particular topic, and an enduring predisposition to reengage over time (Harackiewicz, Smith and Priniski, 2016). Thereby, it stimulates ones' subject choices and leads to better learning and better grades (Holmes, 2018).
- Educational aspiration: Students' career choices and the university courses which they intend to opt influence their subject choices.
- Practical application: This can be understood from 2 different perspectives—(i) The application or use of the subject in the daily life which helps us in day-to-day chore while enhancing our personality and capability of doing things. (ii) The use of the subject to understand a particular aspect, i.e., why and how of everything.

- Scoring: Students tend to opt some subjects because they are scoring. Subjects are scoring because of an external motivation (The Rewards and Pressure of Good Grades), which is one of the two most dominating motivations, (Garn and Jolly, 2014).

2. Influences or influencers

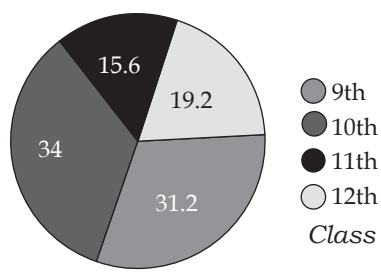
- Parents and family: The parents' education and occupation and the family's environment impacts a student's thinking, their subject choices as well as their career choices (Dryler, 1998).
- Teachers: Students spend 1/3 of their day at school; surrounded by teachers. Many times, the teaching style of their subject teachers influences a student's opinion towards a particular subject.
- Friends: Students may consider the advice of their friends and wish to opt similar subjects as them.
- Self-motivation: Self-motivation incorporates self-efficacy beliefs and self-set academic goals that influence their grades.

Findings and Analysis

The categories of ordinal variables cannot be measured in ratio or interval scale because the social distance cannot be measured quantitatively. In order to do a valid analysis, rank order analysis is used to measure ordinal variables. In the questionnaire, the participants had to provide their opinion on 5-point Likert Scale. Henceforth, the data has been coded as consecutive integer from 1 to 5 category in the excel sheet. Furthermore, the rank order analysis has been performed by multiplying the number of responses in each category by 5 to 1 consecutively. The category that has the highest weightage has been multiplied by 5, and as the weightage decreases the multiplying number decreases and the category with the lowest weightage is multiplied by 1.

1. Subject Preference Analysis on the basis of Grades

The present research uses Rank Order Analysis based on the class of the students to be accustomed with the subject preferences of respective grades and to base the analysis of criteria upon it. While exploring this criterion, we considered students of Grade IX and X as one cluster and students of Grade XI and XII as the second cluster.



250 responses

Figure 2: Pie-chart showing class-wise distribution of the primary data collected

We then grouped these grades because the subjects opted by the students and the level of these is similar. Furthermore, the analysis

was performed on the basis of these two clusters.

(a) Grade IX and X: The 163 students from the first cluster had to grade 13 subjects on the 5-point Likert Scale.

The data in Table 1 shows the frequency distribution of the students ranking each subject.[1]

Table 1

Subjects	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6
Mathematics	58	35	29	13	23	5
Physics	40	39	35	18	26	5
Chemistry	44	44	30	20	21	4
Biology	49	37	34	14	23	6
Geography	32	37	35	19	20	20
History	35	34	27	18	24	25
Civics	25	43	35	16	21	23
Economics	38	45	32	12	25	11
English	68	34	25	12	19	5
French/German/Spanish/ Hindi	38	34	29	19	21	22
Information Communication and Technology/Computer Science	38	32	27	14	20	32
Art and Design	41	29	21	8	8	56
Business Studies	30	23	15	8	10	77

Table 2

Subjects	Total	Rank
English	594	1
Mathematics	566	2
Chemistry	547	3
Biology	546	4
Physics	523	5
Economics	515	6
French/German/Spanish/Hindi	472	7
Geography	471	8
Civics	455	9
History	452	10

[1]Rank 6 indicates students who have not opted the subject.

Information Communication and Technology/ Computer Science	447	11
Art and Design	408	12
Business Studies	313	13

The results in Table 2 show the most preferred subjects in the first cluster. The total for each subject has been calculated: (Multiplying Rank 1 Frequency by 5) + (Multiplying Rank 2 Frequency by 4) + (Multiplying Rank 3 Frequency by 3) + (Multiplying Rank 4 Frequency by 2) + (Multiplying Rank 5 Frequency by 1)[2].

(b) Grade XI and XII: The 87 students from the second graded 17 subjects on the 5-point Likert Scale.

The data in Table 3 shows the frequency distribution of the students ranking each subject.

Table 3

Subjects	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6
Physics	13	7	8	8	6	45
Chemistry	5	13	15	5	4	45
Biology	13	9	3	3	2	57
Mathematics	18	16	17	5	7	24
Economics	20	6	9	14	8	30
Business Management/ Business Studies	13	11	6	10	3	44
Accountancy	11	3	11	7	3	52
Geography	7	4	2	2	2	70
History	13	7	5	2	1	59
Psychology	14	7	5	6	3	52
English	32	20	13	9	10	3
Hindi/French/ German/ Spanish	9	7	6	7	5	53
Political Science	8	10	3	4	3	59
Sociology	8	2	4	3	1	69
Informatics Practices/ Computer Science	7	5	6	5	7	57
Home Science	7	2	3	3	2	70
Fine Arts	8	4	1	5	2	67

[2]*The frequency of each rank for each subject has been taken from Table 1.

Table 4

Subjects	Total	Rank
English	307	1
Mathematics	222	2
Economics	187	3
Business Management/Business Studies	150	4
Physics	139	5
Chemistry	136	6
Psychology	128	7
Biology	118	8
Accountancy	117	9
History	113	10
Hindi/French/German/Spanish	110	11
Political Science	100	12
Informatics Practices/Computer Science	90	13
Fine Arts	71	14
Sociology	67	15
Geography	63	16
Home Science	60	17

The results in Table 4 show the most preferred subject in the XI and the XII.[3]

2. Analysis of subject influencers/ influences on the basis of class grade:

This criterion was explored to rank the subject influencers or influences on the basis of the two clusters:

(a) Grades IX and X: From the sample surveyed, 163 students studying in Grades IX and X chose the most influential and the least influential influence or influencer.

The data in Table 5 shows the frequency distribution of the students grading each influencer on the 5-point Likert Scale.

Table 5

Rank Order Analysis for Influencers	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Teachers	40	40	31	31	21
Parents/Family	58	39	26	25	15
Friends	25	41	42	26	29
Self-motivation	96	14	13	12	28

[3]*The construction of Table 4 and the method through which the total and the rank have been calculated is the same as Table 2.

Table 6

Rank Order Analysis for Influencers	Total	Rank
Self-motivation	627	1
Parents/Family	589	2
Teachers	536	3
Friends	496	4

Table 6 shows the most influential influencer amongst Grades IX and X.

(b) Grades XI and XII: From the sample surveyed, 87 students studying in Grades XI and XII chose the most influential and the least influential influence/ influencer.

The data in Table 7 shows the frequency distribution of the students grading each influencer.

The results in Table 8 show the most influential person in Grade XI and XII.

Table 7

Rank Order Analysis for Influencers	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Teachers	7	16	35	15	14
Parents/Family	28	20	19	13	7
Friends	11	15	19	18	24
Self-motivation	55	8	7	6	11

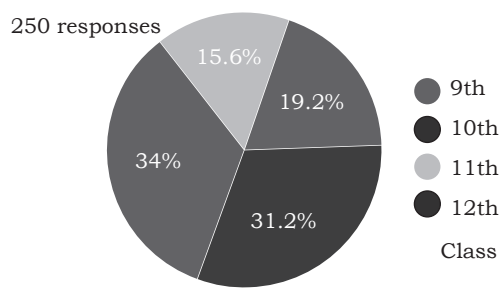
Table 8

Rank Order Analysis for Influencers	Total	Rank
Self-motivation	351	1
Parents/Family	310	2
Teachers	248	3
Friends	232	4

3. Analysis of subject influencers on the basis of the Board of study

The following analysis was carried out to rank the influences/influencers in each board of study.

- The Central Board of Secondary Education (CBSE)



From the sample surveyed, 192 students studying in 'The Central Board of Secondary Education' graded all influences or influencers.

The data in Table 9 shows the frequency distribution of the students grading each influencer.

The results in Table 10 shows the most influential factor for students studying the CBSE.

The data in Table 11 shows the frequency distribution of the students grading each influencer on the 5-point Likert Scale.

Table 9

Rank Order Analysis for Influencers	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Teachers	34	45	42	39	32
Parents/Family	74	46	26	28	18
Friends	24	49	43	34	42
Self-Motivation	121	17	16	8	30

Table 10

Rank Order Analysis for Influencers	Total	Rank
Self-Motivation	767	1
Parents/Family	706	2
Teachers	586	3
Friends	555	4

(c) The International General Certificate of Secondary Education (IGCSE)

From the sample surveyed, 32 students studying in 'The International General Certificate of Secondary Education' had to grade all the influences or influencers. It showed the most influential and the least influential influence or influencer.

Table 11

Rank Order Analysis for Influencers	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Teachers	9	7	10	3	3
Parents/Family	7	7	10	7	1
Friends	6	3	10	6	7
Self-Motivation	17	4	2	6	3

Table 12

Rank Order Analysis for Influencers	Total	Rank
Self-Motivation	122	1
Teachers	112	2
Parents/Family	108	3
Friends	91	4

The results in Table 12 shows the most influential factor in the IGCSE.

(d) The International Baccalaureate Diploma Programme

From the sample surveyed, 20 students studying in 'The International Baccalaureate Diploma Programme' had to grade all the influences or influencers. It showed the most influential and the least influential influence or influencer.

The data above shows the frequency distribution of the students grading each influence or influencer on the 5-point Likert Scale.

The results in Table 14 show the most influential factor or person for students studying in the IBDP.

Table 13

Rank Order Analysis for Influencers	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Teachers	1	3	12	4	0
Parents/Family	3	4	9	2	2
Friends	4	4	9	2	2
Self-Motivation	10	1	1	3	5

Table 14

Rank Order Analysis for Influencers	Total	Rank
Friends	69	1
Self-Motivation	68	2
Parents/Family	64	3
Teachers	61	4

4. Reasons influencing a particular subject on the basis of class:

This dimension enabled us to incorporate and rank the importance of the reasons for a particular subject. The data was segregated into two clusters (as mentioned above). Furthermore, the analysis was executed to understand the 'scholastic factors' that affect a student's interest in a given subject.

- Grade XI and X: In this question, the students of Grade XI and X had to choose 'scholastic factors' and they were allowed to select multiple reasons.

The data in Table 15 shows the frequency distribution of the students choosing multiple reasons.

Table 15

What reasons influence the most for a particular subject	Enjoyment	Educational Aspiration	Practical Application	Scoring	Not Applicable
Mathematics	24	32	19	20	19
Physics	20	38	29	16	19
Chemistry	17	52	30	14	15
Biology	28	36	15	25	23
Geography	23	37	13	27	35
History	30	41	3	20	40
Civics	23	45	12	22	36
Economics	24	43	23	19	17
English	42	43	10	21	7
French/ German/ Spanish/Hindi	34	33	13	27	30
Information Communication and Technology/ Computer Science	27	24	20	17	38

Art and Design	55	14	8	7	63
Business Studies	12	26	8	6	87

Table 16

Reasons influencing the most for a particular subject	Enjoyment	Educational Aspiration	Practical Application	Scoring
Mathematics	2	1	4	3
Physics	3	1	2	4
Chemistry	3	1	2	4
Biology	2	1	4	3
Geography	3	1	4	2
History	2	1	4	3
Civics	2	1	4	3
Economics	2	1	3	4
English	2	1	4	3
French/German/ Spanish/Hindi	1	2	4	3
Information Communication and Technology/Computer Science	1	2	3	4
Art and Design	1	2	3	4
Business Studies	2	1	3	4

The results in Table 16 show the ranks of each 'Scholastic Factor' for a particular subject influencing the student's subject choices.

- Grade XI and XII: In this part of he questionnaire, the students of Grade XI and XII had to choose 'scholastic factors' and they were also allowed to select multiple reasons.

The data in Table 17 shows the frequency distribution of the students choosing reasons.

Table 17

What reasons influence the most for a particular subject	Enjoyment	Educational Aspiration	Practical Application	Scoring	Not Applicable
Physics	5	12	10	3	49
Chemistry	5	17	2	8	49
Biology	11	6	4	2	58
Mathematics	5	21	5	6	28
Economics	9	13	11	13	32
Business Management/ Business Studies	10	9	4	9	49
Accounts	7	6	10	3	54
Geography	2	3	2	1	77
History	6	5	3	4	64
Psychology	12	4	8	1	56
English	21	14	6	18	3
French/ German/ Spanish/Hindi	10	8	5	1	57
Political Science	7	7	2	2	66
Sociology	6	3	0	1	76
Informatics Practices/ Computer Science	10	5	1	5	63
Home Science	6	3	1	1	74
Fine Arts	6	4	3	1	70

*In Table 17, the construction and the method through which the frequency of these reasons have been derived is same as Table 15.

Table 18

Reasons influencing the most for a particular subject	Enjoyment	Educational Aspiration	Practical Application	Scoring
Physics	3	1	2	4
Chemistry	3	1	4	2
Biology	1	2	3	4
Mathematics	3	1	3	2
Economics	4	1	3	1
Business Management/ Business Studies	1	2	4	2
Accounts	2	3	1	4
Geography	2	1	2	4
History	1	2	4	3
Psychology	1	3	2	4
English	1	3	4	2
French/ German/Spanish/Hindi	1	2	3	4
Political Science	1	1	3	3
Sociology	1	2	4	3
Informatics Practices/Computer Science	1	2	4	2
Home Science	1	2	3	3
Fine Arts	1	2	3	4

*In Table 18, the construction and the method through which the reasons have been ranked is same as Table 16.

Interpretations

The present research is going to provide a multi-dimensional view due to the variety of responses.

The analysis has revealed that in both the clusters (9th, 10th and 11th, 12th), the most preferred subject is English followed by Mathematics. Additionally, the ranking of all the sciences and foreign languages have decreased in Grades XI and XII. But physics has been an exception, its ranking hasn't changed, whereas the ranking of economics and business studies has significantly improved. Hence, the student's attitude towards a particular subject changes from time to time.

Consequently, the analysis unveiled that amongst the first cluster 'educational aspiration' is the most dominant 'Scholastic Factor', followed by 'enjoyment'. On the other hand, in the second cluster, 'enjoyment'

surpassed 'educational aspiration'. Though the reasons of both the clusters are different; the influences or influencers are the same; the most influential is self-motivation, followed by Parents or Family, teachers and tailed by friends.

In addition to it, the present research also ranked each influencer, according to the board of study. It found that in 'The Central Board of Secondary Education', the most influential influence is self-motivation, followed by parents and family, teachers and lastly by Friends. Furthermore, the results of the IGCSE are slightly different. Though self-motivation and friends still hold the first and last position, respectively; teachers, and parents and family switched places. However, the results of IGCSE are like chalk and cheese. The highest influencers in it are friends, followed by self-motivation, parents and family, and lastly by teachers.

Conclusion

The objective of this research is to evaluate the subject choices of high school students. It addresses the research question: 'How do the factors affecting the subject choices differ according to the class and the board of study?'

The present study asserts that before delving into the subsequent section, it is essential to comprehend that the eight factors encompass both individuals in a student's environment and the primary reasons influencing a student's preference for a particular subject.

Furthermore, the findings of the present research recognised the problem of the dwindling number of science students in the final years of school which has already been addressed in a research (Palmer, Burke and Aubusson, 2017).

On a whole, the findings indicate that while choosing subjects, 'enjoyment' is the most dominant reason amongst 11 and the 12 graders, whereas amongst 9 and 10 graders, it is 'educational aspiration'. In addition to it, the results suggest that in most scenarios Self-motivation has the most significant influence followed by parents and family towards the subject choices in high school, whereas teachers and friends are often the penultimate reasons. However, in the IGCSE, friends are the most dominating reason, tailed by self-motivation. Thereby, the results indicate some essential measures to foster better subject choices amongst students.

1. Awareness: A particular subject opens doors towards various fields and it is important for the students to be cognizant about those fields in the early years of high school, as it will lead to better and more sophisticated subject choices.
2. Pedagogy: Teachers should use interesting and enjoyable pedagogy in the class for the students because enjoyment leads to higher grades (Holmes, 2018)

and creates the option to take that subject in higher classes. Although the present research has shown that teachers are not a main influence in opting subjects, according to a research (Frenzel et al., 2009), the teacher's and the student's enjoyment have a positive correlation.

3. Congenial environment: Students should be able to speak and think freely because while opting subjects, self-motivation is the key influence. It is also vital that there is an affable environment at a student's house because parents and family are the second most influential influence.

Limitations

Due to insufficient resources, the sample of the research didn't constitute the data of all the boards of study. It particularly didn't have the sample of any of the state boards, the Council for the Indian School Certificate Examinations (CISCE) and the National Institute of Open Schooling (NIOS). Thereby, it is vital a replication of the following study is conducted with state boards and other national boards.

Future Insights

If we wish to refine and make the subject choices of high school students more accurate, we should study the impact of teachers in greater depth. Some researches have already been conducted to examine it, but it dates back to the late 20th century and it examines this influence with respect to particular subjects. Thereby, further work is needed to explore the impact of teachers on the subject choices and the grades of high school students with respect to different classes and boards of study.

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