

## **FACTORS FORENHANCING ACHIEVEMENT IN BIOLOGY AT HIGHER SECONDARY LEVEL**

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### **ABSTRACT**

The purpose of this paper is to identify the factors for enhancing academic achievement in biology at higher secondary level. The population of the study is higher secondary level students studying 11<sup>th</sup> standard in Madurai District. The investigators selected the sample consists of 150 higher secondary students with the simple random technique. Achievement in Biology Tool for the Higher Secondary Students constructed and validated by Sabina Jose. S., A. Edward William Benjamin. (2020) adopted to collect the data. Interest Level, Motivation Level, Attitude Level, Study Habits, Future Career, School Environment, Study Skills, Classroom Environment and Teachers Efficiency was tested with the background variables like gender, locality of the school, locality of the students, type of management and medium of instruction. The findings of the study shows that there is no significant difference in the achievement in biology with respect to the background variables.

**KEYWORDS:** Factors for Enhancing, Achievement in Biology, Higher Secondary Level

### **INTRODUCTION**

Education is an essential instrument for the progress of any nation. School serves as a recognized channel of imparting knowledge with the network of students, teachers and parents. Teachers are the implementers of the educational programme in the school through the translation of educational theories into practice. Today, the student centred methods of learning plays a significant role in academic achievement. More than ever there is a dire need for studying life science –biology in the school due to growing requirements of biologist, doctors and scientist. Biology find answers to the concerns on the health, illness and severe situations like pandemic. Biology is a compulsory subject for any science oriented course. The scope of biology is diverse as it starts its specification from single cell organism to complex human being. The knowledge acquired in Biology subject is applied in many fields as Medicine, Biochemistry, Pharmacy, Microbiology, Agriculture etc. In spite of its importance, the performance of students needs lot of improvement among higher secondary level students. The influencing factors can enable the students to perform their optimum level in biology for the progress of self and of the nation.

### **REVIEW OF LITERATURE**

**Talton and Simpson (1985)** made a study on many factors that influence attitudes and achievement among adolescents. Some of the factors are associated with parental background and family environment. Other factors relate to individual characteristics such as self-concept, locus of control, and achievement motivation. Still other variables are associated with schools influences such as class climate, teachers, and administrative styles.

**Suman B. (2011)** conducted a research on influence of parents' education and parental occupation on academic achievement of students. He discovered that education and occupation of parents positively influence the academic achievement of children.

**Dinah (2013)** notes that availability of text books, laboratory apparatus and other learning resources contribute significantly to the performance of students in Biology examination.

**Auwalu et al (2014)** remarks that factors responsible for ineffective teaching and learning as well as poor enrolment of students in biology. The factors include lack of exposure to practical work, lack of qualified teachers, ineffective use of teaching methods and inadequacy of computers.

### **FACTORS FOR ENHANCING ACHIEVEMENT IN BIOLOGY**

**Interest level:** Biology courses train students for a wide variety of careers, from medical doctors to conservation biologists to academic or industry researchers etc. Students, when provided with student centered resources and teaching methodologies create interest in learning Biology.

**Motivational level:** Achieving high motivation in the classroom leads to higher levels of understanding, creativity, productivity and achievement. These positive outcomes make motivation as the most important elements of learning.

**Attitude level:** Biology is closely associated with a lot of disciplines and it serves humanity in the fields of agriculture, industry, medicine, and pharmacy along with many more. (Dilek Sultan, Hüseyin Abdurrahman, 2020). Achievement in biology takes place with appropriate scientific attitude that drives students to achieve their goal.

**Study habits:** The good study habits permits students to study independently at home and aspire for higher educational profession. The formation of good study habits in secondary school level further serves as the basis for students' performance in examinations and groom the future life.

**Future career :** Studying biology promises students an exciting and rich professional career with a wide array of opportunities to study what they love. Studying biology offers students flexibility in their career paths. Biology majors are able to learn about various aspects of biology like ecology, cells biology and marine life etc.

**School environment:** School Environment plays a foremost role in the life of every individual whether students, teachers, employer or employee. Poor lighting, noise, high levels of carbon dioxide in the classroom, and inconsistent temperature make teaching and learning difficult. The equipped lab facilities and practical sessions enhance biology learning in students.

**Study skills:** Study habits are at the core of a learner's academic success. It is an action like reading, taking notes, conducting study groups that students perform frequently, and regularly accomplishing the learning goals (Jhoselle Tus et al 2020). The study habit of the students are also based on budgeting time, physical condition, learning motivation, memory, taking examinations and health.

**Class room environment:** Classroom environment refers to all classroom facilitates and students' academic materials that can be used for the purpose of teaching and learning. Onwuakpa & Akpan (2000) classified classroom environment into three structures which are the physical, psychological and sociological environment.

**Teacher's efficiency:** Biology teacher uses a variety of methods to make the biology curriculum accessible to students of different cognitive levels and learning styles. Teachers should continually evaluate the effectiveness of their chosen methods by measuring student progress.

#### **NEED AND SIGNIFICANCE OF THE STUDY**

In order to improve the quality of education, certain innovative strategies are developed that will enhance the educational standards. In addition to that, from the students side there must have some important steps, which form the basis for their academic achievement. Here the investigator thought that students' achievements in biology depends on nine influencing factors.

Present study enhances the factors of the students in learning biology and helps them to achieve their educational goal. This study will definitely help to achieve better results in biology learning. This study may definitely be supportive to the parents and teachers in home as well as in schools while dealing with young minds incorporating the attitudes mentioned in the study.

#### **OBJECTIVE OF THE STUDY**

1. To find out whether there is any significant difference between Boys and Girls at higher secondary level in their Achievement in Biology and its Dimensions.
2. To find out whether there is any significant difference between Rural and Urban school at higher secondary level in their Achievement in Biology and its Dimensions.
3. To find out whether there is any significant difference between Rural and Urban students at higher secondary level in their Achievement in Biology and its Dimensions.
4. To find out whether there is any significant difference among Government, Govt. Aided and Private Students at higher secondary level in their Achievement in Biology and its Dimensions.
5. To find out whether there is any significant difference between Tamil medium and English medium students at higher secondary level in their Achievement in Biology and its Dimensions.

#### **HYPOTHESES OF THE STUDY**

1. There is no significant difference between Boys and Girls at higher secondary level in their Achievement in Biology and its Dimensions.
2. There is no significant difference between Rural and Urban school at higher secondary level in their Achievement in Biology and its Dimensions.
3. There is no significant difference between Rural and Urban students at higher secondary level in their Achievement in Biology and its Dimensions.
4. There is no significant difference among Government, Govt. Aided and Private Students at higher secondary level in their Achievement in Biology and its Dimensions.
5. There is no significant difference between Tamil medium and English medium students at higher secondary level in their Achievement in Biology and its Dimensions.

## METHODOLOGY

### TOOLS

Achievement in Biology Inventory for higher secondary level students by Sabina Jose. S., Edward William Benjamin. A. (2020) was used to collect the data. It consists of 43 items belonging to 9 dimensions of Achievement in Biology. The minimum score for the tool is 43 and maximum score of the tool is 215. The intrinsic validity of achievement in biology inventory is 0.809.

### SAMPLE

This present study conducted on a sample of 150 students of class 11<sup>th</sup> of Government, Government aided and Private schools of Madurai District. A simple random sampling technique was employed.

### TESTING OF HYPOTHESIS

#### Hypothesis: 1

There is nosignificant difference between Boys and Girls at higher secondary level in their Achievement in Biology and its Dimensions.

**Table– 1: Difference in the Achievement in Biology and its Dimensions of Students at Higher Secondary Level with Respect to Gender**

Gender		N	Mean	Std. Deviation	Std. Error Mean	t value	Sig. Level
Interest Level	Boys	75	22.84	1.534	.177	.475	NS
	Girls	75	22.65	1.656	.191		
Motivation Level	Boys	75	22.11	1.214	.140	.776	NS
	Girls	75	22.05	1.077	.124		
Attitude Level	Boys	75	17.95	1.173	.135	.630	NS
	Girls	75	17.85	1.193	.138		
Study Habits	Boys	75	23.20	1.405	.162	.317	NS
	Girls	75	22.96	1.520	.175		
Future Career	Boys	75	18.11	1.181	.136	.732	NS
	Girls	75	18.04	1.202	.139		
School Environment	Boys	75	22.01	1.615	.186	.915	NS
	Girls	75	22.04	1.447	.167		
Study Skills	Boys	75	22.45	1.154	.133	.292	NS
	Girls	75	22.24	1.314	.152		
Classroom Environment	Boys	75	23.29	1.206	.139	.148	NS
	Girls	75	22.99	1.370	.158		
Teachers Efficiency	Boys	75	22.61	1.432	.165	.713	NS
	Girls	75	22.69	1.219	.141		
Total	Boys	75	194.57	7.467	.862	.368	NS
	Girls	75	193.52	6.797	.785		

It is inferred from the above table that the overall mean score of boys students is 194.57 and girls students is 193.52. This shows that the boys' students have higher achievement in biology than girls' students. All the dimensions show that their 't' values are not significant. The calculated 't' value of achievement in biology is 0.368 which is greater than 0.05 levels of significance. This shows that there is no significant difference between boys and girls of higher secondary level in their achievement in biology. **Hence the hypothesis is accepted.**

#### Hypothesis: 2

There is no significant difference between Rural and Urban school at higher secondary level in their Achievement in Biology and its Dimensions.

**Table– 2: Difference in the Achievement in Biology and its Dimensions of Students at Higher Secondary Level with Respect to Locality of the School**

Locality of the School		N	Mean	Std. Deviation	Std. Error Mean	t value	Sig. Level
Interest Level	Rural	75	22.68	1.620	.187	.610	NS
	Urban	75	22.81	1.574	.182		
Motivation Level	Rural	75	22.15	1.111	.128	.477	NS
	Urban	75	22.01	1.180	.136		
Attitude Level	Rural	75	17.83	1.256	.145	.448	NS
	Urban	75	17.97	1.102	.127		
Study Habits	Rural	75	23.07	1.510	.174	.912	NS
	Urban	75	23.09	1.425	.165		
Future Career	Rural	75	17.99	1.268	.146	.373	NS
	Urban	75	18.16	1.103	.127		
School Environment	Rural	75	22.03	1.551	.179	1.000	NS
	Urban	75	22.03	1.515	.175		
Study Skills	Rural	75	22.32	1.286	.148	.793	NS
	Urban	75	22.37	1.194	.138		
Classroom Environment	Rural	75	23.24	1.261	.146	.346	NS
	Urban	75	23.04	1.330	.154		
Teachers Efficiency	Rural	75	22.60	1.385	.160	.624	NS
	Urban	75	22.71	1.271	.147		
Total	Rural	75	193.89	7.481	.864	.793	NS
	Urban	75	194.20	6.820	.788		

It is inferred from the above table that the overall mean score of rural schools are 193.89 and urban schools are 194.20. This shows that the urban schools have higher achievement in biology than rural schools. All the dimensions show that their 't' values are no significant. The calculated 't' value of achievement in biology is 0.793 which is greater than the significant at 0.05 level. This shows that there is no significant difference between urban schools and rural schools students at higher secondary level in their achievement in biology. **Hence the hypothesis is accepted.**

**Hypothesis: 3**

There is no significant difference between Rural and Urban students at higher secondary level in their Achievement in Biology and its Dimensions.

**Table– 3: Difference in the Achievement in Biology and its Dimensions of Students at Higher Secondary Level with Respect to Locality of the Students**

Locality of the Students		N	Mean	Std. Deviation	Std. Error Mean	t value	Sig. Level
Interest Level	Rural	70	22.73	1.512	.181	.896	NS
	Urban	80	22.76	1.671	.187		
Motivation Level	Rural	70	22.09	1.018	.122	.954	NS
	Urban	80	22.08	1.251	.140		
Attitude Level	Rural	70	17.81	1.107	.132	.404	NS
	Urban	80	17.98	1.242	.139		
Study Habits	Rural	70	23.09	1.370	.164	.964	NS
	Urban	80	23.08	1.549	.173		
Future Career	Rural	70	17.84	1.315	.157	.028	S
	Urban	80	18.28	1.031	.115		

School Environment	Rural	70	21.96	1.449	.173	.601	NS
	Urban	80	22.09	1.601	.179		
Study Skills	Rural	70	22.40	1.095	.131	.618	NS
	Urban	80	22.30	1.354	.151		
Classroom Environment	Rural	70	23.17	1.318	.158	.783	NS
	Urban	80	23.11	1.283	.143		
Teachers Efficiency	Rural	70	22.59	1.335	.160	.561	NS
	Urban	80	22.71	1.324	.148		
Total	Rural	70	193.67	6.374	.762	.543	NS
	Urban	80	194.38	7.766	.868		

It is inferred from the above table that the overall mean score of rural students are 193.67 and urban students are 194.38. This shows that the urban students have higher achievement in biology than rural students. From the above table the dimension such as future career shows that their significant value is significant. The other dimensions such as interest level, motivation level, Attitude level, study habits, school environment, study skills, classroom environment and teachers efficiency show that their significant values are not significant. The calculated significant value of achievement in biology is 0.543 which is greater than 0.05 levels of significance. This shows that there is no significant difference among locality of the students at higher secondary level in their achievement in biology. **Hence the hypothesis is accepted.**

**Hypothesis: 4**

There is no significant difference among Government, Govt. Aided and Private Students at higher secondary level in their Achievement in Biology and its Dimensions.

**Table – 4: Difference in the Achievement in Biology and its Dimensions of Students at Higher Secondary Level with Respect to Type of Management**

Type of Management		N	Mean	Std. Deviation	Std. Error
Interest Level	Govt	50	22.82	1.438	.203
	Govt. Aided	50	22.76	1.611	.228
	Private	50	22.66	1.745	.247
	Total	150	22.75	1.594	.130
Motivation Level	Govt	50	21.98	1.270	.180
	Govt. Aided	50	22.10	1.111	.157
	Private	50	22.16	1.057	.149
	Total	150	22.08	1.144	.093
Attitude Level	Govt	50	17.84	1.167	.165
	Govt. Aided	50	17.98	1.078	.153
	Private	50	17.88	1.304	.184
	Total	150	17.90	1.180	.096
Study Habits	Govt	50	23.04	1.484	.210
	Govt. Aided	50	23.04	1.484	.210
	Private	50	23.16	1.448	.205
	Total	150	23.08	1.463	.119
Future Career	Govt	50	18.02	1.220	.173
	Govt. Aided	50	18.10	1.182	.167
	Private	50	18.10	1.182	.167

	Total	150	18.07	1.188	.097
<b>School Environment</b>	Govt	50	21.98	1.732	.245
	Govt. Aided	50	22.06	1.202	.170
	Private	50	22.04	1.628	.230
	Total	150	22.03	1.528	.125
<b>Study Skills</b>	Govt	50	22.44	1.181	.167
	Govt. Aided	50	22.20	1.385	.196
	Private	50	22.40	1.143	.162
	Total	150	22.35	1.237	.101
<b>Classroom Environment</b>	Govt	50	23.14	1.370	.194
	Govt. Aided	50	23.16	1.299	.184
	Private	50	23.12	1.239	.175
	Total	150	23.14	1.295	.106
<b>Teachers Efficiency</b>	Govt	50	22.62	1.413	.200
	Govt. Aided	50	22.70	1.313	.186
	Private	50	22.64	1.274	.180
	Total	150	22.65	1.326	.108
<b>Total</b>	Govt	50	193.88	7.258	1.026
	Govt. Aided	50	194.10	7.203	1.019
	Private	50	194.16	7.087	1.002
	Total	150	194.05	7.136	.583

It is inferred from the above table that the overall mean score of Government students are 193.88, Govt. Aided students are 194.10 and Private students are 194.16. This shows that private students have highest level of achievement in biology and Govt. students have lowest level of achievement in biology.

#### 4 (A) ANOVA

Type of Management		Sum of Squares	df	Mean Square	F	Sig. Value	Sig. Level
<b>Interest Level</b>	Between Groups	.653	2	.327	.127	.881	NS
	Within Groups	377.720	147	2.570			
	Total	378.373	149				
<b>Motivation Level</b>	Between Groups	.840	2	.420	.318	.728	NS
	Within Groups	194.200	147	1.321			
	Total	195.040	149				
<b>Attitude Level</b>	Between Groups	.520	2	.260	.185	.832	NS
	Within Groups	206.980	147	1.408			
	Total	207.500	149				
<b>Study Habits</b>	Between Groups	.480	2	.240	.111	.895	NS
	Within Groups	318.560	147	2.167			

	Total	319.040	149				
<b>Future Career</b>	Between Groups	.213	2	.107	.075	.928	NS
	Within Groups	209.980	147	1.428			
	Total	210.193	149				
<b>School Environment</b>	Between Groups	.173	2	.087	.037	.964	NS
	Within Groups	347.720	147	2.365			
	Total	347.893	149				
<b>Study Skills</b>	Between Groups	1.653	2	.827	.537	.586	NS
	Within Groups	226.320	147	1.540			
	Total	227.973	149				
<b>Classroom Environment</b>	Between Groups	.040	2	.020	.012	.988	NS
	Within Groups	250.020	147	1.701			
	Total	250.060	149				
<b>Teachers Efficiency</b>	Between Groups	.173	2	.087	.049	.953	NS
	Within Groups	261.800	147	1.781			
	Total	261.973	149				
<b>Total</b>	Between Groups	2.173	2	1.087	.021	.979	NS
	Within Groups	7584.500	147	51.595			
	Total	7586.673	149				

From the above table all the dimensions show that their significant values are no significant. The calculated significant value of achievement in biology is 0.979 which is greater than 0.05 levels of significance. This shows that there is no significant difference among type of management students at higher secondary level in their achievement in biology. **Hence the hypothesis is accepted.**

**Hypothesis: 5**

There is no significant difference between Tamil medium and English medium students at higher secondary level in their Achievement in Biology and its Dimensions.

**Table- 5: Difference in the Achievement in Biology and its Dimensions of Students at Higher Secondary Level with Respect to Medium of Instruction**

Medium of Instruction		N	Mean	Std. Deviation	Std. Error Mean	t value	Sig. Level
<b>Interest Level</b>	Tamil	75	22.76	1.496	.173	.919	NS
	English	75	22.73	1.695	.196		
<b>Motivation Level</b>	Tamil	75	21.99	1.257	.145	.319	NS
	English	75	22.17	1.018	.118		
<b>Attitude Level</b>	Tamil	75	17.92	1.136	.131	.836	NS
	English	75	17.88	1.230	.142		
<b>Study Habits</b>	Tamil	75	23.07	1.446	.167	.912	NS
	English	75	23.09	1.490	.172		

<b>Future Career</b>	Tamil	75	18.08	1.183	.137	.945	NS
	English	75	18.07	1.201	.139		
<b>School Environment</b>	Tamil	75	21.99	1.598	.185	.750	NS
	English	75	22.07	1.464	.169		
<b>Study Skills</b>	Tamil	75	22.32	1.327	.153	.793	NS
	English	75	22.37	1.148	.133		
<b>Classroom Environment</b>	Tamil	75	23.19	1.302	.150	.661	NS
	English	75	23.09	1.296	.150		
<b>Teachers Efficiency</b>	Tamil	75	22.68	1.317	.152	.806	NS
	English	75	22.63	1.343	.155		
<b>Total</b>	Tamil	75	193.99	7.335	.847	.918	NS
	English	75	194.11	6.980	.806		

It is inferred from the above table that the overall mean score of Tamil medium students are 193.99 and English medium students are 194.11. This shows that the English medium students have higher achievement in biology than Tamil medium students. All the dimensions show that their 't' values are no significant. The calculated 't' value of achievement in biology is 0.918 which is greater than the significant at 0.05 level. This shows that there is no significant difference between Tamil and English medium students at higher secondary level in their achievement in biology. **Hence the hypothesis is accepted.**

#### FINDINGS

- There is no significant difference between boys and girls students of higher secondary level in their achievement in biology.
- There is no significant difference between urban schools and rural schools students at higher secondary level in their achievement in biology.
- There is no significant difference among locality of the students at higher secondary level in their achievement in biology.
- Private students have highest level of achievement in biology and govt students have lowest level of achievement in biology.
- There is no significant difference among type of management students at higher secondary level in their achievement in biology.
- There is no significant difference between Tamil and English medium students at higher secondary level in their achievement in biology.

#### RECOMMENDATIONS

1. Biology teachers should concentrate the factors needed for learning biology with the appropriate learning strategies in teaching biology can foster capacity of students at the secondary level.
2. Biology teachers should be trained on how to effectively use the lab, learning to enable the students to develop skills for academic achievement.
3. The government, management and stakeholders should provide an enriched learning environment in schools to facilitate the students to study biology for designing future career.

#### CONCLUSION

The effective usages of factors mentioned in this present study determines the achievement of biology students at secondary level. The reinforcement of certain factors in the low performing schools in biology can be done through remedial classes, effective use of teaching methods and technologies for better learning outcome.

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