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DESIGN THINKING AS A NEW APPROACH IN EDUCATION

Ivanova A. Design Thinking as a New Approach in Education. The article reveals the main principles of design thinking in art education and justifies the origin and appropriateness or using of the studied method. The aim of the article is to identify essential nature of implementation of the design thinking principle in the world practice. In the article, there have been analyzed 18 sources of foreign literature. The conducted analysis represents theoretical significance and practical significance in the teaching methodology, and its results may be implemented on practice. It has been identified that the design thinking is a cross disciplinary creative problem-solving process aimed to solve such issues as analytical thinking and creative thinking, and contributes to the forming of practical skills of the students. The analysis of the scientific literature has revealed that the design thinking is the efficient method of solving of students' tasks while education. This very analysis confirms the efficiency of the studied method that activates cognitive and creative activity of the students, and forms their personal qualities.

Keywords: design thinking, education, solution, skills, creative, innovative.

Іванова А. А. Дизайн-мислення як новий підхід в освіті. У статті розкриті основні принципи дизайн-мислення в художній освіті, обґрунтовано походження та доцільність використання даного підходу. Ціллю статті є виявлення сутності використання принципу дизайн-мислення в освіті. У статті проаналізовано 18 джерел із зарубіжної літератури. Проведений аналіз має теоретичне та практичне значення в методиці викладання, а його результати можуть бути використані на практиці. Виявлено, що дизайн-мислення є міждисциплінарним творчим процесом, направленим на вирішення таких проблем, як аналітичне мислення та творче мислення, а також сприяє формуванню практичних навичок студентів. Аналіз наукової літератури показав, що дизайн-мислення є ефективним методом рішення поставлених завдань студентам під час навчання. Даний аналіз підтверджує продуктивність метода навчання, що досліджується, який активує пізнавальну та творчу діяльність студентів, а також формує їх особистісні якості.

Ключові слова: дизайн-мислення, освіта, рішення, навички, творчий, інноваційний.

Иванова А. А. Дизайн-мышление как новый подход в образовании. В статье раскрыты основные принципы дизайн-мышления в художественном образовании, обосновано происхождение и целесоо-бразность использования данного подхода. Цель статьи — выявить сущность использования принципа дизайн-мышления в образовании. В статье проанализировано 18 источников из зарубежной литературы. Проведенный анализ имеет теоретическое и практическое значение в методике преподавания, а его результаты могут быть использованы на практике. Выявлено, что дизайн-мышление — междисциплинарный творческий процесс, направленный на решение таких проблем, как аналитическое мышление и творческое мышление, а также способствует формированию практических навыков студентов. Анализ научной литературы показал, что дизайн-мышление является эффективным методом решения поставленных задач студентам во время обучения. Данный анализ подтверждает продуктивность исследуемого метода обучения, который активизирует познавательную и творческую деятельность студентов, а также формирует их личностные качества.

Ключевые слова: дизайн-мышление, образование, решение, навыки, творческий, инновационный.

Problem statement. It is becoming increasingly difficult to ignore the fact that new century has caused many challenges for the people in every area including education. In this new era all the traditional approaches in this very sphere seem to be ineffective and hence new education methodology needs to be introduced. Any advancement in the education sector from here forward requires a new thinking paradigm: design thinking. A new competing approach named "Design Thinking" is the best answer to the problem. The very method originates in architecture, design, art. It is due to its multiversity it is used nowadays in many fields including education. A key aspect of the opportunity to think like a designer is that it is a problem solving and human oriented approach that can accelerate creativity and innovation in teaching as well as in learning. However, far too little attention in the literature has been paid to the investigations in relation to the education.

The aim of the article. In the latest several years, "Design Thinking" has run at very high popularity and it is now considered as an entirely new approach to dealing with IT, Business, Education and Medicine. This very method challenges the design researchers to provide us with answers to the questions: "What is the Design Thinking?" and "What could it bring to other fields like Education?" This article seeks to at least partially answer these questions by analyzing the literature by the most successful researchers in the field.

Analysis of recent research and publications. The expression "Design Thinking" has been used by design researchers since Rowe applied it as the title of his 1987 book (Rowe, 1987) [17]. The first Design Thinking Research Symposium was an exploration of research into design and design methodology, viewed from a design thinking perspective (Cross, Dorst, & Roozenburg, 1992) [3]. Multiple models of design thinking have emerged since then. Recent evidence suggests that they are based on widely different ways of viewing design situations and using theories and models from design methodology, psychology,

education, etc. [5]. Together, these streams of research create a rich and varied understanding of a very complex human reality. Nowadays, "Design Thinking" is identified as an exciting new paradigm for dealing with problems in many professions, most notably Information Technology (IT) (e. g. Brooks, 2010) [1] and Business (e. g. Martin, 2009) [11]. The eagerness to adopt and apply these design practices in other fields has created a sudden demand for clear and definite knowledge about design thinking (including a definition and a toolbox). (Kees Dorst "The Nature of Design Thinking").

Many writers have challenged to give a comprehensive definition of the method so we can state that Design Thinking as a concept is quite indistinct. There are numerous definitions; some of them are even contradictive. However, we can for sure say that it's a *way of thinking* and this very thinking is of a loose framework where insights are taken from a variety of sources which eventually lead towards a solution.

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It is becoming increasingly difficult to ignore the fact that new century has caused many challenges for the people in every area including Education. In this new era all the traditional approaches in this very sphere seem to be ineffective and hence new education methodology needs to be introduced. A new competing approach named "Design Thinking" is the best solution of the problem. The very method originates in architecture, design and art. It is due to its multiversity it is used nowadays in many fields including Education. A key aspect of the opportunity to think like a designer is that it is a problem solving and human oriented approach that can accelerate creativity and innovation in teaching as well as in learning. However, far too little attention in the literature has been paid to the investigations in relation to the education.

Talk to any educator, parent, or policy maker and you will inevitably hear about the many problems that exist in education. It's not for lack of trying for millions of people are working across the country to find new solutions. And yet we're struggling to find new answers that make a real difference. But we can't solve our problems by using the same kind of thinking we used when we created them. We tend to think first about the needs of the system and create solutions from there. But what if we looked first to the needs of people, and then designed ways the system could meet its goals by serving these needs? This is the heart of how design thinking gets to innovative solutions.

"Design Thinking is a cross disciplinary creative problem-solving process which combines analytical thinking, creative thinking, and practical skills" (Ingalls

Vanada, 2011) [8]. Design thinking is promoted by its supporters as it is a system for solving difficult or wicked problems. *This process rests on methods drawn from engineering and design, and combines them with ideas from the arts, tools from the social sciences, and insights from the business world.*

In higher education we frequently describe critical thinking as an important outcome for college students. One way in which students can develop higher level critical thinking ability is in solving difficult problems. So it would make sense that helping them to better understand and use design thinking would be a valuable component of higher education.

A wide range of authors have considered concepts of twenty-first century skills. Researcher, author and internationally acclaimed speaker Tony Wagner (former teacher and principal) points out twenty-first century skills, the seven survival skills for careers, college and citizenship and distinguishes in his book "The global achievement gap":

• Critical thinking and problem solving
• Collaboration across networks and leading by influence
• Agility and adaptability
• Initiative and entrepreneurialism
• Effective oral and written communication
• Accessing and analyzing information
• Curiosity and imagination [18].

Successful author Daniel Pink describes in his book "A Whole New Mind" six essential aptitudes. He distinguishes:

• Design: to detect patterns and opportunities
• Story: to create artistic and emotional beauty and to craft a satisfying narrative
• Synthesis: to combine seemingly unrelated ideas into something new
• Empathy: ability to empathize with others and to understand the subtleties of human interaction
• Meaning: to find joy in one's self and to elicit it in others and to stretch beyond the quotidian in the pursuit of purpose and meaning [13].

Harvard professor Howard Gardner describes: *the specific cognitive abilities that will be sought and cultivated by leaders in the years ahead* in his book "Five Minds for the Future". The five Minds are:

• The Disciplinary Mind: the mastery of major schools of thought, including science, mathematics, and history, and of at least one professional craft.
• The Synthesizing Mind: the ability to integrate ideas from different disciplines or spheres into a coherent whole and to communicate that integration to others.
• The Creating Mind: the capacity to uncover and clarify new problems, questions and phenomena.
• The Respectful Mind: awareness of and appreciation for differences among human beings and human groups.
• The Ethical Mind: fulfillment of one's responsibilities as a worker and as a citizen [6].

A serious weakness with these classifications, however, is that according to context, audience and

goal, the descriptions vary a lot, but we came to the conclusion that they all center around the same basic concepts. Thus, in an attempt to make a comprehensive classification we have chosen the most abstract three-tier categorization of competences offered by Himmelmann that will work for every analysis being done. He classifies key competences into:
• Cognitive abilities
• Affective, moral attitudes
• Practical, instrumental skills [7].

Design and design thinking are identified as making valuable contributions to education. The numbers of higher education programmes that teach design thinking to students abroad are growing, however we have little information about the outcomes of these initiatives, let alone the native education.

After pointing out the growing interest in design thinking in the world we can state that: helping students to think like designers may better prepare them to deal with difficult situations and to solve complex problems in school, in their careers, and in life in general.

The approach enables the graduates to obtain the following qualities:
• ability to visualize
• human centered attitude
• ability to develop multiple solutions to a single problem
• systemic vision
• ability to clearly outline ideas to others
• ability to be effective in teams

In his book Razzouk highlights that "Design thinking is an approach to learning that involves hands-on learning projects, focusing on inquiry and problem solving, investigation of possible solutions, sketching and prototyping, collaboration and feedback, created 'products' or ideas, as well as reflection and redesigns if necessary" (Razzouk et al., 2012) [15]. This very finding suggests that design thinking is, above all, an iterative process that requires flexible and integrative thinking; it can be incorporated into any discipline: science as easily as visual art or history.

For students, design thinking develops both inductive and deductive line of reasoning along with intuition, concept development through creation of ideas and brainstorming, collaboration and risk-taking (Kolko, 2010) [10]. Taken together, all these findings support the idea that students are challenged to combine ideas and common sense into a new whole, as says Kel-

logg (2006) [9]. As IDEO design firm's website (2013) suggests: "Design thinking is a deeply human process that taps into abilities we all have but get overlooked by more conventional problem-solving practices. It relies on our ability to be intuitive, to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to express ourselves through means beyond words or symbols… Design thinking provides an integrated third way".

It is necessary to clarify that this very methodology gives students opportunity to learn to see their failure as an opportunity to gather and implement important information, so they are less likely to give up. They learn *how* to think, instead of *what* to think in order to give one right answer on a task (Resnick, 1999) [16]. The key components of the design thinking process, as identified by the Hasso Plattner Institute of Design or "d.school" are shown in Figure 1.

Design thinking processes help to foster students' abilities for creative problem solving (Carroll et al., 2010) [2].

Design thinking in education is sometimes referred to as "design-based learning". It is perceived as "a model for enhancing creativity, endurance, engagement and innovation" (Dolak, et.al, 2013, p. 2) [4]. The benefit of design thinking in pedagogy refers to its character which "enables students to work successfully in multi-disciplinary teams and enact positive, design-led change in the world" (Rauth, Koppen, Jobst, & Meinel, 2010, p. 2) [14]. Learning and knowledge creation in design thinking education are based on highly iterative proceedings.

The design thinking as a process embodies different elements. Kolko in his work suggests that it contains analytic and synthetic elements. During the analytic phase, which is a discovery phase, the existing theories are studied; observations are made in order to find problem solutions. This stage corresponds to understanding, observing and expressing a point of view. During the synthetic phase, idea generation continues. It corresponds to ideation, prototyping and testing, with a focus on making. Both stages are interconnected as problem solution starts with observation and ends with testing the options and improving the worked out solutions. Design thinking skills can be developed in various activities during studying, especially in group work and projects as one of the preconditions is team working and open communication. [9] Thus, we can
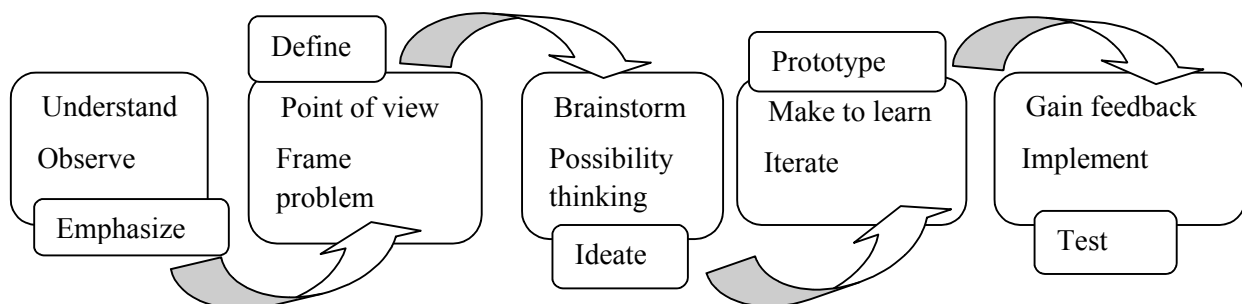

Figure 1. Overview of the design thinking process (d.school as cited in Carroll et al., 2010) [2]

conclude that the very method comprises students' ability of empirical acting as a live process and generating ideas as an artificial process.

Ray (2012) suggests working in small groups or "Collabs" observing the following six steps: 1) identify opportunity; 2) design; 3) prototype; 4) get feedback; 5) scale and spread; 6) present. One of the basic rules concerns the way of asking the questions and expressing the opinion. Students are encouraged to say "yes" when they agree with others' ideas and "yes, but..." when they disagree. This is done in order not to discourage other students from expressing their opinion and to search alternative ideas which is essential in building prototypes. This idea demonstrates that sometimes even small changes can greatly impact the result. The activity starts with a problem that is offered for students to solve.

Conclusions. According to the literature analyzed, the term design thinking is increasingly used to mean the human-centred "open" problem solving process decision makers use to solve real world "wicked" problems.

Atkinson in his study introduced the idea that "innovation drives improvement, either incrementally by advancing existing processes or more radically by introducing new practices" which means that the emergence of the new approach of design thinking, especially in education, is reasonable (OECD, 2014, p. 3) [12].

In the context of major demographic changes, a person's aging, increasing global competition and sustaining competitiveness of the EU economy, the role of innovation increases. This refers also to education which has to be modernized at all levels. It is necessary to "promote excellence in education and skills development and diminish innovation skills gaps" (Europe 2020 Flagship Initiative Innovation Union, 2010) [5].

One of the ways how to increase innovation is developing design thinking skills. Since the term "design thinking" was first used it has developed into an approach that extends far beyond its original application in architecture, design and art. The designed models demonstrate their applicability in pedagogy and their use in studying may diversify the teaching/learning process as well as the study content and motivate students' learning. The greatest benefit of the various teaching/learning tools created in accordance with the design thinking principles is their non-traditional, innovative tasks that may be completed individually or in groups and that develop students' problem solving skills. Working in groups to solve the tasks helps students enhance team working, collaboration, communication skills and develop their design thinking skills that will later be useful in solving everyday and work-related problems in a creative and innovative way. Students practice during the studies and learn to make their own mistakes. They learn to explain their opinions and listen to others' opinions, accept untraditional ideas thus welcoming innovation.

Further research prospects. Although we have carried out a study on the design thinking concept, its origin and its relevance towards education, it has still been a glance on the design thinking. It should be noted that there are still wide research prospects on its history and implementation in education.

References:

1. *Brooks, F. P. (2010). The Design of Design — Essays from a Computer Scientist. New Jork : Addison Wesley. [In English].*
2. *Carroll, M., Britos, L., Koh, J., Royalty, A., Hornstein, M. (2010). Destination, Imagination and the Fires Within : Design thinking in a middle school classroom. International Journal of Art and Design Education, 29 (1). Retrieved from www.stanford.edu/dept/SUSE/takingdesign/proposals/Destination_Imagination_the_Fire_Within.pdf. [In English].*
3. *Cross, N., Dorst, K., Roozenburg, N. (1992). Research in Design Thinking. Delft : Delft University Press. [In English].*
4. *Dolak, F., Uebemickel, F., Brenner, W. (2013). Design Thinking and Design Science Research. Positioning Paper DESRIST 2013. Institute of Information Management. New York : University of St. Gallen, HSG. [In English].*
5. *Europe 2020 Flagship Initiative Innovation Union. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, SEC. eur-lex.europa. (2010). Brussels. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF. [In English].*
6. *Gardner, H. (2007). Five Minds for the Future. New York : McGraw-Hill Professional. [In English].*
7. *Himmelmann, G. (2005). Was ist Demokratiekompetenz? blk-demokratie. Retrieved from http://blk-demokratie.de/materialien/beitraege-zur-demokratiepaedagogik/himmelmann-gerhard-2005-was-ist-demokratiekompetenz.html. [In German].*
8. *Ingalls Vanada D. (2011). Designing Thinking : Developing Dynamic Learners in the Arts. Germany, Saarbrücken : LAP LAMBERT Academic Publishing. [In English].*
9. *Kellogg, C. (2006). Learning from Studio : Focus on the Future. In Design Intelligence Knowledge Reports. P. 30–31. [In English].*
10. *Kolko, J. (2010). Abductive Thinking and Sensemaking: The drivers of design synthesis. Design Issues, 26 (1), 28–29.*
11. *Martin, R. (2009). The Design of Business. Cambridge : Harvard Business Press. [In English].*
12. *Atkinson, A., Jacotin, G., Rimini, M. (2014). Measuring Innovation in Education: A New Perspective, Educational Research and Innovation. OECD Publishing Centre for Educational Research and Innovation. Retrieved from http://www.keepeek.com/Digital-Asset-lvlana gement/oecd/education/measuring-innovation-in-education. [In English].*
13. *Pink, D. H. (2006). A Whole New Mind : Why Right-brainers Will Rule the Future. New York : Penguin Group. [In English].*
14. *Rauth, I., Koppen, E., Jobst, B., Meinel, C. (2010). Design Thinking : An Educational Model Towards Creative Confidence. In Proceedings of the International Conference on Design Creativity. [In English].*
15. *Razzouk, R. & Shute, V. (2012). What Is Design Thinking and Why Is It Important? Review of Educational Research, 82 (3), 48. [In English].*
16. *Resnick, L. (1999). Making America smarter. Education Week Century Series, 18 (40), 39. [In English].*
17. *Rowe, P. (1987). Design Thinking. London : MIT Press, Cambridge MA. [In English].*
18. *Wagner, T. (2010). The Global Achievement Gap: Why Even Our Best Schools Don't Teach the New Survival Skills Our Children Need – And What We Can Do About It. New York. [In English].*