A Study of Scientific Creativity of Secondary School Students for their Demographic Variables

Amita Joshi[1], Sambit Kumar Padhi[2], Subrat Kumar Padhi[3], Aditi Joshi[4]

[1,2]Guru Ghasidas Vishwavidyalaya (A Central University) Bilaspur, Chhattisgarh, India,
[3]Government Training College Kalinga, Odisha, India,
[4]National Institute of Technology Raipur, Raipur, Chhattisgarh, India.

ABSTRACT
This study aims to compare the Scientific Creativity of secondary school students across various demographic variables, including gender, grade level, type of institution, family structure, parental education, and parental occupation. For this purpose, data were collected from 200 students in grades 8th and 9th in Chhattisgarh, India. A survey method was used, and data were gathered from a representative sample of students using a standardized Scientific Creativity Test. The data were analyzed using descriptive statistics, t-test, and ANOVA. Hypotheses were tested at the $\alpha = 0.05$ level of significance. The analysis showed no significant differences in Scientific Creativity based on gender, grade level, type of institution, family structure, parental education, or parental occupation. However, students with academically supportive backgrounds exhibited higher levels of Scientific Creativity. These findings emphasize the impact of socio-demographic factors on students' interest in scientific exploration and suggest the need for targeted educational strategies to foster Scientific Creativity among diverse student groups.

Keywords: Scientific Creativity, Secondary School Students, Demographic Variables.

INTRODUCTION
The beliefs in science and scientific knowledge, the understanding of the nature of science determine how an individual structures and manipulates information received from the world around us. For example, a student who has the positivist views of science believes that scientific knowledge consists of absolute truths and that everyone reaches the same truths by using the same step-wise methodological procedures (Aikenhead & Ryan, 1992; Edmondson & Novak, 1993). This understanding ignores imagination and creativity in scientific knowledge construction. This rigid understanding of the nature of science limits the student’s imagination and scientific creativity when involved in a scientific problem activity. However, reformist science curriculums aim to educate students as scientifically literate individuals who have a relativist view of the nature of science. An accurate and relativist understanding of the nature of science is a prerequisite to scientific literacy. A student who has the relativist views of science believes that science is a human endeavour, in which imagination and scientific creativity play a vital role in scientific knowledge production (Aikenhead & Ryan, 1992; Edmondson & Novak, 1993). For these reasons, scientific knowledge that may change in time is improved with divergent ideas and different

methodological procedures. Indeed, the same data can be interpreted differently and all interpretations can be scientifically valid. As a result, one can claim that beliefs about the nature of science predict scientific creativity.

On the other hand, there are some studies to improve students' beliefs about the nature of science and scientific knowledge by making use of scientific process skills (Khishfe & Abd-El-Khalick, 2002). The research on this domain indicated that explicit-reflective scientific inquiry activities, where students use scientific process skills, improve their understanding of the nature of science Lederman et al., (2002). Some studies support this claim. For example, (Ren et al., 2012), focused on students' creative imagination and found that Chinese students' creative imagination improved when involved in science-related competitions and visits to science-related places. It cannot be disregarded that these science-related activities most probably help students to learn the nature of science and to develop scientific process skills that support their creative imagination. It indicated that students who are successful in science have high scores in creative thinking. Similarly, in a Turkish sample, both general and scientific creativity scores of 6-8th grade students positively correlated to their academic achievement in a science and technology course (Ayverdi, Asker, Öz Aydın, & Sarıtaş, 2012). Another study focused on creative scientific problem finding (Weiping Hu Quan Zhen Shi & Adey, 2010), and found that students' abilities in this aspect have a developmental trend up until high school. Taking these facts into account, one can claim that beliefs about the nature of science would have a mediating role between scientific process skills and scientific creativity.

IMPORTANCE OF SCIENTIFIC CREATIVITY

Creativity represents a significant form of talent capable of transforming history by altering the human experience. The capacity for creative thought is a distinctive attribute of the human intellect, enabling individuals to achieve elevated levels of cognitive function, dignity, and accomplishment. (Bruner (1961) argues that the creative abilities of individuals serve to restore their dignity in an era dominated by technology. In contemporary society, the identification and cultivation of creative talent have become imperative. The national agenda increasingly necessitates a focus on creativity and advanced cognitive skills across all scientific disciplines. Furthermore, the reconstruction of society relies on the expertise of proficient engineers, medical professionals, scientists, technicians, educators, administrators, architects, and similar specialists.

Scientific creativity stands as one of humanity's most valuable resources. It plays a crucial role in addressing the stresses of daily life. The necessity for creativity extends beyond scientific innovation and original inventions, permeating everyday professions such as domestic management and sales. Creative insights are vital to the survival and resilience of society, serving as a cornerstone for future stability and prosperity.

Sensitivity to scientific challenges is regarded as a crucial aspect of scientific creativity. This encompasses innovative scientific experiments, the identification and resolution of scientific problems, and engaging in creative scientific activities. The foundation of scientific creativity is rooted in a solid understanding of scientific knowledge and skills. Creativity serves as the driving force, the methodology, and the means of all human advancement; thus, it is accurately stated that the cultural, scientific, and social advancement of any nation is contingent upon the level of creativity fostered among its populace, which fundamentally originates from education. In contemporary society, every forward-thinking nation requires scientific creativity across various sectors, leading to ongoing initiatives aimed at nurturing students' scientific creativity.

Scientific creativity can be nurtured using the appropriate creative environment: (a) schools with continuous enrichment of their environment; (b) creative programmes for developing creative thinking; and (c) creative teachers and creative ways of teaching. Nurturing scientific creativity is important for students because it gets cognitive development, divergent thinking, self-confidence, and happiness.

SCIENTIFIC CREATIVITY AMONGST STUDENTS: INDIAN CONTEXT

Scientific creativity is often attributed to eminent scientists. However, in the context of secondary school students, it is defined as, "a kind of intellectual trait or ability producing or potentially producing a certain product that is original and has social or personal value, designed with a certain purpose in mind, using given information". This definition reflects the individual, procedural, and product dimensions of scientific creativity, while also emphasizing the creative potential, everyday creativity, and personal creativity of students. In India, although there is an abundance of creative potential, significant efforts are required to cultivate it. The National Curriculum Framework (NCF) 2005 explicitly indicates in its position paper on science that the current science education system in India fails to foster inventiveness and creativity. The underlying issue likely resides in the methods of science education as implemented in Indian schools and universities. When examining science education at the school level, several challenges emerge, including inadequate infrastructure in schools—particularly in rural and government institutions—lack of science laboratories, high student-teacher ratios, substandard educational quality, and an excessive focus on rote learning for examination preparation. Furthermore, many pedagogical approaches employed in science classrooms remain traditional. Nevertheless, there are initiatives and projects designed to equip teachers with innovative science teaching practices, particularly in rural or resource-limited settings. A nationally recognized initiative that has thrived for three decades, despite numerous challenges, is the Hoshangabad Science Teaching Programme (1972–2002). This programme was a joint effort involving the State Education Department of Madhya Pradesh, the voluntary organization Eklavya, and numerous scientists and academics from leading Indian universities and research institutions. It aimed to enhance innovative science education at the middle school level (grades VI to VIII) in both rural and urban settings. The programme promoted a discovery-based learning approach, encouraging students to engage with science through observation, create apparatus from inexpensive materials, conduct experiments, and analyze their findings. In 1991, the Ministry of Human Resource Development (MHRD) of the Government of India strongly endorsed this initiative for statewide implementation, advocating for it to serve as a model for replication across the nation. Another noteworthy example is the Science Programme initiated in 2006 by the NGO Pratham, targeting slums and under-resourced areas in Mumbai and other cities in Maharashtra. This programme trained 2,000 government teachers in the Aurangabad district in the 'learning by doing' methodology and collaborated with the Homi Bhabha Centre of Science Education to develop educational reading materials. The intervention seeks to ignite children's natural curiosity, foster a scientific mindset, and encourage them to explore and conduct experiments by constructing various models, tools, and apparatus independently.

OPERATIONAL DEFINITIONS OF THE VARIABLES USED

Scientific creativity: Scientific creativity refers to three dynamic dimensions; product, trait, and process. The product dimension contains technical products, science knowledge, science phenomena, and science problems; while the trait dimension contains fluency, flexibility, and originality; and the process dimension contains the thinking and imagination of secondary school students in class 8th and 9th (C.G.

and CBSE Board) at Bilaspur. In the present study, scientific creativity is operationally defined as the scores obtained by scientific creativity test developed by (Hu & Adey (2002) and adapted by the investigator.

Demographic variables: The demographic variables such as gender (boys and girls), grade/class (8^{th} and 9^{th}), family structure (joint and nuclear), school types (private and government), parental education (mother education and father education), and parental job (mother job and father job) were included in the present study.

RESEARCH QUESTIONS

Is there any difference in the scientific creativity of secondary school students with respect to their demographic variables (gender, class, family structure, school types, parental education, and parental job)?

OBJECTIVES OF THE STUDY

To compare the scientific creativity of secondary school students with respect to their demographic variables (gender, class, family structure, school types, parental education, and parental job).

HYPOTHESIS OF THE STUDY

The scientific creativity of secondary school students is not significantly different with respect to their demographic variables (gender, class, family structure, school types, parental education, and parental job).

Review of Scientific Creativity

Scientific creativity-related articles and books are taken into consideration for this study.

Gupta and Sharma (2019) studied nurturing scientific creativity in the science classroom. Dutta and Chetia (2018) conducted a study on the creativity of secondary school students in the Lakhimpur and Sonitpur districts of Assam. Smyrnaiou et al. (2020) implemented a mixed-methods approach to investigate scientific creativity through the lens of digital storytelling, utilizing the CCQ model for creativity. Ozdemir, G., & Dikici, A. (2017) studied the relationship between demographic variables and scientific creativity: mediating and moderating roles of scientific process skills. Sun et al. (2020) studied on effects of divergent thinking training on students' scientific creativity and the impact of individual creative potential and domain knowledge. Siew et al. (2014) undertook a study aimed at enhancing the scientific creativity of fifth-grade students through problem-based learning methodologies. Mori (2015) studied on scientific creativity of students in higher secondary schools. Ayverdi et al. (2012) studied the relationship between elementary students' scientific creativity and academic achievement in science and technology courses. Kim (2006) studied whether can we trust creativity tests. A review of the Torrance Tests of Creative Thinking (TTCT). Hu and Adey (2002) studied a scientific creativity test for secondary school students. This study aimed to develop a test of scientific creativity for use with secondary school students. Liang (2002) in his research the exploring scientific creativity of eleventh-grade students in Taiwan.

METHOD OF THE PRESENT STUDY

In the present research, the researcher has tried to select the appropriate research method to solve the research problem. It has been decided to adopt the descriptive survey method as the survey is one of the most commonly used methods of descriptive research in the behavioural sciences.

Variables of the Study

Descriptive research is a type of research where the interdependency and relationship of various

variables are studied. The present study **consists of the** following variables:

a) Scientific Creativity

b) Demographic Variables

Population of the Study

All students of secondary school in Bilaspur, Chhattisgarh, India constituted the population of the proposed study.

Sampling Procedure

A random sampling technique was used to select secondary school students of the Bilaspur district of Chhattisgarh state concerning their demographic variables.

SCIENTIFIC CREATIVITY TEST

The scientific creativity test was prepared by Hu and Adey (2002), named the Scientific Structure Creativity Model (SSCM), and adapted after checking the reliability and validity. The model has three dynamic dimensions; product, trait, and process. The product dimension contains technical products, science knowledge, science phenomena, and science problems; while the trait dimension contains fluency, flexibility, and originality; and the process dimension contains thinking and imagination.

ORGANISATION OF DATA

Data after being collected from the specified sample, tool-wise scoring was done for individuals and the data was systematically arranged for statistical analysis to evaluate the hypotheses. Individual, as well as master scoring sheets, were prepared for each variable for further analysis.

PROCEDURE OF DATA ANALYSIS

After completion of data collection, at first, the scoring was done, and the data were fed into Excel sheets on the computer. In order to analyse the collected data and test the null hypotheses, differential as well as correlational statistics like: t-test, ANOVA were used.

DESCRIPTIVES ANALYSIS

The analysis and interpretation are based on the data collected from the secondary school students of Chhattisgarh. Descriptive as well as inferential statistics were used for the analysis of the collected data.

Nature of Distribution of Scientific Creativity of Secondary School Students

It is a well-established fact that to employ inferential statistics for analysis purposes, it is an essential criterion that data must be normally distributed. Hence, before the analysis of data, the researcher determined the normality of scientific creativity of secondary school students. The important measures to show the normality of the studied variable scores and their graphical presentation are provided as follows: -

Table 1: Mean, Median, Mode, SD, Skewness, and Kurtosis of the Scientific Creativity Score

N	Mean	Median	Mode	SD	Skewness	Kurtosis
200	56.7	57.0	59.0	13.8	0.593	1.48

The table 1. Reflects that the mean, mean, median mode, and SD value for scientific creativity of secondary school students is 56.7, 57.0, 59.0, and 13.8 respectively. The skewness and kurtosis is found to be 0.593 and 1.48 respectively. With the obtained value of the distribution of scientific creativity scores, it can be assumed as normal distribution. The graphical representation of the distribution is represented with the normal curve with the histogram in the following figure:

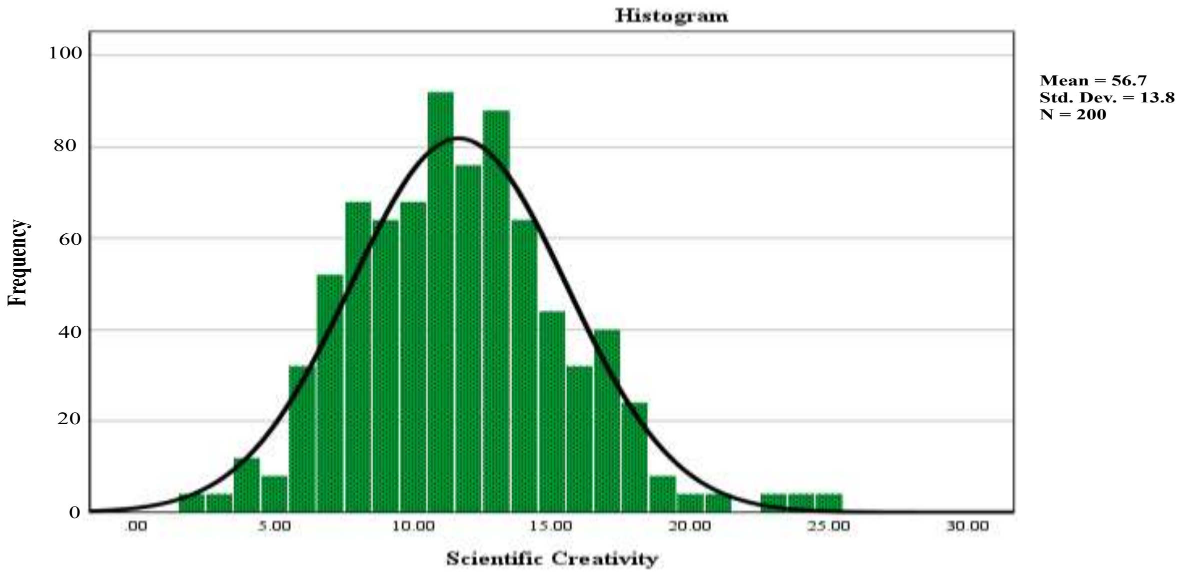

Figure 1. Normal Curve with Histogram of Scientific Creativity of Secondary School Students

The **p-value** is a statistical measure that helps determine the strength of the evidence against the null hypothesis in a hypothesis test.

- **$p \leq 0.05$**: Strong evidence against the null hypothesis and significant (reject H_0).
- **$p > 0.05$**: Weak evidence against the null hypothesis and not significant (accept H_0).
- **Table Value:** 1.96 at 0 .05, 2.58 at 0.01

Objective1: To compare the scientific creativity of secondary school students with respect to their demographic variables (gender (boys and girls), class (8^{th} and 9^{th}), institution (government and private), and family structure (joint and nuclear).

- **H_1.1: The scientific creativity of secondary school students is not significantly different with respect to their gender.**
- **H_1.2: The scientific creativity of secondary school students is not significantly different with respect to their class.**
- **H_1.3: The scientific creativity of secondary school students is not significantly different with respect to their institution.**
- **H_1.4: The scientific creativity of secondary school students is not significantly different with respect to their family structure.**

Table2: Comparison of scientific creativity of secondary school students with respect to their demographic variables (Gender, Class, Institution, Family Structure)

	Demographic Variable		N	Mean	SD	df	t-value	*p*-value	Remark
Scientific Creativity	Gender	Boys	100	56.6	13.36	198	0.271	0.787 *p*>0.05	Not Sig.
		Girls	100	56.2	10.45				
	Class	8^{th}	103	56.1	11.59	198	0.454	0.650 *P*>0.05	Not Sig.
		9^{th}	97	57.0	12.94				
	Institution	PVT	108	56.1	12.77	198	0.243	0.808 *p*>0.05	Not Sig.
		GOVT	92	56.5	11.58				
	Family Structure	Joint	77	56.4	12.84	198	0.012	0.991 *P*>0.05	Not Sig.
		Nuclear	123	56.4	11.44				

- Table 2, reveals that the mean and standard deviation of scientific creativity of secondary school boys are 56.6 and 13.36, respectively, and secondary school girls are 56.2 and 10.45 respectively. The calculated t-value is 0.271 which is not significant at 0.05 level with df =198 as it is less than the critical t-value. It means that boys and girls of secondary schools in Chhattisgarh are not significantly different in their mean scientific creativity scores. Thus, the null hypothesis i.e. "The scientific creativity of secondary school students is not significantly different with respect to their gender" is retained. It may, therefore, be interpreted that secondary school boys and girls are not significantly different in their scientific creativity.
- Table 2, reveals that the mean and standard deviation of scientific creativity of secondary school class 8^{th} students are 56.1 and 11.59 respectively, and secondary school class 9^{th} students are 57.0 and 12.94 respectively. The calculated t-value is 0.454 which is not significant at 0.05 level with df= 198 as it is less than the critical t-value. It means that class 8^{th} and 9^{th} secondary school students in Chhattisgarh are not significantly different in their mean scientific creativity scores. Thus, the null hypothesis i.e. "The scientific creativity of secondary school students are significantly different with respect to their class" is retained. It may, therefore, be interpreted that secondary school class 8^{th} and 9^{th} students are not significantly different in their scientific creativity.

- Table 2, reveals that the mean and standard deviation of scientific creativity of private secondary school students are 56.1 and 12.77 respectively, and government secondary school' students are 56.5 and 11.58 respectively. The calculated t-value is 0.243 which is not significant at 0.05 level with df= 198 as it is less than the critical t-value. It means that private and government secondary school students in Chhattisgarh are not significantly different in their mean scientific creativity scores. Thus, the null hypothesis i.e. "The scientific creativity of secondary school students is not significantly different with respect to their institution" is retained. It may, therefore, be interpreted that private and government secondary school students are not significantly different in their scientific creativity.

- Table 2, reveals that the mean and standard deviation of scientific creativity of secondary school students belonging to joint families are 56.4 and 12.84 respectively, and secondary school students belonging to nuclear families are 56.4 and 11.44 respectively. The calculated t-value is 0.012 which is not significant at 0.05 level with df= 198 as it is less than the critical t-value. It means that the secondary school students belonging to the joint and nuclear family of Chhattisgarh are not significantly different in their mean scientific creativity scores. Thus, the null hypothesis i.e. "The scientific creativity of secondary school students are not significantly different with respect to their family structure" is retained. It may, therefore, be interpreted that secondary schools' students belonging to joint and nuclear families are not significantly different in their scientific creativity.

H_1.5: The scientific creativity of secondary school students is not significantly different with respect to their mother's education.

Table 3 : Comparison of scientific creativity of secondary school students with respect to their mother's education.

Scientific Creativity							
Demographic Variable	Source of Variance	Sum of Square	df	Mean square	F	*p-value*	Sig.
Mother's Ed^n	Between Groups	276.555	2	138.278	1.266	0.284	Not Sig.
	Within Groups	21518.000	197	109.228			
	Total	21794.555	199				

It is evident from the table 3. that calculated F value is 1.266 which is not significant at 0.05 level with df 2/197. It reveals that mean scores of scientific creativity of secondary school students belonging to their respective mother education i.e. class 1-5, class 6-10, and above class 10 do not differ significantly. Thus, the null hypothesis "the scientific creativity of secondary school students is not significantly different with respect to their mother education" is retained. It can finally be stated that secondary school students are not significantly different in their scientific creativity with respect to their mother's education.

H_1.6: The scientific creativity of secondary school students is not significantly different with respect to their father's education.

Table 4: Comparison of scientific creativity of secondary school students with respect to their father's education.

Scientific Creativity							
Demographic Variable	Source of Variance	Sum of Square	df	Mean square	F	*p-value*	Sig

Father Ed^{n}	Between Groups	183.594	2	91.797	0.837	0.435	Not Sig
	Within Groups	21610.961	197	109.700			
	Total	21794.555	199				

It is evident from the table 4. that calculated F value is 0.837 which is not significant at 0.05 level with df 2/197. It reveals that mean scores of scientific creativity of secondary school students belonging to their respective father education i.e. class 1-5, class 6-10, and above class 10 do not differ significantly. Thus, the null hypothesis "the scientific creativity of secondary school students is not significantly different with respect to their father's education" is retained. It can finally be stated that secondary school students are not significantly different in their scientific creativity with respect to their father's education.

H_1.7: The scientific creativity of secondary school students is not significantly different with respect to their mother's job.

Table 5: Scientific creativity of secondary school students with respect to their mother job.

Scientific Creativity							
Demographic Variable	Source of Variance	Sum of Square	df	Mean square	F	*p-value*	Sig.
Mother's Job	Between Groups	447.758	2	223.879	2.066	0.129	Not Sig.
	Within Groups	21346.797	197	108.359			
	Total	21794.555	199				

It is evident from Table 5. that the calculated F value is 2.066 which is not significant at 0.05 level with df 2/197. It reveals that mean scores of scientific creativity of secondary school students belonging to their respective mother job i.e. government job, private job, having no job do not differ significantly. Thus, the null hypothesis "the scientific creativity of secondary school students is not significantly different with respect to their mother job" is retained. It can finally be stated that secondary school students are not significantly different in their scientific creativity with respect to their mother's job.

H_1.8: The scientific Creativity of secondary school students is not significantly different with respect to their father's job.

Table 6: Comparison of scientific Creativity of secondary school students with respect to their father's job.

Scientific Creativity							
Demographic Variable	Source of Variance	Sum of Square	df	Mean square	F	*p-value*	Sig.
Father's Job	Between Groups	191.637	2	95.819	0.874	0.419	

	Within Groups	21602.918	197	109.659			Not Sig.
	Total	21794.555	199				

It is evident from Table 6, that the calculated F value is 0.874 which is not significant at 0.01 level with df 2/197. It reveals that mean scores of scientific creativity of secondary school students belonging to their respective father job i.e. government job, private job, and having no job do not differ significantly. thus, the null hypothesis “the scientific creativity of secondary school students is not significantly different with respect to their father's job” is retained. It can finally be stated that secondary school students are not significantly different in their scientific creativity with respect to their father's job.

The first hypothesis was tested and found that boys and girls of secondary schools in Chhattisgarh are not significantly different in their mean scientific creativity scores. This result is consistent with the studies conducted by Alves-Oliveira et al. (2022), Bi et al. (2020), Du et al. (2020), Kim & Park (2020), Lee and Choi (2018), Özdemir et al. (2021), Pont-Niclòs et al. (2023), and Lee and Choi (2018), as they also reported that there was no significant difference in scientific creativity between male and female students. However, this result conflicts with the studies conducted by Francis et al. (2023), Pont-Niclòs et al. (2023) Torres and Sandoval (2022), (2024), Zhang et al. (2021), where they found that there was a significant difference in scientific creativity between male and female students. The second hypothesis was tested and found that class 8^{th} and 9^{th} secondary school students in Chhattisgarh are not significantly different in their mean scientific creativity scores. This result is consistent with the studies conducted by Park & Kim (2018), Tran et al. (2019), Zhang and Liu (2020), where they reported that there was no significant difference in scientific creativity between class 8^{th} and 9^{th}students. However, this result conflicts with the studies conducted by Demirhan & Şahin, 2021), Ruiz-del-Pino et al., 2022; Xia et al., 2021) where found that there was a significant difference in scientific creativity between class 8^{th} and 9^{th}students. The third hypothesis was tested and found that private and government secondary school students in Chhattisgarh are not significantly different in their mean scientific creativity scores. This result is consistent with the studies conducted by W. Hu & Adey (2002), S. Ma et al., (2023), Pont-Niclòs et al., (2024b), Wang et al., (2022), where they reported that there was no significant difference in scientific creativity between government and private secondary school students. However, this result conflicts with the studies conducted by Chen and Wang (2021), Lee and Kim (2020), and Patel and Nguyen (2019), where they found that there was a significant difference in scientific creativity between government and private secondary schools' students. The fourth hypothesis was tested and found that the secondary school students belonging to the joint and nuclear family of Chhattisgarh are not significantly different in their mean scientific creativity scores. This result is consistent with the studies conducted by Bi et al. (2020b), Chen et al. (2018), and Kim & Park (2020), as they also reported that there was no significant difference in scientific creativity between secondary school students belonging to nuclear and joint-family. However, this result conflicts with the studies conducted by Conner & Silvia, (2015) Nguyen and Patel (2022), and where they found that there was a significant difference in scientific creativity between secondary school students belonging to nuclear and joint family.

The fifth hypothesis was tested and found that mean scores of scientific creativity of secondary school students belonging to their respective mother education i.e. class 1-5, class 6-10, and above class 10 do not differ significantly. This result is consistent with the studies conducted by Dai et al. (2022), Demirhan & Şahin (2021b), PATEL, (2013), and Verma (2020), who also reported that there was no significant difference in scientific creativity among students whose mothers are educated up to class 1-5, class 6-10, and above class 10. However, this result conflicts with the studies conducted by, Alves-Oliveira et al., (2022), Tytler, (2014) where they found significant differences in scientific creativity among students whose mothers are educated up to class 1-5, class 6-10, and above class 10. The sixth hypothesis was tested and found that mean scores of scientific creativity of secondary school students belonging to their respective father education i.e. class 1-5, class 6-10, and above class 10 do not differ significantly. This result is consistent with the studies conducted by Olive, (1972), Patle (2013), Zhang et al., (2022), also reported that there was not significant difference in scientific creativity among students whose fathers are educated up to class 1-5, class 6-10, and above class 10. However, this result conflicts with the studies conducted by Gupta & Sharma (2019), Hu et al., (2023), where they found significant differences in scientific creativity among students whose father are educated up to class 1-5, class 6-10, and above class 10. The seventh hypothesis was tested and found that mean scores of scientific creativity of secondary school students belonging to their respective mother job i.e. government job, private job, having no job do not differ significantly. This result is consistent with the studies conducted by Azizah et al., (2022), Fulcher (2011), Patel (2013) who also reported that there was no significant difference in scientific creativity among students with respect to their mother's job such as government job, private job, and no job mothers. However, this result conflicts with the studies conducted by Desai (2017), Gupta (2019), where they found a significant difference in scientific creativity among students with respect to their mothers' job. The eighth hypothesis was tested and found that mean scores of scientific creativity of secondary school students belonging to their respective father job i.e. government job, private job, and having no job do not differ significantly. This result is consistent with the studies conducted by Patel (2018), Supatminingsih (2024), Wirawan & Ratnaningsih, (2017), Zhang et al., (2022), who also reported that there was no significant difference in scientific creativity among students with respect to their father's job such as government jobs, private jobs, and no job. However, this result conflicts with the studies conducted by Gupta (2019), and Sonnert, (2009), where they found significant differences in scientific creativity among students with respect to their mothers' job.

The reason behind getting such results for hypotheses seventeen to twenty-four may be due to several underlying factors. It was found that the scientific creativity of secondary school students was not significantly different with respect to certain demographic variables. It is observed that scientific creativity is more influenced by school-based factors such as curriculum, teacher support, peer collaboration, and students' personal interests. These factors, combinedly emphasis on science learning and creativity, provide all students with opportunities to develop scientific creativity, regardless of their gender, class, family structure, school type, parental education, or parental occupation.

CONCLUSION

In summary, the present study aimed to compare the Scientific Creativity of secondary school students based on various demographic factors such as gender, class, type of institution, family structure, parental education, and parental occupation. The findings revealed that Scientific Creativity is not significantly varied across demographic groups like gender, class, type of institution, family structure, parental education, and parental occupation. These results emphasize the need for educators and policymakers to recognize and address demographic disparities when designing curricula and interventions to foster Scientific Creativity among all students. Overall, promoting equitable opportunities for scientific exploration and providing targeted support to underrepresented groups are crucial steps toward cultivating a more scientifically engaged and innovative generation.

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