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IMPLEMENTING INTEGRATED LEARNING IN ELEMENTARY SCHOOL MATHEMATICS LESSONS USING THE 4K MODEL

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ABSTRACT

This article examines how methods and textbooks contribute to the development of 4K skills, but without a well-thought-out, scientifically grounded methodological approach, it is impossible to achieve these skills. It is also important to clearly understand which skills and in what sequence we develop within a given subject, and this requires a curriculum. After all, a textbook is just one tool for achieving the goals set forth in the curriculum. However, the curriculum on which new elementary school textbooks are based has not yet been made public.

Keywords: 4C skills, communication, collaboration, critical thinking and creativity, in the context of education, skills, training, education, and thinking.

What is 4K training, why does your child need it, and where can you study using it? Twenty years ago, no one had heard of professions like SMM specialist or mobile app developer. It’s hard to predict what the labor market will demand in a few years, but it will definitely change. Even the work of accountants and analysts will gradually be automated, not to mention physical labor. Employers will primarily be interested in skills that cannot be replaced by algorithms.

A bit of theory In 2016, Klaus Schwab, President of the World Economic Forum in Davos, announced that the Fourth Technological Revolution had begun. This means

that soon robots will do everything for us, and by 2020, every in-demand employee will need to be able to:

1. solve complex problems;
2. think critically;
3. think creatively;
4. manage people;
5. work in a team;
6. recognize and manage the emotions of others and your own;
7. form judgments and make decisions;
8. be customer-focused;
9. negotiate;
10. quickly switch from one task to another[4].

By 2020, critical thinking and creativity will be among the top 3 most in-demand skills, while in 2015 they were ranked 4th and 10th. These skills are commonly referred to as Soft Skills (soft skills, cross-professional competencies) as opposed to Hard Skills. In our country, education experts have narrowed the Davos Ten down to a system of four key skills, called the 4C System: 1. Critical Thinking; 2. Creativity; 3. Communication; 4. Coordinating With Others. Learn more about each of the four Cs • Critical thinking is the ability to navigate information flows, see cause-and-effect relationships, filter out the unnecessary, and draw conclusions.

The 4Cs (communication, collaboration, critical thinking, and creativity) are increasingly mentioned in the context of education. What are these skills, how can they be implemented, and how is this being achieved in Uzbekistan?

The 4Cs, 21st-century skills, and soft skills—an "inverted Tower of Babel"?

According to Wikipedia, the term "4Cs" (originally: "4Cs" – Communication, Collaboration, Critical Thinking, and Creativity) was first coined in the early 2000s in the United States by the nonprofit organization Partnership for XXI st Century Skills (P21) (now part of Battelle for Kids) to describe the skills the organization identified as key elements of XXI st-century learning. According to P21, "students must master

new skills—Xxi st-century skills—that are essential for learning after school, in the workplace, and in modern society, and the United States can provide students with a relevant education only by integrating XXI st-century skills into core curriculum"[11].

To find solutions even in the face of failure, you need to understand the reasons for your successes and failures. • Creativity allows you to evaluate situations from different perspectives, make unconventional decisions, and feel confident in changing circumstances. A person with developed creativity becomes a creator. They can generate ideas and develop the initiatives of others. Overcoming difficulties becomes an exciting puzzle for them[10].

Communication. Nowadays, everyone is just a phone call or text away practically 24/7. The ability to negotiate and establish contacts, listen to others, and convey your point of view has become a vital skill. • Coordination (collaboration) is closely related to communication, but is related to the professional sphere. This is the ability to define a common goal and how to achieve it, assign roles, and evaluate results. The 4K system was developed in response to employer demand, but all these skills should be developed not only by those planning to reach dizzying career heights. By and large, these are the signs of a harmonious and happy personality. Soft skills are formed long before a person begins a career. This means that school should also play a role in their development. But, you must admit, it is difficult to imagine the development of creativity in algebra or history lessons. Self-education Anyone can successfully develop 21st century skills.

As Chris Dede of Harvard University notes, P21 is neither the first nor the only organization to attempt to develop a conceptual framework for 21st-century skills. He argues that the XXI st century differs from the 20th century in that advanced information and communication technologies are taking away some of the workload from humans—routine cognitive and manual tasks that programmed computers can handle. More and more people are employed in fields that require expert thinking and complex communication—things that computers cannot do. Hence the need to develop 21st-century skills in students. However, the researcher argues, many education

reforms have failed because conversations about XXI st-century skills resemble an "inverted Tower of Babel"—everyone uses the same words, but talks about different things[9].

Indeed, many researchers, organizations, and education systems have developed their own concepts of "21st-century skills." Comparing these concepts, one can see that the composition, definition, and name of these skills vary from document to document.

In the "Global Framework on Transferable Skills," the United Nations Children's Fund (UNICEF) draws attention to the urgent need to expand, rethink, and transform education and education systems to ensure they provide children with a quality education that includes the skills they need to succeed in school, work, and life.

The document notes that "transferable skills" (also known as "soft skills," "21st-century skills," or "life skills") are central and serve as the foundation for mastering other skills. These "transferable skills" include cognitive skills (problem solving, making informed decisions, planning, and goal setting), social skills (communication, collaboration, conflict resolution, and negotiation), and emotional skills (understanding one's own and others' emotions, empathy, and stress management).

The Organisation for Economic Co-operation and Development (OECD) document "The Future of Education and Skills: Education 2020" states that the goal of education is not only to prepare students for the world of work but also to develop the skills they need to be active, responsible, and assertive citizens. The OECD proposes three categories of skills—"transformative skills"—that enable students to change society for the better: the ability to create new values (creative thinking, flexibility, curiosity, openness); the ability to resolve contradictions and dilemmas (systemic thinking, problem solving); and the ability to take responsibility.

The National Research Council's Committee on Defining Deep Learning and 21st Century Skills (CRDC) research group proposes the following categories of skills that support deep learning and that can be used in a variety of contexts and learning domains: cognitive skills (critical thinking, information literacy, logical reasoning and argumentation, creativity, innovation), interpersonal skills (communication,

collaboration, responsibility, conflict resolution, leadership), and intrapersonal skills (intellectual openness, conscience, positive self-esteem) [13].

The Ministry of Education of Singapore, a leader in the international PIRLS and PISA assessments, identifies the following skills that will enable students to "succeed in school and beyond, living, learning, and working in a rapidly changing, highly digital, and interconnected world": critical, adaptive, and inventive thinking; communication, collaboration, and information skills; and civic, global, and intercultural literacy. These skills are called "emerging XXI st-century skills"[10].

In Finland, whose experience was much discussed last year, the National Curriculum defines the following "core" skills (transversal skills) that should be developed within any academic discipline: thinking and learning; cultural competence, interaction and self-expression; self-care and managing everyday life; multi-literacy; ICT competence; competence in working life and entrepreneurship.

Shukhrat Sattorov, former director of the Republican Education Center under the Ministry of Preschool and School Education, said that "we need a generation of young people with forward-thinking, decisive, goal-oriented, and capable of making independent decisions and solving problems... The goal of the National Curriculum is to develop the core competencies students need to succeed in the XXI st century"[12].

As we see, there is an understanding that school should not only impart academic knowledge but also develop skills that will help students find their place in the modern world and contribute to the development of society. The name and composition of these skills may vary from document to document. As for the "4Ks," this is not some new methodology or model, but a "fashionable," "branded" name for some of these skills.

So what are the 4Cs?

To understand how to develop a particular skill in a student, it’s necessary to break it down and understand its composition. For example, to teach an apprentice to bake bread, a baker must understand the component skills—the "subskills"—that make up that skill. Let’s try to understand the composition of each skill within the 4Cs.

Critical Thinking. The term "critical thinking" was first used by the American philosopher, psychologist, and educator John Dewey. In his book "How We Think," published in 1910, he writes: thinking is filling in the gaps of experience, connecting isolated facts. But we can do this in a rush—"thinking uncritically," allowing our emotions to fill in the gaps and readily accepting any proposition that seems plausible. Or we can try to find a principle connecting these facts and test—confirm, disprove, or modify—that principle. According to Dewey, the second is critical thinking[3].

Although the term was coined by Dewey, researchers note that the concept itself has ancient roots, in the famous "Socratic method" of problem-solving. Researchers also note that critical thinking is not simply acquiring and storing information, or reflecting on something, or even considering what to believe and what not to believe.

Analyzing various definitions of critical thinking, Stéphane Vincent-Lancrin of the OECD Centre for Educational Research and Innovation cites the following key characteristics of critical thinking: the ability to examine a problem from multiple perspectives and a willingness to challenge assumptions and accepted ways of thinking before arriving at a particular position.

In the lesson structures described above, I don’t see what, as Mamanazar Dzhumaev said, makes learning interactive and develops the 4Cs: setting a task or problem, solving the problem together, sharing knowledge, and developing one’s own knowledge. The overwhelming majority of assignments are aimed specifically at reproductive learning: reproducing knowledge in specific situations (examples).

According to him, critical thinking consists of the following cognitive processes:

• inquiry (understanding the context and framework of a problem, identifying assumptions about the problem and questioning them, testing the accuracy of facts and interpretations, analyzing knowledge gaps),

• imagination (identifying, analyzing, and comparing different perspectives and alternative opinions),

• action (explaining the strengths and weaknesses of a product, solution, or opinion),

• reflection (reflecting on the chosen solution/opinion in relation to other alternatives).

Important components of critical thinking—the ability to evaluate the quality and reliability of material and evaluate different opinions—are included in the concept of "reading literacy" in the PISA study.

Creativity. The authors of the international PISA study, which assesses creative thinking among other things, offer the following definition: "the ability to generate, evaluate, and refine ideas that can lead to original and effective solutions, advances in knowledge, and impressive expressions of imagination." They emphasize the following key criteria of creativity: novelty (originality) and usefulness (effectiveness) of the proposed idea, solution, or product[9].

Ken Robinson, a specialist in creativity and innovation in education, also argues that creativity is original, valuable ideas. Ideas that are completely impractical cannot be considered creative. Therefore, the ability to evaluate ideas or solutions is an integral aspect of creativity. Other researchers also cite two metrics of creativity: novelty and usefulness (ability to use).

Analyzing research on creative thinking, Birgili notes that this skill includes the following processes:

• synthesis (thinking by analogies, the ability to construct original new ideas from components, the ability to propose new and authentic solutions to problems);

• articulation (expanding knowledge, the ability to make unusual connections);

• imagination (the ability to see connections, the flexibility of the imagination).

Communication and Collaboration. Communication—the exchange of information to achieve a desired goal—includes several aspects: verbal competence (the ability to express thoughts orally or in writing), pragmatic competence (the ability to correctly use the communication system), and social competence (the ability to behave in accordance with accepted social norms). Collaboration, on the other hand, can be defined as participation in a shared effort to achieve a common goal, which involves the exchange of opinions and the sharing of resources. Important aspects of

collaboration include mutual respect, trust, and responsibility. Some authors call communication and collaboration "two sides of the same coin."

Based on the above analysis, it is appropriate that the main directions for the development of mathematics teaching in the public education system are as follows:

– ensuring the compliance of the requirements of the state educational standard in mathematics with the international requirements for the training of personnel, based primarily on the needs of the future modern state and society, and the quality of education in accordance with the skills of the XXI st century;

– forming an integrated system that ensures close cooperation, continuity and coherence between preschool, general secondary, secondary specialized and vocational, higher educational institutions and scientific and methodological research structures;

– improving the quality of teaching mathematics in general secondary and secondary specialized, vocational educational institutions, organizing and developing a system of specialized schools in mathematics in the regions;

– developing a system of training and retraining of personnel in mathematics, especially in schools in rural areas;

– improving textbooks and teaching aids in mathematics;

– identifying talented young people and ensuring their successful participation in local and international mathematics Olympiads and winning prizes;

– qualitatively updating the content of mathematics, as well as improving teaching methods, and gradually implementing the principles of individualizing the educational process[8];

– improving, optimizing the content of mathematics and strengthening its integration with other general education subjects;

– applying the acquired knowledge and skills in students in real life situations, forming mathematical literacy, critical, creative and inventive competencies;

– introducing modern digital technologies and innovative approaches to ensure the efficiency and effectiveness of the mathematics teaching process;

– based on advanced foreign experiences in assessing student achievement and the results of international research in this area, create a new assessment system and, based on it, introduce a national certification system for assessing the level of knowledge of mathematics;

– raising the quality of teaching mathematics to a new level, including the implementation of new scientific directions and principles of organizing the educational process using modern information and communication technologies, electronic textbooks and modern laboratory equipment;

– harmoniously conducting education and upbringing, forming students not only as knowledgeable, but also as spiritually and morally mature individuals;

– creating a healthy creative environment in mathematics lessons, raising the quality of teaching to a new level by introducing advanced innovative modern technologies into the educational and upbringing process, developing students' worldview, thinking, and logical independent thinking skills;

– radically updating the content of clubs, optional and elective courses organized outside the classroom and outside the school in teaching mathematics;

– developing the scientific methodological support of teaching mathematics;

– improving the system of encouraging the work of young people who have won international science Olympiads and their mentors;

– to form an innovative infrastructure by introducing digital technologies and modern methods into the educational process;

– to conduct educational research in the classroom and extracurricular activities to demonstrate the relevance of the knowledge, skills and competencies acquired by students in mathematics to everyday life, to cultivate creativity aimed at design, and to develop their interest in creating innovations[7].

The main things are desire and perseverance. The following will help you master the theory and practice of 4K in everyday life: • extracurricular activities: clubs, sections, events, volunteering; • networking - the ability to share skills with partners, learn and teach at the same time;

We suggest related literature: - Sergey Shabanov, Alena Aleshina "Emotional Intelligence. Russian Practice"; - Larry King "How to Talk to Anyone, Anytime, Anywhere"; - Daniel Pink "Drive: What Really Motivates Us"; - Eric Berne "Games People Play: The Psychology of Human Relationships"; - Hal Elrod "The Miracle Morning"; - Austin Kleon "Steal Like an Artist"; - Keith Ferrazzi "Never Eat Alone and Other Rules of Networking".

To implement the 4K learning model, it is possible to use a combination of various teaching methods and technologies: case studies, collaborative learning, collective mutual learning, project-based learning, debates, quests, creative stations, workshops of the future, etc. In general, this model provides the teacher with significant freedom in choosing the methods, forms, and means of organizing pedagogical interaction [6].

REFERENCES:

1. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated December 8, 2018 No. 997 “On measures to organize international research in the field of assessing the quality of education in the public education system” (National Database of Legal Documents, 10.12.2018, No. 09/18/997/2289)
2. OECD (2013), PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy, OECD Publishing.
3. Bakhvalova, L.V. Techniques of Pedagogical Technology in the Work of a Vocational School Teacher: A Textbook-Methodological Handbook / L.V. Bakhvalova. 3rd ed., reprinted. Minsk: RIPO, 2020. 148 p.
4. Belyaeva, O.A. Educational Technologies: A Textbook-Methodological Handbook / O.A. Belyaeva, T.A. Bobrovich. Minsk: RIPO, 2020. 182 p.
5. Belyaeva, O.A. Evaluation of the Effectiveness of Pedagogical Experience / O.A. Belyaeva, T.A. Bobrovich // Mastery Online [Electronic resource]. 2018. No. 4(17). Access mode: http://ripo.unibel.by/index.php?id=3807. Access date: July 14, 2022.
6.Belyaeva O.A.TRAINING MODEL 4K.
https://ripo.by/assets/masterstvo_online/docs/.pdf
7. Dzhumaev M.I**.** Competence- based approach to teaching mathematics to primary school students according to the requirements in the national curriculum of Uzbekistan Science and innovation. International Scientific Journal Volume 3 Issue 2 February 2024 Uif-2022: 8.2 | Issn: 2181-3337 | Scientists.Uz. ***https://doi.org/10.5281/zenodo.10694172***

8.Dzhumaev M.I. Competence- based approach to teaching mathematics to primary school students according to the requirements in the national curriculum of Uzbekistan Science and innovation. International Scientific Journal Volume 3 Issue 2 February 2024 Uif-2022: 8.2 | Issn: 2181-3337 | Scientists.Uz. https://doi.org/10.5281/zenodo.10694172
9. Dzhumaev M.I. Implementation of professional competence of teachers as a means of methodological and mathematical training in colleges. Professional education of the Arctic regions No. 4/2022.7-9 st. www.arctic-prof.ru
10. Pinskaya, M.A. 21st Century Skills: How to Develop and Assess in the Classroom? / M.A. Pinskaya, A.M. Mikhailova, O.A. Rydze // Educational Policy. No. 3. 2019. pp. 50–62.
11. Teslasuit: A Suit That Changes Reality [Electronic resource]. Access mode: https://ichip.ru/tekhnologii/teslasuit-kostyum-kotoryjj-menyaetrealnost-422052.
Access date: July 14, 2022.
12. Formation of Transprofessional Competencies in the Process of Continuous Professional Education: A Methodological Manual / E.L. Kasyanik [et al.]. Minsk, 2020. 248 p.
13. Shchukin, T. Neuroscience in Education: Is It Possible to Find a Smart Approach to the Brain? [Electronic resource] / T. Shchukin. Access mode: https://www.youtube.com/watch?v=tmmyCkq_-mM&ab_channel=SCUVideo.
Access date: 07/14/2022. 8. Shchukin, T. Augmentation Technologies of Collective Thinking in the Educational Process / T. Shchukin [Electronic resource]. Access mode: https://drive.google.com/file/d/1VtmdcJepwpXwbEH1Iivhx0oDG5l2GEBi/view.
Access date: 07/14/2022.
14.https://www.gazeta.uz/ru/2023/12/30/4k/