https://doi.org/10.53656/ped2024-7.06

Research Insights Изследователски проникновения

## CHILDREN AND ABSTRACT ART. CREATING A NON-FIGURATIVE COMPOSITION BY ASSOCIATION FROM A MUSICAL WORK IN PRESCHOOL AGE

Dr. Galina Nikolova, Assist. Prof.

St. Cyril and St. Methodius University of Veliko Tarnovo (Bulgaria)

Abstract. The article views the need for integration of arts as a crucial factor for the overall aesthetic development of preschool children in the context of the synthesis between abstract painting and music. The purpose of the research is to clarify the existing direct relationship between the two types of art and their place in preschool education. Artistic perception and co-experience of abstract art are a starting point for the task of creating a non-figurative composition under the impact of a musical work. The paper includes a methodology for carrying out the specific visual form of work in preschool age and emphasizes in a systematized form the benefits of its impact that favour the development of associative thinking, creative imagination, creativity, and individuality.

Keywords: abstract art; artistic creativity; associative thinking; music; non-figurative composition; preschool age

Modern pedagogy increasingly focuses attention on the importance of inclusion of various types of arts in preschool education, as this creates prerequisites for the complete and comprehensive intellectual and aesthetic development of children. Cultivation of artistic creativity and imagination is among the most important pedagogical tasks, and this would only be feasible should there be a complete integration of arts. The full disclosure of their magical worlds, the contact with them, and creative activities contribute to the cultivation of happy and independent children who are confident in their own capabilities and strengths and develop as thinking and emotionally intelligent persons.

The topic was chosen based on the finding that introduction of children to artists of various artistic trends in visual art is poorly represented in preschool education. The article does not claim to be exhaustive, but outlines some basic aspects related to the specifics of abstract art and its relation to children's creativity; the synthesis between music and visual arts; the perception of abstract works of art and their co-experience by preschool-age children; the creation of non-figurative works in-

spired by the synthesis between the two types of art seen through the creative imagination of little artists.

Before clarifying the issue of artistic perception and co-experience of abstract paintings by preschool-age children, let us dwell briefly on the specifics of this modernist trend and its close relation to music.

The emergence of modernist trends in visual art at the beginning of the 20th century was closely related to some historical, social, and cultural changes. (Farthing 2017, p. 452) Abstract art (Lat. Abstractio – separation, distraction), also called non-figurative art, was a trend where artists strived to achieve a compositional chord by depicting certain colour combinations and shapes, the interaction of which created a complete composition feeling. Abstract artists were looking for new means of expression, their aesthetic searches were aimed at the senses, touching the invisible and bringing out the subconscious. One of the reasons for the interest in the spiritual and immaterial was the emerging at the time phenomenology or philosophy of experience. (Farthing 2017, p. 453) Sensation, as a process conditioned by the senses, activated feelings which in turn built the idea of objects. The thesis was supported that colours and sounds directly affected human consciousness and created pure emotions. The theoretical works of abstract artists showed their increased interest in music. We can find musical analogies and their depicting as visual-associative artistic images in works by V. Kandinsky, P. Klee, H. Miró, J. Braque, P. Picasso, K. Malevich, and P. Mondrian.

Thanks to the theoretical works and diaries of some of the artists, we can learn about their aesthetic searches aimed at finding a visual language, an adequate translation of musical imagery through shapes, lines, and colours. P. Klee looked precisely into the musical structure, rethought it, and brought it to a visual level (as it was, for example, in J.S. Bach's Sonata No. 6) (Klee 1966, p. 287). A similar example of this was the 'reading' of Beethoven's Symphony No. 5 by W. Kandinsky (Kandinsky 1995, p. 39), but visual melodicity can be found in many works of his. At the basis of the artists' searches were the invisible spiritual layers, the emotionally saturated states expressed through form, line, and matter. V. Kandinsky was captivated by the expressive power of improvisational music: "Colour is the keyboard, the eyes are the chords, the soul is the piano with many strings. The artist is the hand that plays, touching one key or another, to invoke vibrations in the soul". V. Kandinsky was based on the associative approach, and embodied music in his paintings using the expressive means of painting vibrating with the frequency of musical tones to provide a complete musical chord. Gradually, thanks to such creative searches, the term 'visual music' was imposed, widely used by artist and art theorist R. Fry who analysed the works by V. Kandinsky and P. Picasso and emphasized the relation of the process to the need of artists and musicians to express the elusive, invisible, and immaterial.

In her book *Art: A Look from the Inside* (Vallier 2001), art historian Dora Vallier introduced some eminent abstract artists and analysed their works. Thus, we now know that for G. Braque colour acted like music, materializing a new, hand-made space (Valier 2001, p. 45). P. Bonnard's works were defined as a symphony in which the theme overflew to infinity (Vallier 2001, p. 58). F. Léger himself wrote that while making his sketches from nature, the drawing followed the inner movement, the inner line of the object which, like a stretched string, gave it integrity (Vallier 2001, p. 115) J. Villon shared, "Sometimes, I redo the colours of the painting with ink. Thus, I make sort of an accompaniment to it. The canvas is already composed, and the accompaniment can be made freely without affecting it. Here, I allow myself to add something from myself, from my heart" (Valier 2001, p. 117).

Modern, abstract art was aimed at the senses and the immediate impact of art on them. The aspiration of abstract artists to overcome space and reveal the deep worlds through the emotion and the colourful vibrations generated by the act of their creation and fixation on the canvases opened new avenues of inspiration for their works.

Here, it is necessary to pay attention to another aspect of the creative pursuits of modernists. The artists of the New Age were captivated by the immediate, expressive form of children's drawings, by the sincerity of children's visual art. "The interest in children's drawings was characteristic of prominent representatives of the avant-garde, too, attracted as lecturers at the famous Bauhaus art school (which existed from 1919 to 1933). The atmosphere in the higher school stimulated the development of the abstract-geometric trend in art, the experimentation with the plastic, expressive, dynamic characteristics of various forms, the study of the relationships between colours, lines, and planes" (Gyulchev 2018, p. 92). Modernist artists were known to be collectors of children's works of art. P. Klee, for example, collected the drawings of his young son and openly admitted they were the inspiration for some famous paintings of his (Kümmerling-Meibauer 2013, p. 15) Some researchers put forward the thesis that in several cases it was a question of direct borrowing: "Kandinsky used extensive samples of children's drawings for his abstract paintings in the period 1908-1914" (Fineberg 1977, p. 50). H. Miro shared, "The more I master the craft and advance in life, the more I return to my first impressions. Perhaps at the end of my life I will find all the values of childhood" (Valier 2001, p. 162).

Interest in children's art was gradually growing and became the object of study by many educators, psychologists, and art theorists. The growing interest was also related to the change in the attitude towards children's drawings, which until then were seen more as a carrier of information about children's inner world than as a product of a creative process. Publications devoted to the problem were gradually increasing, various manuals on visual art for children were issued, and monographs studying children's art were published. Drawing schools for talented children at art

schools and academies were also gaining popularity. A pioneer in art education was the Austrian teacher Franz Cižek who taught drawing in his art school to children aged 5 to 14. In his 1925 book *Das freie Zeichnen* (Cižek 1925), he stated that children should learn to draw freely as this stimulated their imagination. According to Cižek, children's imagination, perceptions, and emotions were more than enough to motivate children to draw. During creative activities in Cižek's school, music was played as according to him "nothing helped the work the way good musical rhythm did" (Viola 1936, p. 12). Thanks to the growing popularity of Cižek's revolutionary methods, he was appointed a lecturer at the Vienna School of Art and in 1906 his methods were officially recognized by the Austrian government. (Kümmerling-Meibauer 2013, p. 15) Cižek's innovative ideas were widely applied in both European and American educational institutions.

Of interest are also the views of abstract expressionist Mark Rothko, a direct follower of Cižek, who taught children from preschool to junior high school at the Brooklyn Art Centre in New York. For Mark Rothko, art was a means of reproducing emotions and visualizing inner experiences, and children knew how to express their emotionality in a spontaneous, natural way: "Children can express their thoughts vividly and beautifully so that they make us feel what they feel" (Rothko 2006, p. 3). Expressive form, spontaneity of children, and bold use of colour were concepts which modernist artists also strived for. "Abstract Expressionism is a return to the spontaneity of childhood perceptions, a nostalgia for innocence and sincerity" (Rothko 2006, p. 9). In this sense, children were also teachers for the artists of the New Age.

So far, we have analysed children's art as a source of inspiration for abstract artists. But are their works understandable for children and can they serve as a starting point and creative inspiration for little artists?

Children's first contacts with pictorial and graphic materials lead to the creation of non-figurative images. And though the random scribbles, circles, zigzag or chaotic lines, and coloured spots do not mean anything specific at first but are rather the result of children's first experiments with pictorial materials, at a later stage little explorers begin to name the depicted and detect shapes that resemble real subjects, objects, or phenomena. For quite a long period of time, it is not the final pictorial results that are important for children, but the joy of procedural actions and playing with pictorial materials. "If left to themselves, children never copy what they see, never, as we say, 'draw from nature', but express, with a delightful freedom and sincerity, the mental images which make up their own imaginative lives", wrote art theorist R. Fry analysing the spontaneity of children's visual art (Fry 1988, p. 58).

The very pictorial process in children is a product of an emotional, spontaneous reaction from the encounter with reality, a non-verbal sharing of the impressions accumulated: "Perceiving and sending emotional signals becomes a kind of communicative act", wrote D. Chuhovska. (Chuhovska 2022, p. 22) As researcher of

children's art V. Dimchev concluded, "The child's perceptions are more a product of an emotional reaction than a synthesis of subject contents." (Dimchev 1993, p. 43). According to P. Konakchieva, "on the basis of emotional self-regulation and conscious feeling of one's own position in life expressed through a concrete product of children's creativity, relationships with the environment are optimized." (Konakchieva 2022, p. 36).

Creative processes are part of children's acquaintance with the world, a spontaneous emotional reaction, an attempt to reflect the accumulated impressions refracted through the prism of children's imagination.

In turn, abstract thinking is strongly associated with imagination, fantasy, and creativity. Assimilation of the artistic language and its improvement contribute to the development of associative perceptions, in which visual images awaken sensitive sensations: auditory, tactile, and motor. This contributes to the creation of a synthesized artistic image, with imagination leading in the creative process. "The visual-sensory and abstract-logical experience of individuals are related to the mental process of imagination. The source of imagination is objective reality. The new image has objectively real features, it is based on various facts and phenomena, but at the same time is generally an invented, reborn image, the result of a creative act. Imagination in the creative process is as necessary as the requirement to reflect the actual existing reality." (Dimchev 1977, p. 104). An important role in the creative development of children is played by emotionality, the subjective evaluation of the surrounding reality.

Perception of abstract works of art happens precisely based on the associations generated. Children's imagination and fantasy allow them to 'enter' the world of abstract paintings as if through a magical portal, discover different forms and elements, and be co-authors in this new, fantasy space created by the co-experience of the work of art. Thus, children penetrate the rich world of abstract art saturated with emotional intonations, games of shapes, colours, and volumes and constructed by the temperament of the creator.

Preschool age is the most sensitive aesthetic development period. At this age, interest in artistic activity is easily awakened. Children intuitively turn to colours and show a need for artistic creativity and creative activity. (Gyulchev 2018, p. 17). The development of children's artistic creativity and overall aesthetic growth can be fully realized through the integration of arts. Integrative connections between visual art and music stimulate children's visual representations and creative imagination and activate various associative processes. A pictorial process by association from a piece of music is particularly suitable for the development of creative thinking, the realization of a synthesis between different types of perceptions and their presentation in a new artistic image refracted through individuality.

As researcher of children's visual art P. Legkostup wrote, "Since music is primarily related to abstract thinking, its association with colours and their nuances is

quite possible, using colour spots to reproduce musical imagery" (Legkostup 2003, p. 91). When activating these synthesized associative processes, it is necessary to find adequate correspondences between musical and visual art works, to clarify the means of expression that connect the two types of art. "Colours in paintings are the same as sounds in music. For their selection, an artistic eye is necessary, just like a musical ear for musical sounds. Both are products of human education in the process of artistic activity and perception, the result of listening to music and looking at pictures, and therefore, part of the musical and pictorial traditions (Volkov 1965, p. 100).

As earlier mentioned, one of the authors who explored the close relationship between visual art and music was the abstract artist V. Kandinsky. In his theoretical studies, he reached remarkable conclusions and discoveries. The aesthetic searches of the artist were related to the search for common expressiveness dictated not by similar artistic means but the overflow of associative sensations, to the penetration of spiritual depths through insight into the essence of the deep layers of artistic matter. "Colour is a means of exerting a direct impact on the soul. Colour is the key, the eye is the mallet, the word is the multi-stringed piano," Kandinsky wrote (Kandinsky 2016, p. 68) and added: "The expression 'fragrant dyes' is widely applicable. After all, the hearing of colours is so precise that perhaps no one will be found to try to reproduce the impression of bright yellow on the bass keys of the piano, nor compare the dark rose madder with the bass voice." (Kandinsky 2016, p. 67).

The principle of Kandinsky's theory did not consist in the transfer of similar means of expression between the two types of art, but in the orchestration of the picture itself created as music. The famous work *Impression III (Concert)* was a response to Arnold Schoenberg's concert in Vienna in 1911. The canvas expressed the event visually, reflected auditory impressions reproduced with the help of a large yellow surface that expressed a state of excitement, anxiety, even aggressiveness. According to V. Kandinsky, each colour had a psychic meaning and effect. "Many colours have been described as rough or sticky, others as smooth and uniform, so that one feels inclined to stroke them (e.g., dark ultramarine, chromic oxide green, and rose madder). Equally, the distinction between warm and cold colours belongs to this connection. Some colours appear soft (rose madder), others hard (cobalt green, blue-green oxide), so that even fresh from the tube they seem to be dry" (Kandinsky 2016, p. 66).

Overflow of sensations reflecting musical artistic images through the means of visual art was a phenomenon that was also found in many composers. Synaesthesia is a condition in which perceptions merge, connect with each other to form the concept of 'colour hearing'. The visual perception of colours and their nuances can be compared to the harmonic musical tones that form the natural resonance of any sound (Shershenovich 2020, p. 9). It is known that A. Scriabin possessed the gift of seeing his musical works in colour, and that N. Rimsky-Korsakov's ob-

servations on correspondence between musical and pictorial tones were similar. According to psychologist B. Tiepłow (Tiepłow 1951, p. 20), N. Rimsky-Korsakov had a sophisticated 'object-emotional complex', a combination of extremely strong sensitivity to tonality and its co-experience through bright, colourful visual images. Each tonality had a certain mood and emotional colouring, which caused a visual association in a visual image embodying the emotionality of the tone, turning it into its colour. An example of this amazing mechanism of association can be found in a fragment of a letter by N. Rimsky-Korsakov describing the tonality in A-moll: "This is the tonality of youth, of spring, when everything blooms, and the meadows are strewn with flowers. The tonality of the morning dawn, though not at daybreak, but when the whole horizon turns purple and gold." Similar emotional-visual associations of his cited by Tiepłow are: "E-dur – 'gloomy, blue-grey, the tonality of buildings and fortresses'; F-dur - 'light green, pastoral colour'; A-moll - 'pale pink, like a reflection of the sun in a winter, snowy landscape'; H-dur - 'gloomy, dark grey, with a steely sheen, lead grey, the colour of thunder clouds'; G-moll -'with no certain colour, has a religious-idyllic character'; As-dur - 'grey-violet, with a delicate, dreamy character" (Tiepłow 1951, p. 19).

In this type of synaesthesia, there was a transfer from sound to visual and from visual to sound sensations. Thus, composers depicted their visual experiences in colourful, picturesque chords. An example of this is the *Moonlight* by C. Debussy, *Moonlight Sonata* by Beethoven, and *Rhapsody in Blue* by G. Gershwin.

In this regard, also of interest is what was shared by the famous composer, music theorist, and pedagogue O. Messiaen, who revealed the interaction between musical and visual forms in his creative process. "Every visual impression is transformed in me in the form of music, and every melody is connected with a certain colour range" (Kaczyński 1984, p. 16). Colour associative sensations generated by musical tones also have their dynamics: they move simultaneously with the tempo and intensity determined by the musical chord, changing their nuances.

As it turns out, music and visual art have a lot in common. The two types of art are in continuous connection with each other, many concepts are identical: scale, tone, semitone, nuance, musical colour, rhythm, cold and warm timbre, minor and major chords. The musical space receives not only outlines that have their own unique appearance, colour, and flavour. The musical space breathes and pulsates, expands and contracts, amazes with the variety of sound combinations. Musical pictures hide wide possibilities for our imagination, and it is the same with works of visual art. Whether we observe a portrait, admire a landscape, a still life or enter the world of a non-figurative abstract composition – all these images have their own melodiousness that can be reproduced through the expressive means of painting.

Tonality is present as a concept in both music and painting. Bright, contrasting colour chords can be associated with a lively, dynamic musical composition. Colourful non-figurative compositions of close, delicate, pastel colour tones remind of

a lyrical, calm melody. Both in music and painting, a single tone out of place would sound false, out of chord or colour.

Up to here, we viewed some specifics of abstract art and its relationship with music, as well as the role of colour perception in rendering musical artistic images. We emphasized the particular importance of the integral connections between different types of art for the development of the aesthetic qualities of preschool children. By introducing children to the world of art and the specifics of the means of expression, we provide them with the opportunity to create and express their emotionality through the language of art.

Children are known to have a rich imagination and fantasy. This is why they easily perceive non-figurative forms of abstract painting such as coloured spots, lines, shapes, and texture that cause emotional suggestions directly affecting children's perceptions and ideas. The impact is direct and immediate, emotional, just as musical melodies produce certain moods, feelings, and states.

Gradually introducing children to various types of arts and their means of expression in a continuous integration relationship and synthesis would lead to freedom of inspired expression. Thus, children master the language of associations, abstract shapes, and colours and get acquainted with the semantic structure of non-figurative art and its concept.

The tasks of creating a non-figurative composition by association from a piece of music provoke creative thinking. In this kind of pictorial activity form, children can be taught to create a composition of colourful, picturesque spots in a certain chord in tune with the character of a chosen melody. To activate associative thinking, children's independent work on creating a pictorial non-figurative composition should be preceded by listening to musical works with different emotional sounds—major and minor, and abstract pictorial works corresponding to the musical images by implication should be additionally analysed.

A pictorial form by association from a musical work is not necessarily realized only through pictorial materials. It is good to give children the freedom to choose the means of expression and techniques through which to fully render a visual image: painting and graphic materials, application with various means, modelling. We could also include creating a collage or kinetic sculpture as a team activity.

Let us systematize the separate stages for carrying out the pictorial process of creating a non-figurative composition by association from a piece of music:

– Introducing children to the art of abstract artists and the means of expression used by them.

Suitable non-figurative works by P. Klee, V. Kandinsky, M. Rothko, H. Miró, with a clear emotional message, should be selected. An analysis of the reproductions should follow, emphasizing the colour chord, richness of tonalities, melodiousness of the composition. The talk should clarify the role of colourful chords in reproducing certain emotional states.

- Clarifying the relationship between abstract art and music.

The discovery of common means of expression between the two types of art can be realized by applying a problem-situational approach. Thus, children will be able to understand the terms that are common: rhythm, chord, tonality, dynamics, etc.

– Analysing the possibilities of non-figurative art.

The focus here is on abstract art as a means of reproducing emotional states and experiences, and sensations generated by music. It is also a specific visual 'translation' rendering a visual image through the means of visual art. Creating a non-figurative composition provides opportunities for creative freedom, expression of creativity, and originality of form.

– Listening to several pieces of music that have different implications.

Musical works that have a different character – lyrical, melancholic, cheerful, dynamic, and dramatic – should be selected. Classical works are particularly suitable.

- Finding visual correspondences from prepared reproductions of abstract non-figurative works.

In the form of a game, children can find visual correspondences to each of the pieces of music they listen to.

Setting a task for independent work.

To carry out the task, we a piece of music unknown to the children should be selected. The goal is to create a non-figurative composition by association from an unknown piece of music by provoking associative thinking and artistic creativity. The choice of materials and type of visual activity is provided to children.

- When reproducing a pictorial composition, we could also include a short literary text, in poetic form, in tune with the corresponding emotional message.

Creative tasks for depicting a non-figurative composition by association from a piece of music provide children with unlimited creative opportunities and contribute to the:

- Development of associative abilities, imagination, creativity, and creative thinking.
- Improvement of children's colour perception by creating colour chords and a unified colouring under the impact of music.
- Cultivation of skills for creating artistic images, improvement of visual literacy.
- Cultivation of emotional intelligence interweaving of emotional co-experience by reflecting the impact of a musical work on the pictorial surface of a visual image.
  - Development of abstract thinking.
  - Encouraging of artistic creativity.

The stages and approaches systematized allow for individual creative interpretations when performing the task and for application of various visual techniques.

Today, with the increasing focus on creativity, emotional intelligence, and aesthetic education, appropriate foundations for their development should be built. Acquainting preschool-age children with modern trends in art provokes their associative thinking and fantasy and expands the scope of opportunities for creative self-expression. The integral connections between visual art and music in preschool education are crucial to both to the cultivation of skills and competences and the overall aesthetic development of children.

## REFERENCES

- CIZEK, F., 1925. *Free Drawing*. Vienna: Schroll Publishing House [In German].
- CHUHOVSKA, D., 2022. Integrative Model for the Development of Communicative Competence through Pedagogical Interaction in Kindergarten. V. Tarnovo: ITI Publishing House [In Bulgarian]. ISBN 978-619-7602-29-6.
- DIMCHEV, V., 1993. *Art. Methodology*. Sofia: Prosveta Publishing House [In Bulgarian]. ISBN 954-01-0419-X.
- DIMCHEV, V., 1977. *Development of Art and Visual Activity*. Sofia: Narodna Prosveta Publishing House [In Bulgarian].
- FARTHING, S., 2017. *Art. The whole story.* Sofia: Knigomania Publishing House [In Bulgarian]. ISBN 9789548432511.
- FINEBERG, J.D., 1977. *The Innocent Eye: Children's Art and the Modern Artist*. Princeton: Princeton University Press.
- FRY, R., 1988. *Imagination and Painting*. Sofia: Nauka i Izkustvo Publishing House [In Bulgarian].
- GYULCHEV, N., 2018. *Preschool-Age Children and Visual Art Educational Activity*. Veliko Tarnovo: St. Cyril and St. Methodius University Publishing House [In Bulgarian]. ISBN 978-619-208-176-8.
- GYULCHEV, N., 2006. *Educational Work Forms in Children's Artistic Activity.* V. Tarnovo: St. Cyril and St. Methodius University Publishing House [In Bulgarian] Online ISSN 2367-9360; Print ISSN 1310-358X.
- KACZYNSKI, T., 1984. *Messiaen*. Kraków: Polish Music Publishing House [In Polish].
- KANDINSKY, V., 2016. *Concerning the Spiritual in Art.* Sofia. Iztok Zapad Publishing House [In Bulgarian]. ISBN: 978-619-152-921-6.
- KANDINSKY, V., 1995. *Point and Line to Plane*. Sofia. Lik Publishing House [In Bulgarian] ISBN: 9546070432.
- KLEE, P., 1966. Notebook. The thinking eye. Basel: Shabe&co, Verlag.

- KONAKCHIEVA, P., 2022. *Traditions and Innovations in Preschool Environmental Education*. Veliko Tarnovo: ITI Publishing House [In Bulgarian]. ISBN 978-619-7602-34-0.
- KUMMERLING-MEIBAUER, B., 2013. *Childhood and Modernist Art.* University of Tübingen: Libri & Liberi.
- LEGKOSTUP, P., 2003. *Children and Works of Art*. Veliko Tarnovo: Faber Publishing House [In Bulgarian]. ISBN: 954-524-148-9.
- ROTHKO, M., 2006. Writings on Art. Yale: Yale University Press.
- SHERSHENOVICH, Y., 2020. Synaesthesia: Physiology Aesthetics Metaphysics. In: N.V. ZLYDNEVA. *Problems of Synaesthesia and Poetics of the Avant-Garde*, p. 254. Moscow: State Institute of Art Studies [In Russian].
- TIEPLOW B., 1951. *Psychology of Musical Abilities*. Warsaw: Nasza Księgarnia Publishing House [In Polish].
- VALLIER, D., 2001. *Art: A Look from the Inside*. Sofia: Agata Publishing House [In Bulgarian]. ISBN 954-540-025-0.
- VIOLA, W., 1936. *Child art and Franz Cizek*. London: Simpkin Marshall. VOLKOV, N., 1965. *Colour in Painting*. Moscow: Art [In Russian].

## **☑** Dr. Galina Nikolova, Assist. Prof.

ORCID iD: 0000-0002-7751-1680 St. Cyril and St. Methodius University of Veliko Tarnovo Veliko Tarnovo, Bulgaria E-mail: g.nikolova@ts.uni-vt.bg