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Creativity Of Secondary School Students

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Abstract. The success of a school largely depends on its teachers, who are responsible for molding their students' moral, aesthetic, and intellectual personalities. Teachers must be resourceful and able to produce individuals who can apply their knowledge or experience in unfamiliar situations and think critically, creatively, objectively, discriminatively, and analytically. To explore students' creativity, the researchers attempted to examine secondary school students' creativity using a survey research method. A sample of 255 secondary school students was selected from four government and five private schools in Tamil Nadu, India. Data to assess the sample's creativity were collected by distributing the Passi Tests of Creativity along with the Test Manual. The study's key findings show that most school students had an average level of creativity.

Keywords: blocks test of creativity, consequences test, secondary school education, seeing problems test, square puzzle test, test of inquisitiveness, unusual uses test

Introduction

Education, as a dynamic and innovative force, shapes human behaviour and involves both bringing out a child's innate qualities and guiding him from darkness to light (Biesta, 2015). The educational system's goal of bringing about planned, anticipated change in society is driven by teachers (Butera et al., 2021). Teachers have a significant impact on how a community will evolve, and they are held in the highest regard among all professions (Sarabjeet Kaur, 2019). Students learn and grow through their teachers' expertise and experience, as well as through the acquisition of new skills, routines, and attitudes.

When a sensitive teacher is kind and supportive, the students can learn the most in the classroom. A teacher with motivating skills can inspire students to actively participate in class. These three qualities describe a successful educator who can help students acquire the necessary social and intellectual skills (Em et al., 2021). This makes it quite evident how crucial teachers are to the current educational system. To make the educational system vibrant and creative, teachers must push the limits of knowledge and complete two crucial duties. Teachers must first and foremost actively participate in the educational process if they are to have a meaningful impact on transforming the educational system. Additionally, they must encourage the growth of flexible, logical, and imaginative people. Given the age of science and technology, every person in modern society faces a variety of difficulties daily (Huang et al., 2001; Jeschke et al., 2002).

After realizing how crucial it is to provide education to the country's population in the context of global education, administrators and educators have pushed for improving the standard and scope of education at all levels. The demands of society vary over time and geographically. The current system and its processes should adapt to the changing social demands (Barman, 2020). It is clear that the current educational system needs to change, as what is being taught to our students today does not need to be repeated. For instructional purposes, the teacher and student are identical. It emphasizes how important it is to raise the caliber of training materials given to pre-service teachers in order to help them become the best educators who can benefit not only the student population they will teach but also the entire community in which they reside (Tasdemir et al., 2020; Farhah et al., 2021).

A high-quality educational process is marked by innovative modifications and novel teaching and learning strategies, rather than stagnation, a static nature, or the repetitive pouring of knowledge into the classroom (Munna & Kalam, 2021). Creativity is a driving force behind most of the advances we have made (Florida, 2014) and gives individuals a chance to analyse their originality in solving problems (Nuhoglu and Akgül, .2019). We highly appreciate the creative work of outstanding artists, designers, innovators, and scientists because it reflects the core values of their culture and significantly contributes to its development. Consequently, creativity is a key factor in human growth (Khalil et al., 2019). From the very beginning of the training period, every teacher trainee should be exposed to novel teaching and learning strategies. Current practices in the educational system encourage teachers to stimulate students' creative potential. For this purpose, the teacher must have adequate teaching competence and creative potential (Sun et al., 2020).

Creativity

The school system's advancements in teaching and learning techniques have given teachers new roles in the classroom (Gokalp, 2015). They must stay up to date with the latest developments worldwide and refresh their professional expertise to meet students' requirements and skills. They also understand how to manage their students and provide appropriate learning activities in a conducive learning environment (Lim-Toe et al., 2008). Teachers were once considered reliable sources of information, with the expectation that they would pass on their knowledge to their students.

In the present scenario, due to advancements across all walks of our lives, parents wish to provide their children with a quality education and support them in acquiring creative knowledge. Novelty and originality are important characteristics of creativity and emerge from individuals who can create something new, such as a new solution to a problem, method, device, object, or form (Olatoye, Akintunde, and Ogunsanya, 2010). Creative thinking is important in our everyday lives to resolve difficult, inconsistent problems (Miron-Spektor, Gino, and Argote, 2011), and it is necessary for our endurance and affluence. Creativity is a multidimensional characteristic, differentially distributed among individuals, and includes chiefly the factors of seeing problems, fluency, flexibility, originality, inquisitiveness, and persistence (Passi, 1972). According to Isenberg and Jalongo (1997), creativity is defined as doing or creating something that has never been done before and responding to objects, symbols, ideas, and situations by relating them to previous experiences. Creativity is a person's ability to think about things in new ways to find unusual and unique solutions to problems (Seif, 2008). Creative talent emerges from the person as a result of the interaction of personal characteristics and environmental factors (Tan, 2013). Creativity is a process characterized by flexibility, fluency, originality, and the ability to generate diverse solutions. Fluency refers to the quantity of unique ideas generated by an individual within a fixed duration of time. Flexibility is the ability to quickly switch between approaches and the characteristics of the problem being addressed. The unusual and uniqueness of an idea or solution is referred to as originality (Kupers et al., 2018).

Teachers are the key to creative thinking in the classroom (Aiken, 1973) but sometimes get confused in differentiating the nature of creativity with the intellectual capacity of students (Mullet, et al., 2016), and sometimes they believe that students with high academic achievements in their subjects are more creative than students with low achievement records (Hoff & Carlsson, 2011). There is much research evidence supporting the relationship between creativity and achievement, but in most cases it is found to be moderate to weak (Gralewski & Karwowski, 2013; Gajda, 2016). Further, creativity was observed as independent of academic achievement as well as intelligence (Plucker et al., 2018), and with the use of various teaching and learning strategies, teachers can promote creative skills among students and lead to constructive changes in students' behaviour, social skills, and overall development (Sternberg, 2003; Levanon, 2021). Creativity is not a divine inspiration or a special instinct that can be acquired by chance by a few people, but rather a skill and behavior that can be improved through practice (Ozdemir & Cakmak, 2008; Ceko, 2021). Therefore, there is a need to foster creativity and innovative talents among students through suitably taught and learnt activities (Selvi Narayanan, 2017).

Torrance (1990) viewed the teacher as having a vital role in fostering students' creativity. To promote students' creative abilities, it is necessary to diversify school structures and for teachers to keep up with new teaching and learning practices (Hosseini & Watt, 2010). The need for changes in curriculum and practices must be recognized by the authorities of the educational system, and the initiatives in this regard should begin with the teacher education programme. Teacher education programmes have to prepare pre-service teachers from a wide range of diverse teaching environments. The characteristics and competencies of pre-service teachers also play a role in the development of a country's education system, as they are members of the teaching profession (Padagas, 2019). With the above background, the researchers have conducted a research study with the following objectives.

1. To know the creativity levels of secondary school students
2. To analyze the strengths and weaknesses of students in creativity tests
3. To analyze the effect of school management on the creativity of students

Methodology of research

A survey research method was used in this study to assess the creativity levels of secondary school students. For the investigation, a total of 225 students were selected as a sample from four government and five private secondary schools in Tamil Nadu State, India. Among them, 128 were from government schools, and the remaining 127 were from private schools. The sample was selected for this study using simple random sampling. In this study, the needed data were collected from the selected sample by distributing the research tool, namely, Passi Tests of Creativity (PTC).

According to Passi (1972), creativity is viewed as a multidimensional (verbal and nonverbal) attribute, differentially distributed among people, and includes chiefly the factors of seeing problems, fluency, flexibility, originality, inquisitiveness, and persistence, which enable students to view an incident or problem from different perspectives. Based on this, the Passi Tests of Creativity were constructed with six subtests, namely: the seeing problems test, the unusual uses test, the consequences test, the test of inquisitiveness, the square puzzle test, and the *blocks test of creativity*. To facilitate the sample's understanding of the test items, the PTC tool was prepared in a bilingual format (Tamil and English), following the PTC manual's instructions.

The validation of the research tool (PTC) was carried out using face validity, and its reliability was assessed using the split-half method. The coefficient values found from the reliability test for PTC were 0.78 for the composite scale, 0.75 for the seeing problems test, 0.82 for the unusual uses test, 0.80 for the consequences test, 0.71 for the test of inquisitiveness, 0.83 for the square puzzle test, and 0.75 for the blocks test of creativity, respectively. These reliability scores for PTC indicate that the selected research tool was highly reliable to use in research studies. After establishing rapport with the selected sample, the Passi Tests of Creativity were administered with proper instructions regarding their responses in the research tool. After the sample's response in the PTC sheets, the filled PTCs were collected from the sample, and their responses were carefully analyzed using scoring keys.

The creativity levels of the sample were categorized into three formats, namely, low, average, and high, based on their obtained mean and standard deviation scores in PTC. If one gets a score below 1 standard deviation (S.D) from their mean score, then the sample is classified as a *sample with low creativity*; above 1 standard deviation (S.D) from their mean score, then the sample is classified as a *sample with high creativity*; and between 1 S.D above and 1 S.D below the mean score, then the sample is classified as *sample with average creativity*.

4. Research Findings

Data from 255 PTC samples were analyzed to determine whether the scores are normally distributed. The test results are listed in the following table.

Table1.Normal distribution test on the scores of the sample in PTC

Descriptive Measures			Normality Test	Statistic	df	p-value
PTC	Mean	*123.98*	Kolmogorov-Smirnova	*0.056*	*255*	*0.048*
	SD	*15.47*				
	Skewness	*0.11*	Shapiro-Wilk	*0.988*	*255*	*0.036*
	Kurtosis	*-0.68*				

According to the aforesaid normality test results, the mean score for the sample in PTC is 123.38. The p-values from the Kolmogorov-Smirnov and Shapiro-Wilk tests are 0.048 and 0.036, respectively, and both are less than 0.05; hence, the sample scores in PTC follow a normal distribution. The following table shows the number of samples with low, average, and high creativity.

Table 2.Number of samples with low, average, and high levels of creativity

Level	Creativity	
	N	%
Low (Mean - SD)	*37*	*14.51*
Average (between Low & High)	*169*	*66.27*
High (Mean + SD)	*49*	*19.22*

Among the selected 255 samples, 14.51% had low creativity, 66.27% had average creativity, and 19.22% had high creativity. It was found that most samples had an average level of creativity. The following table shows the strengths and weaknesses of the sample in the PTC sub-tests, with reference to mean scores.

Table 3. Strengths and weaknesses of the Sample in the sub-tests of PTC

S.No.	Sub-test PTC	N	Mean	Strong/Weak	Reason
1	Seeing problems test	*255*	*16.69*	*Weak*	*< GM*
2	Unusual uses test	*255*	*32.83*	*Strong*	*> GM*
3	Consequences test	*255*	*25.08*	*Strong*	*> GM*
4	Test of inquisitiveness	*255*	*10.15*	*Weak*	*< GM*
5	Square puzzle test	*255*	*12.47*	*Weak*	*< GM*
6	Blocks test of creativity	*255*	*26.16*	*Strong*	*> GM*
Grand Mean - GM (Mean Score of Means)		*255*	*20.56*		

The above table 3 data show that the grand mean (GM) of the pre-service teachers' mean scores across all six sub-tests of PTC is 20.56. The table data also indicate that the pre-service teachers were strong in the usual uses test (32.83), the consequence test (25.08), and the blocks test of creativity (26.16), as their mean scores in these components exceed the grand mean (20.56). Further, the pre-service teachers were weak in the problem test (16.69), the test of inquisitiveness (10.15), and the square puzzle test of creativity (12.47), as the mean scores in these components are lower than the grand mean. The following table shows the comparison of the mean scores of students from government and private schools students

Table 4. Comparison of mean scores of pre-service teachers in PTC: institution-wise

PTC	Institution	N	Mean	SD	t	p
Seeing problems test	Government	*128*	*17.37*	*2.45*	*0.99*	*0.323*
	Private	*127*	*17.06*	*2.57*		
Unusual uses test	Government	*128*	*30.68*	*7.38*	*2.01*	*0.045**
	Private	*127*	*32.70*	*8.62*		
Consequences test	Government	*128*	*25.36*	*9.12*	*0.17*	*0.868*
	Private	*127*	*25.17*	*8.77*		
Test of inquisitiveness	Government	*128*	*9.41*	*3.82*	*1.06*	*0.290*
	Private	*127*	*9.98*	*4.71*		
Square puzzle test	Government	*128*	*13.37*	*3.78*	*1.68*	*0.095*
	Private	*127*	*12.47*	*4.69*		
Blocks test of creativity	Government	*128*	*29.09*	*8.55*	*3.50*	*0.000**
	Private	*127*	*25.28*	*8.85*		
composite creativity	Government	*128*	*125.28*	*15.14*	*1.35*	*0.177*
	Private	*127*	*122.66*	*15.74*		

From the above mean comparison table 4, it is found that the mean scores of students from government and private schools on the unusual uses test are 30.68 and 32.70, respectively, indicating that students from private schools are better at the unusual uses test of creativity than those from government schools. Also, the t-value (2.01) and p-value (0.045 < 0.05) indicate a significant difference in the mean scores of students from government and private schools on the unusual uses test. Similarly, the mean scores of government and private school students on the Blocks Test of Creativity are 29.09 and 25.28, respectively; therefore, students from private schools are better on the Blocks Test of Creativity than those from government schools. Also, the t-value (3.50) and p-value (0.00 < 0.05) indicate a significant difference in the mean scores of students from government and private schools in

the blocks test of creativity. But there were no significant differences in the mean scores of students from government and private schools on the problem test, consequence test, test of inquisitiveness, square puzzle test, and composite creativity, as the p-values for these sub-tests were less than 0.05. The following table shows the comparison of students' creativity scores using an ANOVA test, with reference to their school management and levels of creativity.

Table 5. Comparison of mean scores of school students in Fluency, Flexibility, and Originality: institution-wise

Creativity	Institution	N	Mean	SD	t	p
Fluency	In General	*255*	*56.25*	*13.38*	*NA*	*NA*
	Government	*128*	*56.28*	*13.32*	*1.08*	*0.279*
	Private	*127*	*56.22*	*13.43*		
Flexibility	In General	*255*	*35.82*	*15.39*	*NA*	*NA*
	Government	*128*	*35.26*	*16.24*	*0.27*	*0.785*
	Private	*127*	*36.38*	*14.54*		
Originality	In General	*255*	*31.31*	*16.98*	*NA*	*NA*
	Government	*128*	*33.10*	*16.28*	*1.29*	*0.199*
	Private	*127*	*29.52*	*17.68*		

From the above mean comparison table - 5, it is found that the mean scores of pre-service teachers of government and private teacher training institutions in the unusual uses test are 30.68 and 32.70, respectively, which indicates that students from private schools are better in the unusual uses test of creativity than those of students from government. Also, the t-value (2.01) and p-value (0.045 < 0.05) indicate a significant difference in the mean scores of students from government and private schools on the unusual uses test. Similarly, the mean scores of students from government and private schools in the blocks test of creativity are 29.09 and 25.2, respectively, and therefore, students from government schools are better in the blocks test of creativity than those from private schools. Also, the t-value (3.50) and p-value (0.00 < 0.05) indicate a significant difference in the mean scores of students from government and private schools in the blocks test of creativity. However, there were no significant differences in the mean scores of students from government and private schools on the problem test, consequence test, test of inquisitiveness, square puzzle test, and composite creativity, as the p-values for these sub-tests were not significant.

Conclusion

The infusion of technology into our lives brings many challenges and new changes in daily life as well. Innovations and creations cherish the cause for these changes in our survival. People with creative talent are behind the scenes and contribute to the advancements in this world. Many research findings highlight that creativity can be fostered among student learners through adequate practices and training. The teaching force in any nation is an instrument to make it possible. A teacher with adequate teaching competencies and creative abilities can make a significant contribution to effectively moulding their students. The present study reveals that secondary school students had an average level of creativity. Hence, teachers and parents must encourage students to let down their emotional guard during activities related to teaching and learning. Also, they must be directed to update their knowledge and be equipped with a variety of teaching and learning methods and materials. Feedback and exposure visits can also help school students acquire different learning experiences that could help them face career challenges independently.

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