ISSN No. 2583-357X
Vol.2. Issue 1. May 2023

ST. XAVIER'S INSTITUTE OF EDUCATION
Mumbai

XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE

A Peer Reviewed Interdisciplinary Journal

About the Institution

St. Xavier's Institute of Education (Autonomous), Mumbai is the oldest Government aided, Christian minority Teacher Education College for the course of B.Ed., affiliated to the University of Mumbai and recognized by the National Council for Teacher Education (N.C.T.E.). and is accredited by the National Accreditation Assessment Council (NAAC) with an 'A' grade. Besides, it has various courses and extension services for students, teachers and society. The Institute has completed 69 years as a Teacher Education College par excellence, with alumni ranging from Principals of various colleges, a Vice-Chancellor of Mumbai University and Heads of the Department of Education.

The two main programs of the Institute are the Ph.D. program and the present two-year CBCS B.Ed. Program. The B.Ed. Program is affiliated with the University of Mumbai and follows the syllabus and guidelines of the University. At the same time, the Institute has value-added programs like research enrichment programs, curriculum enrichment, community work enrichment programs. The Institute has a research cell that promotes research activities throughout the year. The library is equipped with research theses, journals and has a section for Ph.D. guidance and reference.

The Institute aims at imparting Quality Teacher Education and all round development. The College stands for academic excellence and the development of skills and strives after character formation based on the love of God and the service of man. The ethos of the institute reflects its theme of Building a *Hope-filled Future* which aims at preparing competent men and women of conscience, care and compassion. The Institute as it ascends into the new venture of developing its own e-journal ensures to integrate the essence of the Institute in promoting the current educational and research themes.

Vision

"Joyous, Creative Teacher Education"

Mission

" To Provide Quality Education For Empowerment and Enlightenment To create a just and Humane Society and Strive to build a World of Faith, Freedom and Fellowship For God's Greater Glory "

Our Core Values: MAGIS(Greater and More), Cura Personalis (Care of each person), Ad Majorem De Gloriam (For the Greater Glory of God), Forming Men and Women for others.

Title of the Journal : XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE - A Peer Reviewed Interdisciplinary Journal.
Frequency : Biannual
Subscription : Open Access e-journal
Publisher : St.Xavier's Institute of Education, (Autonomous), Mumbai
Place: 40 A , New Marine Lines, Opp.State Bank of India, Mumbai, Maharashtra, India 400 020
Editor in Chief : Dr.Sosamma Samuel
Copyright : Open Access CC BY 4.0
Starting year : 2022
First Published : March 2022
Subject : Education - Interdisciplinary
Medium of Language : English
Mode of publication : e-journal Biannual
Contact email : sxiejournal@sxie.in
Phone No. : 022 22014666
Website : www.sxie.info
Specific Url to XJEP: https://ww2.sxie.info/xjep-open-access-journal
Cover Design : Sheetal's Design, Goregaon (W), Mumbai 400 104
ISSN No. 2583-357X
Vol. No.2. Issue No. 1 published on 10 th May 2023
This publication may not be reproduced, stored or retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior permission of the publishers.

Disclaimer

The views and opinions expressed in the articles in this edition of "XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE" are those of the authors. None of the contributors, sponsors, administrators, or anyone associated with the journal in any way whatsoever can be held responsible for the appearance of incorrect or libellous information.

XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE

Peer Reviewed Interdisciplinary Journal

Vol. No.2, Issue 1, May 2023

ISSN No. : 2583-357X

Published by

St. Xavier's Institute of Education

(Autonomous)

Mumbai, India

Fr.Blaise D' Souza S.J
Manager (Patron)
St. Xavier's Institute of Education Society
Mumbai, India 400 020

Editorial Board Members

Dr Sosamma Samuel
Editor-in-chief
St. Xavier's Institute of Education (Autonomous)
Mumbai, India 400 020

Dr. Bijoy K Thomas
Managing Editor
Assistant Professor
St. Xavier's Institute of Education (Autonomous)
Mumbai, India 400 020

Prof. Vini Sebastian
Associate Editor
Professor
St. Xavier's Institute of Education (Autonomous)
Mumbai, India 400 020

Dr. Shadab Paloji
Associate Editor
Associate Professor
St. Xavier's Institute of Education (Autonomous)
Mumbai, India 400 020

Ms Kalpana Chavan
Associate Editor
Assistant Professor,
St. Xavier's Institute of Education (Autonomous)
Mumbai, India 400 020

Dr Margaret Downes
Editorial Board Member
Professor Emeritus
University of North Carolina,
Ashville, USA, NC 28804

Dr. Karuna Gokarn
Editorial Board Member
Vice Principal, Associate Professor
St. Xavier's College,(Autonomous),
Mumbai, India 400 001

Dr. Charlotte Simpson-Veigas
Editorial Board Member
Vice-Principal (Education), Associate Professor
St. Xaviers College (Autonomous)
Kolkata, India 700016

About the Journal

The e-journal "XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE", is published by St. Xavier's Institute of Education (Autonomous) is Peer reviewed Open access journal. The name of the journal exuberates the institution's commitment to encouraging innovations in educational practice which can bring transformation and enhance progressive thinking.

The journal aims to corroborate multiple perspectives and innovations in different contexts, leading to collaborative learning and networking. The understanding of how educational practice can be understood for maximising the outcomes of learning is the main thrust of the journal.

The e-Journal is a bi-annual journal and encourages authors to publish their conceptual as well as research articles in the journal. The e-journal will review and publish conceptual papers, research papers, case studies, analytical papers, book reviews, critical views on policies and any other of educational interest.

The e-journal provides a platform for teachers in Higher Education, student teachers, researchers and all those interested in novel educational practices and making them more student-centric in nature. The e-journal provides updates on the current research trends in different disciplines as well as conceptual articles with innovative ideas. The quality of the articles will be assessed by a (double-blind)peer review. The peer reviewers as well as the members of the Editorial Board constitute a group of eminent persons in Education and the institute will have the right to decide the members in these teams. The publication will be a resource for all those striving to carry out innovations in the field of Education.

1. Manuscript should be written in English. The submission of the document should be in Doc. Or Docx. and PDF file. The manuscript should be typed on A4 size paper.
2. The manuscript should be typed in MS word in 1.5" line spacing. Margins 1.5" spacing from left and 1" from all other sides.
3. Title of the paper should be followed by name of the author(s) with title, affiliation(s) of author(s) and valid email id of the main author.
4. There must be a single space between the title, paragraphs and sections.
5. All the pages should be numbered with the help of the insert 'Page number' option.
6. Use a single column layout with both left and right margins justified.
7. Use style Times New Roman with black font size 14pt. for the main title and 12pt.for the body of the manuscript including subtitles. The title of the article should be a bold title case. (More details of title case) Do not underline the subtitle. Instead, use the bold font.
8. Tables and Figures should appear in the document near/after where they are referenced in the text. All tables and figures must be properly numbered and their titles must be mentioned below the number. (Eg. Figure 1: Title of the figure, Table 1: Title of the table) Tables and figures should be placed properly. The author must take the responsibility of following the formatting guidelines as mentioned.
9. Please avoid footnotes and include all references at the end.
10. An abstract of the article must be submitted and not exceed 250 words along with the paper with a limit of 1500-2000 words including tables and figures. Key words (4-5 words)must be mentioned in italics immediately below the abstract.

For more guidelines please visit:

https://ww2.sxie.info/xaviers-illuminare-e-journal/manuscript-submission

Journal Ethics Policy

Open Access Policy

e-journal provides immediate open access to its content, thereby making research freely available to the public for a greater global exchange of knowledge.

Privacy Policy

"XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE" has a well-defined privacy policy. Confidentiality of data is maintained. The names, email addresses, and research manuscripts or other information submitted to the journal is exclusively used for the stated purposes and will not be used for any other purpose or made available to any other party.

Ethics for Publishing

1. The authors should ensure that they have written entirely original work and if the authors have used the work and/or words of others that this has been appropriately cited or quoted.

2. Authorship should be limited to those who have made a significant contribution to the conception, design, execution or interpretation of the reported study.

3. The authors should provide proper acknowledgement. Acknowledgement should be brief with maximum of 100 words.

4. Authors are responsible for their citing of sources and the accuracy of their references and bibliographies.

5. It is the responsibility of the authors to seek copyright clearance for any part of the content of the articles.

6. The journal is not liable in any respect for the views and ideas represented in the manuscripts regarding caste, racial, gender, sexual orientation, religious, political or other controversial issues and its solutions prescribed by the authors.

7. If an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal editor or publisher and cooperate with the editor to retract or correct the paper.

XAVIERIAN JOURNAL OF EDUCATIONAL PRACTICE

Vol. No.2, Issue 1, May 2023

Contents

Opinions of Secondary School Teachers on Social Responsibility Towards Building a Peaceful Society

Nusrat Anjum Siddiqui and **Frances Ketan Vaidya

**Principal, Iqra English High School and Junior College, Ambernath*
***Associate Professor, Gandhi Shikshan Bhavan's Smt. Surajba College of Education, Mumbai*

**Corresponding email: nusanjum@gmail.com*

Abstract

A teacher's social responsibility is to create a welcoming and supportive learning environment for all students. Inside the school, teachers play a significant role in demonstrating a model of social personality, creating a peaceful school atmosphere and environment. In addition, a teacher's presence and central placement in the school can produce similar ripples across the neighbourhood, spreading the message of peace, social cohesion, collaboration, and building a peaceful society.

This research comprises three dimensions of a teacher's social responsibilities: the social personality of the teacher, influence on the school atmosphere, and attitude towards the environment. These are essential dimensions for understanding teachers' social responsibilities toward building a peaceful society.

This paper focuses on the social responsibilities of secondary school teachers toward building a peaceful society. The researcher used secondary school teachers as the sample. The snowball sampling technique, a non-probability sampling method, was used. The demographic variables included gender and years of experience of the teacher.

A descriptive survey was used. The researcher developed a tool to study teachers' social personality, influence on school atmosphere, and attitude towards the environment. The findings of the study show that the mean social responsibility of females (62.6) is higher than that of males (58), and the mean of more than five years of experience (63) is higher than that of less than five years of experience (56.2). These findings will be helpful to secondary school teachers in modelling their social responsibilities toward building a peaceful society.

Keywords: Social responsibilities, social personality, School atmosphere, Environment, Peaceful society

Introduction

At a young age, teachers instil transcending capacities for communication, decision-making, and social responsibilities. Teachers are responsible for instilling information, inspiring creativity, and promoting innovative ideas. A teacher's social responsibility is to create a welcoming and supportive learning environment for all students. Inside the school, teachers play a significant role in demonstrating a model of social personality, creating a peaceful school atmosphere and environment. In addition, a teacher's presence and central placement in the school can produce similar ripples across the neighbourhood, spreading the message of peace, social cohesion, collaboration, and building a peaceful society.

Operational definitions of key terms

Social Responsibility: This study defines social responsibility as the social personality of a teacher who upholds a positive attitude toward the school environment and influences their surroundings to foster a peaceful society.

Social personality: According to this study, a teacher is said to have a social personality when they have good communication skills, a positive attitude, are sensitive to others, deal with situations gently, and promote teamwork.

School Atmosphere: According to this study, a teacher's ability to instil discipline, foster social skills development, and promote a sense of responsibility has a positive impact on the school climate.

Environment: According to this study, a teacher is said to have a positive attitude toward the atmosphere if they ensure sustainability and resource conservation, which results in a clean and tranquil environment.

Peaceful society: A harmonious, inclusive, and compassionate society works together to bring about the change that its members wish to see in the world.

Literature Review

APV Appa Rao et al, in their article “Role And Responsibilities of Teacher And Student in Building Modern India” mention that a teacher's job is to influence the mind of the next generation. Constructive moulding takes place, including the growth of a scientific and humanistic mindset and sense of self, empathy, and environmental responsibility. In addition to imparting knowledge, a teacher must motivate pupils; he or she must have an impact on their lives

and personalities and provide them with the concepts and morals that will prepare them to contribute to society as worthy members.

Bouguila Sihem, in the article "Social Responsibility of Educators", conducted an exploratory study on 100 students and teachers asking questions reflecting on social responsibility and found that 80% of educators are aware of the social responsibility of education. 80% of educators believed that addressing social concerns in their lessons would help students develop into responsible citizens. Only 55% of instructors participated in social gatherings, debates and other green activities. 60% of educators interacted positively with their charges. 70% of them were motivated by their reputation among their pupils, and all agreed to be serious and stern in their duties to encourage students to practice discipline. 60% of educators regularly read and acquire new information.

Philip Bulawa and Mavis B. Mhlauli, in their article "Social Responsibilities of Schools in Botswana: The Role of Teachers in the Activities of the Community". It was a descriptive survey that used a questionnaire to gather the data. The sample was primary and secondary school teachers from Botswana's Southeast region, chosen via probability sampling. The findings of this study demonstrated that teachers in both elementary and secondary schools are aware of and actively engage in their social obligations. However, their heavy workloads occasionally prevent them from participating in community projects and activities.

The study has the following objectives:

1. To study the difference in social personality of secondary school teachers based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

2. To study the difference in the influence on school atmosphere among secondary school teachers based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

3. To study the difference in the attitude towards environment among secondary school teachers based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

4. To study the difference in social responsibilities of secondary school teachers for the total sample based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

The study has the following hypotheses:

1. There is no significant difference in social personality of secondary school teachers based on

a. Gender (Female and Male)
b. Experience (below five years and above five years)

2. There is no significant difference in the influence on school atmosphere among secondary school teachers based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

3. There is no significant difference in the attitude towards environment among secondary school teachers based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

4. There is no significant difference in social responsibilities of secondary school teachers for the total sample based on
   a. Gender (Female and Male)
   b. Experience (below five years and above five years)

Research Methodology

A descriptive survey approach was adopted to gather information about secondary school teachers' opinions on their social personality, influence on the school atmosphere, and attitude towards the environment. A sample of 87 teachers was drawn from secondary schools using snowball sampling. Data were collected through statements on a 5-point Likert scale. A total of 15 statements were distributed among secondary school teachers. Data were analysed using Jamovi software.

Data analysis and Interpretation

The results of the study are presented descriptively in tables.

Social personality of secondary school teachers based on Gender (Female and Male)

	Gender	N	Mean	Median	Mode	SD
Social Personality	Female	48	20.9	21	22	2.89
	Male	39	19	20	20	4.04

Table no. 1a: Social personality of secondary school teachers based on Gender

The mean score of social personality of female secondary school teachers (20.9) was higher than that of male teachers (19), indicating that female teachers have a higher social personality.

Social personality of secondary school teachers based on years of experience.

	Year of Experience	N	Mean	Median	Mode	SD
Social Personality	Below 5 years	42	18.9	19	18	3.78
	Above 5 years	45	21.2	22	22	2.99

Table no. 1b: Social personality of secondary school teachers based on years of experience.

The social personality data of all teachers having experience above five years of experience had a mean of (21.2) which is higher than that of teachers having experience below five years (18.9), indicating that experienced teachers have a higher social personality.

Influence of secondary school teachers on school atmosphere based on gender

	Gender	N	Mean	Median	Mode	SD
Influence on school atmosphere	Female	48	21.5	22.5	25	3.35
	Male	39	19	19	25	4.21

Table no. 2a: Influence of secondary school teachers on school atmosphere based on gender.

The mean influence of secondary school female teachers (21.5) is higher than that of males (19), showing that female teachers have a greater influence on the school atmosphere than male teachers.

Influence of secondary school teachers on school atmosphere based on years of experience

	Year of Experience	N	Mean	Median	Mode	SD
Influence on school atmosphere	Below 5 years	42	19	19	25	4.3
	Above 5 years	45	21.6	23	25	3.12

Table no. 2b: Influence of secondary school teachers on school atmosphere based on years of experience.

The mean data of influence on school atmosphere of all teachers having experience above five years (21.6) is higher than that of teachers having experience below five years (19), showing that the higher the experience, the greater the influence on school atmosphere.

Attitude of secondary school teachers towards an environment based on gender

	Gender	N	Mean	Median	Mode	SD
Attitude towards environment	Female	48	20.2	20.5	25	3.64
	Male	39	18.1	19	20	3.86

Table no. 3a: Attitude of secondary school teachers towards an environment based on gender.

The mean score of attitudes of secondary school female teachers is (20.2) which is higher than that of males (18.1), indicating that female teachers have a higher attitude towards the environment than male teachers.

Attitude of secondary school teachers towards an environment based on years of experience

	Year of Experience	N	Mean	Median	Mode	SD
Attitude towards environment	Below 5 years	42	18.3	19	17	3.97
	Above 5 years	45	20.2	21	19	3.55

Table no. 3b: Attitude of secondary school teachers towards an environment based on years of experience.

The mean score of attitudes towards the environment of all teachers having experience above five years (20.2) is higher than that of teachers having experience below five years (18.3), indicating that experienced teachers have a higher attitude toward the environment.

Social Responsibilities of secondary school teachers based on gender

	Gender	N	Mean	Median	Mode	SD
Social Responsibilities	Female	48	62.6	63.5	57	7.55
	Male	39	56.1	58	49	9.81

Table no. 4a: Social Responsibilities of secondary school teachers based on gender.

The mean score of social responsibilities of female secondary school teachers (62.6) is higher than that of males (58), indicating that female teachers have a higher attitude toward social responsibility as compared to male teachers.

Social Responsibilities of secondary school teachers based on years of experience.

	Year of Experience	N	Mean	Median	Mode	SD
Social Responsibilities	Below 5 years	42	56.2	56.5	66	9.96
	Above 5 years	45	63	63	58	7

Table no. 4b: Social Responsibilities of secondary school teachers based on years of experience.

The mean score of social responsibilities of all teachers having experience five years (63) is higher than that of teachers having experience below five years (56.2), indicating that experienced teachers have higher attitudes toward social responsibility.

Inferential analysis of the study was done using independent t – test to verify hypotheses which are presented in the form of the table given below

Hypothesis 1a: There is no significant difference in social personality of secondary school teachers based on gender

Social Personality	Student's t	Statistic	df	p
		2.54	85	0.013

Table no. 1a. Social personality of secondary school teachers based on gender.

To assess differences in social personality between female and male secondary school teachers, an independent sample t-test was utilized. The results showed a significant difference (p=0.013) in the social personality of females (N=48, M=20.9, SD=2.89) and male teachers (N=39, M=19, SD=4.04). Hence, the null hypothesis is rejected.

Hypothesis 1b: There is no significant difference in the social personality of secondary school teachers based on their experience.

Social Personality	Student's t	Statistic	df	p
		-3.16	85	0.002

Table no. 1b Social personality of secondary school teachers based on their experience

To assess the differences in social personality between those having experience below five years and those having experience above five years, an independent sample t-test was utilized. The results indicated a significant difference (p=0.002) in the social personality of secondary school teachers having experience below five (N=42, M=18.9, SD=3.78) and above five years (N=45, M=21.2, SD=2.99). Hence, the null hypothesis is rejected.

Hypothesis 2a: There is no significant difference in the influence on school atmosphere among secondary school teachers based on gender

Influence on school atmosphere	Student's t	Statistic	df	p
		3.06	85	0.003

Table no. 2a. Influence on school atmosphere among secondary school teachers based on gender

To assess the differences in influence on school atmosphere between female and male secondary school teachers, an independent sample t-test was utilized. The results revealed a significant difference (p = 0.003) in the influence of female teachers (N=48, M=21.5, SD=3.35) and male

teachers (N=39, M=19, SD=4.21) on the school atmosphere. Hence, the null hypothesis is rejected.

Hypothesis 2b: There is no significant difference in the influence on school atmosphere among secondary school teachers based on experience

Influence on school atmosphere	Student's t	**Statistic**	**df**	**p**
		-3.24	85	0.002

Table no. 2b. Influence on school atmosphere among secondary school teachers based on experience

To assess the differences in the influence of teachers having experience below five years and above five years on the school atmosphere, an independent sample t-test was utilized. The results showed a significant difference (p=0.002) in the influence of secondary school teachers having experience below five years (N=42, M=19, SD=4.3) and above five years (N=45, M=21.6, SD=3.12) on the school atmosphere. Hence, the null hypothesis is rejected.

Hypothesis 3a: There is no significant difference in the attitude towards environment among secondary school teachers based on gender

Attitude towards environment	**Student's t**	**Statistic**	**df**	**p**
		2.64	85	0.01

Table no.3a. Attitude towards environment among secondary school teachers based on gender

To assess differences in attitudes towards the environment between female and male secondary school teachers, an independent sample t-test was utilized. The results showed a significant difference (p=0.01) in attitudes towards the environment between female teachers (N=48, M=20.2, SD=3.64) and male teachers (N=39, M=18.1, SD=3.86). Hence, the null hypothesis is rejected.

Hypothesis 3b: There is no significant difference in the attitude towards environment among secondary school teachers based on experience

Attitude towards environment	**Student's t**	**Statistic**	**df**	**p**
		-2.43	85	0.017

Table 3b. Attitude towards environment among secondary school teachers based on experience

To assess the differences in attitude towards the environment between those having experience below five years and those having experience above more than five, an independent sample t-test

was utilized. A statistical difference was observed in the results (p=0.017) in the attitude towards the environment of secondary school teachers with less than five years of experience (N=42, M=18.3, SD=3.97) and more than five years of experience (N=45, M=20.2, SD=3.55). Hence, the null hypothesis is rejected.

Hypothesis 4a: There is no significant difference in social responsibilities of secondary school teachers for the total sample based on gender

Social Responsibilities	Student's t	Statistic	df	p
		3.49	85	<.001

Table 4a. Social responsibilities of secondary school teachers for the total sample based on gender

To assess the differences in social responsibilities between female and male secondary school teachers, an independent sample t-test was conducted. The results revealed a significant difference ($p < .001$) in the social responsibilities of females (N=48, M=62.6, SD=7.55) and male teachers (N=39, M=58, SD=9.81). Hence, the null hypothesis is rejected.

Hypothesis 4b: There is no significant difference in social responsibilities of secondary school teachers for the total sample based on experience

Social Responsibilities	Student's t	Statistic	df	p
		-3.73	85	<.001

Table 4b. Social responsibilities of secondary school teachers for the total sample based on experience.

To assess the differences in social responsibilities between those having experience below five years and those having experience above five years, an independent sample t-test was utilized. The results revealed a significant difference ($p <.001$) in the social responsibilities of secondary school teachers having experience below five years (N=42, M=56.2, SD=9.96) and above five years (N=45, M=63, SD=7). Hence, the null hypothesis is rejected.

Findings

The above study reveals that female teachers had a higher social personality than male teachers, and that, overall, experienced teachers had a higher social personality than those with less experience. Female teachers had a greater influence on the school atmosphere than male teachers, and experienced teachers were more likely to influence the school atmosphere than less experienced teachers. Female teachers had a higher attitude toward the environment than male

teachers, and experienced teachers also had a higher attitude towards the environment than less experienced teachers. The social responsibility of female teachers was higher than that of male teachers, and more experienced teachers exhibited higher social responsibility than less experienced teachers.

Discussions

These findings show that female teachers have a better understanding of students' mental and emotional needs. They are good counsellors, create an inclusive, safe, and peaceful environment, focus on their holistic development, and thus have a higher mean for their social responsibility. The findings also revealed that experienced teachers have a higher mean for their social responsibility because experience makes them well equipped to assist their students in overcoming challenges and rising above them.

Recommendations

More research is required to better understand teachers' social responsibility toward building a peaceful society. More time should be available in schools so that students can participate in social activities. Teachers should be given guidance to empower them to carry out their social responsibilities. School administration should encourage teachers for their community involvement by fostering a sense of community among them, which would improve the education of children, aiding in building a peaceful society.

Conclusion

When teachers teach compassionately, students benefit from sharing their thoughts, trying new things, and academically and socially challenging themselves. A positive attitude is one of the most important characteristics of teachers. This has the potential to positively influence students' learning.

Discipline also influences the school atmosphere, which helps make substantial educational developments. When there is an established discipline code that both students and teachers are conscious of and acknowledge, everyone can learn in a secure and encouraging environment. Social skills help in students' communication and in becoming compassionate and concerned members of their communities. Students learn to achieve individual goals, perseverance, and abilities that are critical for their smooth transition into adulthood.

A healthy and pleasant environment is likely to make one feel at ease and tranquil. The environment must be kept clean, and all needs must be met. Through their teaching, teachers can instil these qualities and help build a peaceful society.

Teachers are pioneers in shaping students' lives. Students are makers of the future and represent the nation. Teachers are the ones who not only teach but are also first-role models. They help and inspire the students. Consequently, being a great inspiration is essential, and being a great inspiration entails having an excellent social personality. Teachers must continue to perform their social responsibilities to build a peaceful society.

References

1. Amit Chaturvedi, Reena Kumari, & Satyendra Singh. (2014, July 2). Environmental Awareness Through Education. Retrieved March 21, 2022, from https://www.spijebhu.in/SPIJ-July-14%20pp9-13.pdf
2. APV Appa Rao et al (2017) 'Role And Responsibilities of Teacher And Student in Building Modern India ', International Journal of Current Advanced Research, 06(09), pp. 5971-5973. DOI: http://dx.doi.org/10.24327/ijcar.2017.5973.0844. Retrieved March 21, 2022, from https://journalijcar.org/sites/default/files/issue-files/2873-A-2017.pdf
3. Bouguila Sihem. (2012, November 23). The social responsibility of teaching. *ResearchGate*. Retrieved March 27, 2022, from https://www.researchgate.net/publication/255724211_The_Social_Responsibility_of_Teaching/link/5bf3b58492851c6b27cc14fa/download
4. Dr Santosh Kumar Behera. (2013). Role of teacher and peace education. Retrieved March 21, 2022, from https://dialog1.webs.com/sejv2i1/samwaad_2.pdf
5. Lajos Goncz. (2017, June 22*)*. Teacher personality: A review of psychological research and guidelines for a more comprehensive theory in educational psychology. Taylor & Francis. Retrieved March 21, 2022, from https://www.tandfonline.com/doi/full/10.1080/23265507.2017.1339572
6. Philip Bulawa, & Mavis B. Mhlauli. (2012, January 1). Social Responsibilities of Schools in Botswana: The Role of Teachers in the Activities of the Community. International Journal of Social Sciences and Education. Retrieved March 21, 2022, from https://ijsse.com/sites/default/files/issues/2012/volume%202%20issue%201%20Jan%202012/paper%2016/paper-16.pdf
7. Rajendrakumar Muljibhai Parmar. (n.d.). Role of teacher for peace education, Mr Rajendrakumar Muljibhai Parmar. Academia.edu - Share research. https://www.academia.edu/7313532/Role_Of_Teacher_For_Peace_Education_Mr_Rajendrakumar_Muljibhai_Parmar

Two Birds in One Shot - Bridging the Math Proficiency Gap and Addressing Math Anxiety Using Art: A Pilot Study

Riddhi Bharani, *Pushpa Vishwakarma, *Sadhana Mishra, **Gayathri Balasubramanian

**Department of Mathematics, Vivekanand Education Society's College of Arts, Science and Commerce (Autonomous), Mumbai, Maharashtra, 400071, India*
***Department of Psychology, Vivekanand Education Society's College of Arts, Science and Commerce (Autonomous), Mumbai, Maharashtra, 400071, India*

** Corresponding author: riddhi.bharani@ves.ac.in*

Abstract

The aim of this study was to investigate whether using art in a math bridge course will reduce math anxiety among students, help students develop an interest in mathematics as a subject, and improve students' test scores in mathematics. The data presented here is based on two pilot studies conducted on students of first-year Bachelor of Commerce students. The intervention consisted of ten sessions of an hour and a half each conducted once a week for a total of 24 students. Math anxiety scores of all participants were measured using the MARS 30-item test before and after the bridge course. The difference in their math anxiety levels post and pre-intervention was found to be statistically significant for the better. The difference in their math proficiency scores post and pre-intervention was also found to be statistically significant. The subjective interviews revealed that the negative emotions attached to math anxiety saw a significant decline.The subjective interviews conducted at the end of the course revealed that the negative emotions associated with math anxiety had reduced and students were motivated and confident in their approach to mathematics.

Key words: Mathematics anxiety, Innovative pedagogy, Bridge programs, Math and art, STEAM

Introduction

Mathematics proficiency at school and college level in Maharashtra, India

According to the statistics given in the Annual Status Education Report ("ASER Centre", 2019) published by Pratham (a non-profit national level organization), in the Indian state of Maharashtra roughly 60% of all children in 8th standard struggle with division, 40% struggle with subtraction and only 33 - 49% of children in the age group of 14 -16 years could apply the math skills for calculating time, financial decision making, and calculating discount. The National Achievement Survey report of 2017 of the state of Maharashtra classifies the performance levels of students of class 8th in mathematics as 67% below basic or basic. Both these surveys imply that overall the basic math conceptual understanding as well as procedural knowledge among children is low at

the end of completion of school education. Once students complete secondary school (SSC - 10th standard), they can enter higher secondary studies by attending a junior college. In junior college (11th and 12th), students can choose one of the three streams: arts, science, or commerce. By the end of 10th standard, typically achieving secondary students have studied arithmetical concepts, number systems, algebra, geometry, trigonometry, statistics, measurement, graphs and coordinate geometry. In the Higher Secondary Certificate (HSC) Board, students can substitute math for Secretarial Practice (S.P.) during 11th and 12th standard. However, Secretarial Practice being a theoretical paper requires no mathematical skill. Lacking a strong foundation in basic math skills affects their confidence and their ability to cope, leading them to drop the subject in higher secondary. The Maharashtra State Board of Secondary and Higher Education ("STATISTICS HSC," 2019) provides the following data: Only 23% of the students opt for Mathematics at the 10+2 level in Maharashtra. In the February 2019 examination out of 180785 students, 142031 chose 'Secretarial Practice' and only 38754 students chose the 'Mathematics and Statistics' course. However, during commerce graduation, Mathematics becomes a compulsory subject for these students who drop mathematics at the 10+2 Level. Because mathematics knowledge base is hierarchical, the low levels of math proficiency amongst school students, continues to remain low at college level too. The low levels of math proficiency, having low math literacy and poor application skills increases anxiety and increases the likelihood that in higher education, they experience difficulty in grasping higher-order concepts. Causes for difficulty in mathematics could be ineffective instruction, difficulties in abstract and symbolic thinking, reading problems, poor attitudes or anxiety, mathematical disability etc (Hammill & Bartel, 1990, p. 215)

Across the globe, conventional methods for dealing with this problem have been to use bridge courses, remedial and tutorial classes and encourage and formulate peer-to-peer learning sessions (Bahr, 2008; Büchele, 2020). A bridge course is one that seeks to fill up the knowledge gaps between the students' current course and their previous course. The focus of these methods has been on bridging the gaps in the knowledge of math and using individual attention to correct the errors in knowledge and skills required for math in higher education. These include clarifying concepts and tools learned earlier like fractions, dealing with operations, solving linear and quadratic equations, understanding and interpreting word problems etc. Usually, students are given remedial education to help them develop the missing core academic skills competences. The Mathematics bridge course is an overlap between remedial coaching and a bridge program. Mathematics bridge programs are aimed at refreshing prior knowledge in Mathematics with more emphasis on conceptual learning and problem solving. And this must be true for all bridge courses in Mathematics as the mathematical knowledge base is hierarchical in form, therefore mastery of

prerequisite knowledge is crucial. Each new understanding is built upon and incorporated into the preceding knowledge gained.

As a math educator, it is not uncommon to hear statements like "I'm not good at math", 'I can't do math', 'I am afraid of numbers' etc, from students taking math courses. Over the years, we have had repeated encounters with students who express that they "went blank" during the exams. The remedial measures continue to build on processing skills but do not directly address the debilitating effects of anxiety.

Math Anxiety

Math anxiety is commonly defined as "a feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations" (Richardson & Suinn, 1972, p. 551). High levels of math anxiety can have a significant and negative impact on the math performance level (Ashcraft, 2002; Ashcraft & Krause, 2007). The stronger negative connections between math anxiety and attitudes toward math are also seen as supporting evidence for a general tendency of avoidance. The love and motivation of doing math, mathematical self-confidence, and views of mathematics as a useful subject are all adversely correlated with math anxiety. (Hembree, 1990; Mammarella et al., 2019)

A case for STEAM Education: Integrating Art in STEM

In recent years, it has been felt that Science, Engineering, Technology & Mathematics (STEM) education was missing another dimension and that of Art. The reframed STEM model now known as STEAM includes Art (A). At the cognitive level, using art for doing math reduces anxiety, increases the available working memory capacity (Ashcraft, 2002), makes the problem more concrete (Edens & Potter, 2007), and activates the right brain which allows them to better tap intuition and creativity (Edens & Potter, 2007). As a pedagogical method, using art is non-threatening to self-esteem as there are no correct/wrong answers. In the context of teaching and learning, observations in most classrooms in India focus on structured learning sequences with correct answers, that is, often "one correct answer"(Sparapani et al., 2014). Doing art allows one the capacity to dare to try different answers (Edens & Potter, 2007). Art-based interventions allow a student to reorganize and use spatial skills to represent the elements of the problem thereby reducing the impact of poor language skills (Georgette, 2008; Edens & Potter, 2007). STEAM education has benefited students in both the affective and cognitive domains by helping them converge their personal experience and knowledge in problem-solving processes to better structure concepts (cognitive) and also by internally motivating students in learning science and

math (affective). It has thus helped students improve their problem-solving and critical thinking, both desired outcomes of math education (Briggs, 2015). An intervention study was set up by Essen & Hamaker (1990) to investigate if generating drawings of arithmetic word problems will facilitate problem-solving performance for fifth graders. They found that fifth graders achieve better on a word problems test when they were instructed to make drawings of those problems. Their performance on other problems also improved and without any prompting, their action of visualizing the word problem increased post-test. A study by Edens & Potter (2007) found that the use of drawings and the level of spatial understanding were positively correlated to the problem-solving performance of the students. They commented that the art classroom could be important in developing students' spatial, proportional thinking and mathematical ability.

As previous research indicates the benefits of integrating art into the curriculum at the school level, we felt the need to integrate art into the mathematics education we provide at the graduate level also to facilitate them to become lifelong learners. The rationale of the present study is based on these findings and studies the benefits of integrating art into the bridge course for students who have dropped mathematics in the 10+2 Level.

Methodology

Objectives

A Pre-Post Exploratory design was used wherein 24 FYBCOM students who had failed their first semester math exam participated in a bridge course designed as an intervention to improve. This bridge course was designed by integrating art into the activities of the conventional math bridge course.

Their scores on math anxiety and math proficiency were assessed pre and post the bridge course. Semi-structured interviews were conducted to understand the impact of the intervention on interest in, confidence and motivation to approach the math subject related activities in future.

The broad objectives of this study were to investigate if there is a significant difference in the math anxiety levels and math proficiency levels of the participants pre and post the bridge course.

The following two hypotheses were tested:

1. There is no difference in the math anxiety levels of the participants pre and post the bridge course.
2. There is no difference in the math proficiency levels of the participants pre and post the bridge course.

Participants

The data presented here is based on two pilot studies conducted on students of first-year Bachelor of Commerce students who had failed their first-semester mathematics exam and were recommended to take the math bridge course based on art. Informed consent was taken from them. The final count of students completing the pilot studies of this intervention was 24 students (7 male participants and 17 female participants).

Measures

1. Math Anxiety: To measure students' math anxiety the Mathematics Anxiety Rating Scale (MARS) 30-brief test was used. The MARS 30-brief is a 30-item instrument developed by Suinn and Winston (2003). It measures math anxiety as defined by Richardson and Suinn (1972). The scores can range from 30 to 150, with higher scores indicative of higher levels of math anxiety. The test has a Cronbach alpha of 0.96. The MARS can be used to screen certain students in order to determine whether they should be enrolled in remedial mathematics courses and if they should be offered counselling regarding their math anxiety.
2. Math proficiency: To measure students' math proficiency, a math test was given to the students before and after each intervention session. Each test was marked out of 10. The final math proficiency score of each student was calculated as the combined marks obtained by the student sessions are (marked out of 100) These tests were based on the topics covered in the bridge course.

Procedure

Students who failed in their Semester I Mathematics Exam were invited to participate in the bridge course. Before the bridge course began, their math anxiety levels were assessed using the MARS 30-item.

The bridge course consisted of ten sessions, each session for an hour and a half, conducted once a week. Around 20 activities were conducted across these ten sessions. Before each session, a test was administered of 10 marks based on the contents that were to be covered in that session. The content of the bridge course was basic arithmetic, fractions, percentages, indices, mathematical rules involving operations, and basic algebra. Art was integrated into the activities of the bridge course. In each session, 2-3 instructors were present to guide the students. After each session, a test was administered of 10 marks based on the contents that were covered in that session.

Math anxiety scores of all participants were measured using the MARS 30-item test at the end of the bridge course.

Semi-structured interviews to understand the subjective experience of the sessions were conducted for ten participants chosen randomly at the end of the bridge course.

Art based bridge course Session Details (Integration of Fine Arts into math topics)

Activities were divided into following three categories:

- Art Activities
- Activities featuring math Manipulatives
- Presentation of math problems in the context of drawing/colouring

This categorization allows us to group the objectives in terms of the cognitive skills involved. During the ten sessions, the flow of the mathematical content was as follows: Operations, Fractions - Concept and models, Equivalent Fractions, Operations on Fractions, Order of Operations (BODMAS Rule), Recognising symbols, Linear Equations, Word problems. At the beginning of each session, the details of the activities and relevant instructions were shared with the students.

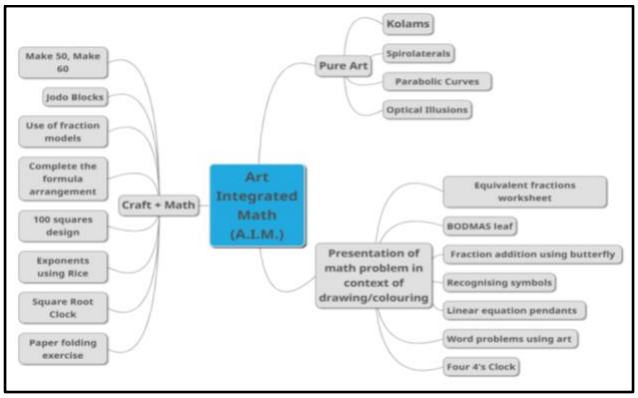


Figure 1: Mind map of the activities conducted

The activities under each of the categories along with their descriptions are mentioned below.

Art Activities

1. Making Kolams: Kolam is a form of drawing in India. Kolams are usually made in the courtyards and outside homes using rice flour etc to decorate houses during festivals. Students were provided designs of 5 kolams and asked to replicate them on a dotted sheet. A lot of confusion ensued while drawing the 20 by 20 dot kolam for almost all participants. Some changed their strategies of drawing the 20 by 20 when they made mistakes.
2. Drawing Spirolaterals: Spirolaterals are spiraled, structured designs based on a repeated series of commands using length and angle. In this session, students choose number

sequences of their choice as the length (for instance: 1,2,3,1,2,3,1...) drawn in successive 90-degree angles to create beautiful closed loops known as spirolaterals.

3. Parabolic Curves Drawing: The basic principle of Parabolic Curve line design is the creation of curved shapes from the intersection of straight lines. Students were given different templates to create and color their parabolic curves.
4. Optical Illusions: Op Art is an abstract art style that looks like an optical illusion. The students were given wooden coasters to draw on and measurements to make an optical illusion were given.
5. 100 squares design: The students were asked to divide their coaster into a hundred small squares. (10 by 10). They then created a pattern/design using different colors in the grid. Further, students calculated percentages and fractions of each color in their design. They further solved a worksheet understanding the relationship between percentages, fractions, decimals and their pictorial representation.

Cognitive skills involved: Pattern Recognition, Decision making, Cognitive flexibility, Sustained attention were some of the cognitive skills involved in these activities. Students explored mathematics concepts such as Symmetry, Measurement, Parallel lines, geometry, Algorithmic thinking, use of math in real life in the course of these activities.

Activities featuring Math Manipulatives

1. Make 50, make 60 (using triangles): Make 50 and Make 60 are addition and multiplication math games with equilateral triangles. Each side of the triangle had numbers written on them. In one set, students had to match up sides of the triangles such that the numbers on the meeting sides of two triangles add up to 50 and in another set match those whose product is 60.
2. Jodo blocks: These are snap-on cubes also known as Jodo Cubes. Concepts like addition, subtraction, multiplication, division, fractions, factors of integers, etc were taught with snap-on cubes.
3. Use of fraction models: Physical models gave a hands-on experience to students to understand parts of the whole and comparison of different fractions of a whole.
4. Complete the Formula arrangement: With the idea of developing symbol sense, a formula was cut into various parts and the students had to place together various parts to get back to the original formula.
5. Exponents using Rice: On each of the nine squares of the Tic-tac-toe board, students were asked to place rice grains in powers of 2 ranging from 21 to 29. ("Exploring exponents," 2020)

6. Square root clock: Students had to make a clock where every digit (from 1 to 12) was expressed as a square root. They had to choose from cut-outs of square roots provided to them.
7. Paper folding exercise: The students started with a square sheet of paper and made folds to construct a new shape. They were asked to construct a square and a triangle with exactly ¼ the area of the original square and construct a square with exactly ½ the area of the original square. ("Paper folding," 2020)

Cognitive skills involved: Decision-making, Visual-spatial, perceptual motor skills, and creative thinking were some of the cognitive skills involved in these activities. Students explored mathematics concepts such as operations, fractions, exponents, roots, algebra of operations, percentages, and decimals in the course of these activities.

Presentation of math problem in the context of drawing/colouring

1. Equivalent fraction worksheets: Fractions were presented in circular and rectangular shapes to aid learning of the concept of equivalent fractions. Further to consolidate their knowledge they coloured a worksheet that was color coded with respect to fraction values.
2. BODMAS Leaf: The students were taught BODMAS and given a worksheet to solve BODMAS problems. The worksheet involved painting a leaf while solving the problems. The problems were thus presented in a non-linear format thereby engaging both sides of the brain.
3. Fraction addition using the butterfly method: The students were provided a simple way to add fractions by making a butterfly. They were also taught fraction multiplication and division.
4. Recognizing symbols/formula worksheets: Three worksheets were created to improve their friendliness with symbols. These were made based on a sunflower theme to insert an element of art and playfulness into them. The first worksheet was about recognizing symbols and associating the given values with the symbols, the second was about using the symbol '$\sum$' (summation) in various contexts and the third was about recognizing and selecting the appropriate symbolic representation for a problem from a variety of choices. These three worksheets given in chronological order were aimed at first allowing them to associate with the symbols, then learn how they are used and then finally learn to differentiate between them and select the relevant ones based on the requirement.

5. Linear equation triangles/ pendants: Students were given pendants to learn how to solve linear equations.
6. Word problems using art: The students were given a worksheet to work out word problems by drawing them out. The word problems ranged from simple ones based on operations to more complicated ones that required solving simultaneous equations.
7. Four 4's Clock: The students were asked to make a clock where every digit from 1 to 12 on the clock was written using only four 4's and any operation. This was intended as a low threshold, high ceiling activity. ("four 4's," 2020)

Cognitive skills involved: One-one correspondence, Attention, visual-spatial, Memory, Language, and abstract reasoning were some of the cognitive skills involved in these activities. Students explored mathematics concepts such as BODMAS, fractions, Linear equations, Symbol sense Word problems, Pictorial representation, Estimation, Symbol sense (To extend the construct of number sense in school arithmetic to school algebra, researchers suggested the construct symbol sense (Arcavi, 2005), manipulating and interpreting symbols, number sense, operations in the course of these activities.

Data Analysis

The following analysis was conducted:

1. A descriptive analysis of MARS-30 Brief values and Math Proficiency Test values.
2. A test of normality was conducted for both pre and post test values relating to math anxiety and math proficiency.
3. The MARS Scores were found to be normally distributed, a paired t-test was conducted to test the null hypothesis relating to the math anxiety levels.
4. As the math proficiency test scores were not found to be normally distributed, a Wilcoxon Signed-Rank Test was run to determine if there was a statistically significant mean difference between the post and pre-test results of the Math Proficiency Test.
5. The semi-structured interviews were also analysed to gain insight into the impact of the bridge course.

Results and Discussion

Analysis of scores on MARS-30 Brief

No outliers were found in the MARS scores (pre and post) using the ROUT method. The average MARS-30 item scores of the participants were found to be 84 with a standard deviation of 20 before the bridge program. Post the bridge course, their average MARS-30 item scores were reduced to 70 with a standard deviation of 21. The violin plot as shown in Fig. 2 shows the median and interquartile range of the MARS Scores along with the distribution of the data. The median MARS test score reduced from 79 before the intervention to 69 after the intervention. The range of the scores before the intervention was 53-134 and post the intervention was 30-115. A higher MARS score indicates higher anxiety.

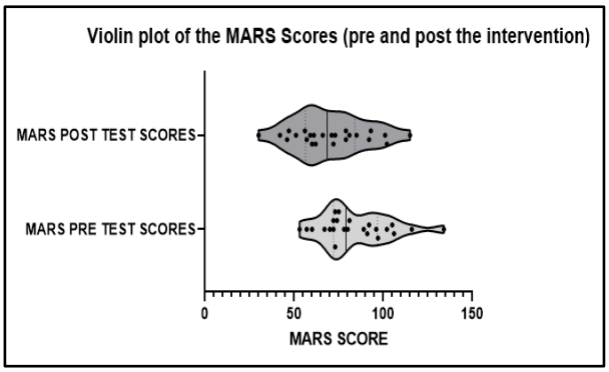


Figure 2: Mars-30 brief scores of Pre and Post Intervention

As can be seen in the area chart in Figure 3, the MARS-30 Anxiety Scores of 45% of participants were below the MARS-30 score of 65 post-intervention as compared to that of only 12.5% of participants before the intervention.

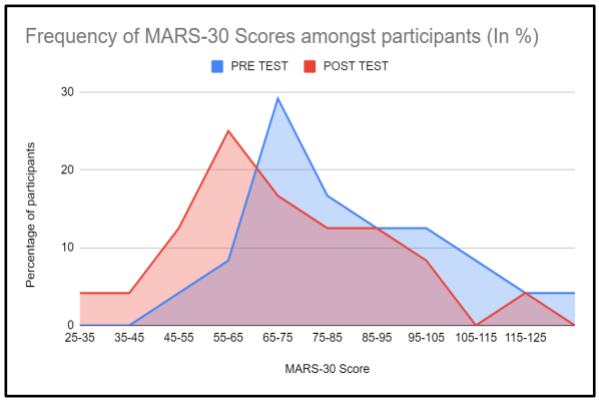


Figure 3: Frequency analysis of MARS-30 Scores amongst participants (in percentage)

Five out of the 24 participants registered an increase in their anxiety scores. Upon inquiry, they mentioned that as their final exams had drawn closer, their anxiety had increased as compared to

nine weeks earlier when the pre-test was conducted. All other students registered a decrease in their anxiety scores ranging from 2% to 69%.

Pre-test and Post-test MARS-30 Scores

Paired Difference								
Paired Difference= MARS Post-test Scores - MARS-30 Pre-test Scores	**Mean**	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval**		**t**	**df**	**Sig (1 tailed)**
				Lower	**Upper**			
	-13.88	24.26	4.952	-24.12	-3.631	-2.802	23	0.0051

Table 1: A paired t-test results of the difference in the post and pre-test MARS-30 Scores

The MARS-30 item scores (pre and post) were found to be normally distributed using the Shapiro-Wilk Test (at alpha= 0.05). A paired t-test with results as shown in Table 1 was run to determine whether there was a statistically significant mean difference between the MARS 30 item scores of the participants' pre and post-bridge course. ($t = -2.802$, $p = 0.0051$). From the above results, we can say the following:

- The difference in their anxiety levels post and pre-intervention was found to be statistically significant.
- On average, the post-intervention MARS-30 scores were 13.88 points lower than the pre-intervention anxiety scores. (95% CI [-24.12, -3.631]).

Analysis of math Competence Levels

Participants were administered mathematics tests before and after the intervention and marked out of 100. Their cumulative scores on these tests had a mean score of 51 with a standard deviation of 20 before the sessions and an average score of 74% with a standard deviation of 19 after the sessions. The adjoining violin plot shows the distribution of scores.

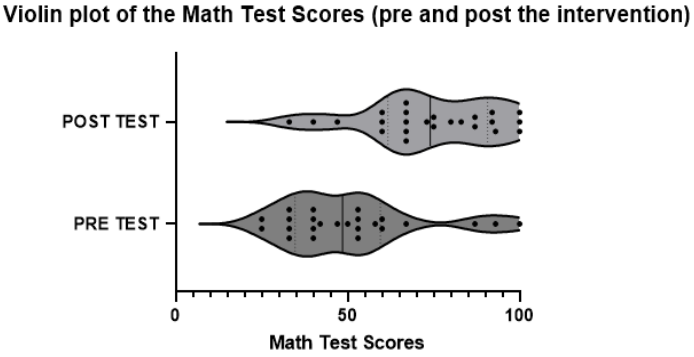


Figure 4: Math Test Score pre and post Intervention

The test scores were found to be not normally distributed by the Shapiro-Wilk Test. A Wilcoxon Signed-Rank Test was run to determine if there was a statistically significant mean difference between their post and pre-test results. It was found that 18 participants had a higher post-test Score than the pre-test score. However, 4 participants had a pre-test score higher than the post-test score and 2 participants saw no change in their score. Normal approximation was used for tie correction. The test statistic Z = -3.541323, which is not in the 95% region of acceptance: [-1.6449 : ∞] and W-=17.00, is also not in the 95% region of acceptance: [75.8700 : 253]. The result was found to be significant at $p < .05$. The observed standardized effect size, $Z/\sqrt{n}$, is large (0.76). That indicates that the magnitude of the difference between the scores from the post-test and the scores from the pre-test is large.

Results of the Interviews

Effect on motivation in solving math problems and math courses

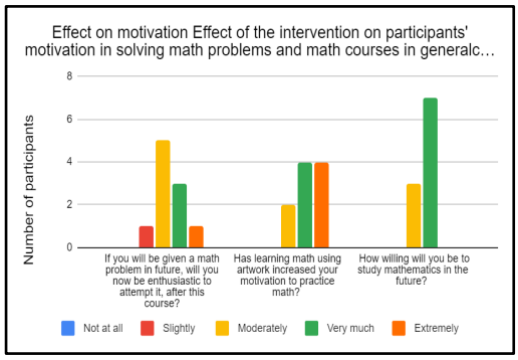


Figure 5: Effect on motivation in solving math problems and math courses

90% of the students showed moderate to extreme enthusiasm in solving a math problem. All students were moderately or extremely motivated to practice math as well as study math in the future. Avoidance is a strong negative emotion associated with math anxiety. Overall, Figure 5 suggests that after the bridge course, students felt more positive about approaching math as a subject in future.. In informal conversations, many students expressed that their outlook toward math had changed for the better. When asked why they feel like their outlook has changed, one of them said ‘ I now have doubts in math class!’ Another said she gets the right answers and understands better.

When queried about the different activities used to teach math using art, mentioned earlier, the students exhibited this new-found enthusiasm and took up the challenges head-on in the two ‘low threshold, high ceiling activities’.

The Four 4's clock activity was quite a task and students came up with multiple answers for the same number, some of them were very elegant solutions. One student didn't stop at 12 and went home and continued up to 20! The first time we did 'spirolaterals', most students couldn't complete the loop during the session and kept making mistakes. They took it up as homework and came back in the next session with completed loops. They seemed to have developed this resilience and interest in the subject. During the BODMAS session, they were asked to solve 25 problems, which in a linear format would have been extremely tedious but when presented in the form of a leaf (non-linear, artwork), not even a single one felt the monotony!

Effect on confidence in passing exams

20% of the students are moderately confident about passing their semester-end exams and 80% of them were very confident about passing. Unfortunately, due to the Covid-19 pandemic, the exams were not conducted. And hence there is no way to verify their optimism.

Effect on Approach to learning

The following ideas/responses emerged through a content analysis of their responses to how their approach to learning math had changed after the bridge course. The probes with their corresponding frequencies are highlighted in Figure 6.

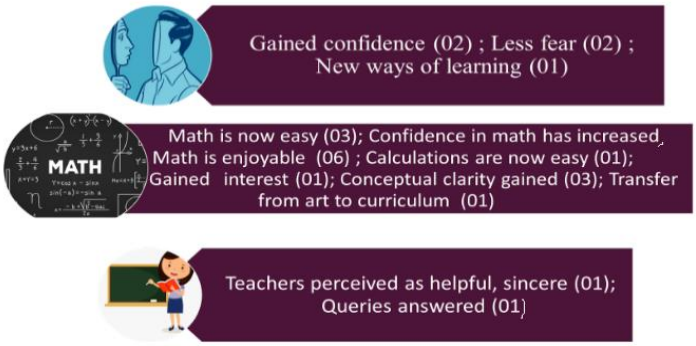


Figure 6: Shifts in the participants' approach to learning after the bridge course

Jain and Dowson (2009) described mathematics anxiety as a consequence of "an inability to handle frustration, excessive school absences, poor self-concept, internalized negative parental and teacher attitudes toward mathematics, and an emphasis on learning mathematics through drill without "real understanding". The interviews with the participants suggest that the environmental variables like teacher characteristics and the reduction in expectation to do well in the sessions, personality variables like self-concept, confidence and learning behaviour seem to have improved.

These characteristics are explained as the causal factors for math anxiety by many studies along with intellectual variables that include the child's level of more general cognitive abilities.

Effect on fear

When asked if the bridge course helped reduce their fear of mathematics, all 10 students replied in the affirmative. When probed about the reasons for the reduction in fear, the following thoughts emerged: (the numbers indicate the frequency)

1. Fear has reduced because they have a better grasp on the basics (03)
2. Fear has reduced because their confidence has increased (02)
3. Fear has reduced because the teachers have been very helpful (02)
4. Fear has reduced because their performance has improved. In their understanding improvement in performance is reflected by problem-solving becoming easier, formulae appearing easier, their understanding has improved, they have started studying from the textbooks on their own, they get the right answers. (07)
5. Fear has reduced because their self-efficacy with respect to mathematics has improved. (03)

Although the reduction in the MARS Anxiety scores wasn't statistically significant, the subjective interviews revealed that the negative emotions attached to math anxiety saw a significant decline.

Effect on fear

When asked if the bridge course helped reduce their fear of mathematics, all 10 students replied in the affirmative. When probed about the reasons for the reduction in fear, the following thoughts emerged: (the numbers indicate the frequency)

1. Fear has reduced because they have a better grasp on the basics (03)
2. Fear has reduced because their confidence has increased (02)
3. Fear has reduced because the teachers have been very helpful (02)
4. Fear has reduced because their performance has improved. In their understanding improvement in performance is reflected by problem-solving becoming easier, formulae appearing easier, their understanding has improved, they have started studying from the textbooks on their own, they get the right answers. (07)
5. Fear has reduced because their self-efficacy with respect to mathematics has improved. (03)

Although the reduction in the MARS Anxiety scores wasn't statistically significant, the subjective interviews revealed that the negative emotions attached to math anxiety saw a significant decline.

Effect of use of art on math learning

All 10 students resonated that learning math was easier through art-based activities. These activities helped simplify math concepts. They found them enjoyable, useful and fun. Their perception of math as a tough and less-scoring subject was changed. Math was simplified. They liked and are motivated to practice problems now. Math classes were now easier to understand. Many students specified that the BODMAS session, the session on symbols and formulas, the session on exponents, and the square root clock were especially helpful.

Growth Mindset

In our efforts to develop a growth mindset (Boaler, 2015) among the students we stressed two major points. One that "mistakes are good. Your brain fires up when you make a mistake, so please share the mistakes with others so they can learn from them too." And the other is that "math is about understanding and making sense". When asked if they feel more comfortable with making mistakes in mathematics after the bridge course, 80% of them replied in the affirmative.

The overall reception of the Bridge Course:

All students expressed that they would recommend this course to their friends

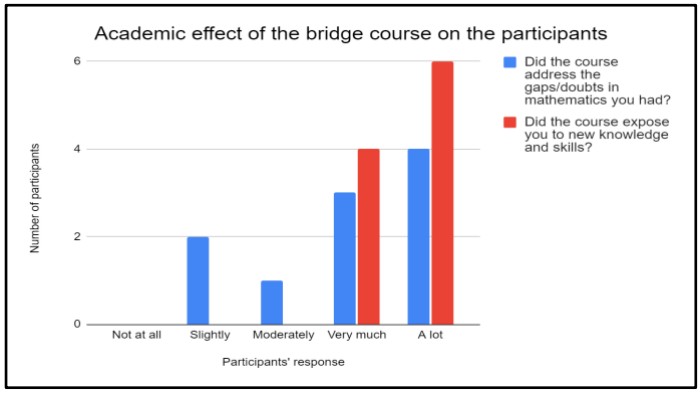


Figure 7: Academic effect of the bridge course

Figure 7 suggests that most students learned new knowledge and skills during the bridge course. The contents of the bridge course satisfied the gaps of 70% of the students but couldn't completely address those of 30%. In their answer to a separate question, all students found their current math coursework had become easier due to the bridge course. All the students said that the course would be useful and should be run in the first week of college.

Limitations of the research

Time constraint: Due to paucity of time, topics like quadratic equations and manipulations of linear equations couldn't be taught. The authors also wanted to conduct some sessions focused on building number sense and data analysis skills. These tools are important for their current curriculum and perhaps that's what some students found lacking.

2. Participation: Since the bridge course required additional time, for various personal reasons, many students dropped out of the bridge course. Also, we found that students with very high math anxiety scores didn't even enroll. As a remedy, some kind of preparatory orientation can be given before enrolment to increase sustained attendance and participation.

Conclusion

Results of the interviews indicate the impact of the Art-based Bridge program in reducing math anxiety, negative emotions such as avoidance associated with math anxiety. Art can be integrated into math classes even at the undergraduate level to address the debilitating effects of math anxiety.

In India, the Mathematics department of Azim Premji University runs a program exploring Math and Art for undergraduate students. At the University of Mumbai, however, no such integration is seen at the college level. In many schools in India today, especially at the primary/kindergarten level, such interventions are seen. There is a need for such integration at the college level since the math proficiency levels of our HSC students aren't up to the mark. Another aspect to consider is that teaching in India happens by a teacher for whom English is a second or third language and similarly, for the student, English, the usual medium of instruction in college under Mumbai University, is his/her second/third language. This makes the teaching-learning process more difficult and prone to assumptions and ambiguity. Art-based activities may reduce the need for such negotiations.(Sparapani et al., 2014)

Keeping in mind the results of this case study and the literature available, the authors plan to conduct another Art based Math bridge program and study it for a larger group of students. Worksheets created for this case study will be modified according to the feedback received during this case study and used for this larger group of students.

Acknowledgment

This research has been funded by the Minor Research Project grant 2019-20 given by the University of Mumbai, India. The authors are grateful to their Departmental colleagues, Research Circle Committee, and the College Principal with special mention to Mr. Suman Ganger for their support.

References

1. Arcavi, A. (2005). Developing and Using Symbol Sense in Mathematics. For the Learning of Mathematics, 25(2), 42-47.
2. ASER Centre. (2019). Retrieved August 15, 2019, from http://www.asercentre.org/education/data/india/statistics/level/p/66.html
3. Ashcraft, M. H. (2002). Math Anxiety: Personal, Educational, and Cognitive Consequences. Current Directions in Psychological Science, 11(5), 181-185. https://doi.org/10.1111/1467-8721.00196
4. Ashcraft, M. H., & Krause, J. A. (2007). Working memory, math performance, and math anxiety. Psychonomic Bulletin & Review, 14(2), 243-248. https://doi.org/10.3758/bf03194059
5. Bahr, P.R. Does Mathematics Remediation Work?: A Comparative Analysis of Academic Attainment among Community College Students. Res High Educ 49, 420–450 (2008). https://doi.org/10.1007/s11162-008-9089-4
6. Bequette, J. W., & Bequette, M. B. (2012). A Place for Art and Design Education in the STEM Conversation. Art Education, 65(2), 40-47. https://doi.org/10.1080/00043125.2012.11519167
7. Bhandary, S. (2019, June 3). BCom results: How Mumbai University passed the test with flying colours. Hindustan Times. https://www.hindustantimes.com/mumbai-news/bcom-results-how-mumbai-university-passed-the-test-with-flying-colours/story-PFQm6djbcgqblE7vFKjPnO.html
8. Bickley-Green, C. A. (1995). Math and Art Curriculum Integration: A Post-Modern Foundation. Studies in Art Education, 37(1), 6. https://doi.org/10.2307/1320488
9. Bishop, A., Clements, M., Keitel-Kreidt, C., Kilpatrick, J., & Laborde, C. (2012). International Handbook of Mathematics Education. Springer Science & Business Media.
10. Boaler, J. (2015). Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching. John Wiley & Sons.
11. Briggs, S. (2015, November 8). How Integrating Arts Into Other Subjects Makes Learning Come Alive. https://www.opencolleges.edu.au/informed/features/how-integrating-arts-into-other-subjects-makes-learning-come-alive/
12. Büchele, S. (2020). Bridging the gap – How effective are remedial math courses in Germany? Studies in Educational Evaluation, 64, 100832. https://doi.org/10.1016/j.stueduc.2019.100832
13. Carneiro, C. (2000). Art and the brain in the learning process. Retrieved November 29, 2020, from http://www.cerebromente.org.br/n12/opiniao/criatividade2_i.html
14. Carnevale, A. P., & Desrochers, D. M. (2003). The Democratization of Mathematics. In Quantitative Literacy: Why Numeracy Matters for Schools & College (pp. 21-31). National Council on Education and the Disciplines.
15. Cunningham, C. (2016, November 11). Cobb receives state grant for arts integration. Atlanta. New. Now. https://www.ajc.com/news/local/cobb-receives-state-grant-for-arts-integration/fcOKPoh4F37TgNzNWfxEKI/

16. Day, E. E. (1946). The Role of Administration in Higher Education. The Journal of Higher Education, 17(7), 339. https://doi.org/10.2307/1975797
17. Edens, K., & Potter, E. (2007). The Relationship of Drawing and Mathematical Problem Solving: Draw for Math Tasks. Studies in Art Education, 48(3), 282-298. https://doi.org/10.1080/00393541.2007.11650106
18. Essen, G. V., & Hamaker, C. (1990). Using Self-Generated Drawings to Solve Arithmetic Word Problems. The Journal of Educational Research, 83(6), 301-312. https://doi.org/10.1080/00220671.1990.10885976
19. Exploring exponents. (2020, April 8). YouCubed. https://www.youcubed.org/tasks/exploring-exponents/
20. Fatima, R. (n.d.). Role of Mathematics in the Development of Society. http://www.ncert.nic.in/pdf_files/Final-Article-Role%20of%20Mathematics%20in%20the%20Development%20ofSociety-NCER-.pdf
21. The four 4's. (2020, April 8). YouCubed. https://www.youcubed.org/tasks/the-four-4s/
22. Georgette. (2008). STEAM Education: an overview of creating a model of integrative education [Master's thesis]. https://www.researchgate.net/publication/327351326_STEAM_Education_an_overview_of_creating_a_model_of_integrative_education
23. Giridhar, S. (2010). Learning Curve: Special Issue on School Mathematics (1st ed.). Azim Premji University.
24. Hammill, D. D., & Bartel, N. R. (1990). Teaching students with learning and behavior problems. Allyn & Bacon.
25. Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. Journal for Research in Mathematics Education, 21(1), 33-46. https://doi.org/10.5951/jresematheduc.21.1.0033
26. Jain, S., & Dowson, M. (2009). Mathematics anxiety as a function of multidimensional self-regulation and self-efficacy. Contemporary Educational Psychology, 34(3), 240-249. https://doi.org/10.1016/j.cedpsych.2009.05.004
27. Ko, Y., An, J., & Park, N. (2012). Development of Computer, Math, Art Convergence Education Lesson Plans Based on Smart Grid Technology. Communications in Computer and Information Science, 109-114. https://doi.org/10.1007/978-3-642-35264-5_15
28. Kumari, L. (n.d.). INTEGRATION OF MATHEMATICS WITH ART [PDF document]. http://www.ncert.nic.in/pdf_files/Loveneet_kumari.pdf
29. Mammarella, I. C., Caviola, S., & Dowker, A. (2019). Mathematics anxiety: What is known, and what is still missing. Routledge.
30. Nahornick, A. (2016). Math Matters: Comparison of the Mathematics Requirements for Bachelor of Arts and Bachelor of Science Degrees in Canada. Canadian Journal of Higher Education, 46(1), 109-120.
31. Paper folding. (2020, April 8). YouCubed. https://www.youcubed.org/tasks/paper-folding/

32. Rampal, A., Ramanujam, R., & Saraswati, L. S. (1998). Numeracy counts. A handbook for literacy activists and resource persons. National Literacy Resource Centre, LBSNAA National Academy of Administration.
33. Richardson, F. C., & Suinn, R. M. (1972). The mathematics anxiety rating scale: Psychometric data. Journal of Counseling Psychology, 19(6), p.551-554. https://doi.org/10.1037/h0033456
34. Sparapani, E. F., Callejo Perez, D., Gould, J., Hillman, S., & Clark, L. (2014). A Global Curriculum? Understanding Teaching and Learning in the United States, Taiwan, India, and Mexico. SAGE Open, 4(2), 215824401453640. https://doi.org/10.1177/2158244014536406
35. STATISTICS HSC. (2019). https://www.mahahsscboard.in/statisticshsc.htm. Retrieved August 15, 2019,
36. Suinn, R. M., & Winston, E. H. (2003). The mathematics anxiety rating scale, a brief version: Psychometric data. Psychological Reports, 92(1), 167-173. https://doi.org/10.2466/pr0.2003.92.1.167
37. ThePrint Team. (2021, July 14). Students scared of math in Indian middle schools, the fear only grows with time, survey says. ThePrint. https://theprint.in/india/education/students-scared-of-math-in-indian-middle-schools-the-fear-only-grows-with-time-survey-says/695916/
38. Tiwari, N. (Ed.). (2011). Learning Curve: A special Issue on Sports in Education. Azim Premji University.
39. Uppal, S. (Ed.). (2015). Training Package on Art Education for Primary Teachers Art Education Volume II (1st ed.). National Council of Educational Research and Training.

Usage of Technology-Mediated Biology Instruction

**** Andrea Coutinho***

** Sophia College (Autonomous), Mumbai, Maharashtra 400026.*

** Corresponding email: andreawas2023@gmail.com*

Abstract

Visual presentation in multimedia is used by teacher instructional technologies in their classrooms to promote effectiveness in learning and skill development. Biology teachers use a wide range of ICT tools in schools and colleges, although it is very difficult to provide student-centered instruction and assessment. The researcher wants to understand the usage and rationale for using ICT in biology classrooms in urban colleges, so that she can identify the issues, merits and perceptions of biology teachers about using educational multimedia. The theoretical basis is also important so as to devise an effective and pragmatic implementation policy for computer-aided biology instruction. Interviews of 20 biology teachers in five colleges of south Mumbai, revealed that they used the internet to enhance lectures, for research work, to enhance laboratory practicals and for students to review their learning, in project work and in the laboratory work. Teachers felt encouraged to use ICT infrastructure to promote students' knowledge, due to available technical support. A few biology teachers in Sophia College felt inhibited to use PPTs due to a lack of technology resources, a lack of a 'departmental technology' plan, less access to computers/tablets, software problems, equipment malfunction; and they preferred students' active participation.

Keywords: Instructional technologies, Student-centered, Biology instruction, Educational multimedia, ICT infrastructure

Introduction

Teachers manage an electronic generation of students, whose everyday life is primarily based on visual and auditory communication. It is important to facilitate the effective instruction of visual learners through image-rich instructional tools, as is important to promote the learning of auditory learners through discussions and lectures. While multimedia effectively provides effective learning experiences, it also enables teachers to enhance class participation in the right teacher's, improve their teaching techniques and achieve learning outcomes. Teachers and students connect through social media, email and video conferencing. Some science teachers are reluctant to use new ICTs because they do not see it improving their students' learning. Others depend totally on ICT for science instruction, because of its vast scope for individualized learning, its updated

knowledge bank and extensive availability of contemporary data resources, museums and online libraries, as well as science classrooms and virtual field trips, across the world.

The five urban colleges, affiliated to the University of Mumbai, were re-accredited for the third time, with high CGPA grades. They were grant-in-aided by the state government for some courses. They conducted Higher Secondary courses in Arts, Science, Commerce and Vocational streams, Undergraduate courses in BA, BSc. (Biochemistry, Biophysics, Chemistry, Life Sciences, Maths & Stats, Microbiology, Physics and Zoology), BMM, BBA and BSc-IT; PG Diplomas in Medical Laboratory Technology, Laboratory Management and Quality Assurance in the Foods/Pharmaceuticals Industry; MSc courses in Life Sciences, Applied Biology, Biochemistry, Biophysics and Chemistry; and new PhD programmes.

All Science departments have requisite computers. The faculty have dedicated departmental laptops. The college general staff rooms have computers and an internet broadband connection. The libraries have photocopying counters, open access facilities, online journals, an AV section (with numerous audio, video, CD-ROMs, films, maps and scan-resources), computers, scanners, printers and an internet broadband connection. The classrooms have fixed overhead LCD projectors and dedicated laptops. The college timetable Committee allotted at least one technology enriched classroom to each lecturer/professor, to promote the use of AV instructional material in classrooms.

The computer laboratories were established with UGC funding, and also conducted short term courses in Computer Basics, Programming Languages C, C++ & Java, Tally, Photoshop, Corel Draw and Web Design; are conducted for a nominal fee. The computer centres were Authorized Learning Centres (ALC) for the MS-CIT, MS-ACIT and KLiC (Data Management course: Advanced Excel) online courses certified by the Maharashtra Knowledge Commission Limited (MKCL), a state government subsidiary.

Significance of the Study

Science students need skills that are "not only needed by scientists, but by every citizen in order to become a scientifically literate person able to function in a society where science has a major role and impact on daily life" (Huppert et al., 2002, 807). Many college and university administrators expect their faculty to use ICTs to extend quality, access, and equity in higher education. The science departments get grants which impact their educational and research programmes. The root question is: with all its digital educational facilities, have these colleges adequately integrated ICT-enabled learning and teaching in its science programmes? Hence, it is very important to assess if the science (especially biology) teachers of these five urban colleges

provide optimum ICT enabled instruction for students in the junior and senior college programmes.

Definition of Terms

Each discipline develops a working vocabulary, and so the discipline of educational technology has increased the use of technology terms & phrases in education.

a. Browser: Software to see internet sites as graphic images, and not just as text.
b. Compact-Disc Read-Only Memory (CD-ROM): A multimedia platform that can include presentations, animations, tutorials, quizzes, glossaries of key terms.
c. Email (Electronic Mail): Messages sent via computers or mobile phones.
d. ICT: Information and Communication Technology.
e. Multimedia: Integrating several media (text, graphics, animation, audio, video).
f. Network: A set of connected people or computers.
g. Online: Being connected to the internet during an activity.
h. PowerPoint: A complete presentation graphics package.
i. WebCT: A web-based set of course tools designed to deliver online learning.
j. Web Page: A single screen of information that may contain text, images, animation and perhaps sound and video.
k. WhatsApp: Messenger service to send instant text, images, PDF, Word, PPT, Excel, etc.,
l. World Wide Web (WWW): An internet system, which displays sites as graphic images and connects information among, and between sites, through hypertext links.

Related Literature

a. Bitok E. B (2012) investigated Kenyan secondary biology teachers' perception and support in using ICT. The biology teachers showed a positive perception in the integration of ICT in Biology and also recommended on-going administrative support to use computers in instructional activities.
b. Dubey Arun K. (2009) found that secondary students trained on a multimedia package performed better than conventional teaching for biology. He concluded that there is no difference among genders in their science achievement, while using multimedia packages.
c. Jahan Israt et al. (2014) used a triangulation approach (teaching aids, ensuring student participation, "student-centered" activities) to ensure students quality learning, in grade IX instruction in Biology in Bangladesh.
d. Ludwig T. E. (2004) suggested that teachers need to display instruction through a digital projector; or a TV/VCR, videotapes, and to obtain good legal multimedia content.

e. Millen James A. (2003) Teachers in Florida's Community Colleges were less likely to use ICT in their classrooms and laboratories, without training and digital infrastructure.
f. Nachimuthu K. (2012) concluded that the use of multimedia programmes impacts positively on the B.Ed student teachers, improves perceptions on Colour concept of the diagrammatic skills of student teacher knowledge; and found significant differences between male and female secondary student teachers in perception and attitude towards multimedia on biology.
g. O'Day D. H.(2007) showed that long-term memory retention improved, 21 days after viewing a biology animation without narration as compared with equivalent graphics.
h. Schut C. (2007) found that students preferred the interactive white board instruction through enhanced visuals and notes.

Research Questions

The information gathered from the biology teachers (from the departments of Biology, Life Sciences, Zoology, Biochemistry, Biophysics and Microbiology), will direct me to respond to these questions:

1. To what extent are Biology teachers using the Internet?
2. Which factors encourage Biology teachers to use the Internet?
3. Which factors inhibit Biology teachers from using the Internet?
4. To what extent are Biology teachers using the Multimedia?
5. Which factors encourage Biology teachers to use Multimedia?
6. Which factors inhibit Biology teachers to use Multimedia?
7. How do Biology teachers communicate with their students outside the classroom?

Objectives of the Study

1. To comprehend how ICT is used in biology classrooms and laboratories.
2. To understand the issues, merits, and perceptions of biology teachers for usage of ICT
3. To understand the foundation reasons for using ICT in biology education
4. To make a pragmatic policy for ICT usage in biology instruction.

Sample of the Study

A total of 20 teachers formed the sample of this study:

1. Four teachers of the higher secondary educational (junior college level)
2. Sixteen teachers of the higher educational level (senior college level).

Tools of the Study for Data collection

The primary research question that generated this survey was, "What factors encourage and inhibit the use of educational technology in the teaching of biology? The format of the two-part survey was a linear and tabular checklist for some items and a rating scale for other items.

Figure 1: The extent of use of internet resources by biology teachers in the classroom and in the laboratory

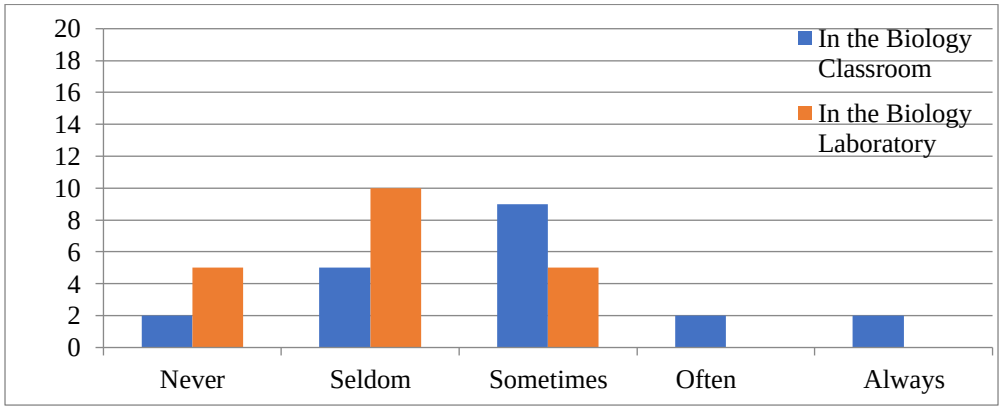
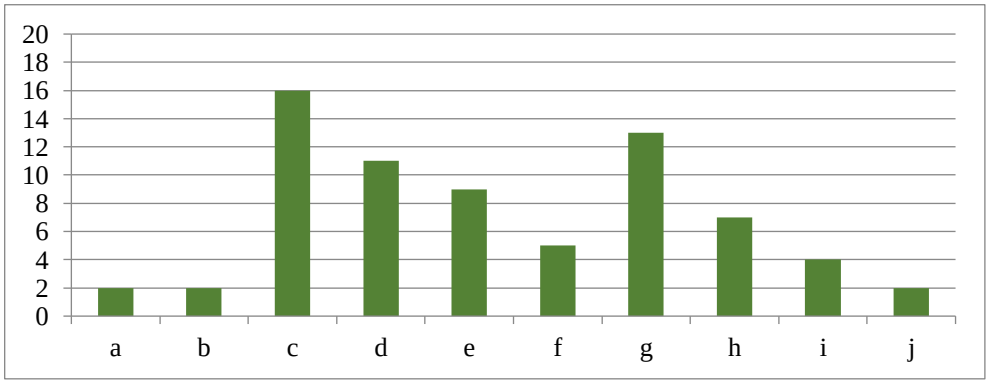


Figure 1 shows only one-tenth of the teachers had never used the internet in the classroom, during lectures; although nearly half reported that they had sometimes used the internet in the classroom. In the laboratory, the number that had never used the internet rose to one-fourth, although a small group of one-fourth teachers sometimes used the internet in the laboratory.

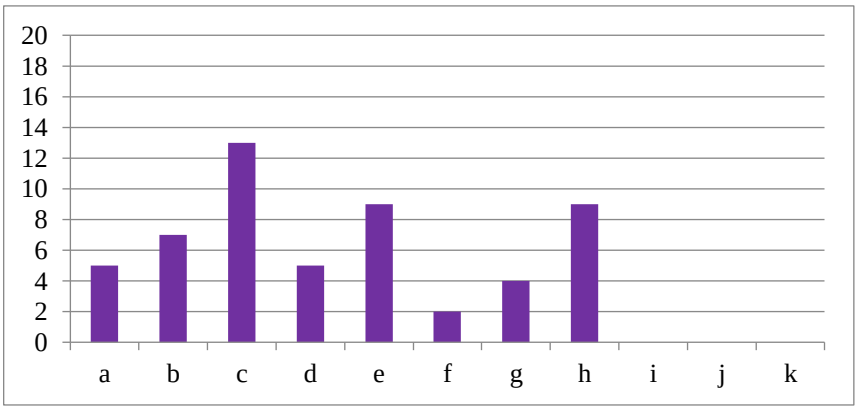
Figure 2 Teacher's use of internet resources for biology instruction



a. In place of the lecture
b. In place of laboratory practical
c. To enhance the lecture
d. To enhance laboratory practical
e. As a review for students
f. For student assignments
g. For research work
h. For students project work and reports
i. For students online quizzes
j. For additional online laboratories

Figure 2 shows that nearly four-fifths of the biology teachers use the internet to enhance their lectures; three-fifths use the internet for research work; while half use the internet to enhance laboratory practical and for students to review their learning. Nearly one-third teachers used the internet for students' project work.

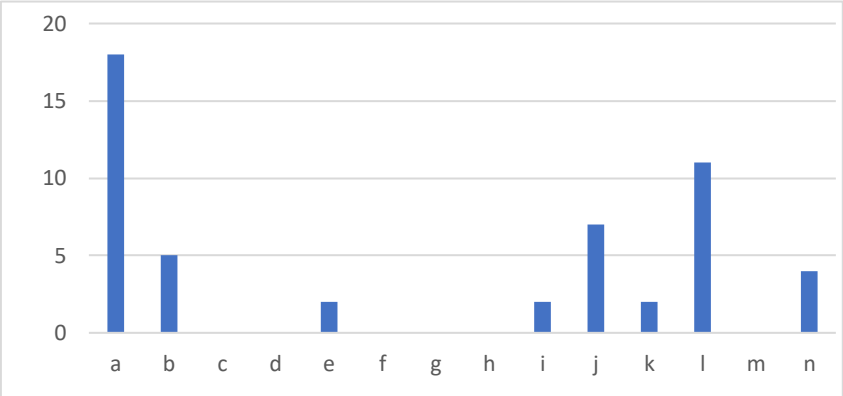
Figure 3: Factors that encourage the biology teacher's use of internet in classrooms and laboratories.



a. Easy access
b. Tech support available
c. Current information
d. Syllabus needs it
e. Students need to know.
f. Training provided.
g. Available technology planned session.
h. Teacher's interest
i. Pressure from students
j. Pressure from administrators
k. Pressure for department & colleagues

Figure 3 shows that nearly three-fifths of the biology teachers were encouraged to use the internet to source current information; nearly half were encouraged out of interest and to promote students' knowledge; while nearly one-third teachers were encouraged to use the internet because technological support was available.

Figure 4: Factors that inhibit the biology teacher's use of internet in classrooms and laboratories.



a. A lack of connectivity for teachers
b. A lack of means of projection.
c. A lack of training to use technology.
d. A lack of teacher's interest
e. A lack of preparation time
f. No administrator encouragement
g. No colleague encouragement
h. A lack of college/department plan
i. A lack of technology resources
j. A lack of access to computers & tablets
k. Prefer traditional instructional methods.
l. Prefer more student active participation.
m. Time lost from traditional methods.
n. Equipment malfunction

Figure 4 shows that most of the biology teachers are inhibited from using the internet in classrooms and laboratories, because of a lack of internet connectivity, i.e., no wiring nor Wi-Fi connection is provided in the classrooms and laboratories. More than half the biology teachers reported that they faced a lack of technology resources for teachers, while nearly one-third teachers were inhibited from using the internet because of a lack of access to computers and tablets. At least one-fifth reported a lack of adequate projection and equipment malfunction.

Figure 5 A: The biology teacher's use of multimedia in the classrooms

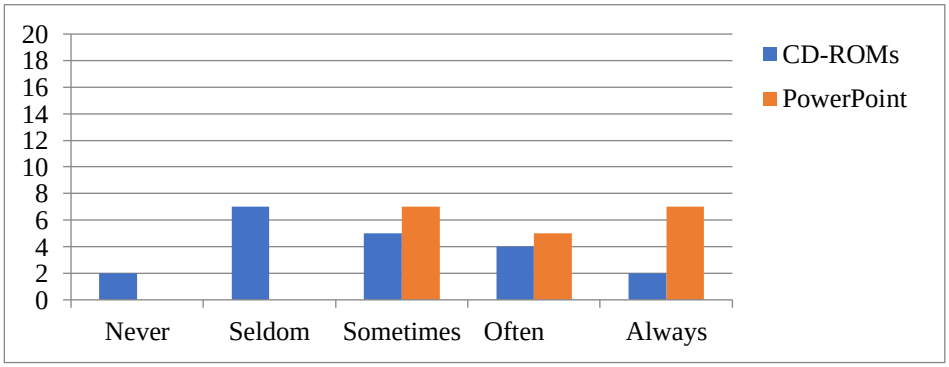


Figure 5 (A) shows only one-tenth of biology teachers never used CD-ROMs in the classroom; although nearly half reported that they do use CD-ROMs in the classroom. Half the teachers use PowerPoint presentations quite often. One-tenth teachers always use CD-ROMs in the classroom, while one-third teachers always use PPTs in the classroom.

5 B: The biology teacher's use of multimedia in the laboratories

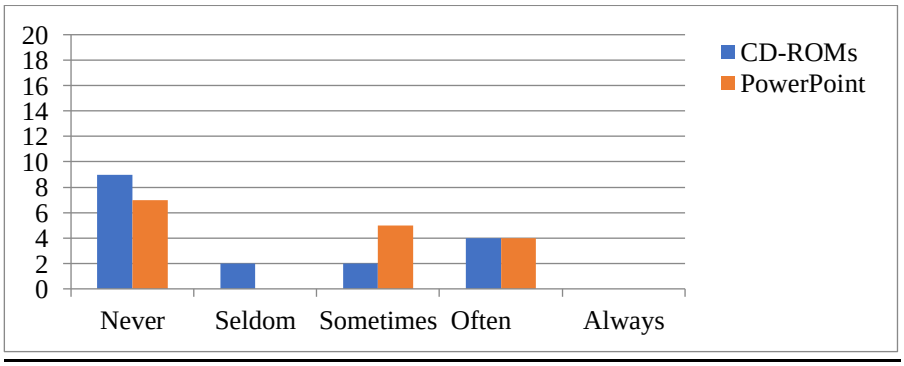
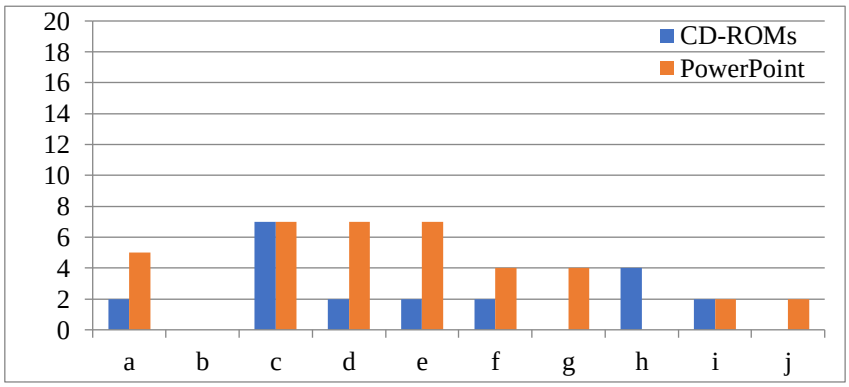


Figure 5 (B) shows nearly half the biology teachers never used CD-ROMs in the laboratories, while nearly one-third teachers never used PPTs in the laboratories. A small number of biology teachers reported that they do use CD-ROMs and PPTs in the laboratories, to some extent.

Figure 6: The biology teacher's use of multimedia for instruction



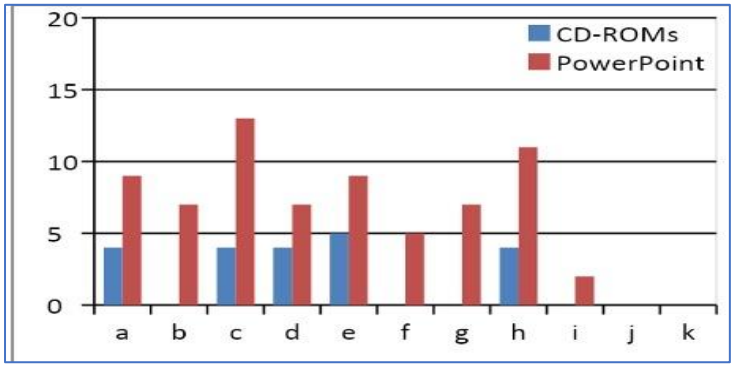
a. Use multimedia in place of the lecture
b. Use multimedia in place of the practical
c. Use multimedia in to enhance lectures
d. Use multimedia in to enhance practical
e. As a review for students learning
f. To give student assignments
g. For study groups
h. Use CD-ROMs inside biology books
i. For students offline quizzes
j. For additional online laboratory work

Figure 6 shows only one-third of biology teachers use multimedia like CD-ROMs to enhance lectures, while a few biology teachers use CD-ROMs inside reference books for instructional purposes. Smaller groups use CD-ROMs to replace lectures, to enhance practical, for students to review their learning, and to give student-assignments and offline quizzes.

Teachers preferred to use PPT presentations, in comparison to CD-ROMs.

Three teacher groups of one-third each, use PPT presentations to enhance lectures and practical, and as a review for students' learning. Smaller groups use PPTs to replace lectures, give student-assignments and for study groups.

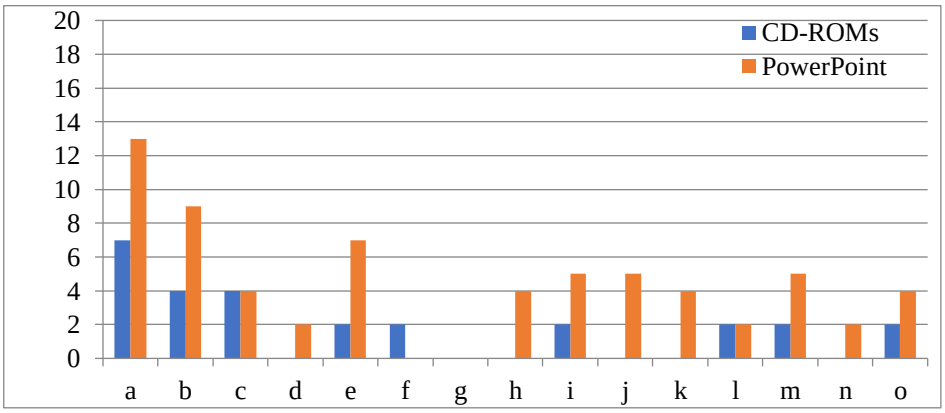
Figure 7: Factors that encourage the biology teacher's use of multimedia in classrooms and laboratories.



a. Easy access to multimedia
b. Can post lectures on website / email.
c. Good for visual learners
d. CD with text/images available with book
e. Students need to know.
f. Training in multimedia is provided.
g. Available technology plan or vision
h. Teacher's interest in using multimedia.
i. Pressure from students to use multimedia.
j. Pressure from administrators
k. Pressure for department and colleagues

Figure 7 shows only one-fourth of biology teachers were encouraged to use multimedia as they wanted to upgrade students' knowledge, while four groups had easy access to them. Teachers were more encouraged to use PPT presentations rather than CD-ROMs. More than three-fifth of biology teachers felt encouraged to use PPTs as they were good for visual learning. Three groups of one-third each, were encouraged to post PPTs online. A few biology teachers use PPTs as they were provided training individually or through the MS-CIT course.

Figure 8: Factors that inhibit the Biology Teacher's Use of Multimedia in the Classrooms and Laboratories



a. A lack of connectivity for teachers
b. A lack of means of projection
c. A lack of training to use technology
d. A lack of teacher's interest
e. A lack of preparation time
f. No administrator encouragement
g. No colleague encouragement
h. A lack of college/department plan
i. A lack of technology resources
j. A lack of access to computers & tablets
k. Software problems encountered
l. Prefer traditional instructional methods
m. Prefer more student active participation
n. Time lost from traditional methods
o. Equipment malfunction

Figure 8 shows nearly one-third of biology teachers feel inhibited to use CD-ROMs as there was a lack of connectivity i.e. no wiring nor a Wi-Fi connection is provided in the classrooms and laboratories. Two groups of one-fifth each reported a lack of adequate projection, a lack of training to use CD-ROMs and a lack of technology resources. A few teachers indicated equipment malfunction, a preference for using traditional instructional methods. More than three-fifths of the biology teachers reported that they felt inhibited to use PPTs as there was a lack of connectivity/projection in the classrooms and laboratories.

Figure 9: Biology teacher-pupils communication outside the classroom

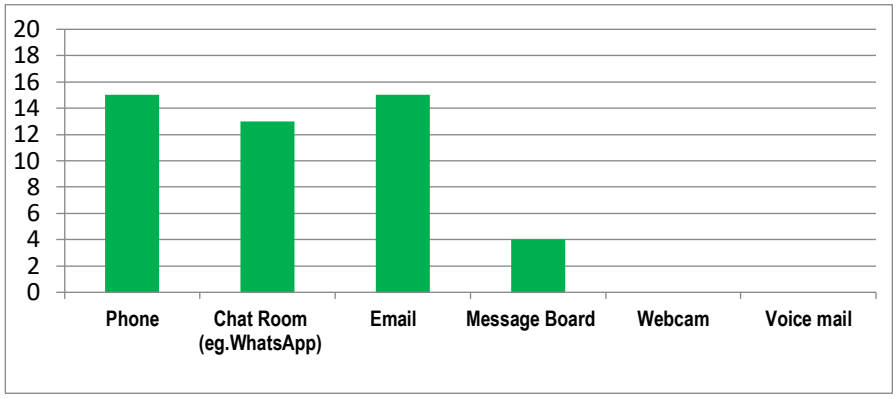


Figure 9 shows three-fourths of the biology teachers communicate with their students outside the classroom via phones and emails. More than three-fifths of the biology teachers communicate with their students outside the classroom via chat-services like WhatsApp, while one-fifth of the biology teachers communicate via message-boards.

Conclusions

The main purpose of this study was to list the factors that stop and promote the use of ICT by biology teachers. The literature suggests that technology planning, adequate resources and time, training, access to computers and teacher interest are important elements in the effective implementation of technology policies in colleges. The results of this survey are:

1. The Biology teachers used the internet to enhance lectures, for research work, to enhance laboratory practicals and for students to review their learning and project work.
2. They felt encouraged to use the internet to source information, out of personal interest, to promote students' knowledge, due to available technical support.
3. Most biology teachers used PPTs in preference to CD-ROMs in the classroom. They felt encouraged to use PPTs for visual learning, by their MS-CIT course training, to post PPTs online, embed it with text/images content; and they had a basic technology policy.
4. Many biology teachers communicate with their students outside the classroom by phone, email and via chat-services like WhatsApp
5. They were inhibited from regularly using the internet in classrooms and laboratories, because of a lack of internet connectivity, a lack of technology resources for teachers; a lack of access to computers/tablets and a lack of adequate projection and equipment malfunction.
6. A few biology teachers in Sophia College felt inhibited to use PPTs due to a lack of technology resources, a lack of a ‘departmental technology’ plan, less access to computers/tablets, software problems, equipment malfunction; and they preferred students’ active participation.

ICT is an expensive resource to provide to all teachers and students. Access to computers and projection technology is important for science education. In the previous academic year 2022-to-2023, the colleges have increased the number of laptops, desktop computers and LCD and portable projectors for its laboratories and classrooms. Smart Boards and TV consoles were installed in classrooms and corridors respectively. Effective ICT maintenance schedules must be followed for optimum ICT use by teachers.

It is evident that biology teachers are interested in using ICT resources efficiently and effectively for their students' benefit. It is impossible to provide each science teacher with a computer or laptop or tablet as resources are scarce. Although the science departments have computers, it is evident that some biology teachers still want more resources and training in using ICT. There are many salient factors that encouraged the biology teachers to use the internet and multimedia in their instructional activities. Hence, colleges need a Technology Committee which must present a technology plan for each academic year. It must also facilitate the training of biology teachers to use new ICT effectively. The technology committee must comprise heads of departments, ICT skilled faculty, technology experts and the principal. Teacher training in ICT skills is extremely important. These five colleges offer both the MSCIT and the ACIT courses to faculty and students. Yet, more comprehensive training and andragogical sound instructional strategies, including mentoring and modeling are critical to successful ICT use in colleges. Despite teacher interest, college policies and upgraded curricula, if the biology teachers do not feel confident and enthused about new ICT implementation, they will proceed with didactic teaching-learning methods. Too often change facilitators get involved in the new technology and fail to address the needs of the people involved. Hence, administrators must understand the technology needs of their faculty for effective instructional practices.

It is not surprising that most of the biology teachers communicate with their students through smart phones, emails and WhatsApp messenger. This promotes access to teacher facilitation that is very important to GenNext. In addition, access to daily instruction can be brought about by using LMS like Moodle, which keeps the teacher-pupil connection strong.

Suggestions for future studies and technology implementation

Science teachers must accept that learning styles of active learners and reflective learners are important. Active learners might possess high interpersonal intelligence, whereas reflective learners might excel in the domain of intrapersonal intelligence (Howard Gardner's theory of Multiple Intelligences). Using offline or online multimedia promotes multi-sensorial learning, advocates different learning styles and thus is an effective resource-based learning and teaching

method that is effective, innovative and inclusive. Hence, teachers must use audiovisual resources and thereby facilitate learning styles and multiple intelligences.

Teachers and administrators may probably use the results of this study to improve instructional systems in urban biology classrooms in India. In addition, there is a need to study the way that students and teachers view the use of ICT, so as to improve the resources and strategies in educational technology, in practice and in theory. Only then will we move from crossing the 'digital divide' to getting a 'digital dividend'!

References

1. Alison (2011) Talking Teaching: Challenges in Teaching Biology, Retrieved 26 August 2022 from https://talkingteaching.wordpress.com/2011/12/01/challenges-in-teaching-biology/
2. Audio visual Education, Retrieved 6 Jul 2021 https://en.wikipedia.org/wiki/Audiovisualedu
3. Bitok Emily B. (2012), Teachers' Perception and Support on the Use of ICT in Tg-Lg Biology in Kenya schools, Retrieved 28 August 2016 from
4. https://www.ijsr.net/archive/v3i11/U1VCMTQxMA%3D%3D.pdf
5. Choosing and Using Instructional Resources (2004), Retrieved 26 August 2022, from http://www.nap.edu/read/5287/chapter/8#54
6. Dubey Arun K. (2012), Impact of Multimedia on Achievement of Science in VIII Std. students. Retrieved 15 August 2020
   http:// pssou.ac.in /ADMIN%5CPHD_SUMMARY_ RECOMMENDATION%5C43.pdf
7. Gardner H. Frames of Mind: The Theory of Multiple Intelligences. (1993) Tenth Anniversary Edition with new introduction, New York: Basic Books.
8. Huppert et al., (2992) Using Multimedia Tools to Help Students Learn Science. Retrieved 26 August 2022 from http://www.cited.org/index.aspx?page_id=148#ref
9. Jahan Israt et al. (2014), Biology Teaching-Learning Practices in Secondary Schools of Bangladesh. Retrieved 25 August 2022 from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2506747
10. Khatoon Zakia et al. (2014), In-Service Teachers' Perception About Their Competencies In Delivery of Biology Lessons, Retrieved 25 August 2022 from http://www.aessweb.com/pdf-files/ijass-2014-4(7)-820-834.pdf
11. Kramer D. W. (1997), WIRED Biology: Using Computers and the Internet to Enhance Teaching and Learning. Retrieved 26 August 2022 from http://botany.org/bsa/montreal/wired.html
12. Millen, J.W. (2003), Factors Affecting the Implementation And Use of Technology in Teaching Biology Courses in Florida's Community Colleges. Retrieved 26 August 2022, http://espace.library.curtin.edu.au:80/R?func=dbin-jump-full&local_base=gen01-era02&object_id=14587
13. Nachimuthu K. (2012), Improve the Attitude & Perception Abilities Through Multimedia in Biology. Retrieved 1 August 2021 http://ijepr.org/doc/V1_%20Is1_%20July12/1.pdf

14. O'Day, Danton H. (2002), The Value of Animations in Biology Teaching: A Study of Long-Term Memory Retention. Retrieved 26 August 2021 from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1964525/
15. Schut C. (2007), Student Perceptions of Interactive Whiteboards in Biology Classrooms Retrieved 3 Aug 2022 http://digitalcommons.cedarville.edu/cgi/viewcontent.cgi?article=1015&context=education_theses
16. Science Teaching Reconsidered (1997), National Academy Press, WDC, Retrieved 26 August 2022, from http://www.nap.edu/read/5287/chapter/1#xiii
17. Tanner K. and Allen D. (2005), Approaches to Biology Teaching and Learning: Learning Styles & the Problem of Instructional Selection-—Engaging All Students in Science Courses, Retrieved 15 July 2022, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC533116/
18. Using Multimedia in Classroom Presentations: Best Principles (2007). Retrieved 8 July 2022 from http://teach psych.org/Resources/Documents otrp/pedagogy/classroommultimedia.pdf

Entrepreneurship Education

**** Kalpana Chavan***

** Assistant Professor, St. Xavier's Institute of Education (Autonomous), Mumbai*

** Corresponding email: kalpana@sxie.in*

Abstract

Higher Education has to be connected to application of knowledge and creation of new knowledge. The unfortunate part of education is the lack of employability skills amongst the graduates. There is a gap between the conceptual and procedural knowledge, which allows the version Education 1.0 still to prevail in our education system. The paper is an attempt to bridge the gap between theory and application in higher education with entrepreneurship education as a connecting link between the two. The paper draws attention that the entrepreneurship can be integrated in education from aims of education, to curriculum, to methods of teaching, assessment and role of teacher. The paper also interconnects education to social entrepreneurship for betterment of the society. The nation's economic development and visibility on the global face can be when there is evolution of education, especially higher education from the version 1.0 to 4.0. The entrepreneurship in education is amalgamation of the heart, head and the hand, which will make entrepreneurship mindset a part of any education, not limiting it to only students of economics and commerce, but any stream of academic discipline. To conclude, the paper presents a rationale for entrepreneurship education, with illustration of applying it in the college of education.

Keywords: Entrepreneurship skills, entrepreneurship education, integration, pedagogical, social.

Introduction

In the eighth edition which was presented in the India Skills Report that less than half of the Indian graduates are employable, and the reason is professional skills are lacking. "The report stated in 2021, nearly 45.9 percent of graduates are found employable, a decline from 46.21 percent in 2020 and 47.38 percent in 2019." The question arises why a young country with the potential raw material seems to be inadequate in achieving the outcome of national developmental goals. The answer might be obvious or too simplistic. The raw material is not processed with the ability to be contributors of the changing needs and times of the society and the nation. The process is in

the hands of the education system, and all the facets that come under its spectrum. It may be unfair to blame everything on the education system, but there is some element of truth in it.

The development of the people whether economic or socio-cultural requires an entrepreneurial and innovative bend of mind, this has been underscored even by the higher education of India. But it is not easy to convert centuries old education system of conventional education version of 1.0 into innovative, make in India version of 4.0. "Building a culture of entrepreneurship requires a fundamental rethinking of educational systems, both formal and informal, as well as the way in which lecturers or educators are trained, how examination systems function and the way in which rewards, recognition and incentives are given" (World Economic Forum). There is a need for rethinking, revisualizing higher education from a more alleviated and futuristic perspective.

Present Education System

The education system presently in India is also conducive to creating a follower mindset wherein the pre-determined knowledge is transmitted from the authority to the follower, for quiet submission and this can be evaluated with the examination system which can be even more demanding on reproduction of what has been already taught. The education system started with an intention to have people who will be able to work with machines as skilled labourers. The Factory Model of Education led the education system to have the features of being transmitted the education as in a factory, with set timings, assembly lines, strict adherence to schedules, already pre-determined work allocation, without any choice or inclinations looked into, and most importantly the intention was completing the outputs as expected by the goal setters without having any sense of belongingness of ownership of it. Thus, the content in the classroom was mechanically but very strictly delivered in the classrooms. The teacher was the only dominating personality in the classroom whose task was to pour information and evaluate whether it is absorbed verbatim. The students were the passive recipients of the subjects and their performance was judged by the marks driven exams . The subjects taught like Mathematics, English grammar and likes were promoting following the rules, getting answers by just repetition and following what was handed down in the prescribed books or notes. The traditional classroom transacted bookish knowledge with the chalk talk style, with no students allowed to think on their own or raise any doubt or questions. This total submission and obedience were a cornerstone of the factory model of education and the annihilation of the creative and innovative education system. Thus, there was hardly any exposure to experiential learning or learning by doing. The spirit of innovations, enterprising way of looking at things were not considered. The vocational training was meant for any skills required in the factory and not for any creativity or innovations. The curriculum does not include the skills required for entrepreneurial training. Performance is based

on assessments and marks driven and not innovative as per the changing face of the society. The education 1.0 that is the version of the factory model is not an event from the past. It is still very much prevalent as a social evil in today's education system too. There are still many high schools and higher education institutions who follow this way of transmitting knowledge.

It is not that the students don't want to learn in any other way or teachers cannot teach the content differently. The system is set in such a way that there needs to be a revamping of the goals of education, the syllabus and curriculum and the methods of teaching. Most importantly, the evaluation pattern has to change from promoting reproduction verbatim what is taught in the classroom to the application aspect resulting in fostering thinking education prepared to be the producers of knowledge.

Rethinking Education

In this context, the question arises then what becomes the renewed role of the higher education. The role of Higher Education is to develop an education system promoting not a follower mentality but an entrepreneurial mindset. It is about the mindset which can lead the learner to be in charge of their education with intention of analyzing, applying, valuing and creating knowledge construction. The approach to teaching and learning has to be experience based and learner centred There has to be a strong belief ingrained in the students that the entrepreneur is a part of each one of us, it requires a little efforts and attitude to draw it out. The entrepreneurship mindset is not about just ruthless profit making or risk taking, but also connected to social outreach so as to create something that can be relevant and beneficial to the society. Thus, in education there is social entrepreneurship which is context based and with the purpose of development of the society. This can be easily integrated in the education system.

Recommendations of NEP 2020

The NEP 2020 focuses on vocational training to be integrated with general education, so that the students acquire various skills to meet the needs of the industries. A curriculum for entrepreneurship should focus on direct experience of equipping vocational skills. The vocational crafts of gardening, metal work, electric work, pottery, etc. can be inculcated from the very young age. NEP 2020 envisions that school and higher education by 2025 will be educated about vocational education and skills , leading them to entrepreneurship skills and attitude. The Entrepreneurship in education is encouraged with development of National Skill Qualification Framework NSQF right from school education. It has been recommended that the vocational skills in the curriculum, in co-curricular activities, participation with the industry, entrepreneurial initiatives.

Integration of the entrepreneurship in the education system

Entrepreneurship was initially considered as an economic related, profit-making concept. It was considered either as an inborn talent or a part of family business. But when we integrate entrepreneurship in education, it becomes a part of learning by doing for creating values in the society, service learning for benefit of maximum number of people. Therefore, there is a need to understand how to integrate entrepreneurship ideas in teaching-learning process.

In education, entrepreneurship can be integrated by understanding the goal, the pathway and outcomes in the field of education.

a. Aim of education: The goal and aim of education is no longer to be the reproduction of knowledge but production and regeneration of new knowledge from the perspectives of the learner. Learning need not begin where teaching gets other, but teaching and learning can go hand-in hand.
b. Curriculum: The skills, knowledge and attitude of entrepreneurship has to introduced across all learning ages. The curriculum has to be aligned with the need of the society and contextual, such that it is in in sync with the newer technology and updated research and innovations in the outside world. The teaching methods have to be aligned to the teaching methods and techniques. The learner centric curriculum based on the principles of activity-based learning, individual differences, application has to be inculcated in the curriculum. The enacted as well as hidden curriculum can be harnessed to bring in the changes in the pathway to education.
c. Methods of teaching: The quality and excellence in teaching can be upheld by teaching methods which are experiential, participative and problem-solving methods enhance the learning experiences and stimulate relearning, revised perspectives and gives a sense of engaging involvement. This in turn can lead to higher order thinking skills like thinking out of the box, creativity and analytical thinking. The method of teaching can cultivate the entrepreneurship skills like learning by doing, problem based learning, case studies, seminar presentations, debates, field visits, analysis, internships, research activities etc help students to work independently and in a self-regulated way. These methods help learners to cope up with the challenges, be creative, think of out of box solutions and experience the project work. “Entrepreneurship education should have active learning and a student-centric approach.” (Rahman and Day, 2014)
d. Role of teacher: The teacher plays an extremely significant role in the promoting entrepreneurship in education. The teachers motivate the students to develop their

perspectives towards the local and social context. A teacher can encourage students to participate in entrepreneurial activities, and engage them in critical, creative and meaningful learning integrating these skills in transaction of different subjects. Inspiring students with biographies and autobiographies of different entrepreneurs, a teacher can help students to understand the feasibility of taking risks and involving themselves in the entrepreneurship in education. Teachers can motivate students to opt for self - employment and start-ups connecting them to mentors in the field. The responsibilities of teacher here expect the teachers to have a positive mindset towards entrepreneurship and are aware of the different approaches to entrepreneurship activities and opportunities. Even faculty members who are interested in entrepreneur activities can be provided with opportunities and mentors for their initiatives.

e. Learning environment: The stage on which the entrepreneurship education can be set needs to paid attention too. The learning environment has to be democratic setting, encouraging plural and diverse ways of problem solving. The learning environment can promote exhibitions, mock entrepreneur activities, inter-college competitions, industry-academia linkages, seminars inviting young entrepreneurs, integrate development of entrepreneur skills as a part of certificate and value-added courses, make provisions for seed money for students to explore the small scale business.

f. Learning Outcomes: The entrepreneurship in education can frame the learning outcomes with regards to development of entrepreneur competencies, attitudes, enhanced entrepreneurship activities. The transformation from feeling unsure, detached and disinterested in entrepreneurship concept can be replaced by increased self-efficacy and confidence towards entrepreneurship activities. In India, Entrepreneurship was more a concern of business schools, commerce field but now with the emphasis on social change and entrepreneurial initiatives towards development of the disadvantaged in the society, it also has the outcome of social outreach.

g. Social Entrepreneurship: Institute should also promote entrepreneurship projects which are connected to social cause and social development programs, outreach programs for the disadvantaged and underprivileged. Social entrepreneurship is initiatives that balances concern for society and environment without being overtly ambitious and profit-driven. Women entrepreneurship: Higher Education must promote women entrepreneurs too, especially by making the girl students aware of the provisions and schemes under Niti Ayog. The women entrepreneurs can coordinate with the women of the remote parts of the state and the nation. There are various schemes that have to be made aware of, to the women for assisting them to make their art, talents, artifacts known to the world. The

women may also need assistance regarding the finance literacy and other concepts in starting their enterprises or startups which can be provided under social entrepreneurship.

Thus, the higher education can promote the entrepreneurship in education. There are certain factors we have to pay attention to though. A research study stated that 80% of commerce students responded that they are highly interested in self-employment. Research studies by Satheesh K C. (2017) state that the students at Calicut University have positive attitude towards entrepreneurship. The respondents of Calicut University have brought to forefront that , " 96% of students agreed that entrepreneurs take excessive risk for their operation. Only 14% of the respondents agree that Calicut University syllabus is motivate them to start a new entrepreneurship. 64% of the students argued that teachers do not motivate their student." The conclusion shows that students at Calicut University have a positive attitude with regards to entrepreneurship. But there is not much support from the syllabus and teachers' motivation towards promoting entrepreneurship in higher education.

Thus, the syllabus, learning environment teacher's attitude and approach towards entrepreneurship have to be such that it promotes entrepreneurship for students of higher education. Even NEP 2020 supports start-up eco-system and initiatives of young entrepreneurs. NEP 2020 focuses on vocational education, making it as important as the academic study. The entrepreneurship culture in education can be created by a collective step towards dignity of labour and non-hierarchical attitude towards academic and technical work. Right from schooling if there is respect for education with work experience as envisioned in the Nai-Talim, promoted by Mahatma Gandhi then there is a platform set for an experiential education and entrepreneur pedagogy. In this way, gradually entrepreneurship in education becomes entrepreneurship education.

From Entrepreneurship in Education to Entrepreneurship Education

Bruyat and Julien (2001) defines "Entrepreneurship Education as learning that the individual entrepreneur experiences by interacting with the environment as the change and value creation the entrepreneur causes through his/her actions." Thus, it is more than teaching the entrepreneurship skills but creating a learning environment to transform entrepreneur's idea into action. It is the pedagogical intervention that leads to facing the uncertainty and complications in the real-world with practical, creative and relevant solutions with entrepreneurial competencies like risk-taking, handling diversity, higher order thinking, value creation for others and working with others.

Entrepreneurship education includes all activities aiming to foster entrepreneurial mindsets, attitudes and skills and covering a range of aspects such as idea generation, start-up, growth and innovation (Fayolle, 2009). Thus, Entrepreneurship Education is an approach to develop entrepreneurial skills, way of thinking, creating, and bringing change. It will be affected by the way it is integrated in the curriculum at different levels to bring about advancements in the society.

Entrepreneurship Education

a. The important element of entrepreneurship education is "active learning and student centric approach". (Rahman and Day, 2014).
b. Experience, experimentation and experiential learning play and important role in entrepreneurship education. The students of education, engineering, medicine can identify challenges and come up with solutions for reaching out to the society. The investment in education can be fruitful when it becomes useful to the society.
c. The learning approaches can have a spectrum of conventional and learner-centered approaches from lectures to student led seminars, from classroom discussion to field trips, internships.
d. The focus of Entrepreneurship Education has to be real life experiences and authentic learning. The reflective process of the theory to practice is the core of entrepreneurship education for the students.
e. Service-learning integration in value creation of entrepreneurship education.
f. Technical and practical session should be provided to the teachers for encouraging entrepreneurial development.

Conclusion

The head, heart and hand ideology of Mahatma Gandhi fits in entrepreneurship education seamlessly. The understanding, awareness, conceptual knowledge, know-that, the attitude, approach, values and actual set up, procedural knowledge, the know-how get blended together to form the entrepreneurship education. It is also essential that there is resource and knowledge sharing, collaborative partnerships, and student-led initiatives can strengthen the entrepreneurship education. Great entrepreneurs focus on social transformations, and social transformations is the mission of education. The success of entrepreneurs lies in how they resolve the challenges in the society, the approach they take which is scientific, practical, application based but at the same side is sensitive to the needs of the society.

References

1. World Economic Forum, Educating the Next Wave of Entrepreneurs, Executive Summary, A Report of the Global Education Initiative

2. Central Board of Secondary Education (2002). Entrepreneurship Secretary. New Delhi: CBSE Chhabra, Meghna & Dana, Léo-Paul & Malik, Sahil & Chaudhary, Narendra. (2021).
3. Entrepreneurship education and training in Indian higher education institutions: a suggested framework. Education and Training. ahead-of-print. 10.1108/ET-10-2020-0310 .
4. Entrepreneurship education and training in Indian higher education institutions: a suggested framework.https://www.researchgate.net/publication/352776336_Entrepreneurship_education_and_training_in_Indian_higher_education_institutions_a_suggested_framework
5. Fayolle A. (2009). Entrepreneurship Education in Europe: Trends and Challenges. OECD LEED Programme. Universities, innovation and entrepreneurship: good practice workshop. http://www.oecd.org/dataoecd/11/36/43202553.pdf
6. Hytti, U. and O'Gorman, C. (2004). What is 'Enterprise education'? An analysis of the objectives and methods of enterprise education programmes in four European countries.
7. Education + Training, Vol. 46 No. 1, pp. 11-23,
doi: http://dx.doi.org/10.1108/00400910410518188
8. Satheesh K C. (2017) "A Study on the Entrepreneurial Attitude Level among the Commerce Students in Calicut University," *SSRG International Journal of Economics and Management Studies*, vol. 4, no. 8, pp. 43-45, 2017. *Crossref*, https://doi.org/10.14445/23939125/IJEMS-V4I8P108

A Study of Academic Motivation Among Secondary School Students

Bijoy K Thomas* and Pooja Veerendra Kadam **

**Assistant Professor, St.Xavier's Institute of Education (Autonomous), Mumbai*

***Research Scholar, St.Xavier's Institute of Education(Autonomous), Mumbai*

** Corresponding email: bijoy@ebijoy.in*

Abstract

Academic motivation refers to the internal drive and desire that influences students' engagement, effort, and persistence in pursuing educational goals and achieving academic success. The purpose of this study was to study academic motivation among secondary school students across different types of schools from the suburbs of Mumbai. This research paper examines the relevance and significance of academic motivation among school students. In total 209 students from three different schools were selected by stratified random sampling for data collection. The present research follows the descriptive method of the causal-comparative type. The result shows that, there is a significant difference in the academic motivation of secondary school students with respect to Gender, Types of schools, Grade Academic Score level and Parent's Job. By understanding the relevance and mechanisms of academic motivation, this research aims to provide valuable insights and practical implications for educators, policymakers, and stakeholders to enhance students' motivation and promote their overall academic success.

Keywords: Academic Motivation, Student Teachers.

Introduction

Liew and Treagust (1998) say that researchers have only recently started to focus on the value of students' feelings and emotions when studying how students learn new ideas. Motivation, among the various affective components, serves a crucial role in students' conceptual change processes. (Pintrich et al.1993). According to Garcia and Pintrich (1995), who conducted a review of research on the topic of learning motivation, many motivational components, such as self-efficacy, test anxiety, self-regulated learning, task orientation, and learning techniques, are significant in terms of their relevance. These studies showed that there are many different ways to be motivated to learn, and they also showed how the interests of the researchers affected how they looked at different parts of motivation. Academic motivation is a student's desire or embrace

of the subject matter, when the student's competence is measured against a performance or excellence standard. An individual's level of academic motivation is seen as a significant predictor of academic performance since it stimulates and guides behaviour towards accomplishment (Robbins et al., 2004).

Influence of Academic Motivation

There hasn't been a lot of study on how family influences affect a student's drive and success in school. Most of the studies that have been done have focused on one or two factors, like parental standards or goals or parental participation in schoolwork. The researchers Urdan, T., Solek, M., and Schoenfelder (2007) found that the sorts of family influence varied depending on generational standing and degree of success. Molloy, L. E., Gest, S. D., and Rulison, K. L. (2011) discovered that peer relationships play a unique role in influencing changes in students' academic adjustment, with greater influence effects during the transition from middle school to high school.

The results of an analysis of the research study's data (Aziz, F., Quraishi, U., & Kazi, A. S. (2018) show that the gender of school students affects their level of academic motivation. Fear, a negative factor, influenced both the genders equally. External factors such as teachers, parents, peers, and curriculum encouraged students to participate in class. Thus, it was seen that internal factors are positively correlated to external factors. Academic life which could degrade academic achievement (Fleming et. al.,2006). Lee DJ (2008) research showed that students with better quality of life due to better education, administrative services and facilities had better academic performance.
In this research study, the researcher analyses the academic motivation among secondary-school students.

Significance and relevance of the study

In recent years, it has been observed that there is a lack of academic motivation among students, particularly in high school. Their academic performance suffers for a number of reasons, including peer pressure, current fashion trends, diverse relationships, the entertainment aspect, and more. The results of a study conducted by P.K. Gupta and R.Mili (2017) indicate a significant positive correlation between academic motivation and academic achievement among high school pupils. The study also revealed a significant difference in academic motivation between high and low achievers. On the other hand, a large gender gap was found among the group of poor performers with regard to their academic motivation. In light of this, the academic success of students is dependent upon the proper coordination and interaction between the many parts of

their motivation. (Amrai, K et.al.-2011) Therefore, the researcher believes that both intrinsic and extrinsic academic motivation would increase the academic achievement of high school students.

Objectives of the Study

1. To study the Overall Academic Motivation among Secondary School Students
2. To study the Overall Academic Motivation of Secondary School Students with respect to Gender
3. To study the Overall Academic Motivation of Secondary School Students with respect to Grade level
4. To study the Overall Academic Motivation of Secondary School Students with respect to types of school
5. To study the Overall Academic Motivation of Secondary School Students with respect to Parent's Occupation
6. To determine the academic motivation factors that influence the secondary school students.

Hypothesis of the Study

1. There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Gender.
2. There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Grade level.
3. There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Types of school.
4. There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Parent's Occupation

Research Questions

Methodology of Research

This study employed a mixed-methods research methodology that included quantitative and qualitative data. This research used a concurrent triangulation mixed-method strategy. Quantitative and qualitative methods of data collection were also used by the researcher. Based on the general academic motive, the quantitative data was assembled. In order to acquire the qualitative data, researchers employed questions with open-ended responses. Quantitative and qualitative analyses were both performed on the collected data by the researcher.

Sample of the study

The researcher collected data from 209 secondary school students for the study. For this research, a random sampling technique was employed.

Tools used for the study

The research employed quantitative and qualitative data. The gathering of quantitative data was accomplished via the use of a survey questionnaire.

Data analysis

Quantitative method of data analysis were used. Descriptive statistics (mean, standard deviation, skewness, and kurtosis) and inferential statistics (t test and analysis of variance) were used for the quantitative study.

Analysis and Discussion

To study the Overall Academic Motivation among Secondary School Students

Statistics		
Overall Academic Motivation		
N	Valid	209
Mean		151.88
Median		153.00
Mode		146[a]
Std. Deviation		12.582
Skewness		-0.378
Std. Error of Skewness		0.168
Kurtosis		0.369
Std. Error of Kurtosis		0.335
a. Multiple modes exist. The smallest value is shown		

Table 1. Overall Academic Motivation among Secondary School Students

Statistics	Score	p
Kolmogorov-Smirnov	0.06	0.489
Shapiro-Wilk	0.99	0.109

Table 2. Tests for normal distribution of Overall Academic Motivation

The mean score of overall academic motivation was analysed using a quantitative approach. The mean, median, and standard deviation of the academic motivation values are summarised in Table 1. According to the findings of the research, students in secondary schools had a mean score of 151.88 on an overall measure of academic motivation for, with a standard deviation of 12.58. The skewness of students' total academic motivation is -0.378, and the standard error that corresponds to it is 0.168. The scores on the distribution are skewed in a negative direction. Kurtosis is 0.369 and standard error is 0.335 for this distribution. Skewness, kurtosis, mean, median, and mode

differences are within acceptable variability. Thus, a normal distribution was found for academic motivation scores. The result of the Kolmogorov-Smirnov test revealed that the value of the test statistic (0.06) does not meet the criteria for significance at the 0.05 level. It demonstrates that the data follows a normal distribution (Fig.1.a).

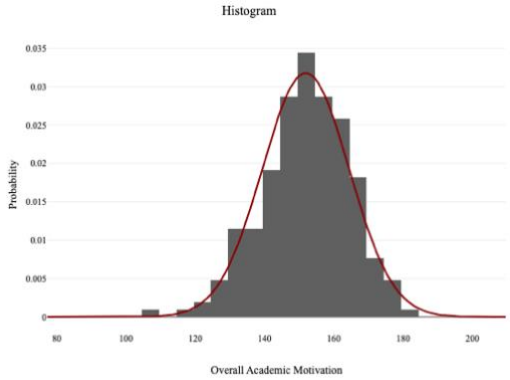


Figure 1. Overall Academic Motivation among Secondary School Student

Hypothesis 1

There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Gender.

Group Statistics						
Dimensions	**Gender**	**N**	**Mean**	**Std. Deviation**	**T Test**	**Sig**
Interest and Enjoyment	Boys	114	28.37	3.780	2.70	P<0.01
	Girls	95	29.71	3.287		
Value and Usefulness	Boys	114	27.09	4.424	3.28	P<0.01
	Girls	95	28.94	3.554		
Perceived Choice	Boys	114	26.39	4.164	0.56	P>0.05
	Girls	95	26.11	2.959		
Perceived Competence	Boys	114	25.55	3.607	1.98	P<0.01
	Girls	95	26.46	2.891		
Pressure and Tension	Boys	114	17.04	4.506	1.14	P>0.05
	Girls	95	17.76	4.509		
Relatedness	Boys	114	24.55	4.079	3.60	P<0.01
	Girls	95	26.37	2.986		
Overall Academic Motivation	Boys	114	149.00	13.969	3.86	P<0.01
	Girls	95	155.34	9.675		

Table 3. Overall Academic Motivation of Secondary School Students with respect to Gender.

A t-test was conducted to determine whether there was a statistically significant difference in the mean score of academic motivation between boys and girls. According to the results of the descriptive statistics, the Girls group had higher values for the dependent variable Overall Academic Motivation than the Boys group (M = 155.34, SD = 9.68; M = 149, SD = 13.97). The results of a two-tailed t-test on independent samples indicated that the difference between girls and boys with regard to the dependent variable Overall Academic Motivation was statistically significant, with t(200.62) = 3.86, p =.001, and a 95% confidence range of [3.08, 9.59]. This was determined by not assuming that the variances of the two groups were identical. The null hypothesis is therefore rejected.

Discussion

For secondary school students, interest and enjoyment were the highest academic motivations. According to the differences in mean (M) and standard deviation (SD), there were differences in response among secondary school students according to their academic motivations. In addition to pressure and tension, there were significant differences between boys' and girls' motivations for academics, indicating that boys' motivations for academics were higher than girls'. Based on Marzieh Arefi and Mahsa Naghebzadeh's (2014) study, high school students are more likely to possess a high level of motivation when it comes to academic subjects. There was a significant difference between high school pupils based on their academic motivation, with the gender gap being significantly greater. Bakari Yusuf Dramanu and Aisha Indo Mohammed (2017) and Taheri-Kharameh et al. (2018) reviewed the results in a comparable manner.

Hypothesis 2

There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Grade levels of Academic Score.

Dimensions	Grade Levels of Academic Score	N	Mean	Std. Deviation	F Value	Sig
Interest and Enjoyment	First Class	115	29.58	3.873	4.616	P<0.01
	Second Class	81	28.04	3.100		
	Third Class	13	29.46	3.256		
	Total	209	28.98	3.618		
Value and Usefulness	First Class	115	28.69	4.081	4.601	P<0.01
	Second Class	81	26.90	4.079		
	Third Class	13	27.62	4.011		
	Total	209	27.93	4.146		
Perceived Choice	First Class	115	26.87	3.538	3.608	P<0.01
	Second Class	81	25.54	3.718		
	Third Class	13	25.38	3.641		
	Total	209	26.26	3.660		
Perceived Competence	First Class	115	26.22	3.644	.778	P>0.05
	Second Class	81	25.70	2.939		
	Third Class	13	25.38	2.534		
	Total	209	25.97	3.324		
Pressure and Tension	First Class	115	16.63	4.905	4.044	P<0.01
	Second Class	81	18.46	3.801		
	Third Class	13	17.15	3.805		
	Total	209	17.37	4.511		
Relatedness	First Class	115	25.90	4.004	2.732	P<0.01
	Second Class	81	24.81	3.245		
	Third Class	13	24.23	3.468		
	Total	209	25.38	3.727		
Overall Academic Motivation	First Class	115	153.89	13.847	3.326	P<0.05
	Second Class	81	149.46	10.744		
	Third Class	13	149.23	8.197		
	Total	209	151.88	12.582		

Table 4. Overall Academic Motivation of Secondary School Students with respect to Grade levels of Academic Score

The data was assessed to see whether there was a statistically significant difference between the academic motivation scores of students in different grade levels of the academic score. Table 4 shows that there was a statistically significant variation in students' academic motivation across grades. A one-factor analysis of variance showed that grade levels of academic score and Overall Academic Motivation varied significantly F = 3.33, p =.038. As a result, the null hypothesis has been rejected by the given evidence. The ANOVA revealed a statistically significant difference. The groups were compared to each other in pairs using the Bonferroni Post hoc test to find out

which ones were significantly different. The Bonferroni Post hoc test revealed that the paired group comparison of Second Class against First Class has a p-value that is less than 0.05; hence, it is reasonable to believe that there is a significant difference between the two classes on the basis of the data that is currently available. Academic motivation was the same for pupils in the second and third classes.

Discussion

The responses of the secondary school students were seen to differ from those of the primary school students when looking at the differences seen in their mean (M) and standard deviation (SD). This is based on their grade levels. There were significant differences found in perceptions of competence, pressure and tension, and relatedness between the two groups. According to the findings of the research that was conducted in 2014 by Hakan, K. and Munire, E., it was found that there were substantial disparities amongst undergraduate students in terms of their desire to learn according to their gender, the domain they were studying, and their grade level. Hardré, P. L. et al.(2006) observed that individuals' differences influenced not just their own views and motives in the classroom, but also the goal structures and variations across groups.

Hypothesis 3

There is no difference in the Overall Academic Motivation of Secondary School Students with respect to types of school.

Dimensions	Grade	N	Mean	Std. Deviation	F Value	Sig
Interest and Enjoyment	Government	115	29.46	3.853	2.632	P>0.05
	Private Aided	60	28.17	3.435		
	Private Unaided	34	28.76	2.840		
	Total	209	28.98	3.618		
Value and Usefulness	Government	115	28.64	4.083	5.995	P<0.01
	Private Aided	60	27.68	3.766		
	Private Unaided	34	25.94	4.410		
	Total	209	27.93	4.146		
Perceived Choice	Government	115	26.98	3.825	5.153	P<0.01
	Private Aided	60	25.33	3.128		
	Private Unaided	34	25.47	3.518		
	Total	209	26.26	3.660		
Perceived Competence	Government	115	26.23	3.576	.829	P>0.05
	Private Aided	60	25.57	2.807		
	Private Unaided	34	25.79	3.292		
	Total	209	25.97	3.324		
Pressure and Tension	Government	115	16.27	4.558	9.655	P<0.01
	Private Aided	60	19.28	4.126		

Dimensions	Grade	N	Mean	Std. Deviation	F Value	Sig
	Private Unaided	34	17.71	3.881		
	Total	209	17.37	4.511		
Relatedness	Government	115	26.16	4.075	6.338	P<0.01
	Private Aided	60	24.70	2.965		
	Private Unaided	34	23.94	3.064		
	Total	209	25.38	3.727		
Overall Academic Motivation	Government	115	153.74	13.748	3.540	P<0.05
	Private Aided	60	150.73	10.211		
	Private Unaided	34	147.62	11.198		
	Total	209	151.88	12.582		

Table 5. Overall Academic Motivation of Secondary School Students with respect to types of school.

A one-factor analysis of variance reveals a significant difference between the categorical variable School Type and the continuous variable Overall Academic Motivation, F = 3.54, p =.031. With the available data, the null hypothesis is therefore refuted. The ANOVA revealed a statistically significant difference. Comparing each pair of categories with the Bonferroni Post hoc test to determine which was significantly different. The Bonferroni Post hoc test revealed that the pairwise group comparison of Private Unaided versus Government has a p-value less than 0.05; therefore, it can be inferred, based on the available data, that the two groups are significantly different. There was no difference between Private unaided and Private Aided school students.

Discussion

A statistical analysis revealed that there was no statistically significant difference in academic motivation between the private unaided schools and the private aided schools when it came to the academic motivation of the children. In the case of government schools, some differences were observed as well. According to the study by Eccles, J. S. (2003), academic motivation has a great influence on the type of school and the facilities provided within it. The term encompasses a wide range of instructional processes, some of which are based on the immediate, proximal relationships between students and the tasks they are required to complete. Based on the study of Alivernini, F. A. B. I. O., & Lucidi, F. A. B. I. O. (2008), it has been found that the type of school has a huge impact on both intrinsic and extrinsic academic motivation as well as academic achievement.

Hypothesis 4

There is no difference in the Overall Academic Motivation of Secondary School Students with respect to Parent's Occupation

Dimensions	Grade	N	Mean	Std. Deviation	F Value	Sig
Interest and Enjoyment	Profession	97	28.82	3.611	1.425	P>0.05
	Business	95	29.34	3.654		
	Skill	17	27.82	3.340		
	Total	209	28.98	3.618		
Value and Usefulness	Profession	97	27.91	3.819	6.444	P<0.01
	Business	95	28.53	4.138		
	Skill	17	24.71	4.714		
	Total	209	27.93	4.146		
Perceived Choice	Profession	97	26.26	3.751	1.702	P>0.05
	Business	95	26.54	3.675		
	Skill	17	24.76	2.751		
	Total	209	26.26	3.660		
Perceived Competence	Profession	97	25.81	3.199	2.121	P>0.05
	Business	95	26.36	3.461		
	Skill	17	24.65	2.999		
	Total	209	25.97	3.324		
Pressure and Tension	Profession	97	17.85	4.588	4.102	P<0.01
	Business	95	16.52	4.436		
	Skill	17	19.41	3.537		
	Total	209	17.37	4.511		
Relatedness	Profession	97	25.26	3.689	3.638	P<0.05
	Business	95	25.87	3.788		
	Skill	17	23.29	2.910		
	Total	209	25.38	3.727		
Overall Academic Motivation	Profession	97	151.91	12.087	3.366	P<0.05
	Business	95	153.15	13.020		
	Skill	17	144.65	10.971		
	Total	209	151.88	12.582		

Table 6. Overall Academic Motivation of Secondary School Students with respect to Parent's Occupation

A one-factor analysis of variance revealed a significant difference between the categorical variables Parent's Occupation and Overall Academic Motivation F = 3.37, p =.036. As a result, the null hypothesis has been rejected by the given evidence. The ANOVA revealed a statistically significant difference. The groups were compared to each other in pairs using the Bonferroni Post hoc test to find out which ones were significantly different. The Bonferroni Post hoc test revealed that the pairwise group comparison of Business and Skill has a p-value less than 0.05; therefore, it can be inferred, based on the available data, that the two groups are substantially different.

Discussion

It was evident from the statistical evidence that the parent's occupation was significantly associated with overall academic motivation. The sig value of P > 0.05 was observed in interest

and enjoyment, perceived choice, and perceived competence dimensions. In the study of Omolade, A. O. K. A. O., & Salomi, O. M. (2012), a significant effect of parents' education on students' academic achievement in Mathematics can be found in the results, while academic motivation had the least impact among the variables influencing students' academic performance in mathematics. Other studies have found that parents with low or high occupation status do not affect their children's self-esteem. A student's self-esteem is not dependent on their parents' work. (Moneva, J. C., Rozada, G. G., & Sollano, A. M. (2020).

Factor Analysis

The Kaiser-Meyer-Olkin (KMO) is a measure for the adequacy of sampling that investigates the suitability of factor analysis.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.723
Bartlett's Test of Sphericity	Approx. Chi-Square	168.352
	df	15
	Sig.	<.001

Table 7 KMO and Bartlett's Test

In this study, KMO value is 0.723. It was found that the KMO value for this study was 0.723, which is within the range that is suitable for carrying out the factor analysis, justifies the appropriateness of the factor analysis.

Principal Component Analysis

	Interest and Enjoyment	**Value and Usefulness**	**Perceived Choice**	**Perceived Competence**	**Pressure and Tension**	**Relatedness**
Interest and Enjoyment	1	0.42	0.24	0.27	-0.02	0.41
Value and Usefulness	0.42	1	0.22	0.27	0.03	0.46
Perceived Choice	0.24	0.22	1	0.25	-0.24	0.22
Perceived Competence	0.27	0.27	0.25	1	-0.05	0.25
Pressure and Tension	-0.02	0.03	-0.24	-0.05	1	-0.13
Relatedness	0.41	0.46	0.22	0.25	-0.13	1

Determinant =0.440

Table 8 Correlation Matrix

In Table 8, it was found that, the determinant value is 0.440, so this assumption is true.

Communalities		
	Initial	**Extraction**
Interest and Enjoyment	1.000	0.562
Value and Usefulness	1.000	0.628
Perceived Choice	1.000	0.544
Perceived Competence	1.000	0.328
Pressure and Tension	1.000	0.770
Relatedness	1.000	0.545
Extraction Method: Principal Component Analysis.		

Table 9 Communalities

Table 9 reveals that about 77% of the variance in Pressure and Tension is accounted for by the factors, while only 33% of the variance of Perceived Competence is accounted for.

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.246	37.439	37.439	2.123	35.383	35.383
2	1.129	18.820	56.259	1.253	20.876	56.259
3	.829	13.823	70.083			
4	.693	11.543	81.626			
5	.593	9.886	91.512			
6	.509	8.488	100.000			

Table 10 Total Variance Explained

In the Rotation Sum of Squared Loadings reveals that, only two component that met cut-off criterion (extraction method).

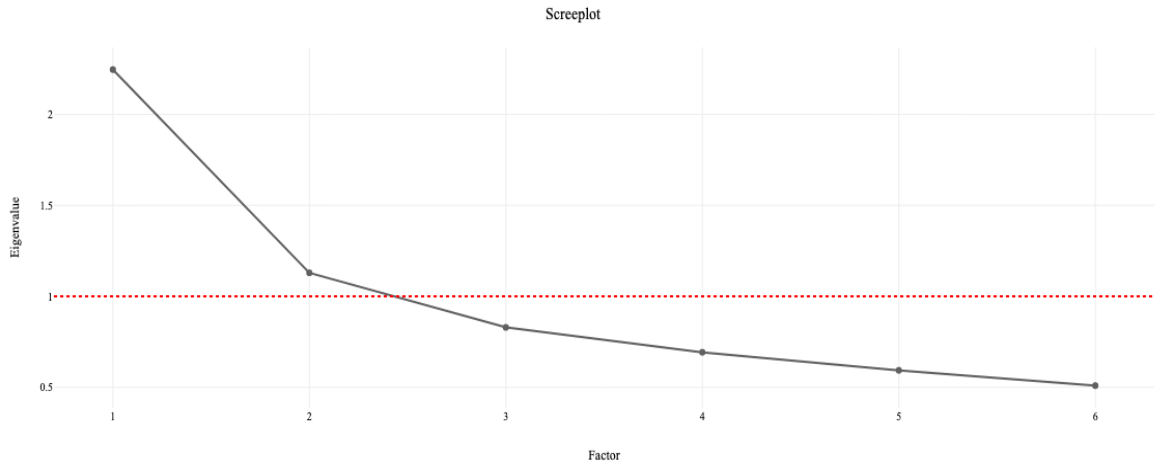


Figure 2. Scree plot for Factor Analysis

The scree plot shown in Figure 2 demonstrates that two variables are responsible for the majority of the overall variability seen in the data.

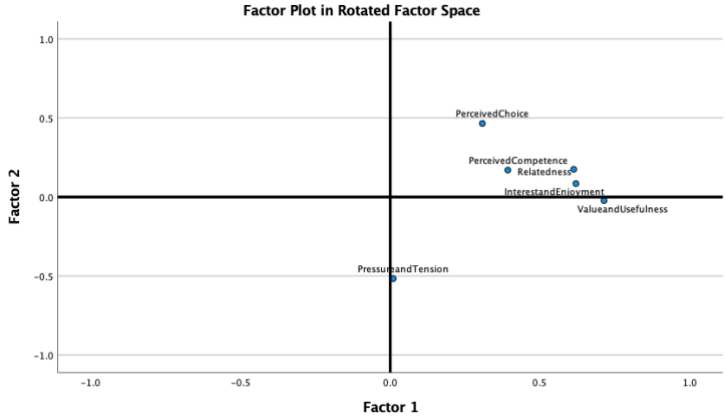


Figure 3. A geometrical representation of factor analysis in two-dimensional space load onto factor 1 and factor 2.

Component Matrix[a]		
	Component	
	1	2
Interest and Enjoyment	.717	.218
Value and Usefulness	.725	.319
Perceived Choice	.547	-.495
Perceived Competence	.572	-.002
Pressure and Tension	-.201	.854
Relatedness	.734	.076
Extraction Method: Principal Component Analysis.		
a. 2 components extracted.		

Table 11. Component Matrix

From the factor matrix shown above, it was found that Factor 1 is related most closely to Relatedness followed by Value and Usefulness and Interest and Enjoyment. Factor 2 is related to Pressure and Tension.

Rotated Component Matrix (Varimax)

Rotated Component Matrix[a]		
	Component	
	1	2
Interest and Enjoyment	.749	.033
Value and Usefulness	.790	-.060
Perceived Choice	.351	.649
Perceived Competence	.539	.192
Pressure and Tension	.094	-.872
Relatedness	.718	.172
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

Table 12. Rotated Component Matrix

After performing the Varimax rotation, it is easy to see that Factor 1 is related to variables Value and Usefulness, Interest and Enjoyment, Perceived Competence and Relatedness whereas Factor 2 is related to variables Pressure and Tension, and Perceived Choice.

The Factor Loadings for each dimension and each factor are listed in the Rotated Component (Factor) Matrix table The factor I (Interest and Enjoyment, Value and Usefulness, Perceived Competence, and Relatedness) seems to show how students feel about "The Joy of Learning." Stressful Learning' associated with learning seems to be connected to Factor 2 (Pressure and Tension and Perceived Choice).

Conclusion

Academic motivation plays a crucial role in the educational development and success of school students. It refers to the internal drive and desire to engage in learning activities, pursue educational goals, and achieve academic success. In conclusion, academic motivation is highly relevant among school students as it positively influences their achievement, engagement, learning, goal orientation, self-efficacy, well-being, resilience, and future prospects. Educators, parents, and policymakers play a vital role in fostering and sustaining students' academic motivation by creating a supportive learning environment, providing meaningful learning experiences, and promoting intrinsic motivation through autonomy, competence, and relatedness.

References

1. Liew, C. W., & Treagust, D. F. (1998). The effectiveness of predict-observe-explain tasks in diagnosing students' understanding of science and in identifying their levels of achievement.
2. Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). Educational and psychological measurement, 53(3), 801-813..
3. García, T., & Pintrich, P. R. (1995). Assessing Students' Motivation and Learning Strategies: The Motivated Strategies for Learning Questionnaire.
4. Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. Psychological bulletin, 130(2), 261.
5. Aziz, F., Quraishi, U., & Kazi, A. S. (2018). Factors behind Classroom Participation of Secondary School Students (A Gender Based Analysis). Universal Journal of Educational Research, 6(2), 211-217.
6. Fleming, D. A., Sheppard, V. B., Mangan, P. A., Taylor, K. L., Tallarico, M., Adams, I., & Ingham, J. (2006). Caregiving at the end of life: Perceptions of health care quality and quality of life among patients and caregivers. Journal of pain and symptom management, 31(5), 407-420.
7. Yu, G., & Lee, D. J. (2008). A model of quality of college life (QCL) of students in Korea. Social Indicators Research, 87, 269-285.
8. Gupta, P. K., and Rashmi Mili. Impact of academic motivation on academic achievement: A study on high schools students. European Journal of Education Studies (2017).
9. Amrai, K., Motlagh, S. E., Zalani, H. A., & Parhon, H. (2011). The relationship between academic motivation and academic achievement students. Procedia-Social and Behavioral Sciences, 15, 399-402.

10. Arefi, M., & Naghebzadeh, M. (2014). The relation between academic self-concept and academic motivation and its effect on academic achievement. Indian Journal of Fundamental and Applied Life Sciences, 4(4), 3225-3230.
11. Dramanu, B. Y., & Aisha, I. M. (2017). Academic motivation and performance of junior high school students in Ghana.
12. Taheri-Kharameh, Z., Sharififard, F., Asayesh, H., Sepahvandi, M., & Hoseini, M. H. (2018). Relationship between Academic Self-efficacy and Motivation among Medical Science Students. Journal of Clinical & Diagnostic Research, 12(7).
13. Hakan, K., & Münire, E. (2014). Academic motivation: Gender, domain and grade differences. Procedia-Social and Behavioral Sciences, 143, 708-715.
14. Hardré, P. L., Chen, C. H., Huang, S. H., Chiang, C. T., Jen, F. L., & Warden, L. (2006). Factors affecting high school students' academic motivation in Taiwan. Asia Pacific Journal of Education, 26(2), 189-207.
15. Eccles, J. S. (2004). Schools, academic motivation, and stage-environment fit. Handbook of adolescent psychology, 125-153
16. Alivernini, F. A. B. I. O., & Lucidi, F. A. B. I. O. (2008). The Academic Motivation Scale (AMS): Factorial structure, invariance and validity in the Italian context. Testing, Psychometrics, Methodology in Applied Psychology, 15(4), 211-220.
17. Omolade, A. O. K. A. O., & Salomi, O. M. (2011). Relative Effects Of Parents'occupation, Qualification And Academic Motivation Of Wards On Students'achievement In Senior Secondary School Mathematics In Ogun State, Nigeria. Office Of Research And Development, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria, 14.
18. Moneva, J. C., Rozada, G. G., & Sollano, A. M. (2020). Parents Occupation And Students Self-Esteem. Int J Res-Granthaalayah, 7(12), 315-24.
19. Urdan, T., Solek, M., & Schoenfelder, E. (2007). Students' perceptions of family influences on their academic motivation: A qualitative analysis. European journal of psychology of education, 22, 7-21.
20. Molloy, L. E., Gest, S. D., & Rulison, K. L. (2011). Peer influences on academic motivation: Exploring multiple methods of assessing youths' most "influential" peer relationships. The Journal of Early Adolescence, 31(1), 13-40.

ISSN No. 2583-357X
Vol.2. Issue 1. May 2023

Published by
St. Xavier's Institute of Education
Mumbai