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Diagnostic Markers for Studying the Dynamics of Adolescent Creativity Development at Arts Integrated Lessons

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Abstract

The article details the final part of S. Tereschenko's dissertation research on the methods of developing creativity of adolescents using integrated art lessons. In this publication, the authors provide a description of the scientific understanding of the construction of a pedagogical experiment aimed at studying the dynamics of adolescent creativity development using art-integrated lessons. The study aimed to identify the structure of creativity of adolescents, determine the developmental potential of integrated art lessons, select experimental testing of a set of psychological and diagnostic techniques, and identify the level of formation of structural components of creative competence adapted to the specifics of integrated art lessons. The set of tasks included a practice-oriented analysis of the creativity of adolescents in secondary education. Well-known diagnostic methods were used to study human creativity and their adaptation to art lessons and features of adolescence. Statistical proof of the effectiveness of the diagnostic apparatus was used to identify the level of formation of adolescents' creativity in integrated art lessons. The study found that the adolescent creativity is defined as a personal ability for productive, creative, and original self-expression by means of art. The structure of adolescent creativity includes the following: associative-visual thinking, creative imagination, artistic observation, and artistic self-expression. We have developed the characteristics that demonstrate the levels of adolescent creativity in integrated music training.

Keywords: Creativity, associative-visual thinking, creative imagination, arts integrated lesson, ascertaining diagnostics.

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Introduction

The extraordinary dynamics of modern life lead to changes in the world outlook and ideology, culture and education. The contradictions between civilizing processes and human individuality, between the needs of today's world and the traditional educational situation, give impetus to new research in the humanities, including pedagogy. New trends predetermine the processes that take place in culture and put forward demands for the modernization of the educational space and continuous updating of the content of artistic education.

In educational practice, the issue of pupils' personality development by means of art is decisive. The conditions and factors for the implementation of artistic principles in the theory and practice of Ukrainian education are reflected in the leading national normative documents such as Law of Ukraine "On Education", Concept "New Ukrainian School" (2017), etc. which determine the current priorities of the education system development in Ukraine. The demands, which are declared in the national educational documents, direct pedagogical activity at searching and expanding the possibilities of immediate interaction between the teacher and pupils at the information, multicultural, and interpersonal levels. It forms the basis for the introduction of effective conditions and tools into modern education, as well as the introduction of educational technologies that help to develop pupils' personal qualities and mental functions (thinking, attention, imagination), their abilities and talents; they also lay a foundation for developing competences and raising a many-sided, cultural, creative, and capable of self-expression personality.

In the context of the educational process in modern school that ought to ensure a high level of pupils' activity in the creative rethinking of artistic knowledge and its practical use, the urgency of creativity development in adolescents at the lessons of art is greatly enhanced. In our research, creativity in adolescents is defined as a personal ability that integrates associative-visual thinking, creative imagination, and artistic observation. Together, all of them provide productivity, novelty, uniqueness, and originality of self-expression by means of art. The holistic-emergent interaction of the structural components of creativity causes the emergence of creative competence as an actual personal quality that adolescents need for the creative process at the lessons of art.

Methods

To determine the essence and to develop the structure of adolescent creativity, we used the content analysis of philosophical, psychological, pedagogical, methodological literature; pedagogical modeling; questionnaire, observation, diagnostic conversation, testing, analysis of pupils' creative works in order to find out the indicators which demonstrate creativity development at the lessons of art; methods of self-assessment and expert assessment, quantitative and qualitative analysis of the research and experimental results.

The search for methodological bases for the scientific study of the phenomenon of creativity made it possible to choose from a large list of classifications by cognitive models the most productive approaches, in our opinion. As a general scientific approach, we have chosen a holistic-emergent one (Seheda, 2011, p.115). A holistic-emergent approach is a research approach in which the understanding and evaluation of the phenomenology of personality development in the process of its involvement in artistic activity take place in the context of the logic of the idea of reintegration as a continuous renewal of integrity on new grounds; as a formative-procedural system in which the emergence of creative neoplasms of non-summative nature occurs (ibid, 2011, p.245). An integrated approach became a specific scientific approach in the study, and among the subject scientific ones, a personal-activity, praxeological and competence-based approaches were chosen, with the help of

which educational activities aimed at developing adolescent creativity, in our opinion, will have an effective result.

We interpret these approaches as ideological and praxeological attitudes, according to which the appropriate methods have been chosen: the content analysis of philosophical, psychological, pedagogical, methodological literature; pedagogical modeling; questionnaire, observation, diagnostic conversation, testing, analysis of pupils' creative works in order to find out the indicators which demonstrate creativity development at the lessons of art; methods of self-assessment and expert assessment, quantitative and qualitative analysis of the research and experimental results.

Literature Review

Analysis of literature, its generalization in accordance with the specified issues covers the philosophical, psychological, cultural, art critics foundations. The issue of creative personality development through the formation of creative qualities is reflected in the works of philosophers (E. Ilienkov "Philosophy and culture" (1991), A. Luk "Thinking and creativity" (1976), etc.) and psychologists (D. Bogoiavlenskaia "Psychology of creative abilities" (2009), V. Druzhynin "Thinking and creativity" (2001), Ya. Ponomariov "Psychology of creativity" (2006), etc.).

One of the main tasks of a general secondary education institution is to educate a thinking person. Thinking has a creative aspect because new ideas are born in the head. A. Luk listened to this opinion and noted: "Who wants to think creatively thinks creatively" (Luk, 1976, p.12), arguing this by the favorable conditions of the environment in which the student is at the time of training. We, of course, agree with the stated opinion and pay special attention to the environment of art lessons in which teenagers are during the educational process at school. We believe that only the creative atmosphere created by the teacher in the office with a bright design, among art objects, with the availability of technical equipment and art centers by type of activity, will be able to stimulate the mental activity of adolescents, promote dialogue in class and influence the creative development of adolescents.

Some researchers (O. Rebrii "Modern concepts of creativity in translation" (2012), etc.) study the creativity phenomenon through the scrutiny of creative works while comparing their common and distinctive features. The pedagogical aspect of the issue dealing with the formation of pupils' creative personality by means of music during the educational and upbringing process is based on the analysis of the research by K. Zavalko (2013), L. Masol (2006), and other scholars.

Analyzing the monograph of K. Zavalko "Pedagogical innovations in the theory and practice of music education" (2013) we found that the author formulates the concept of creativity, calling it a "personal category, where creativity appears as divergent thinking, intellectual activity, integrated personality quality (Zavalko, 2013, p.115). These positions impress our views because we define creativity as a personal ability associative and figurative thinking, creative imagination, artistic observation, which together provide productivity, novelty, uniqueness, and originality of their self-expression using art, but we project this definition on adolescents and the specifics of integrated art lessons.

The developmental influence of music on the formation of adolescent creative personality is studied by V. Brylina "Leisure-time activity: concepts, reality, problems. Music pedagogy: important problems of theory and practice" (2011), A. Vynohorodskiy "Development of teenagers' personal reflection (based on the material of music reflection)" (1999) and other researchers.

Research works done by scholars from Great Britain, Denmark, the USA, the Czech Republic, and other countries around the world are of great importance for our study. Among them, there are such

researchers as M. Agoguea et al. "The impact of age and training on creativity: A design-theory approach to study fixation effects. Thinking skills and creativity" (2014), J. Baer "Implications of domain specificity for creativity assessment. Domain specificity of creativity" (2016), F. Lilly "Creativity and cognitive development in adolescence. The encyclopedia of child and adolescent development" (2020), V. Petre "Creativity as cultural participation" (2010), M. Fryer "Making sense of creativity from a psychological perspective. Creativity and human development" (2012) and others, whose research works deal with the issues of the personal phenomenon of creativity, its relationships with culture, creativity and social aspects of human life.

Among the mentioned works in this field, it is necessary to address the position of R. Florida "The rise of the creative class. And how it's transforming work, leisure and everyday life" (2014), whose opinion concerns globalization challenges to modern man. He emphasizes that in the knowledge economy of the last quarter of the twentieth century the main resources were intelligence, innovation, inventions, works of art, and other intellectual property (Florida, 2014). Therefore, today in Ukraine and around the world, the attention of scientists in various fields of knowledge is focused on changing educational trends, on providing modern students with opportunities to develop creative qualities that will help them in the future to earn a living with their ideas.

In particular, we paid attention to the technique of teaching emotion and creativity skills through art that was developed by the academics from Yale University such as N. Maliakkal, J.D. Hoffmann, Z. Ivcevic, and M.A. Brackett, the scientists' thoughts were published in the article "Teaching Emotion and Creativity Skills through Art: A Workshop for Adolescents" (2016, pp. 69–83). They offered a workshop on developing emotional intelligence skills for adolescents aged 13-18. The artistic events and seminars stressed the use of emotions to make thinking easier and to understand emotions and creative skills. A group of academics conducted their experiment at fine arts lessons, which makes their research different from ours.

Important for our research was the fundamental work "Creativity in Art Education and its Impact on General Education" by R. Podlipkiy and J. Vancat (2017), and others, where researchers objectively emphasize that the definition of creativity that exists in the academic works and its understanding in practice are inseparable from general education in the general consciousness. At the same time, in today's educational environment there is a problem of clear professional criteria that are not based on the subjective evaluation according to the aesthetic effect. In this book, M. Slavikova (2017, pp.199-206) expresses her position on creativity in music. She says that music is understood as a means of developing a person's abilities in the emotional sphere and also in logical thinking and creativity. Today, creativity is seen as an individual and social need and it is manifested in almost all human activities. The internal prerequisites for creative perception of music are determined primarily by the psychological characteristics of the individual. His/her musical auditory abilities and dispositions – sensitivity, differentiation, and analytical ability to detect musical means of expression (melody, rhythm, tempo, dynamics, agogics, harmony, instrumentation, musical form, style, genre, etc.) play a very important role. Equally important are the tonal senses, musical memory (which integrates the auditory, visual, motor stimuli of the individual sensory organs and creates a synthetic perception of perceived music), musical imagination, rhythmic feeling, musical thinking, and elements of musical creativity (ibid, 2017, p.202–203). Summarizing the content analysis of this work, we have drawn attention to the important idea of the researchers that aesthetic assessment is a unique tool for each person to evaluate his/her own cognitive and communicative abilities unconsciously, but a responsible teacher cannot evaluate the results of the pupils' creativity with this approach.

Hence, taking into account the level of interest that academicians and practitioners show in the issue of adolescent creativity development and the level of its theoretical and practical study, we have

outlined our research interests that are focused on the purpose. The purpose of our research is to define the criteria and characteristics that demonstrate the levels of creativity development in adolescents at arts integrated lessons. To do this, we developed a complex of appropriate diagnostic tools based on adjusted psychological and pedagogical techniques, which could help to determine the dynamics of adolescent creativity development. We checked the suggested criteria, levels, and techniques at the arts-integrated lessons in general secondary education institutions of Ukraine.

Theoretical and methodological grounds of research are comprised of the theories of creativity development (Ye. Ilyin "Psychology of crafts, creativity, giftedness" (2012), P. Torrance "Diagnostics of creative thinking" (1962), etc.), which allow us to define the parameters and markers of creativity. They also include experimental and theoretical research on the phenomenon of creativity as a multi-level phenomenon. This aspect is thoroughly revealed in the work of "Psychological and pedagogical foundations for the development of creativity" (2006) authors T. Barysheva and Yu. Shekalov, where scientists consider the psychological structure of human creativity as a system of motivational, affective, intellectual, aesthetic, communicative parameters. At the same time, scientists do not pay attention to the structure of students' creativity in adolescence. In turn, we structure the creativity of adolescents in four components: associative and figurative thinking, creative imagination, artistic observation, and artistic self-expression.

Among musical and pedagogical concepts of the creative personality development, we can name the founders of the Ukrainian musical and pedagogical thinking O. Rostovskyi (2001), O. Rudnytska (2002), H. Padalka (2008) and others, who emphasize the importance of integrative connections between different types of art in the creative development of schoolchildren.

Thus, substantiating in the work "Pedagogy: general and art" (2002), the expediency of using the integration of arts in the educational process, O. Rudnytska argues that any kind of art used as a separate, cannot fully ensure the solution of educational problems, and that is why the integration of arts, based on their interaction, promotes the harmonious development of personality and reveals a holistic artistic picture of the world (Rudnytska, 2002, pp.86-88).

We do not leave aside the idea L. Masol, set out in the work "The technique of teaching art in elementary school" (2006), where it articulates a position on the polycentric type of integration, which involves the selection of two or more dominant semantic lines – music and fine arts, which are organically combined with other semantic lines of synthetic arts – choreography, theatre, cinematography (Masol, 2006, pp.68-70). At the same time, in this way of teaching the artistic and aesthetic complex of disciplines, visual arts are more relevant, ignoring the importance and inexhaustible possibilities of musical art as means of developing the creativity of students.

It is proved in our study that creativity is most actively developed using musical art and its integration with other types. We have proved that in the process of integrated study of school subjects, in particular art disciplines, a teenager can understand the essence of the artistic phenomenon and concept, he develops complex creative and practical skills in the process of artistic activity in an integrated music lesson and promotes optimal interaction of a teenage student with the world of art (Tereschenko, 2017, p.86). The main tasks of integrated art lessons are the personal development of adolescents, enrichment of their emotional and aesthetic experience, the need for creative self-expression, and spiritual and aesthetic self-improvement, which undoubtedly contributes to the development of structural components of adolescent creativity.

Discussion

Setting down diagnostic markers of the dynamics of adolescent creativity development in the process of integrated music learning is one of the important stages of the experimental part of our

research. The study of the category of development gives reason to argue that quantitative and qualitative changes in creativity practically cannot be separated which is explained by the compensatory nature of human psychophysiology. Therefore, we consider the experimental study of the creativity dynamics in adolescent schoolchildren through the creative competence, the structural components of which can be fixed in the statistical indicators of qualitative and quantitative changes. Pedagogical diagnostics of this phenomenon meant the clear definition of its criteria and manifestations, on the basis of which the necessary techniques were selected. Based on the identified structural components of the creative competence in adolescents, we have defined the criteria of their development:

- associative-visual thinking is a set of ways and procedures which help manipulate the images of objects whose individual properties are perceived through information associations with the objects of art that are already known;

- creative imagination is an ability to create new images and ideas which are embodied in the original, personally valuable creative products;

- artistic observation is a part of the human intellect and worldview phenomenon where the concept of “attention” to the artistic content of phenomena or cultural facts attains an intellectual ability;

- artistic self-expression is a personal ability to express one’s own individual worldview (thoughts, feelings, impressions) by means of art during individual creative activity.

Making diagnostics of the levels of the creative competence development, we have defined that it means:

- 1) adolescents’ ability to generate ideas and show flexibility in search of non-standard decisions; to offer original ways how to tackle an artistic task; to have personally valuable productivity of the creative process; to be able to search for associative links between artistic phenomena and events; to handle visual material and to formulate own ideas while discussing the works of art and artistic phenomena;

- 2) an ability to create new ideas based on the previous sensuous artistic experience, to memorize musical material, to possess a wide associative lexical stock in order to describe, compare and discuss artistic phenomena and events; an ability to develop an imaginary “way to create a masterpiece”;

- 3) a focus on the creative process, intellectualization of the views; an ability to compare works of art, to find which way music is connected with other types of art; an ability to simultaneously turn attention to different types of artistic activity and switch from one kind to another, to identify signs and objects of art that have slight differences, to find differences in the similar things;

- 4) strong motivation to engage in art, a manifestation of initiative, a desire to express one’s individuality, and an ability to convey various emotional states through expressive verbal and non-verbal means, to be creatively active, sensitive to the unusual, to use the means of creating an artistic image accurately and appropriately, to be able to choose the means of artistic expression on your own, to have a general creative orientation, to have experience of artistic and creative activity, to express yourself in artistic activities (singing, music, improvisation, drawing, sculpting, etc.).

Having studied the connection between the structural components of creative competence and each of the described processes, we can assume that adolescent schoolchildren are able to use these psychic functions freely, so it is a precondition for their personal creative self-expression. Therefore,

during research and experimental work, based on the study of age peculiarities of adolescent schoolchildren, we have defined the characteristics demonstrating the levels of creativity development in adolescents (high, medium, and low) in the course of integrated music learning. in particular:

The high level of creativity development in adolescents is characteristic of those pupils who are actively engaged in educational and creative activity and learn new artistic material quickly, they can analyze the works of music, visual, theatrical and other arts, they are full of determination and confidence in their creative abilities, they can offer several ways to solve a creative task and these ways are characterized by novelty, uniqueness, personal value. These pupils have original associative and visual thinking and a developed creative imagination, they are focused on the perception of art, they can observe the embodiment of the artistic image in a work of art, notice details, find differences, they are able to express themselves, they delve in a process of creative activity in an emotional way, they are able to concentrate their creative power in individual and group work in the classroom, they are focused on good results.

The medium level of creativity development is characteristic of those adolescent schoolchildren who possess developed components of the creative competence but do not use them in full. Psychological barriers, self-doubt, complexes, and laziness prevent such pupils from expressing themselves. Although these pupils feel creative, they do not seek to actively demonstrate their creativity in artistic and creative activities. Adolescents of this level are not active enough in the classroom, they tend to copy or repeat their classmates' way to solve a creative task, their ideas are not marked by novelty, and they can be inattentive. These adolescents are characterized by a lack of motivation for creative activity, but providing they are interested in the creative process, they can work with inspiration bringing the matter to a close.

The low level of creativity development is characteristic of adolescent schoolchildren who very rarely express themselves creatively. Such pupils lack motivation for artistic self-expression and for practicing art. They do not know how to generate ideas; it is difficult to make them engage in creative search. They sing and draw with reluctance; they are unable to look for differences and similarities in works of art and they are inclined to apathy. These adolescents find it easier to work on a pattern or scheme, to perform reproductive tasks. Nevertheless, they do all these things reluctantly. Such schoolchildren do not show interest in performing creative tasks that require their own search for a solution or use of imagination. They can hardly associate artistic phenomena and events; they are inclined to consult with a deskmate about the activity. In case they perform any tasks, they do it inactively just to avoid troubles or get a grade.

Results

The experimental base of the study was the general education institutions of I-III stages, namely: Melitopol specialized general education school of I-III stages № 25, Municipal education institution "P.I. Shkidchenko Secondary general education school №97" of Dnipro City Council (Dnipro), V.O. Nyzhnychenko Horishnio-Plavska specialized general education school of I-III stages №3, O. Kobylanska Chernivtsi general education school of I-III stages №24. In total, 487 adolescents participated in the experiment. The experimental group (EG) consisted of 244 pupils, the control group (CG) consisted of 243 pupils.

Having studied the creative essence of creativity, we made a conclusion about a close relationship between its markers and we chose the appropriate techniques to study the levels demonstrating the development of the structural components of creative competence in adolescents. Among them, there are: "Correction Test, or Can You Keep Attention?" by H. Münsterberg (Ilyin, 2012, p.147); B. Bourdon's concentration test (Krogerus, 2015, p.215); P. Torrance's techniques (1962)

“Verbal creative thinking” and “Imaginative creative thinking”; “Spatial Imagination” by R. Amthauer (2003, p.112); “Verbal Imagination” by R. Nemov (2005); “Motivation for success and the fear of failure” (Rean questionnaire) (Obraztsova, 2012); “Geometry in composition” by Ye. Torshylova and T. Morozova (2010); “Style Comparison” by T. Barysheva and V. Shekalov (2006, p.74); techniques for identifying musical by V. Anisimov (2004), L. Shkoliar (1999), artistic by V. Meyerhold (2011), O. Bulatova (2001), and other abilities that we have adjusted to the specific features of the content and process of integrated music lessons.

While implementing the experimental technique for studying the levels of criteria development within adolescent creative competence, we used the statistical λ -criterion by Kolmogorov–Smirnov test (Novikov, 2004, p.23). The suggested diagnostic tools for studying the level of adolescent creativity development made it possible to provide an experimental study of the dynamics that demonstrate the adolescent creative competence development, which is fixed in the statistical indicators of quantitative and qualitative changes during the pedagogical experiment at arts-integrated lessons.

The diagnostics of the levels demonstrating the development of creative competence in adolescents were carried out in *three stages of the pedagogical experiment*: ascertaining, formative and final ones. The purpose of the ascertaining stage was to diagnose the state and levels of creativity development in adolescent schoolchildren, and to divide the schoolchildren into the experimental and control groups. In order to obtain the data regarding the state of the identified issue at the first stage of the pedagogical experiment, we conducted a research work on establishing the levels of creative competence development in adolescents of Grades 5-8. Using testing and creative tasks, we checked the levels demonstrating the development of creative competence components in adolescents (487 pupils).

At the stage of the ascertaining experiment, 175 diagnosed pupils showed a low level of creative competence development, 225 pupils – the medium level and only 87 adolescents demonstrated the high level. According to the data obtained, we divided the schoolchildren into experimental groups. This was done using the methodology of a pedagogical experiment, according to which the homogeneity of the formed groups was checked using the methods of mathematical statistics. At the stage of the ascertaining experiment, in order to test the homogeneity of the selected groups, we used the Kolmogorov–Smirnov criterion (Novikov, 2004, p.23). The following hypotheses were formulated: H_1 – the distribution of the studied feature in the experimental group is not different from its distribution in the control group, and the alternative hypothesis: H_1 – the distribution of the studied feature in the experimental group is different from its distribution in the control group. To check the statistical hypotheses by the Kolmogorov–Smirnov criterion, the statistics value λ was calculated by the formula: $\lambda = d_{max} \cdot \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$ where is n_1 the number of pupils in the experimental group and n_2 is the number of pupils in the control group, d_{max} is the largest absolute value of the difference in cumulative frequencies.

For the level of significance $a = 0,05$ which is conventional in psychological and pedagogical research we choose $\lambda_{kp} = 1,3581$ by the tables. If $\lambda_{cn} \geq 1,3581$, the differences between the distributions will be considered probable. This will allow us to formulate the conclusion that the empirical distribution of the studied feature in the EG differs from the distribution in the CG at the ascertaining stage of the experiment.

Table 1 shows the data regarding the distribution of adolescents who participated in the experiment by levels of creative competence development at the ascertaining stage of the experiment.

Table 1. Comparative data of the adolescents' distribution by the levels of creative competence development at the ascertaining stage of the experiment

Criteria of creative competence in adolescents	Groups	Level of creative competence development in adolescents						λ -the Kolmogorov-Smirnov criterion	
		Frequencies			%			λ_{cn} EG-CG	λ_{kp}
		Low	Medium	High	Low	Medium	High		
Associative-visual thinking	EG	48,39	144,69	48,48	19,83	59,3	19,87	1,3236	1,3581
	CG	72,71	118,71	51,03	29,92	48,85	21		
	Total	121,1	263,4	99,51	48,75	108,15	40,8		
Creative imagination	EG	118,34	91,50	34,16	48,5	37,5	14		
	CG	127,09	91,20	25,03	52,3	34,53	10,3		
	Total	245,43	182,7	59,19	100,8	72,03	24,3		
Artistic observation	EG	115,7	101,16	29,45	47,42	41,46	12,07		
	CG	74,21	113,24	55,40	30,54	46,6	22,8		
	Total	189,91	114,4	84,85	77,96	88,06	34,87		
Artistic self-expression	EG	112,65	101,65	32,01	46,17	41,66	13,12		
	CG	74,12	106,92	60,07	30,5	44	24,72		
	Total	186,77	208,57	92,08	76,67	85,66	37,84		

To calculate relative frequencies according to the selected statistical criterion, we used f – an indicator of the number of frequencies demonstrating the recurrence of the levels of creative competence in adolescents according to their distribution into the control and experimental groups. Thus, f is equal to the fraction of the frequency division by the sample volume for the two samples we have. Then, the module of difference of corresponding relative frequencies for the control and experimental samples was defined. As a result, the initial table looks like that:

Table 2. The module of difference of corresponding relative frequencies for the EG (244 pupils) and CG (243 pupils) samples

	levels	Relative frequency EG (f_{exp})	Relative frequency CG (f_{contr})	Module of frequency difference $ f_{exp} - f_{contr} $
Associative-visual thinking	l	48,39/244≈0,19	72,71/243≈0.29	0.1
	m	144,69/244≈0,59	118,71/243≈0.48	0.11
	h	48,48/244≈0,19	51,03/243≈0.21	0.02
Creative imagination	l	118,34/244≈0,48	127,09/243≈0.52	0.04
	m	91,5/244≈0,37	91,2/243≈0.37	0
	h	34,16/244≈0,14	25,03/243≈0.1	0.04
Artistic observation	l	93,7/244≈0,38	74,21/243≈0.3	0.08
	m	101,16/244≈0,41	113,24/243≈0.46	0.05
	h	29,45/244≈0.12	55,4/243≈0.23	0.11
Artistic self-expression	l	95,65/244≈0.39	74,12/243≈0.3	0.09
	m	101,65/244≈0.41	106,92/243≈0.44	0.03
	h	32,01/244≈0.13	60,07/243≈0.25	0.12

Among the received modules of relative frequencies difference, we choose the largest module which is specified as d_{max} . In the example that we consider $d_{max} = 0.12$, so the values of λ_{cn} are less than those of λ_{kp} which allows us to accept the null hypothesis – the distribution of the studied feature in the experimental group is not different from its distribution in the control group. On this basis, we conclude that samples are homogeneous for the given level of significance α . We see that the levels of creative competence development in the pupils of the EG and CG turned out to be almost the same and homogeneous at the stage of the ascertaining experiment. Therefore, the division into groups is made according to the curricula which were selected for the schools participating in the experiment and according to the statistical accounting, the results of which are given above.

During the ascertaining stage of the pedagogical experiment, we carried out the tests to diagnose the levels demonstrating the development of creative competence components. The psychological and diagnostic techniques, which we had selected, were distributed according to the criteria of creative competence (associative-visual thinking, creative imagination, artistic observation, and artistic self-expression).

Before the ascertaining stage of the experiment, pupils from both groups expressed surprise and interest when we asked them to undergo the tests. The word “creativity”, which today’s adolescents associate with originality, uniqueness, and success, appeared to be a stimulus for diagnosing their own creative manifestations. That is why we made an opening speech emphasizing the demands of the modern society for creative people who are capable of displaying creative abilities, original solutions to problem situations, and who can generate a large number of different ideas.

While studying the process of creativity, the researcher N. Druzhynin (2001, p.54) emphasizes that the time limit should not be set, so it lets the schoolchildren do the creativity tests more effectively (it should be noted that setting no time limit has better influence on highly creative children). We cannot but agree with the effectiveness of this condition. However, to extend the time limit in the classroom-teaching system is very difficult and sometimes even impossible. Therefore, we tried to

adjust the diagnostics in such a way that the diagnostic and developmental techniques would be within the topic of the lesson and be part of it (motivational, meaningful, final, etc.). For this purpose, psycho-diagnostic techniques were adjusted to the specifics of the integrated music lessons that we used in the course of the subject study. Simultaneously, the diagnostics were being carried out.

Within this publication, we propose to pay attention to the effective techniques of the experimental study of the levels demonstrating the development of such criteria of creative competence in adolescents as associative-visual thinking, creative imagination, and artistic observation.

The levels of associative-visual thinking development in adolescents were determined according to the thinking activity techniques (4 subtests) by I. Lushchykhina (Rimskaia, 2007, p.127), P. Torrance creativity test (1962) "Verbal and Pictorial Creative Thinking", L. Vygotsky technique of "Pictogram" (Khersonskiy, 2003, p.24) and "4 Associations" by Aristotle (Golubeva, 2019).

Table 3. The comparative table of the dynamics of the results which demonstrate the levels of development of associative-visual thinking indicators in adolescents of the EG (244 pupils) and CG (243 pupils) in% ratio

Indicators of associative-visual thinking	Ascertaining stage						Final stage					
	l		m		h		l		m		h	
	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG
quickness	18	18,3	57	56	25,0	25,7	15,1	20	59	56	37,6	24
flexibility	23	22	56,2	58,2	20,8	18,8	16,5	22	57,5	60	26	18
productivity	28	24	50	57	22	19	12,8	22,9	57	59	30,2	18,1
imagery	19	21	58,8	55,7	22,2	23,3	9,2	18,2	63	60	27,8	21,8
associativeness	17,2	30,2	68,8	48	14	21,8	10,8	36,6	67,8	42,4	21,4	21
originality	19,8	64	65	18,2	15,2	17,8	10,1	63,5	59,9	23,4	30	13,1
Average indicator	19,83	29,92	59,3	48,85	19,87	21	12,42	30,5	60,7	50,13	28,83	19,3

Based on the calculated and described indicators of associative-visual thinking, we conclude that the overall level (45.9%) of the defined criterion of creative competence has increased because of re-diagnostics (the final stage). This indicates that adolescents have learned to express their thoughts more competently, to associate phenomena, objects, to come up with new ideas.

Studying the levels of creative imagination development as a structural component and criterion of creative competence in adolescents, we applied psycho-diagnostic techniques, namely: "Circles" by Wartegg (Raihorodskiy, 2001, p.430) and "Verbal imagination" by R. Nemov (2005, p.133). To study the level demonstrating the development of non-verbal components of creative imagination, to determine quickness and productivity of the imagination process, the adolescents were offered the diagnostic technique where pupils were given worksheets with twenty circles. They had to draw as many objects or phenomena as possible, using circles as a basis. According to the obtained data of this technique, we conclude that there is a higher percentage of medium (58.4%) and high indicators (27.6%), which show a sufficient development of non-verbal components of creative imagination, the desire to generate ideas, quickness and imaginative nature of thinking processes in adolescence. We also see that (40%) of the pupils coped with the task at the low level at the ascertaining stage of the

experiment, which is an indicator of these adolescents' low motivation to creative activity and it demonstrates an inability to use it while doing the tasks. However, after conducting a formative experiment, we observe a decrease in the percentage of the low level in pupils of the EG (19.6%), while in the CG the result remains unchanged.

Another is the situation with the study of the levels demonstrating the development of verbal components of creative imagination. To study them, we chose R. Nemov's technique "Verbal imagination" (Nemov, 2005, 133), which allowed us to diagnose the quickness of imagination processes, originality of images, fertility of imagination, depth and detailed elaboration of created images. Adolescent schoolchildren had to create a story (6 – 7 sentences) about friendship of music with other arts.

While carrying out and processing this diagnostic technique, we observed the adolescents and found the following features: the adolescent schoolchildren lack emotionality and detailed images for verbal imagination. Most adolescents (72%) (especially in Grades 7-8) were ashamed to express their thoughts, they refused to dream in the presence of classmates. We suggested that these pupils should write down their thoughts, but it was not a viable tool either, because, unfortunately, children of this age group do not have sufficient vocabulary for both specific and imaginative content. In our opinion, this is due to the general problem of modern society – the lack of interest in reading. Therefore, the task for imagination verbalization turned out to be difficult for adolescents and caused self-doubt. After the formative stage of the experiment, we observed a slight increase in this indicator (64.8%). It means that it is worth to further elaborate the technique and continue purposeful developmental influence on this indicator in the process of artistic training. The processing of the indicators showed that the pupils in both groups had average results. The norm was 6 correct answers. However, about 60% of students in both groups had 7-10 correct answers, which indicated that the adolescents had a medium level of image memory. See the table of levels demonstrating the development of image memory in the EG (244 pupils) and CG (243 pupils) in the % ratio (according to V. Solomon's technique) (Gretsov, 2018, p.46). The description of the psycho-diagnostic techniques which were used to study the levels of development of creative imagination in adolescents makes it possible to offer a generic table and calculate the data using mathematical and statistical methods.

Table 4. The comparative table of the dynamics of the results to determine the levels which demonstrate the development of indicators of creative imagination in adolescents in the EG (244 pupils) and CG (243 pupils) in % ratio.

Elements of creative imagination	Ascertaining stage						Final stage					
	low		medium		high		low		medium		high	
	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG
Quickness and originality of imagination processes	43,86	52,3	41,8	35,4	14,34	12,3	27,45	54	54,1	35,4	18,45	10,7
Fertility of imagination	43	46	37,3	42	19,7	12,3	19,5	47	43	45,3	37,5	7,8
Image memory	58,6	58,6	33,4	35,2	8	6,2	18	33,4	66,4	61,3	15,6	5,3
Average indicator	48,5	52,3	37,5	37,53	14	10,3	21,65	44,8	54,5	47,4	23,8	5,9

Assessment of the level of artistic observation as a criterion of creative competence in adolescents was made by using diagnostic techniques for indicators of attention in the structure of personality. We conducted B. Bourdon's concentration test "Correction Test, or Can You Keep Attention?" (Krogerus, 2015, pp.109-110), "Selectivity of attention" by H. Munsterberg (Ilyin, 2012, p.270), "Recognize figures" by T. Rybakov (Karelin, 2007, p.189) and "Image memory, or how to distinguish an object from its image" by V. Solomon (Gretsov, 2018, p.46).

H. Munsterberg technique (Ilyin, 2012, p.270) is aimed at detecting the selectivity of attention and making its diagnostics. The pupils were given a test form where they had to find and underline words among the sets of letters. We adjusted this technique to the lessons of the artistic and aesthetic cycle and hid the words according to the themes of the integrated music lessons. The time limit to do the task was 2 minutes. B. Bourdon test (Krogerus, 2015 pp.109-110) "Correction Test, or Can You Keep Attention?" was also adjusted by us according to the specifics of the integrated music lesson and was aimed to determine the adolescents' level of concentration, tenacity and attention switch in the course of artistic activity. The research was conducted with the help of special blanks that contained lines of notes, treble clefs, rests, and accidentals and which were presented in the wrong order. The schoolchildren had to look through the blank and to cross the odd man out line by line. Both experimental groups had a task to cross out half notes, eighth rest, and the accidental – # (sharp note).

At the interim stage of diagnostics, the pupils received a task where they had to look through each line of symbols and they had to cross out only notes in the first line, treble clefs in the second line, rests in the third line, accidentals in the fourth line. Then, the task was repeated according to the number of lines on the blank. At the final stage, we offered the adolescents to make the connection between the note values and to make a red gradient where the whole note is red, the quarter note is bright yellow, the eighth note is yellow, sixteenth note is light yellow. The pupils had one minute to do B. Bourdon test.

Highlighting artistic observation as a criterion for creative competence, we identified such an element as image memory. We studied the level of its development using the technique "Image memory, or how to distinguish an object from its image?" by V. Solomon (Gretsov, 2018, p.48) that was adjusted to the specifics of the integrated music lesson. As a unit of memory, we took the image in the form of an elementary musical instrument, treble clefs, and musical notation. The pupils had 20 seconds to memorize the maximum number of images in the table, after that, within a minute, they had to record or draw what they managed to remember.

Another technique which we used to identify the level of artistic observation in adolescent schoolchildren and which was aimed at memorizing visual images, was an adjusted to the integrated music lessons technique "Recognize figures" by T. Rybakova (Karelin, 2007, p.132). The pupils' attention was drawn to the board where they could see a table with 9 music symbols. They had to look at the table carefully for 10 seconds. After that, the pupils were shown another table with a large number of symbols. They had to find the symbols from the first table among the symbols in the second table.

In the course of the above techniques, we observed the external manifestations of the adolescents' concentration on the tasks. The majority of pupils (61%) showed a focus on the process, which was expressed in external indicators: concentrated look, extension of the nostrils, strained and clear movements of the fingers, looking for similar elements on the sheet (especially during B. Bourdon test), mouth tension, pulling its corners up and sideways, increased muscle tone of the back and wrists. Other students (39%) showed indifference, communicated with each other, some just played on the phone. This indicates a low concentration of attention of such pupils, inability to concentrate, lack of motivation.

These manifestations were taken into account when carrying out the technique of creativity development at the stage of ascertaining experiment, after which we observed a significant increase in the total number of pupils with the low level (31.7%) to the sufficient one (12.1%), which is reflected in Table.

Table 5. The comparative table of the dynamics results demonstrating the levels of artistic observation development in adolescents of the EG (244 pupils) and CG (243 pupils) in the % ratio.

Elements of artistic observation	Ascertaining stage						Final stage					
	l		m		h		l		m		h	
	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG
Concentration of attention	69,7	47,3	23,36	44	7	8,6	15,5	48,15	41,4	44	27,1	7,8
Persistence of attention	36,6	15,2	56,3	53,5	10	31,3	12,1	17,3	60,5	56	27,4	26,75
Attention switch	60,4	41,15	30	25,5	10,5	33,3	15,5	39,9	41,4	25,5	27,1	34,5
Scope of attention	23	18,5	56,2	63,37	20,8	18,1	16,5	19,75	57,5	61,32	26	18,9
Average indicator	47,42	30,54	41,46	46,6	12,07	22,8	14,9	31,27	50,2	46,7	25,4	21,98

According to the results obtained from the experimental forms, the pupils of both groups when being tested for the levels of attention development, which we consider a criterion of artistic observation in the personality structure of adolescents, showed high and average results. It indicates that adolescents eagerly perceive the information and visual material, which is an important element for adolescents' creative activity.

The comparative analysis of the levels demonstrating the development of creative competence criteria in adolescents shows positive changes. The dynamics of the results of the pedagogical experiment show medium and high indicators. All these testify that we created an effective organizational and methodological model of adolescent creativity development at the integrated music lessons.

On the basis of the developed criteria of creative competence (associative-visual thinking, creative imagination, artistic observation, artistic self-expression), their diagnostics were made during the experimental stage of the dissertation research. The processing of the diagnostic data at the stage of the ascertaining experiment gave the following indicators: the high level of creativity development was found in 27,3% of adolescents. The pupils of this level had a conscious need for communication with the arts, they showed creative activity and interest in the subject, quickly and creatively responded to the proposed tasks, offered extraordinary solutions to the problem, performed creative tasks at the high aesthetic level with the use of specialized knowledge in the subject, felt free with terminology, were able to present their creative work.

36.7% of adolescents appeared to have a medium level of creativity development. This category of pupils showed a lack of theoretical knowledge and practical skills in the subject. Their interest in the creative process was fragmentary; such pupils were not ready to overcome the difficulties. As a result, their motivation for artistic learning reduced, their response to creative tasks was not always adequate, and they could not solve problematic situations at a sufficient level.

When conducting ascertaining diagnostics, 35.1% of adolescents showed a low level of creativity development. These pupils almost have no knowledge of the subject, they are passive in doing the

tasks, have low motivation to engage in art, do not want to participate in collective creative activity, they are emotionally-unbalanced, perform the tasks unwillingly at the low aesthetic level.

Conclusion

The influence of musical and artistic expressive means on the development of adolescent creativity is effective if adequate pedagogical means are used at arts integrated lessons. The effectiveness of these tools is determined by the use of the proposed diagnostic markers – criteria, indicators, characteristics of the levels of creative competence development in adolescents, improved pedagogical content of the selected well-known psycho-diagnostic techniques. The comparative analysis of the experimental data indicates a positive change in the levels which demonstrate the development of structural components of creative competence in the EG after a formative experiment, whereas in the CG any shifts towards the indicators increase are not observed. The dynamics of the pedagogical experiment results showed the dominance of average and high indicators. The number of pupils with high indicators of the level of creativity development in the EG rose to 29.9% (73 pupils), while in the CG this figure reached 23.3% (57 pupils). During the formative stage of the experiment, the number of the EG pupils with a low level of creativity decreased (15.6% – 38 pupils). Thus, purposeful and gradual introduction of the authors' technique of creativity development in adolescents in the process of music education and upbringing in institutions of general secondary education in Ukraine contributed to positive qualitative changes in the development of adolescents' creativity by means of art and confirmed the effectiveness of the created technique.

We consider that the prospective areas of further research include the study of the theory and practice of forming the adolescents' ability for artistic self-expression through musical activity that is a basis for personal and cultural growth of schoolchildren in general secondary education institutions in accordance with the evolution of music intonation practices.

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