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Statistical Prediction of Attitude towards Science based on Life Skills and Academic Motivation of Higher Secondary School Students

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Abstract

In this paper, the role of life skills and academic motivation in attitude towards science of higher secondary school students are studied. Life skills, academic motivation and attitudes towards science are those attributes that enhance students' abilities to deal with future challenges, meet unique needs and influence their educational outcome and future aspirations. To investigate impact of life skills and academic motivation on attitude towards science, the present investigators administered three standardized scales to collect data these are - Life Skills Scale (LSS-KCTA) by Chandra Kumari and Ayushi Tripathi, Academic Motivation Inventory by Misra, K.S. and the Adolescents' Holistic Scientific Attitude Scale by Gaikwad and Sonawane. Data were collected from 100 higher secondary students studying in science stream in West Bengal, India. Mean, SD, Pearson's correlation and Regression analysis were conducted to analyze the data. Key finding of this study is that attitude towards science of higher secondary school students can be predicted based on life skills and academic motivation.

Keywords: *Attitude towards Science, Life Skills, Academic Motivation, Higher Secondary Students.*

1. INTRODUCTION

In modern times science and its application (technology) are important in the growth trajectory of a country. Science in all its manifestations has not been well received by ordinary people. The message of science still baffles them. It is in this context, attitude towards science held by the upcoming generation becomes pertinent. Their life skills and academic motivation are the likely partners in the story of attitude towards science held by them.

Attitudes towards science are the development of a curious mind, finding rational answers to statements, searching for information, establishing truth, and finding cause-and-effect relationships of a condition through the light of science. Science as a subject satisfies the usual needs in the curriculum by adding intellectual, moral, cultural, aesthetic and vocational values into it. Science learning helps to develop a scientific attitude in the mind of the learner **(Singh and Bai 2017)**. It is the cognitive, behavioral, and emotional response towards science. This concept is supported by some key theories; these are Constructivist Learning Theory **(Piaget, 1972; Vygotsky, 1978)**, the ABC (Attitudes-Behavior-Cognition) Model by **Krapp (2002)**, and TPB (Theory of Planned Behavior) by **Azen (1991)**.

World Health Organization (1997) has defined life skills as, the abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life. WHO has classified ten core life skills; these are decision-making, problem solving, creative thinking, critical thinking, coping with stress, managing emotions, empathy, self-awareness, interpersonal skills and effective communication. **Usher and Morris (2012)** referred academic motivation as the cause of behavior that leads to academic performance by achieving favorable outcomes in academia; it shows the dedication and endeavor of students in their learning process. It also refers to the consistency of students and their effective functioning to approach their educational venture successfully. **Ryan and Deci (2000)** defined academic motivation as the reason for students' involvement in education, influenced by intrinsic and extrinsic variables. The idea of academic motivation is rooted in Attribution Theory by **Weiner (1985)**, Social-Cognitive Theory by **Albert Bandura (1986)**, Self-Determination Theory by **Deci and Ryan (1985)**, and Expectancy-Value Theory by **Eccles and Wigfield (2002)**.

2. REVIEW OF LITERATURE

2.1 Role of Life Skills in Attitudes towards Science

Das (2021) conducted a study on the attitudes of secondary school students towards life skills. The researcher collected data from 100 students (girls-50 & boys-50). He found that secondary school students were found to have positive attitudes towards life skills. Attitudes of boys and girls towards life skills education differed significantly in this study. Attitudes of girls towards life skills were better than Attitudes of boys towards life skills. **Shyla (2015)** concluded that science learning can enrich and enhance the life skills of adolescents. Knowledge of science helps adolescents to promote positive attitude, motivate students to solve problems and assisting them to live a meaningful life. **Maranan (2017)** tried to investigate relationship of mastery in basic process skills and Attitudes toward science among students. Findings of this study partially confirmed null hypotheses. These were -1. Students' mastery of basic process skills and performance in science were not significant. 2. Students' attitudes and performance in science were not significantly related. According to **Binwal (2020)**, developing science-related attitudes in science education programs is crucial for students. Students were enlightened through science education programs, workshops, and awareness programs to motivate them to apply this scientific knowledge in their day-to-day lives. Results of this study disclosed that the attitudes towards science and academic achievement were positively correlated. This study uncovered a significant difference in the attitude towards science between urban and rural students indicating that urban students were found to have more favorable attitude towards science compared to rural fellows.

2.2 Role of Life Skills in Academic Motivation

Knowledge of soft skills among students was positively associated with students' achievement, motivation, emotion, self-independent learning, and satisfaction. Extra-curricular activities affect students enormously on their cognitive capabilities and soft skills **(Feraco et al. 2022)**. **Prajina and Premsingh (2015)** investigated the impact of life skills on the academic achievement motivation of tribal adolescents. From the result, they concluded that academic achievement motivation and life skills were positively correlated but tribal

adolescents had very little life skills and achievement motivation. Hence this study suggested taking necessary interventions to improve life skills of adolescents so that their achievement motivation could be increased.

Aghajari et al. (2015) investigated the effect of life skills training on learning motivation, achievement, and self-esteem among nursing students. Life skills training improve learning motivation, academic achievement, and self-esteem. **Misra (2021)** observed that creativity, an aspect of life skills **(WHO 1997)** and academic motivation were positively related. This study identified a significant gender difference between males and females. Females were more academically motivated than their male counterparts. Students having high creative skills are more academically motivated. In a research study, **Griffin et al. (2013)** found that intrinsic motivation positively influences academic performance and academic performance of students were significantly predicted by attitude of lifelong learning. The study emphasized on pedagogical implications to maximize their academic performance.

Life skills significantly affect the academic benefits of adolescents **(Sultan et al.2021)**. Integrating problem-based learning and simulation courses increased skills like problem solving, self-efficacy for learning, and self-directed learning **(Young Sook and Suk Kim, 2015)**.

2.3 Role of Academic Motivation in Attitudes towards Science

Guido (2013) investigated physics learning attitudes and motivation towards learning physics. There is no significant difference in the attitudes and motivation of students towards learning physics. He stated that correspondence between attitude and motivation is found to be a matter of chance. **Kisoglu (2018)** did a similar study on the role of academic motivation in learning biology and their attitudes toward biology lessons. There was a significant difference between gender and class level in the sub-dimensions of motivation and attitudes towards biology. **Chua and Karpudewan (2017)** observed that students' attitude towards learning science can be predicted by motivation level of students and their perception about science laboratory learning environment. **Mishra (2013)** explained that science attitudes and educational aspiration were positively correlated but by a narrow margin. Science Attitudes and educational aspirations about gender were not significantly different.

3. RESEARCH GAP

Previous studies did not shed light on interconnectedness among life skills, academic motivation and attitudes towards science in higher secondary science students. There was a gap in previous studies finding impact of life skills in science learning.

4. RESEARCH OBJECTIVES

Objectives of this study have been formulated following the research gap. These are:

- To examine the interrelationships among attitude towards science, life skills and academic motivation of higher secondary school students.
- To assess the impact of life skills and academic motivation on attitude towards science of higher secondary school students.

5. HYPOTHESES

Hypotheses of this study have been formulated following the proposed research objectives. We hypothesize that:

- H0(1): There is no correlation between attitude towards science and life skills of higher secondary school students.
- H0(2): There is no correlation between attitude towards science and academic motivation of higher secondary school students.
- H0(3): There is no correlation between academic motivation and life skills of higher secondary school students.
- H0(4): There is no impact of life skills on the attitude towards science of higher secondary students.
- H0(5): There is no impact of academic motivation on the attitude towards science of higher secondary students.

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6. RESEARCH METHODOLOGY

6.1 Sample

The present investigator collected data from higher secondary students from classesXI and XII who were studying in the science stream. Stratified random sampling method has been adopted to accumulate data from 4 senior secondary schools in Jhargram and Bankura districts of West Bengal. The size of the sample was 100, comprised of 59 males and 41 females. The schools are co-educational, English-medium (1), and Bengali-medium (3) schools. Bengali-medium schools are affiliated with the West Bengal Council of Higher Secondary Education (WBCHSE), while English-medium schools are affiliated with the Central Board of Secondary Education (CBSE).

6.2 Tools

The present investigator administered three psychometric tests on senior secondary science students to assess their scientific attitudes, life skills, and academic motivation. To collect comprehensive information about participants, a self-made questionnaire was also employed on them.

- Adolescents' Holistic Scientific Attitude Scale (AHSAS-GSSS) BY **S. P. Gaikwad and S. A. Sonawane (2021)**.
- Life Skills Scale (LSS-KCTA) by **Chandra Kumari and AyushiTripathi (2019)**.
- Academic Motivation Inventory (AMI-MKS) by **K. S. Misra (2020)**.
- Investigator-made questionnaire

6.3 Statistical technique

Following statistical techniques were used for data analysis: Mean, SD, Pearson's correlation and Regression analysis.

7. RESULT AND DISCUSSION

Table-1: Descriptive statistics

Attitude towards Science	Attitude towards Science	Life Skills	Life Skills	Academic Motivation	Academic Motivation
Mean	SD	Mean	SD	Mean	SD
246.7	21.86	164.6	21.9	176.34	17.66

By analyzing the descriptive statistics of higher secondary students studying science, we observed that mean attitude towards science score of higher secondary students was 246.7, that indicated an exceptionally high attitude towards science. Findings revealed that students had above average score (164.6) in life skills including high score (176.34) in academic motivation.

Table 2: Relationship between Attitude towards Science and Life Skills

Variables	Pearson Correlation	Sig
Attitude towards Science * Life Skills	0.227	0.023

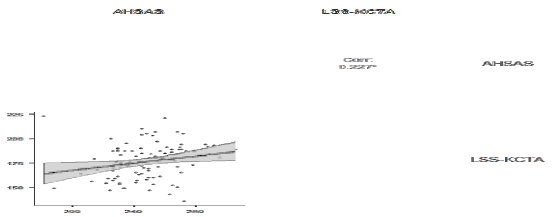

Fig-1: Relationship between Attitude towards Science and Life Skills

Table 2 shows a positive correlation between attitude towards science and life skills, where r = .227, p < .05 (.003), indicating that as life skills increase, attitude towards science tends to increase. Hence the null hypothesis H0(1) "There is no correlation between attitude towards science and life skills of higher secondary school students" was rejected. This result was supported by a previous study conducted by **Das (2021)**, who found that secondary school students had positive attitudes towards life skills.

Table-3: Relationships between Attitude towards Science and Academic Motivation

Variables	Pearson Correlation	Sig
Attitude towards Science * Academic Motivation	0.475	0

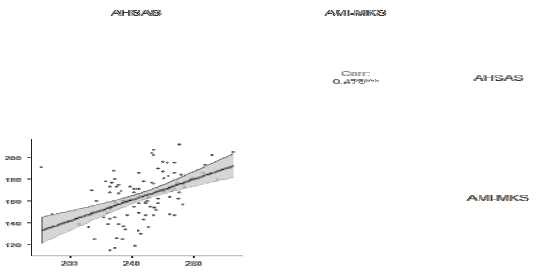

Fig-2: Relationship between Attitude towards science and Academic motivation

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Table 3 shows a positive correlation between attitude towards science and academic motivation, where r = .475, p < .05 (.000), indicating that as academic motivation increases, attitude towards science tends to increase. Therefore, the null hypothesis H0(2) "There is no correlation between attitude towards science and academic motivation of higher secondary school students" was rejected. **Glynn et al. (2009)** observed the impact of academic motivation on scientific attitudes, demonstrating a positive correlation between intrinsic motivation and attitudes towards science.

Table 4: Relationships between Academic Motivation and Life Skills

Variables	Pearson Correlation	Sig
Academic Motivation* Life Skills	0.36	0

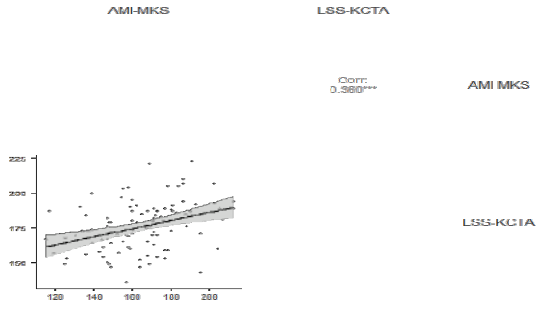

Fig-3: Relationship between Academic Motivation and Life Skills

Table 4 shows a positive correlation between academic motivation and life skills, where r = .360, p < .05 (.000), indicating that as academic motivation increases, life skills tend to increase. Hence it rejects the null hypothesis H0(3), which stated "There is no correlation between academic motivation and life skills of higher secondary school students". In a similar research, **Misra (2021)** observed that creativity, an aspect of life skills **(WHO 1997)**,and academic motivation were positively related.

Table-5: Results of Regression: Prediction of Attitude towards Science (DV) based on Life Skills (IV)

R	Constant	B	SE	Adjusted R^2	F	Sig
0.227	197.06	0.281	0.122	0.042	5.347	0.023

DV: Dependent Variable, **IV:** Independent Variable

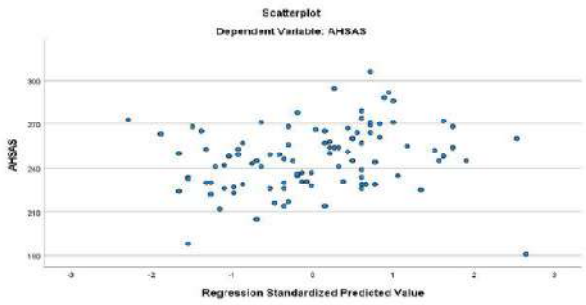

Fig-4: Prediction of Attitude towards Science (DV) based on Life Skills (IV)

In table 5, the coefficient of determination (R^2) is .042, indicating that 4.2% of the variance in attitude towards science can be explained on the basis of life skills of participants. The F value is 5.347 (sig .023), which indicates that the regression is significant. Hence, we reject the null hypothesis H0(4): "There is no impact of life skills on the attitude towards science of higher secondary students". We may therefore conclude that attitude towards science among higher secondary students can be predicted by life skills. This was supported by **Shyla (2015)**, WHO concluded that science learning can enrich and enhance the life skills of adolescents.

Table-6: Results of Regression: Prediction of Attitude towards Science (DV) based on Academic Motivation (IV)

R	Constant	B	SE	Adjusted R^2	F	Sig
0.475	168.7	0.474	0.089	0.218	28.52	0

DV: Dependent Variable, **IV:** Independent Variable

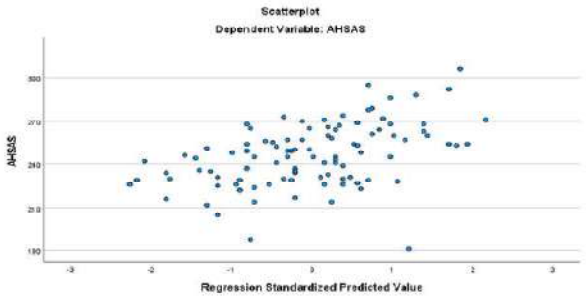

Fig-5: Prediction of Attitude towards science (DV) based on Academic motivation (IV)

In table 6, the coefficient of determination (R^2) is 0.218, indicating that 21.8% of the variance in attitude towards science can be explained on the basis of academic motivation of participants. The F value is 28.52 (sig .000), which indicates that the regression is significant. Hence, we reject the null hypothesisH0(5): "There is no impact of academic motivation on the attitude towards science of higher secondary students". We may therefore conclude that attitude towards science among higher secondary students can be predicted by academic motivation. **Glynn et.al (2009)** observed the impact of academic motivation on scientific attitudes, demonstrating a positive correlation between intrinsic motivation and attitude towards science.

8. CONCLUSION

In conclusion, findings of this study suggest that attitude towards science is correlated with life skills and academic motivation of higher secondary science students. Furthermore, it was observed that science students at the higher secondary level exhibited high attitude towards science along with high academic motivation and above-average life skills. Results of the regression analysis showed that the attitude towards science of science students studying at higher secondary level can be predicted by their life skills and academic motivation. The findings emphasize the need for life skills and academic motivation to foster scientific attitude among higher secondary students.

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