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A Comparative Study on Reasons Behind Difficulties in Life Science Concept Learning on Gender Basis

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ABSTRACT

The purpose of the study was to compare the reasons behind difficulties on the dimension of difficulties in life science concepts i.e. Inability to understand concepts, Unawareness, Poor intensity of learning, Non adequate facilities at institutions, Irregular teaching learning process, Unfavourable home environment, Improper study habits, Peer group effects, Internet and Mobile phones, Low scientific aptitude for the concepts- Accessory digestive glands, Sphygmomanometer, Flow cytometer, Accessory reproductive organs, ECG, Homeostasis, Chloride shift, Dialysis, Hormonal regulation in gametogenesis, In vivo and In vitro fertilisation, Parthenogenesis, Embryonic stem cells, Cryopreservation, Haemocytometer, Electrophoresis, Tissue Culture, Gene cloning, Bacteria inoculation, In-situ and Ex-situ conservation, Autoclave between under graduate girls(100) and boys (62) of Atal Bihari Vajpayee university of Bilaspur (C.G) India. For the collection of data researcher has constructed “REASON BEHIND DIFFICULTIES INVENTORY(RBDI)” and implemented purposive sampling technique. In this present study only ten (20) life science concepts of B.Sc. 3rd year Zoology subject were taken. After collection of data through this tool researcher has analysed the quantitative data by using descriptive statistics, chi-square test was applied. On the basis of results and findings of the study insignificant difference was found in the reason-unawareness and significant differences were found in all remaining nine reasons- Inability to understand concepts, Intensity of learning, Non-adequate facilities at institutions, Teaching learning process, Home environment, Study habits, Peer group effects, Internet and Mobile phones, Scientific aptitude at 0.025 level of significance.

Keywords: Concept learning, Life Science concepts.

THRESHOLD

Education is regarded as the cornerstone for the development of human society, forming the backbone of progress and betterment. Science, in particular, holds a pivotal place in shaping our lives. Fitzpatrick (1960) defines science as "a cumulative and endless series of empirical observations which result in the formation of concepts and theories of knowledge and the process of acquiring it" (Bhatt, 1983). To address the challenges of daily life effectively, a robust understanding of life science concepts is essential.

Science is a human endeavour that seeks to solve problems and answer questions through experimentation. It is dynamic and continually expanding, covering a vast body of knowledge that spans the physical, chemical, and biological realms. Life-science, as a subdomain of science, focuses on the study of living organisms, exploring their structures, functions, and interactions within ecosystems. Through processes

like observation and hypothesis testing, life-science fosters critical thinking and the application of scientific principles to real-world scenarios.

For instance, a student studying a camel's adaptations to desert environments learns not only about the animal's physical features but also how these adaptations contribute to survival in harsh conditions. This understanding extends beyond theory, enabling the student to apply such knowledge to broader ecological and environmental contexts.

The **National Curriculum Framework (NCF, 2005)** emphasizes the transformative power of science in liberating society from poverty, ignorance, and superstition. In an era of rapid change, skills like flexibility, innovation, and creativity are crucial for survival. To prepare students for these challenges, life-science education must evolve to emphasize practical knowledge and real-world applications rather than rote memorization and theoretical examinations.

Unfortunately, in many educational institutions, life-science is often treated as a theoretical subject, with teachers focusing solely on completing syllabi and assessing students based on conceptual learning through exams. This approach undermines the essence of life-science education, which thrives on hands-on experiences and concept clarity derived from practical knowledge.

The difficulties in life-science concept learning can be attributed to several factors, including inadequate infrastructure for practical experiments, limited teacher training in experiential teaching methods, and a lack of emphasis on inquiry-based learning. Addressing these issues is imperative to ensure that life-science education fulfils its potential to shape students' understanding and equip them with skills to navigate and contribute meaningfully to a rapidly changing world.

By adopting a more practice-oriented and conceptually rich approach to teaching life-science, educators can bridge the gap between theoretical knowledge and practical applications, ultimately fostering a generation of learners capable of solving real-world problems with confidence and creativity.

OBJECTIVE:

To compare the reasons behind difficulties in the concept learning - *Accessory digestive glands, Sphygmomanometer, Flow cytometer, Accessory reproductive organs, ECG, Homeostasis, Chloride shift, Dialysis, Hormonal regulation in gametogenesis, In vivo and In vitro fertilisation, Parthenogenesis, Embryonic stem cells, Cryopreservation, Haemocytometer, Electrophoresis, Tissue Culture, Gene cloning, Bacteria inoculation, In situ and Ex situ conservation, , Autoclave*; on dimensions- *Inability to understand concepts, Unawareness, Poor intensity of learning, Non adequate facilities at institutions, Irregular teaching learning process, Unfavourable home environment, Improper study habits, Peer group effects, Internet and Mobile phones distraction, Low scientific aptitude* between undergraduate girls and boys of Atal Bihari Vajpayee university of Bilaspur (C.G).

HYPOTHESES:

1. If researcher will compare the reasons behind difficulties in life science concept learning between undergraduate girls and boys of Atal Bihari Vajpayee University of Bilaspur (C.G) then there will be no significant difference will be found.

METHODOLOGY:

Purposive sampling technique was adopted for the study.

POPULATION AND SAMPLE FOR THE STUDY:

The undergraduate Zoology students studying in B.Sc. 3rd year of Atal Bihari Vajpayee University Bilaspur (C.G) are considered as the population for the present study. Total 570 students were considered from Atal Bihari Vajpayee University Bilaspur (C.G).

A sample of undergraduate students from B.Sc. Zoology subject in which 100 girls and 62 boys (162) from Atal Bihari Vajpayee University in Bilaspur (C.G.) India.

TOOL USED FOR THE STUDY

For the present study, the investigator used the REASON BEHIND DIFFICULTY INVENTORY (RBDI).

ANALYSIS TECHNIQUE: REASONS AND APPROPRIATENESS

Before the analysis of null hypothesis researcher has decided the level of significance for the testing of hypothesis. The researcher found that the collected data were not normally distributed and to find out the significant differences among the selected groups the researcher has used Chi-square test as a statistical tool to analyse the data for the present study. The level of significance depends on the property and reliability of data. The data has received from reasons behind difficulty inventory (RBDI) where responses have two categories i.e. Yes /No. and quantify 1 for "Yes" and 0 for "No". Here the RBDI reliability was 0.75 which is in between 0.6 to 0.8 this is above to average and near to high but here RBDI is based on two response scale i.e., Yes or No and if we categorised it in two level -0.6-0.7,0.7-0.8 and reliability was 0.75 which is in between 0.7-0.8 which is in between .03 and .02. Hence, the researcher has selected the 0.025 level of significance for the present study. Validity is 0.90 so the level of confidence was high for analysis.

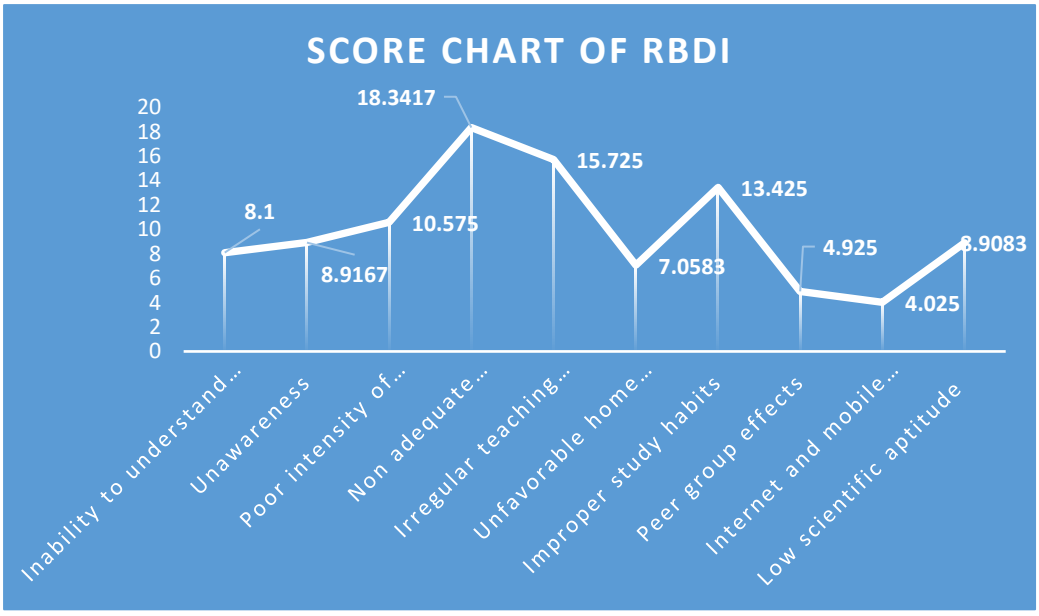

Figure.1- Score chart of RBDI

Analysis and Interpretation of the findings:

Table-1.1

Reason-1- Inability to Understand Concepts in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	541	380	161	25921	68.213		
AU BOYS	219	380	-161	25921	68.213	136.426*	5.024

Significance level at 0.025

Table-3.11 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Inability to Understand Concepts"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason Inability to Understand Concepts. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Inability to Understand Concepts.

Table-1.2

Reason-2- Unawareness in A.U. Girls &A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	448	428	20	400	0.934		
AU BOYS	408	428	-20	400	0.934	1.869	5.024

Significance level at 0.025

Table-3.12 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Unawareness"* is insignificant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps insignificant differences in the reason - Unawareness. So that research hypothesis is rejected and null hypothesis is not rejected in terms of reason i.e., Unawareness.

Table-1.3

Reason-3-Poor Intensity of Learning in A.U. Girls &A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	607	500.5	106.5	11342.25	22.661		
AU BOYS	394	500.5	-106.5	11342.25	22.661	45.323*	5.024

Significance level at 0.025

Table-3.13 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Poor Intensity of Learning"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Poor Intensity of Learning. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Poor Intensity of Learning.

Table-1.4

Reason- 4- Non-Adequate Facilities at Institutions in A.U. Girls &A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	1060	906.5	153.5	23562.25	25.992		
AU BOYS	753	906.5	153.5	23562.25	25.992	51.985*	5.024

Significance level at 0.025

Table-3.14 is showing that the Chi-Square (χ2) value for AU Girls and AU Boys in the reason *"Non-Adequate Facilities at Institutions"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Non-Adequate Facilities at Institutions. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Non-Adequate Facilities at Institutions.

Table-1.5

Reason-5-Irregular teaching learning process in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	χ2	χ2 Table value at 0.025
AU GIRLS	950	770.5	179.5	32220.25	41.817		
AU BOYS	591	770.5	-179.5	32220.25	41.817	83.634*	5.024

Significance level at 0.025

Table-3.15 is showing that the Chi-Square (χ2) value for AU Girls and AU Boys in the reason *"Irregular teaching learning process"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Irregular teaching learning process. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Irregular teaching learning process

Table-1.6

Reason-6-Unfavorable Home environment in A.U. Girls & A.U. Boys							
	fo	**fe**	**fo-fe**	**(fo-fe)^2**	**(fo-fe)^2/fe**	**χ2**	χ2 Table value at 0.025
AU GIRLS	516	350.5	165.5	27390.25	78.1462		
AU BOYS	185	350.5	-165.5	27390.25	78.1462	156.292*	5.024

Significance level at 0.025

Table-3.16 is showing that the Chi-Square (χ2) value for AU Girls and AU Boys in the reason *"Unfavorable Home environment"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Unfavorable Home environment. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Unfavorable Home environment.

Table-1.7

Reason-7- Improper Study Habits in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	χ2	χ2 Table value at 0.025
AU GIRLS	809	659.5	149.5	22350.25	33.889		
AU BOYS	510	659.5	-149.5	22350.25	33.889	67.779*	5.024

Significance level at 0.025

Table-3.17 is showing that the Chi-Square (χ2) value for AU Girls and AU Boys in the reason *"Improper Study Habits"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Improper Study Habits. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Improper Study Habits.

Table-1.8

Reason-8- Peer Group Effects in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	315	226	89	7921	35.048		
AU BOYS	137	226	-89	7921	35.048	70.097*	5.024

Significance level at 0.025

Table-3.18 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Peer Group Effects"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Peer Group Effects. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Peer Group Effects.

Table-1.9

Reason-9- Internet and Mobile Phones Distraction in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	226	187	39	1521	8.133		
AU BOYS	148	187	-39	1521	8.133	16.267*	5.024

Significance level at 0.025

Table-3.19 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Internet and Mobile Phones Distraction"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Internet and Mobile Phones Distraction. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Internet and Mobile Phones Distraction.

Table-2.0

Reason-10- Low Scientific Aptitude in A.U. Girls & A.U. Boys							
	fo	fe	fo-fe	(fo-fe)^2	(fo-fe)^2/fe	$\chi 2$	$\chi 2$ Table value at 0.025
AU GIRLS	528	451.5	76.5	5852.25	12.961	25.923*	
AU BOYS	375	451.5	-76.5	5852.25	12.961		5.024

Significance level at 0.025

Table-3.20 is showing that the Chi-Square ($\chi 2$) value for AU Girls and AU Boys in the reason *"Low Scientific Aptitude"* is significant at 0.025 level of significance. It means that the AU Girls and AU Boys keeps significant differences in the reason - Low Scientific Aptitude. So that research hypothesis is not rejected and null hypothesis is rejected in terms of reason i.e., Low Scientific Aptitude.

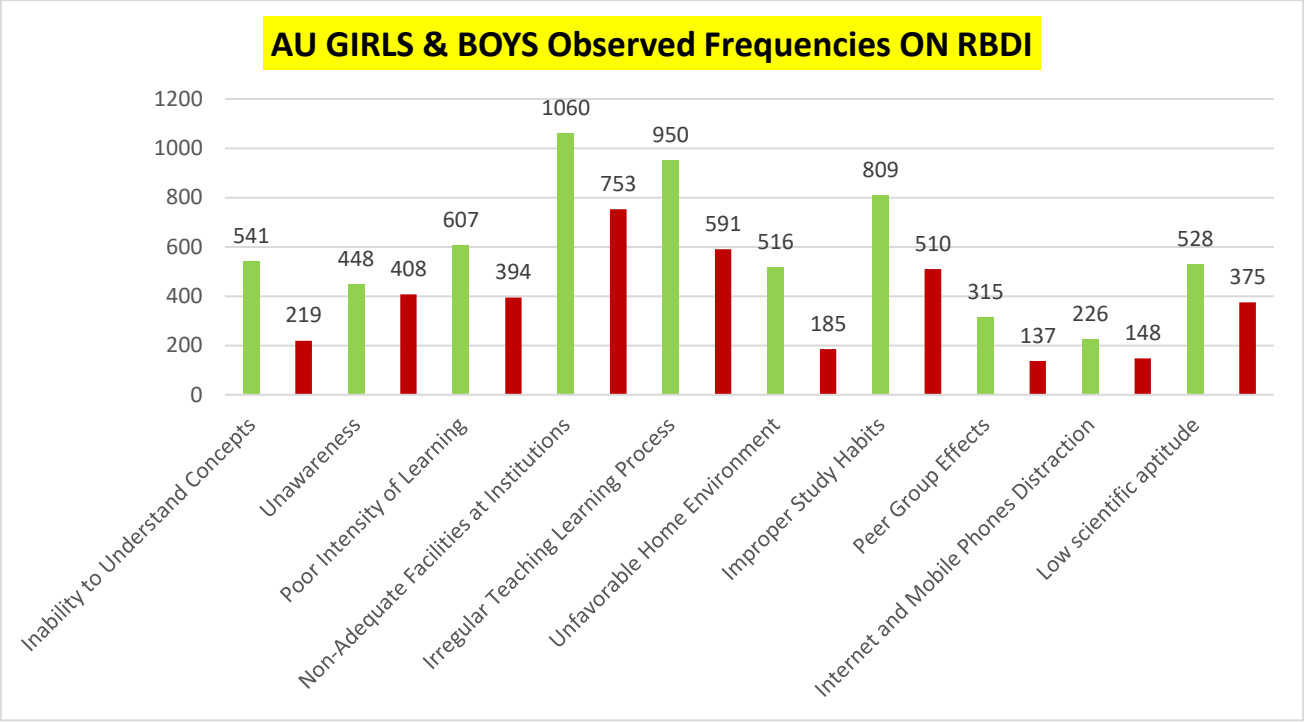

Figure-2- AU GIRLS & BOYS Observed Frequencies ON RBDI

CONCLUSION:

As mentioned in above figure -2, the researcher concluded that out of selected ten (10) reasons significant difference was found in reason i.e**., Inability to Understand Concepts, Poor Intensity of learning, Non adequate facilities at institutions, Irregular Teaching learning process, Unfavourable Home environment, Improper Study habits, Peer group effects, Internet and Mobile phones distraction, Low Scientific aptitude** and insignificant differences were found in **Unawareness** reason. So only one reason -Unawareness is not rejected and rest of all reasons are rejected on null hypothesis hence null hypothesis is partially not rejected.

Therefore, it can be concluded that there is difference in only one reason behind difficulties between Atal Bihari Vajpayee university (AU) Girls and Atal Bihari Vajpayee university (AU) Boys.

DISCUSSION:

From the analysis of data it is clear that girls and boys of Atal Bihari Vajpayee university (AU) is having different reasons behind difficulties in life science concept learning. As during research, it was found that there are many factors which are responsible for poor concept learning but overall few reasons are major factors and as every person come from different background in context of family environment, economical condition, social status and many more so every student is having multiple reasons for poor concept learning and if we do comparing between girls and boys similarly many factors are responsible for their poor concept learning for example if we talk about home environment ,in many families girls are not supposed to stay long at colleges so it will directly affect their lab work, field work and other academic activities etc. which is must in life science subject for good concept learning and likewise other reasons are there. In this study researcher worked on only 10 reasons and found significant differences in boys and girls.

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