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ART EXPRESSION OF IDENTICAL TWINS

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Abstract

The presented research discusses art expression of identical twins in different art fields: drawing, painting and sculpting. The research sample included two elementary school boys of age 12. With the help of a case study we observed, analyzed and studied artworks of these two identical twins.

We established that the artistic expression of identical twins is similar at drawing and painting. At sculpting, the final artworks visually differ, but the boys used similar art and design strategies.

Key words: *twins, boys, artistic expression, design strategies, primary school.*

Introduction

Statistic shows that only 12-14 twins are born per 1000 births, and they can be divided into three populations: the population of identical twins, fraternal twins of the same sex and fraternal twins of the opposite sexes. On a global scale, identical twins occur three-and-a-half times in every 1000 birth. It is distinctive of identical twins to always be of the same sex. Their genetic code is identical, as they develop from the same zygote, which divides into two embryos ten days after fertilization (Milčinski, 1998). The number of multiple pregnancies is rapidly increasing. Experts believe that the causes can be found in fertility medication and in vitro fertilization, which can increase the chance of double fertilization. Črepinšek (2007) says that scientists have confirmed strong bonds between twin pairs. These bonds are much stronger than the ones between two peers, which are born at the same time and then live in the same family. Twins have a greater need for imitating each other, as they have already lived together in the uterus. In her research, Brodar (1967) sums up the thoughts of Luigi Gedda, who stresses the advantage of an identical twin over a singleton, as the twin has an

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opportunity to better know oneself through his twin brother/sister. The twin can also have lesser abilities and various impediments, which can be eliminated with proper upbringing.

Identical twins are anything but a typical sample of population; biologically, psychologically or during the educational process. Studies have shown that twins achieve below-average results on intelligence tests. The birth and early development in twins is not without risks, that is why they tend to achieve below-average results also in physical and intellectual development. The differences in speech and language development in twins are also greater than the differences in intelligence. Twins use a more reduced vocabulary and simpler sentences than non-twin children. Language differences in twins are the most conspicuous between the ages of 2 and 5 years and get reduced with age (Mittler, 1971). Rutter established that twins fall behind their peers in language development by three weeks (Rutter et al., 2003). Sahin et al. showed in their research mental development of Turkish twins. They established that the development of twins did not differ statistically in comparison with other children; however differences occurred at language tests. They concluded that twins have slower development in language (Sahin et al., 2003). In reading Harlaar et al. tried to establish the influence of environment on the development of reading in twins. In their research they used fraternal twins of the same and the opposite sex, aged seven years. The research showed that the differences are more the result of genetic factors and not the environment. Reading abilities are similar in both sexes and are mainly the result of genetics (Harlaar et al., 2005).

Kovas et al. carried out a research on 2596 pairs of identical and fraternal twins. They were looking for correlations between their reading abilities and knowledge of mathematics. The twins were tested through the internet. They picked out 15 per cent of those with the lowest scores in both, reading and mathematics. The results have shown correlations between problems in reading and problems in mathematics, of which both are influenced by environment and genetics (Kovas et al., 2007). Josipović Smojver (2007) used a case study of two pairs of identical twins to establish how an individual twin's identity is expressed through speech from the age of 1 to 8 years. The research has shown that there are differences in the speech of twins. One of the twins uses more phrases every day as the other one follows them and is slower in development. Josipović Smojver (2007) determines four stages in the developments of twin identity: (1) twins have collective identity; (2) twins distinct their personal identity from the identity as a twin pair; (3) personal identity is established within phrases (use of words me, my, mine, etc.); (4) final stage where the identity of both twins is formed and

both identities differ from each other. This is when personal identity of both twins is established. Research findings show that the identity development in twins is different than in non-twins. Brodar (1967) mentions that intellectual abilities are not necessarily reduced in twins and sums up the words of Zazzo, who says that recurrent mental retardation in twins is most likely the consequence of birth injuries rather than a consequence of unsuitable environment and heredity. She established in her research that the average IQ in identical twins or fraternal twins of the same sex is lower than in fraternal twins of the opposite sex. She sums up the words of Gedde, who says that twins are somewhat jealous, and that none of the twins wants to be better than the other, which leads to diminished spontaneity and a kind of mental obstruction. The group of researchers carried out a research on the population of twins that is on the sample of 1300 twins. The study talks about behaviour stiles in puberty. The twins were answering questions about their behaviour stiles, symptoms of depression, and their parents' upbringing methods. The influence of the parents plays a crucial role in the development and behaviour stiles of children in puberty. The correlation is important as the parents' depression can be passed onto their children. The twins were chosen because they wanted to explore the influence of genetics as well as environment. The results have shown that the patterns of behaviour are caused by genetic and social factors (Lau, Rijdsdijk & Eley, 2006). Similar research that explored the twins and the influence of genetics and environment on the transfer of depression from parents onto their children was carried out by another group of authors (Silberg, Maes & Eaves, 2010). They established that parents' depression influences children through genetic factors as well as through environment. Individual genetic factors increase the risks for an individual to fall into depression. In longitudinal research that was carried out by Gagne and Hill Goldsmith they followed anger and behaviour in twins from 12 to 36 month of age. They came to a conclusion that typical twins with low level of self control show high level of anger. They confirmed genetic influence on anger and behaviour control as a result of parents' influence or environmental factors. They established that common genetic factors have an influence on similarities in twins and they overcome genetic factors. Problems in behaviour can also be of genetic origin (Gagne & Hill Goldsmith, 2011). In the second longitudinal study that was carried out by Rietveld et al. they wanted to see how behavioural problems are connected to genetic and environmental factors. They carried out their research on twins between three, seven, ten, and twelve years of age. The research has shown that behavioural problems as impulsivity, hyperactivity, and attention disorder have their origins in genetics. The twins were chosen because they live in the same environment. They established that is not

very likely to develop these problems later in life if they are not present at the age of three (Rietveld et al., 2004).

Newman, Freeman, and Holzinger (1937) studied heredity and environment of identical and fraternal twins. They established that identical twins have identical genetic code, while fraternal twins have 50 per cent of the same genetic code. The findings show that environmental factors have an influence on the twins but they are not the crucial reason for differences in personality characteristics. There are stronger correlations between identical than between fraternal twins. That especially goes for physical characteristics, intelligence, and success in learning. I find the information that more identical than fraternal twins are left-handed quite interesting. In their research authors introduce nineteen identical twins that were separated at birth, but were later on united again. They spend a part of their lives in different families and different environment. The authors were curious about their education, social surroundings, and diseases they have had. They explored the similarities in their writing, as well as their physical similarities and differences, and their character traits. The similarities in pairs of identical twins were surprising. They were similar in their education and careers, physics and characters, as well as their writing, or manuscript. They linked intelligence to the education of an individual and established that the twin that had better education than his sibling got more points on the intelligence test. The results have shown that pairs of twins had similar diseases. The differences were linked to different environment as well as poorer health condition of one sibling at birth. When we speak about similarities and differences in identical twins, we must stress the words of Brodar (1967), who said that identical twin is an individual with his own psyche. The more psychic characteristics are taken into consideration, the more twins' individuality can be seen. Črepinšek (2007) writes that equating the twins is not always in their best interest, as it can put back their personality development. That is why it is crucial to consider individual needs of every twin. Even though they are very similar their needs are not the same.

We represented a few studies that have been done on the population of twins from different fields. We found out there are no studies of twins in art. We wanted to establish what are the similarities and differences in art expression between pairs of identical twins.

Methodology

During the research, we were interested in the artistic expression of an identical twin pair. What are the similarities and the differences and what are their art and design strategies at drawing, painting and sculpting.

Research method

For our research, we used a qualitative paradigm of scientific-pedagogical research with an active observation of the boys' art creation process. Qualitative researching is a path of discovery, where the researcher collects, organizes and interprets information, acquired from people (Lichtman, 2009: 5). In these researches, the data is processed and analyzed verbally without using measurement procedures (Mesec, 1998: 26). We used descriptive, comparative and qualitative method. In the art education field, qualitative researches are more heuristic and are more active within the world of the art teaching praxis (O'Farrell & Meban, 2005). As it follows the process of making an artwork, qualitative approach is also the most appropriate for observing the construction of an artwork and thus determining the manner of creating an artwork. Document analysis technique – especially visual material – appears as the most suitable to accompany the observation. Today photographs are being used in qualitative empirical studies with increasing frequency. Peez establishes that photographs are not used as the sole research material, but as a complement to observations, transcriptions of interviews or students' written reports about art or describing of their own artwork (Peez, 2006). Occasional, yet planned photographing of persons who are being studied provides reliable data for analyzing art and design strategies of children.

Research questions

In our research we asked ourselves some research questions where we were interested in similarities and differences in art and design strategies as well as similarities and differences in final works of identical twins.

- RQ1: Research questions from the perspective of similarities and differences in art and design strategies of identical twins
- RQ1.1: What are similarities and differences from the perspective of art and design strategies between the twins in the art field of drawing.
- RQ1.2: What are similarities and differences from the perspective of art and design strategies between the twins in the art field of painting.

- RQ1.3: What are similarities and differences from the perspective of art and design strategies between the twins in the art field of sculpturing.
- RQ2: Research questions from the perspective of similarities and differences in final works of identical twins.
- RQ2.1: What are similarities and differences in final works of twins in the art field of painting.
- RQ2.2: What are similarities and differences in final works of twins in the art field of sculpturing.

Research sample

In this research, we used case study. The research sample is represented by a pair of identical twin boys from the 6th grade at an elementary school with a nine-year program.

Data acquisition and analysis procedures

Data was acquired by observing the pupils during artistic creation and comparing their artwork. We chose data analysis as an independent data acquisition technique. We analyzed the photographs taken during the pupils' work procedure. An elaborated class preparation was made and carried out three times for two 45-minute periods in the 6th grade. Thus we acquired two paintings and one sculpture from each pupil. For tempera painting technique we chose an imaginary sea theme. Imaginary outer space theme was also chosen for cane painting and coloured ink painting. For sculpting technique the pupils depicted their self-portraits. Altogether we acquired four surface design artworks and two sculptures.

The boys were creating these artworks for three weeks in a row. The task for the first week was to make a pencil drawing on the theme of a thousand miles under the sea and colour it with tempera. First, we observed the pencil drawing and tried to establish similarities and differences between the twins' stencil expression. Then we observed how they coloured the drawing with tempera paints. We did not want to affect their choice of colours or painting technique. In the second week, the pupils draw a picture using a cane and black ink on the theme of wonders of the universe and then used coloured ink to paint it. In the third week, they made their self-portraits from clay. It is important to stress that we engaged the whole class in the art tasks, so the observed boys (identical twins) would not feel exposed. We took photographs of other pupils' work procedures and thus reduced possible disruptive factors, which could affect the observed boys' work. The boys were not sitting together in class, so they could not observe each other during work. At painting techniques, there were four different formats available

to the pupils to choose from as a mat board for their artwork. Each pupil chose their format individually, so that we could prevent possible arrangements about the format between the observed boys. They could also choose how would they turn their piece of paper; horizontally or vertically.

We described the pupils' finished artworks based on the photographs we took during their work. We thoroughly inspected each artwork, analyzed it and presented the making of it from the beginning to the end. We compared their artwork and try to establish similarities and differences between the identical twin pair.

Results

The first art task: A thousand miles under the sea

In the first art task we originated from the motif in the opening motivation. We observed the photographs of different animals and plants that live in the see on the laptop computer and try to talk and revive our imagination about the underwater world.

The process of making a drawing using tempera colours of Boy A

Amongst four different paper formats Boy A used an elongated shape format. He turned the paper horizontally. Firstly he depicted a large octopus, which represents a focal motif. Then he depicted the bottom with a chest and algae on the left, and two fish on the right side. He added small details to the octopus and the fish, circles and small lines. The drawing is filled up, despite smaller amount of elements. Octopus is the central figure that is balanced out with elements on each side.

Picture 1: Initial drawing of Boy A on the theme a thousand miles under the sea and her continuation



We can see in the picture on the right (picture 1) that the boy used four colours, blue, green, orange, and brown, which he applied alternately.

His painting technique is accurate; he used a thin brush to paint the forms he drew earlier. He painted the background with a slightly thicker brush in blue colour. He was applying the colours directly from the tube without mixing them. He painted all previously drawn details. The bottom was filled with brown, the background with blue, and as a contrast to blue he coloured the octopus orange. He was painting with his right hand, which indicates he is right-handed.

The process of making a drawing using tempera colours of Boy B

It is interesting that boy B also used elongated paper format and turned it horizontally. He started his drawing at the bottom with a bottle and plants that grow from the ground. He moved the centre of the drawing slightly to the right, where he depicted three sea snakes and arranged them in the shape of a triangular. Then he filled the picture with two octopuses above the sea snakes, facing each other. In the upper left corner he added a smaller snake. He wasn't adding any smaller details; he just outlined animals and plants.

Picture 2: Initial drawing of Boy B on the theme a thousand miles under the sea and her continuation



Boy B squeezed three colours on the palette, orange, blue, and green, which is quite interesting as his brother had done exactly the same in spite the fact they were not sitting together and were not able to see each other. We can see in the right picture how he enriched his drawing with colours. He started painting the octopuses green. Then he used orange colour to colour three sea snakes, and a snake on the left side. The bottom was filled with brown, and the plants in slightly darker green shade. Boy B also did not mix colours; he was using a dense tempera colour from the tube. In his painting he relied on the drawing that he had done before. He tried to paint the elements very accurately with a thin brush, and the background with a thicker one. The details, like eyes and mouth, were emphasized with black colour. We can see in the right picture that Boy B is painting with his right hand, thus being right-handed.

The comparison of the finished artworks of boys

From the perspective of art and design strategies of identical twins we can see that both boys chose the same paper format and turned it horizontally. (RQ1.1) In the art field of drawing Boy A firstly drew a focal motif, an octopus, in the middle of the paper format. Boy B firstly depicted the bottle at the bottom of the sea and some plants. Both boys drew a line that represents the bottom. The drawing of both boys is pure and clear with some animals and plants. Boy A paid more attention to the details as did his twin brother. Both drawings are accurate and done with consideration. (RQ1.2) Boy A and B have a very similar painting technique. They depicted the painting on the theme a thousand miles under the sea flat with only a few shades of different colours. They both quite relied on their drawings. They both emphasized some details, like eyes, nose, and mouth, with black colour. Differently from Boy B, Boy A painted a few more details. He paid special attention to the octopus, as he painted black dots and lines on her tentacles; he also used black colour to paint rocks at the bottom. He outlined two fish on the right with red colour first. Boy B did not outline the animals in the painting, but have chosen similar colours as Boy A. He was not paying much attention to the details either. At the end, both pupils painted over their painting a few strokes with diluted colour that represent water.

Picture 3: Finished artworks of Boys A and B on the theme a thousand miles under the sea



(RQ2.1) Because the boys chose similar colours their final artworks are quite alike. On both paintings we can see complementary contrast between the depicted elements and the background. They coloured the central motif in orange, and the background in blue colour. They filled the bottom with brown colour. As we said before, Boy A paid more attention to the details which he painted with black colour. Black was also used by Boy B for smaller details as the mouth and eyes.

The second art task: Wonders of the universe

In the second week the pupils used black ink and cane to draw imaginary world on the theme wonders of the universe. Later they enriched their drawings with coloured ink using the colours they picked out themselves. We motivated the pupils by showing them photographs of the planets, stars, the sun, flying objects, and astronauts in space. We also talked about unusual creatures and monsters that do not live on planet Earth.

The process of making a drawing using coloured ink of Boy A

The boy chose a standard A3 format and turned it horizontally. In the middle he painted a big spaceship, a part of a bigger planet in the lower right corner, and a comet on the upper right side. He depicted a planet with a circle around it, and a star underneath. The spaceship and two planets stand still; only the comet gives us an impression that it races downwards with a high velocity.

Picture 4: Initial drawing of Boy A on the theme wonders of the universe and her continuation



Boy A first painted the spaceship in blue, green, and orange colour; and then the comet and the star in orange-yellow. Four legs on the spacecraft are coloured in purple. A smaller planet on the left side and spots on the bigger planet in the lower right corner are also coloured with purple colour. He added a circular shape above the spaceship in black and purple colour.

The process of making a drawing using coloured ink of Boy B

In the art task on the theme wonders of the universe Boy B chose A3 paper size, which he turned horizontally, similar to his twin brother. In the painting that is represented in the picture (picture 5, left) he depicted in the middle a big spacecraft with a Martian head sticking out of the craft. He painted a part of a big planet with spots in the upper left corner (the planet resembles his twin brother's planet). Then he depicted in two groups on each side a few smaller stars.

Picture 5: Initial drawing of Boy B on the theme wonders of the universe and her continuation

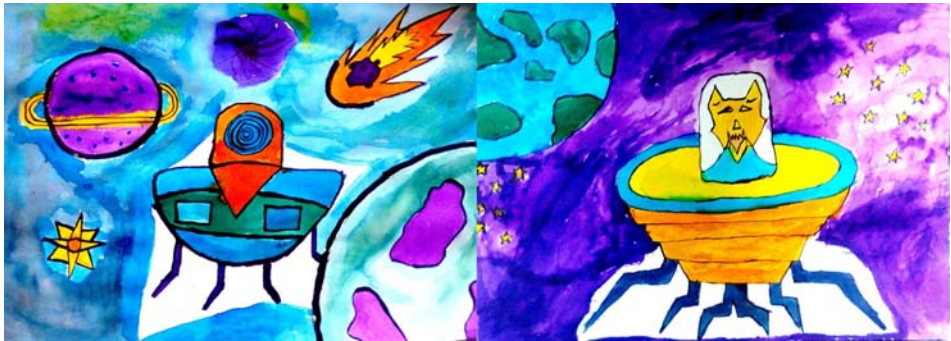


Boy B enriched his painting with green colour that he initially applied on the spots of the planet in upper left corner. After that he coloured the spacecraft in blue, yellow, and orange colour. He painted the smaller stars on both sides of the craft yellow. He painted the background purple, diluting ink with water and thus getting darker or lighter shades. He left white surfaces in the lower part of the spacecraft and in the cockpit with the Martian.

The comparison of the finished artworks of boys

In the picture (picture 6) we can see finished projects of both boys, Boys A and B. (RQ1.1) When we look at them closely, we can again notice the details that became apparent in the making of the drawing with black ink and cane. Both boys put the spacecraft in the middle of the paper format with stars and planets around it that, just as the spacecrafts, float in the air. They both designed the drawing with much sense for filling up the paper format. Boys did not have any problems with ink and cane technique. It can be seen that the drawing of Boy A was done with both thick and thin lines; while the Boy B used only thin lines.

Picture 6: Finished artworks of Boys A and B on the theme wonders of the universe



(RQ1.2) In this art task boys were using similar art and design strategies. They also used the same paper format and turned it horizontally. Both boys painted the elements accurately, they did not want to dilute ink with water too much. They coloured the background in more or less one colour; Boy A with blue and Boy B with purple colour. It is interesting that they both left white surfaces around the spacecraft.

(RQ2.1) If we compare final products of both boys we can notice the focal motif, the spacecraft, in the middle in both paintings, with some planets and stars hovering around it. In the picture of Boy B (picture 6, right) there is no movement, while on the picture of Boy A (picture 6, left) the comet is racing downwards with a high velocity, and also the purple ball above the spacecraft gives us an illusion of spinning. They also depicted in the corner a bigger planet with spots. Their colour palettes are again very similar with complementary contrast on both paintings.

The third art task: Clay self-portrait

In the third week the art task was to design a self-portrait from clay. We presented the frequent mistakes made when making a clay sculpture. They had to be aware of the facial proportions and also had to be careful that the sculpture stands.

The process of making clay self-portrait of Boys A and B

As we can see in the picture (picture 7) both boys started making their self-portrait in a very similar way.

Picture 7: The process of making clay self-portraits by Boy A and Boy B



Boy A designed his self-portrait by separating two forms, a head that he designed four-angled, and the shoulders. The shoulders work as a kind of a base, as they were made in a circular shape and then flattened; he cut off the rims of the base with a modelling stick. We can see in the picture (picture 7, left) how the pupil is making the base using both hands. Boy B worked with clay for a longer period of time, crumpling it and making different forms; then he designed the head and thin, bottom part that he cut off with a modelling stick. The picture (picture 7, right) shows how the boy is using his modelling stick, which he holds in his right hand.

Picture 6: Finished artworks of Boys A and B on the theme wonders of the universe



In continuation we can see almost finished self-portrait of Boy A (picture 8, left). The pupil started designing the face by pulling a big elongated nose out of the clay; he imprinted the eyes with a key thus making an unusual shape with a circle in the middle. Then he designed big, protruding ears in semicircular shape that he pulled out of the clay with his fingers and smooth them out. He made the eyebrows with a modelling stick, pulling them slightly forward with his fingers, above the eyes. He opened the mouth with the help of his modelling stick. He added the hair in elongated strips at the top of the head. He made the surface of the sculpture smoother.

Picture (picture 8, right) represents the making of Boy's B self-portrait. The pupil pulled out a big nose that is widened at the end from the clay, and imprinted the nostrils with a stick. With the help of pointy modelling stick he hollowed the eyes and mouth that are indicated with the upward turned line. He designed the ears by pulling them out of the clay and adding a few lines with a pointy modelling stick that we can see in the picture (picture 8, right) in the bottom right corner. He made the almond shaped eyes without any pupils with a stick, and designed elongated, slightly opened mouth with a modelling stick. He attached the hair with smaller pieces of clay to the head, thus creating a wavy surface. He tried to smooth out his self-portrait but was not very successful as the clay became quite dry.

Comparison of the finished clay self-portraits of boys

In making the self-portrait the boys were using quite similar art and design strategies (RQ1.3). They began with forming the head and the base, then they added the elements on the face, such as the nose, eyes, and mouth, and at the end they added the hair.

Picture 8: Finished sculpture works of Boy A and Boy B on the self-portrait theme



Boy A designed the head in the shape of a cube, not paying much attention to the details, such as eyes, ears, and mouth. He indicated the hair in four strips. The base was designed circularly; he did not make any clothes. Boy B also did not pay much attention to the details on the face; he just indicated the eyes and mouth. He shaped the head in a circle, pulling out the base from the neck. He designed wavy hair from smaller pieces of clay. They both tried to smooth out their sculpture but were not very successful as we can still see the imprints of hands and tools they were using. Boy B had more problems when he tried to smooth out the surface as the clay was dry and was difficult to form. (RQ2.2) Final products of two boys are quite different, which indicates individual characteristics of each boy. The differences are quite apparent in the making of the base that both boys designed in a unique way. The differences can also be seen when they were sculpting the hair, eyes, nose, and ears that were also designed in a unique manner.

Their art and design strategies in making self-portraits are similar; they started designing the head and the base, then they made the elements on the face, such as nose, eyes, and mouth, adding the hair at the end.

Conclusion

The purpose of this research was to discover the artistic expression of identical twins; what are the similarities and the differences, what are their art and design strategies at drawing, painting and sculpting. We established that art and design strategies and the artistic expression of identical twins is quite similar, especially at drawing and painting. To the first research question (RQ1.1), what are the similarities and differences from the perspective of art and design strategies between the twins in the art field of drawing, the answer is: similarities in the drawing were the most apparent in the second art task, where the boys were being creative on the theme wonders of the universe. Both boys put the spacecraft in the middle of the paper format, and draw different planets and stars around. Drawing of Boy A that was made with ink and cane is drawn with both thin and thick lines, while Boy B was using only thin lines. In the first art task on the theme a thousand miles under the sea, Boy A depicted more details than his brother, Boy B. It is interesting that identical twin pairs always chose the same format among the four different formats available. The position of the format was also the same, as they all turned their piece of paper horizontally. In the second research question (RQ1.2), what are similarities and differences from the perspective of art and design strategies between the twins in the art field of painting, we established the following: boys have a very similar painting technique. In both tasks the paintings are depicted flat, they added the same colour shades on bigger surfaces, and they did not want to mix the colours. It is also very apparent that Boy A depicted more details. Colour palette of boys was very meagre, they mostly used four colours, which they did not mix but applied them directly from the tube. The artistic expression of boys is flat and simple. During painting, they relied on the drawing, which they sketched earlier; they almost did not change anything.

Their painting was accurate, done with a thin brush. In comparison to the girls from a previous research (Duh, Gosak, 2012) we establish that boys were slower from the girls. (RQ1.3) We also wanted to see the similarities and differences from the perspective of art and design strategies between the twins in the art field of sculpting. At sculpting, the boys used similar art and design strategies but nevertheless, their final works are quite different. The sequence of the elements is quite similar. Firstly, they shaped the head and the base and added elements, such as eyes, nose, mouth, ears, and finally added the hair. In the research question (RQ2.1) what are similarities and differences in final works of twins in the art field of painting we established the similarities in colour palettes of both boys, as well as colour contrasts in paintings that make the works more diverse. We asked ourselves similar question in the art

field of sculpting where we compared the final products of boys. (RQ2.2) We established that in making the clay self-portrait the individual characteristics of both boys are very apparent, as the final works are, in spite of the similarities between boys, quite different. The results were quite similar to the results in our previous research where we observed two identical twin girls (Duh, Gosak, 2012).

In our research, we focused on the artistic expression of identical twins. We could compare the twin population with singletons of the same age and establish the differences and similarities between them. The results of the study we carried out on singletons, where we observed art and design strategies of children between the ages on 10 and 11, show that art and design strategies were changing when they were using traditional drawing techniques (felt-tip pen and charcoal) as well as when they were using drawing tools in the computer program Paint. Obviously, there were greater differences at drawing with the computer in comparison with the other drawing techniques – felt-tip pen and charcoal (Duh et al., 2011). Duh (2009) established in the study of preschool children that despite the same starting point, there were signs of individual characters of children. It would be interesting to continue observing the pair of identical twins. And study the similarities and differences in their artistic expression at various art techniques and materials. We would discover how identical twins respond to offered techniques and materials; whether they respond similarly to artistic problems and choose similar solutions.

This research could be an introduction to an extensive study, where we would research the three populations of twins: the population of identical twins, fraternal twins of the same sex and fraternal twins of the opposite sexes. We would compare acquired results within individual pairs as well as within different population of twins. Thus we would establish the differences and similarities in the artistic expression of twins on a larger sample, which is necessary for generalizing the acquired results.

Literature and references

- Brodar, V. (1967): *Biologija, psihologija in patologija dvojčkov*. Ljubljana: RSS.
- Birsih Ozcakar, Z., Sahin, F., Beyazova, U., Soysal S. (2003): Physical and mental development of Turkish twins. *Pediatrics International* 45, pp.:712–718.
- Črepinšek, M. (2007): Available at: http://www.mojmalcek.si/teme/dojencek/28/dvojcka_enaka_in_razlicna.html (August 15, 2011).
- Duh, M. (2009): *Likovno-oblikovne strategije predškolske djece. Interdisciplinirani pristup učenju: put ka kvalitetnijem obrazovanju djeteta*. Znanstvena monografija: Učiteljski fakultet Sveučilišta u Rijeci, Hrvatska i Pedagoški fakultet Sveučilišta u Mariboru.
- Duh, M., Herzog, J., Gosak, L. (2011): *Vloga likovne tehnike v likovnooblikovnih strategijah pri osnovnošolcih*. *Revija za elementarno izobraževanje*. PEF, Maribor.
- Duh, M., Gosak, L. (2012): *Art and design strategies of identical twins*. *Školski vesnik* (in print).
- Gagne, R. J., Hill Goldsmith, H., (2011): A longitudinal analysis of anger and inhibitory control in twins from 12 to 36 months of age. *Developmental Science*, 14 (1), pp.:112-124.
- Harlaar, N., Spinath, F. M., Dale, P. S., Plomin, R. (2005): Genetic influences on early word recognition abilities and disabilities: a study of 7-year-old twins. *Jurnal of child Psychology and psychiatry* 46 (4), pp.:373-384.
- Josipović Smojver, V. (2007): *Razvoj izražavanja identiteta u blizanačkome govoru*. Lahor: Časopis za hrvatski kao materinski, drugi i strani jezik, 1(3), pp.:37-25.
- Kovas, Y., Haworth, C. M. A., Harlaar, N., Petrill S. A., Dale, P. S., Plomin, R. (2007): Overlap and specificity of genetic and environmental influences on mathematics and reading disability in 10-year-old twins. *Jurnal of child Psychology and psychiatry* 48 (9), pp.:914-922.
- Lau, J. Y. F., Rijdsdijk, F., Eley, T. C. (2006): I think, there fore I am: a twin study of attributional style in adolescents. *Jurnal of child Psychology and psychiatry* 47 (4), pp.:696-703.
- Milčinski, J. (1998): *Dvojčki – dvojna obremenitev, dvojna sreča*. *Otrok in družina*, 12 (43), pp.:15-16.
- Mittler, P. (1971): *The study of twins*. Penguin Books Ltd, Harmondsworth, Middlesex, England.
- Newman, H., Freeman, F., Holzinger, K. (1937): *Twins: A Study of Heredity and Envirinment*. The University of Chicago.
- Rietveld, M. J. H., Hudziak, J. J., Bartels, M., van Beijsterveldt, C. E. M., Boomsma, D. I. (2004): *Heritability of attention problems in children:*

- longitudinal results from a study of twins, age 3 to 12. *Journal of Child Psychology and Psychiatry* 45 (3), pp.:577-582.
- Rutter, M., Thorpe, K., Greenwood, R., Northstone, K., Golding, J. (2003): Twins as a natural experiment to study the causes of mild language delay: I: Design; twin-singleton differences in language, and obstetric risks. *Journal of Child Psychology and Psychiatry*, 44 (3), pp.:326–341.
- Silberg, J., Maes, H., Eaves, L. (2010): Genetic and environmental influences on the transmission of parental depression to children's depression and conduct disturbance: an extended Children of Twins study. *Journal of Child Psychology and Psychiatry* 51 (6), pp.:734-744.
- Vogrinc, J. (2008): Kvalitativno raziskovanje na pedagoškem področju. Pedagoška fakulteta, Ljubljana.