Research on the Creativity of High School Students in Da Nang City

Pham Thao Giang[1], Phan Nguyen Anh Thu[2], Le Phan Quynh Trang[3]

[1,2,3]Le Quy Don High School for the Gifted DaNang, Vietnam

ARTICLE INFO	ABSTRACT
Published online: 10 November 2021 Corresponding Author: **Pham Thao Giang**	Creativity is now said to be an important and top priority in education today. This is an important personality quality of a person expressed through thoughts and actions, especially ideas or products, solutions that a person offers to a problem, and creativity is the main factor that helps a person stand out or be different from others. The study was conducted on 222 students from 2 groups of gifted schools and non-gifted high schools in Da Nang city in order to describe the reality of students' awareness and creativity level, find out about the expressions, their constitutive elements of creativity and analyze the subjective and objective factors that affect high school students' creativity. Research results show that 80% of students are creative at an average level. One special thing is that factors of academic ability, age, or gender do not completely affect students' creativity. Moreover, factors that directly affect the creativity of students come mainly from the intrinsic motivation of the students themselves, the school and family environment is just the foundation for promoting students' creative motivation. From the above results, the study proposes some measures that partially affect the educational methods of schools and families, as well as directly affect the survey subjects.

INTRODUCTION

Today, the goal of education is not only to provide knowledge but also to shape the personality of students. And that creativity is considered as a personality quality more important than intelligence or human potential. However, traditional educational methods are causing limitations to students' creativity and it can be widely seen that the Creative Quotient (CQ) index in research papers on students is mostly average.

Recently, there have been some studies on creativity in target groups such as primary school students, university students... but research on creativity in high school students is still limited. In addition, with the characteristics of today's new society along with the development of 4.0 technology, the expression of creativity in students has had certain changes compared to the studies of the past years

RESULTS

Some concepts and characteristics of creativity

In 1954, in Buffalo, New York State, Alex Osborn, the author of the brainstorming method, founded the Creative Education Foundation (CEF). In 1967, through Osborn's activities, at the University of Buffalo, the Center for Studies in Creativity (CSC) was established.

According to Alder (2002); Jensen et al (2010), creativity helps to orient students' future careers and is the basis for teachers to change teaching methods to suit each group of subjects, improving creativity for learners. According to research by Westby & Dawson (1995) - they found that teachers prefer students to be non-creative, even though they explicitly endorse creativity as an educational goal. Research by Torrance (1962) and Herr, Moore, Hansen, Castell (1965) suggests that creative children often have to face the decision to either accept their surroundings or maintain their originality which is widely refused. In Vietnam, according to Tran Thi Bich Lieu (2016), teachers still have limited understanding and teaching about creativity. They focus more on creativity when it is required by policies and curricula and often use familiar and convenient creative tools.

Up to now, in the world, there are many definitions of creativity. According to Taylor, D.W. (1961), "create" - means to produce, to create something on the basis of an existing one or a newly formed one. From the perspective of personality, K.Urban (1995) argues that creativity is a personality attribute that manifests in a product that works uniquely and optimally, surprising oneself and also being new to others. . German psychologist Pippig (1988) defines creativity as a special personality attribute, which manifests when people are faced with problematic situations; is a combination of psychological qualities by which people, on the basis of their experiences and by independent thinking, create new, original, and rational ideas on an individual or

social level. There, the creators get rid of the traditional solutions and come up with a new, unique and appropriate solution to the problem posed. From a process perspective, Torrance (1962) defined creativity as an active process that ends in a unique new product that is recognized as useful by a certain group of people at a corresponding time. Le Nam Hai (2011) believes that creativity is a personality attribute that manifests through new and strange ideas and unique products that are not only valuable to individuals but also to society. According to Nguyen Duc Uy (1999), there is no distinction in creativity, whether more or less is all creativity.

Researching on the characteristics and expression of creativity, Guilford and Torrance (1979) and professor Pham Thanh Nghi (2012) stated that creativity is determined by a combination of the following characteristics and capabilities: (1) originality, (2) flexibility, (3) fluency, (4) elaboration and redefinition. Lucas et al (2012) determined that creative students will (1) Explore (2) Imagine (3) Specialize. Le Nam Hai (2011) said that creative people have many initiatives, have the ability to master different problems, they are sensitive to problems, and are unique in their way of solving problems. Davis (1992) concluded that personality traits of creators include: (1) their sense of creativity, (2) originality, (3) independence, (4) risk-taking, (4) enthusiasm, (5) curiosity, (6) humor, (7) intrigued by complexity and novelty, (8) artistic sense, (9) openness, (10) need for privacy, (11) high perception

Regarding the factors affecting creativity, research by Amabile (1983a, 1983b) and Do Thi Thanh both confirmed that the environment affects students' creative motivation. Lubart & Lautrey (1998) asserted that children from families with flexible rules tend to be more creative than children from families with rigid rules, regardless of socioeconomic level. Research by Nguyen Thi Ha (2005) shows the relationship between parents' educational style and children's creativity, parents applying a democratic education style will help their children be more creative than parents with an authoritative type of upbringing. Creativity is also heavily influenced by socio-cultural factors such as education, parents' occupation, family economic conditions, and socio-cultural environment differences between urban and rural areas (Nguyen Nguyen. Cong Khanh, 2007). According to Pham Thanh Nghi, (2012), the general atmosphere of the open class is meant to encourage creativity. Research by Deci, Nezlek, and Sheinman (1981) and by Rosenthal, Baratz, & Hall (1974) both show that the personality and behavior of teachers have an influence on students' creativity. According to Aranguren, M. (2012), individuals who pursue artistic activities are more creative than those who do not. The author's Le Thi Tuyet (2018) et al said that participating as a class officer helps to develop high creativity about 5 times. Research by Amabile (1983a, 1996) and other scholars has pointed out the importance of motivation for creative work, arguing that it is difficult for people to do a creative job in their field unless it is he loves and focuses on the work passionately due to the attraction of the object and the work content rather than because of the reward. Research by Torrance (1987) also shows that people who do things they enjoy are more creative when pursuing them. In addition, recognition of creativity or achievement can lead to higher creativity (Amabile et al., 1996) and (Amabile & Gryskiewicz, 1987).

Discussing measures to enhance creativity, Haddon and Lytton (1968) propose to create a learning environment in which students can open and freely exchange ideas, encourage teamwork and discussion. and cooperation, prioritizing individual freedom. Dan Rea (2003) argues that it is a need to influence education so that students learn to self-regulate their own motivation, educators need to support students to be aware of the measures to control their motivation and learn to control their own motivation. self-regulating way to reach the peak of optimal motivation for creative intelligence. Todd Lubart (2004) states that a complete training program is one that seeks to enhance all components related to creativity (both cognitive and non-cognitive).

Amabile (1983a) argues that creativity can be developed through training, creating an environment, and improving motivation. Developing creativity is possible through strengthening three elements of the new problem-solving structure: motivation, logical action, and intuitive action (Pham T.Ni, 2011a) which also encourages creativity every day, even small changes, but in the long run these small changes lead to big differences.

Methods to enhance creativity can be mentioned as A. Osborn (1953) with Brainstorming Method used to activate creative ideas or Lateral Thinking by E.De Bono (19770), Synectics according to W. Gordon (1961), Creative Problem Solving by Guastella (1998), Herrmann Brain Dominance Instrument by N. Herrmann (1988), especially the Six Thinking Hats method of E. De Bono (1985).

In this article, we determine: the creativity of high school students is a quality, characteristic, and personality that is revealed through new, strange ideas and unique products in the life process (related to family, school, self...). At the same time, in this research, we will also find out about students' awareness of creativity, the components that make up creativity and the status quo of creativity's level of students, the factors that affect it, and the favored solutions that are proposed to enhance creativity in high school students in DaNang City.

Participants and methods

- *Participants:* 222 students from high schools in Da Nang city with all 3 grades, 2 genders and 2 groups of gifted and non-gifted schools

+ Gifted School: Gifted students demonstrate a high degree of intellectual ability. Typically, identification can be done through a combination of gifted tests and assessments. In many cases, tests are used to determine whether a child is gifted or not since performance compared to peers is an

important way of gauging a child's academic abilities.

- *Methods:* Participants who agreed to participate signed informed consent and then completed the questionnaire.

+ *Survey method by questionnaire:* we build a questionnaire consisting of 5 parts, which includes awareness; educational status (at home and at school); proposed measures; expression, and personal information (gender/class/school/ academic/behavior/aptitude...). With the expression question group, there will be 21 expressions with a scale of 1 to 5 points (1 = completely incorrect; 2 = hardly true; 3 = moderate; 4 = almost true and 5 = completely. correct).

+ *Test method:* Using a psychological test of German psychologists. It was K.J.Schoppe's language creativity test abbreviated as TST-N. Test TST-N consists of 9 subtests with requirements that require the subject to record his or her own answers within a time limit of 39 minutes, each answer that is reasonable and different from the other answers is given 1 point. Adding the score of each sub-test and then converting it into 6 sub-tests, from which the corresponding GTC score is calculated, dividing the total by 6 will produce the CQ creativity index. CQ according to the TST-N test is a positive number in the range 70-130. The levels of creativity are categorized as follows: Low (70-75), Below Average (76-90), Medium (91 - 110), Above Average (111 - 125), High (126 - 130).

+ *Mathematical statistical methods:* The Statistical Package for the Social Sciences (SPSS) version 22.0 was used for data analyses. We use SPSS 22.0 software to analyze mean score data; ratio %; standard deviation, the correlation between groups,... The coding procedure was performed as followed:

- 0 = do not agree
- 1 = agree

Survey results on the creativity of high school students in Da Nang City

The survey results in table 1 shows students' awareness and understanding of the elements needed in a supposedly creative idea. "Originality" is the most chosen factor (M=0.924). Almost all students know that creativity requires new and unique ideas compared to other ideas, this seems almost to be a common understanding of students about creativity. The next three most selected factors are "practical applicability", "developing on the old", and "fluency" (with 0.605; 0.556 and 0.538 respectively)

In contrast, the two least selected factors are "having public recognition" (M=0.229) and "having a big impact and causing an immediate change" (M=0.377). These are also two incorrect factors about creativity that are included to cause interference in students' selection. Although the selection rate is the least, there is still a number of students choosing, which means that there is still an inaccurate misunderstanding among students about creativity.

Especially, according to some Research, "flexibility" is an important component of creativity, but the selection rate is only 0.426; this means that the number of students who know this characteristic is not too much, it can be seen from the results of the creativity test that "flexibility" is the factor with the lowest average score. From that, it can be seen that, if students perceive and understand the elements of creativity, they will know how to improve their own creativity based on those constituent elements. Therefore, raising awareness and popularizing students' understanding of the knowledge they need to know related to creativity (such as the components that make up creativity) will be a theoretical method that contributes to improving creativity for students.

Table 1. High school students' perceptions about creativity's elements

Essential elements of a creative idea	M	SD	R
Originality	0.924	0.266	1
Flexibility	0.426	0.4956	6
Fluency	0.538	0.4997	5
Novelty	0.834	0.3728	2
Practical applicability	0.605	0.4899	3
Developing on the old things	0.556	0.498	4
Having public's recognition	0.229	0.4209	8
Having big impact and causing an immediate change	0.377	0.4856	7
Total	4.4888	2.84409	

M: Mean; SD: Standard Deviation; R: Ranking.

Through the survey results about the forms of creative expression, the three forms that students choose the most are extracurricular activities, project work; studying, and the arts. Students tend to show through extracurricular activities, project activities with M=0.812, and the remaining 2 forms with M=0.803 and M=0.673 respectively. Besides, the 2 forms with the lowest rate are housework chores (M=0.345) and sport (M=0.291). It seems that with regular activities, students have the opportunity to participate and when students are asked to be creative or to think, they tend to show their creativity the most. These are also activities that need creativity to make a difference among their products or among people, and at the same time, it does not have a specific limit or rule like sports, making students have to be creative to stand out.

Table 2. High school students' perception about aspects of self-expression of creativity in daily life

The form in which high school students express their creativity	M	SD	Rank
Study	0.803	0.3989	2
Household chores	0.345	0.4765	6
School activities	0.632	0.4833	4
Social activities	0.52	0.5007	5
Extracurricular activities, projects	0.812	0.3919	1
Art	0.673	0.4703	3
Sport	0.291	0.4555	7
Total	4.0762	2.5869	

M: Mean; SD: Standard Deviation; R: Ranking.

Survey on the factors that students think affect creativity, the most chosen and almost absolute factor is "Enthusiasm and interest in an issue"(M=0.937). This shows that the desire from the students themselves or the intrinsic motivation has a great influence on the creative results, they will use their creativity to solve a problem or do the things they want, but conversely, a problem without enjoyment, even if forced to do, will not be creatively effective. This is similar to the 2 factors with the 2nd and 3rd largest rates, which are "The initiative towards work naturally" (M=0.780) and "Motivation and desire to develop creativity". (M=789).

The way teachers teach in schools also has a significant impact when selected with M=0.673; it is the teaching methods or opportunities that teachers create for students as well as teachers' attitudes that will create conditions for students to freely express their creativity. At the same time, the parents' way of handling situations also makes a significant impact (M=0.516). If parents are open in their behavior, ask questions or talk and lead the child to think of many different solutions, this will also partly help the child think and develop higher creativity.

Thereby, when comparing with previous research results in Vietnam and in the world on influencing factors, it can be seen that students' perceptions are relatively correct and students know what will influence their creativity through their own experiences and perspectives.

Table 3. Students' perception of factors affecting creativity

Factors that influence creativity	M	SD	Rank
Family care for children	.390	.4889	7
How parents deal with situations	.516	.5009	6
How teachers teach in schools	.673	.4703	4
The relationship between teachers and students in the school	.157	.3646	10
Persistence towards the goal	.664	.4735	5
Enthusiasm and interest in an issue	.937	.2431	1
The initiative towards work naturally	.780	.4150	3
Motivation and desire to develop creativity	.789	.4088	2
Reward or punishment for doing something	.336	.4735	8
Peer pressure	.211	.4088	9
Total	5.4529	3.2488	

M: Mean; SD: Standard Deviation; R: Ranking.

In terms of grade: The majority of students in all 3 grades are creative at a below-average level with the rate in all 3 grades respectively being 10th grade is 56.25%; 11th grade is 78.38% and 12th grade is 74.55%. The second most dominant level is the average level. There were a small number of students at the low and above-average levels, including 1.82% of 12th graders who were above average. It seems that life's experience partly affects the ability to create language in particular and creativity in general. However, in the end, it can be seen that the difference in level between grades is not too large.

According to a one-way analysis of variance (One-way ANOVA), we get sig.=0.254 (>0.05). It proves that there is no difference in the level of creativity based on the TST-N test across grades

In terms of gender: The majority is still below average and average. With the creativity level at below average, males (70.97%) make up a lower percentage than females (74.03%). As for the average creativity, the male rate is 19.35% and the female is 20.78%. As can be seen, the difference in creativity levels by gender is not too big.

According to sig value, the T-Test is 0.21 > 0.05, so we conclude: There is no statistically significant difference in creativity (according to the TST-N test) of students with different genders.

In terms of school: According to the results of the TST-N test analysis, the ratio of creativity levels from high to low is almost similar with the highest rate being below average with 70.97% in specialized schools and 76.09% in schools. non-specialist. This time, it can be seen that the percentage of students achieving below average in non-gifted schools is about 6% higher than in non-gifted schools. However, with the average level, the gifted school is 22.58% higher than the non-gifted school by about 5% (the non-gifted school is 17.39%).

Thereby, it can be seen that, with 2 levels of average and above average, the percentage of gifted schools is higher, while below average and low are higher in the group of non-gifted schools. However, the ratio is still similar, so school factors or good academic ability do not affect the creativity of students. Highly creative students belong to the majority of gifted schools, but this does not mean that only gifted students are highly creative, but this can happen in non-gifted schools.

According to sig value, the T-Test is 0.22 > 0.05, so we conclude: There is no statistically significant difference in creativity (according to the TST-N test) of students in specialized and non-specialized schools.

Table 4. Creativity level of high school students in Da Nang City

			Level					Total
			Low	Below average	Average	Above average	High	
Grade	Grade 10	n	1	9	6	0	0	16
		%	6,25	56,25	37,5	0	0	100
	Grade 11	n	0	29	8	0	0	37
		%	0	78,38	21,62	0	0	100
	Grade 12	n	5	41	8	1	0	55
		%	9,09	74,55	14,55	1,82	0	0
Gender	Male	n	3	22	6	0	0	31
		%	9,68	70,97	19,35	0	0	100
	Female	n	3	57	16	1	0	77
		%	3,90%	74,03	20,78	1,3	0	100
School	Gifted High School	n	3	44	14	1	0	62
		%	4,84	70,97	22,58	1,61	0	100
	Non-gifted High School	n	3	35	8	0	0	46
		%	6,52	76,09	17,39	0	0	100

n: Number of participants; %: Percentage

Through the analysis of the TST-N test, with 6 segments of 9 subtests, it can be seen that almost the average score of each segment is below average, this is the main reason why most students are below-average according to the TST-N creativity test. Particularly for segment 2 including sub-tests "Four-word sentences" and "Finding and naming", the average score is higher than the average level. These are 2 exercises that require students to find for each acronym as many full names as possible in the task of "finding and naming" as well as to structure as many different 4-word sentences as possible through "Four-word sentences". The exercises in these two sub-tests are intended to practice "fluency". Therefore, it can be concluded that high school students are good and develop the "fluency" factor the most.

Table 5. Creative expression is related to the creative components of high school students based on 6 segments of the TST-N test

	Score	Level
Segment 1	89.157 / 130	Below Average
Segment 2	95.555 / 130	Average
Segment 3	76.490 / 130	Below Average
Segment 4	79.305 / 130	Below Average
Segment 5	87.296 / 130	Below Average
Segment 6	84.944 / 130	Below Average

According to the survey results, when asked about the desired measures from families and schools to enhance creativity, most students expect the school in the curriculum to organize diverse and creative formats of learning reports to apply what they've learned (such as model building, art performance, drama,..)(M=0.726). Besides, other forms which are quite popular after that such as studying projects to promote students' capacity, skills, and their application of knowledge from the curriculum (M=0.673) and through cultural and sports activities at school (M=601).

Thereby, it can be seen that students are also very eager to change or develop from within the school's own curriculum, thereby affecting the way students acquire and apply knowledge through creative methods that they learn. Design thinking students help students be more creative, not just ordinary or temporary activities. On the other hand, periodic small assignments or forms of technology, intensive classes are less popular but still partly receive the attention and interest of students. Perhaps students still want to improve through these forms but have not been approached with them in an interesting or appropriate way that keeps them motivated or interested to participate. In short, students really want changes in the nature of the school's activities, and the outreach activities to improve also need to match the wishes and preferences of the students in order to build the program appropriately.

Table 6. Opinions on measures improving creativity of high school students in Danang City

	M	SD	R
Intensive class to develop creativity with peers	.502	.5011	4
Periodic mini-exercises to practice and develop creativity	.413	.4934	6
In-depth personal consultation with a creative expert	.408	.4926	7
Technology format (online operation on fanpage and website)	.422	.4949	5
Learning projects to promote students' abilities and skills as well as to apply knowledge from the curriculum	.673	.4703	2
Various and creative formats of curriculum reporting and learning pace	.726	.4468	1
Through cultural and sports activities at school	.601	.4908	3
Total	3.7444	2.98678	

M: Mean; SD: Standard Deviation; R: Ranking

CONCLUSION

Creativity is currently receiving certain attention from schools and students in all countries around the world, including Vietnam. Regarding the actual situation, based on the results of creativity tests, it shows that up to 80% of high school students have moderate creativity; 9.8% students at low level and 2.8% at a high level. The survey results show that high school students have partly acquired a basic understanding of creativity. However, students still do not have a deep understanding of the elements of creativity and still have inaccurate thoughts about creativity. Factors such as gender, age, academic ability, conduct, or groups of gifted and non-gifted schools do not affect the creativity of students.

Factors from school or family do not directly affect creativity and do not completely change students' creativity. The biggest factor affecting whether a student's creativity develops or not depends on the intrinsic motivation of the student. In order to develop optimally and bring out the best, it should come from the students themselves (from the initiative, motivation, or their desire and need) and not any external factors that affect them. Although not directly affected, the environment from school and family is also said to be the foundation for influencing and promoting students' creative motivation.

Regarding the elements that make up creativity, most students are weak in "flexibility". However, high school students almost all achieve a good level of "fluency". In particular, this factor is also within the understanding of most students about the element of creativity. It can be seen that raising awareness and popularizing students' understanding of the knowledge they need to know related to creativity (such as the components that make up creativity) will be a theoretical method that contributes to improving creativity. created by students.

Talking about ways to improve creativity, most students want a change from the very nature of the curriculum or teaching methods in the school (with learning projects or diverse forms of creativity). If students learn and develop in the environment and with the method they want, students themselves will be motivated to develop their creativity more. Other measures such as forms of technology, exercises for development, or in-depth consultation also need to be developed in a friendly and interesting way to create excitement and interest for students when approaching them in order to be effective in enhancing creativity.

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