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STEM MODERNIZATION, OPTIMIZATION AND DEVELOPMENT EDUCATION IN UZBEKISTAN

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Annotatsiya: Ushbu maqolada miyaga asoslangan innovatsion ta'lim texnologiyasi va interaktiv ta'lim mazmunini to'plash, ishlatish va tarqatishni qo'llab-quvvatlaydigan barcha texnologiyalar uchun aqlli STEM o'quv muhitiga turli komponentlarning integratsiyasi va ma'lumotlarni yig'ish va tahlil qilish asosida fikr-mulohazalarni baholash xizmati ko'rib chiqiladi. Ushbu tahlil asosida biz o'quv muhiti, ta'lim tizimi va ta'lim yo'lini optimallashtirish muammosini hal qila olamiz.

Kalit so'zlar: STEM ta'limi, intellektual ta'lim tizimlari, intizomlararo yondashuv, gamifikatsiya (o'yin usullari), ekotizim.

Аннотация: В данной статье рассматриваются инновационная технология обучения на основе мозга и интеграция различных компонентов в интеллектуальную среду обучения STEM для всех технологий, поддерживающих составление, использование и распространение интерактивного образовательного контента и сервис с оценкой функций обратной связи, основанный на сборе и анализе метаданных. На основе этого анализа мы можем решить проблему оптимизации учебной среды, системы обучения и траекторию обучения.

Ключевые слова: STEM-образование, интеллектуальные обучающие системы, транс-дисциплинарный подход, геймификация (игровые методы), экосистема.

Abstract. This article examines an innovative brain based learning technology and the integration of various components into an intelligent STEM learning environment for all technologies that support the compilation, use and distribution of interactive educational content and a service with feedback evaluation based on the collection and analysis of metadata. Based on this analysis, we can solve the problem of optimizing learning environment, learning system and learning path.

Key words: STEM education, intelligent learning systems, trans-disciplinary approach, gamification (game methods), ecosystem.

Introduction. For developing Uzbekistan during a market economy and digitalization needs all his talents to develop creative abilities and competitiveness. He needs an innovative scientific education that enables today's and tomorrow's citizens to play a more active role in the research and innovation process, do informed choice and participate in a democratic society based on knowledge. We would like to point out two sides of the problem of promotion and correct presentation of scientific and engineering knowledge and encourage young generation to pursue careers in science, technology, engineering and mathematics (STEM), namely:



- pedagogical problem (wrong methods of teaching science) -the transition to innovative and effective teaching methods is essential for increasing the attractiveness of science education and scientific careers, as well as to increase youth interest in STEM;
- technological problem (wrong methods of studying science, misuse of information communication technology) - we should strive for a student-centered approach; Moreover, the student and his experience should be at the center of the educational process.

The world needs an innovative science education that will enable for today's and future citizens to play a more active role in the process research and innovation, make informed choices and participate in democratic society based on knowledge. Boys and girls must pursue a career in science, technology, engineering and mathematics (STEM), while adhering to the values inherent in responsible research and innovation. Thus, the Union will achieve the goal of R&D intensity of 3% of GDP, which is very important. Nevertheless, it is becoming increasingly difficult to attract enough young people to these areas and avoid the brain drain from Uzbekistan. Therefore, it is necessary transition to innovative and effective methods to increase attractiveness of science education and scientific careers and increase interest youth to STEM.

Pedagogical point of view the last decade, there have been many studies that predicted dramatic changes in educational systems:

- innovative learning: key elements for the development of creative classes in the world [1]; education for all;
- Global Monitoring Report: Education for all by 2015, will we achieve this? [2],
- creating an effective teaching and learning environment: the first results,
- "Understanding the Brain: The Birth of the Science of Learning" (OECD, 2007), One-on-One Program Implementation (Microsoft Learning Partners, 2010). And, of course, a number of other studies: PISA, UNESCO, EU Commission, PIRLS, ICILS, TAUS, HBSC ...

Literature review. Much has been said about the potential of new technologies for transformation of education and training, but only a few of these claims have been confirmed by research or even verified thorough scientific research. Technology-assisted learning in mainly refers to situations where technology is used for the purpose encouraging learning. Today's term "technology-assisted learning" largely reflects what Lowyck, 2008 calls the "shared motivation (try to) use available technology for school purposes. " On this stage, we need to distinguish between two different directions: focused on technology (up to 2010) and learning-oriented (post-2010) approaches to training [3]. In a technology-driven approach, the use of technology is at the heart of education, providing access to the latest technologies.

On the other hand, in a learning-centered approach, we should primarily focus on how people learn and we perceive technology simply as an aid, as a tool for learning. Thus, it seems that the technology should be adapted to the needs of students and teachers in order to create suitable methods for work with her and a suitable pedagogical approach. In short, the majority yesterday's optimistic forecasts about the impact of educational technologies on education didn't come true. Considering these previous disappointments,



when learning with technology, we must strive for an approach that aimed at students; Moreover, the student and his experience should be at the center educational process [4]. One of the main questions that are always faced teachers, was: where to start to improve the teaching process /learning? Undoubtedly, modern lessons are based on modern curriculum environment. However, the simple introduction of modern ICTs such as intelligent learning system (ITS) is not enough. Moreover, we, certainly, at least two elements are necessary in the learning process, if do not take into account the qualifications of the teacher, namely:

- Modern innovative teaching and learning methods, and pedagogy that supports and guides the use of ICT [5].
- Modern teaching materials (course / curriculum for subjects) to give ICT content, and therefore to function and accompany its true value.

Research Methodology. New technologies have made significant changes in educational landscape in general, and especially in the field of STEM, and approaches to education is already having a clear and positive impact on the provision of education. As a result, the educational environment is undergoing significant changes. We are witnessing a change in the way we teach education and in the ways of teaching students. While traditional lecture hall furnishings will continue to form the basis of the systems education, it will be improved through the integration of new tools and teaching methods, and will also be supplemented with many additional online learning opportunities and a wide variety of providers educational services.

New technologies, knowledge about these new technologies and approaches to education already have a clear and positive impact on the provision of education. They can support efforts through FAI grants to modernization to improve the quality and expand the coverage of education in to all Uzbekistan. And they are already starting to contribute to better quality formal and informal learning and teaching both in school and in the Internet as educational resources from around the world become more interactive teaching tools are available and used[6]. Methods training can be better adapted to individual needs learners, and advances in learning analytics enable faster receive feedback on student progress.

New models for providing this way of teaching / learning create certain problems. But given the possibilities they are offer a more efficient way to learn and internationalize, it is imperative that government authorities consider how these opportunities learning can be more fully incorporated into the education system. New the teaching and learning model also made it possible to collect and analyze student data that was not possible before. This gives great potential for personalized learning and improvement withholding, although utmost care must be taken to students were fully aware and gave full consent to the collection and use of your personal data.

Analysis and Results. Finally, new technologies can facilitate closer cooperation both with global partners and on a more local level. Developing educational partnerships is essential an element of Europe's cooperation strategy with other parts of the world, and provides a mechanism for raising the level of education in countries with developing economies. At the local level, technologies can lie in based on national efforts to enhance



cooperation between institutions, pooling expertise and providing more critical masses. Our specific intent for the new paradigm will be to draw attention to a form of learning that goes beyond logic and rhetorical appeal and can be best understood as chaotic transition of states in the dynamics of the brain. If we want to contribute significant changes in the learning process, which, of course, is introduction of artificial intelligence and intelligent learning systems, the current learning process must be brought to the edge of chaos and then reformulated in terms of cognitive modeling. Digital skills for learning and teaching. Providing everything staff of higher education institutions with the skills and attributes necessary for the successful use of these new technologies, and their inclusion in the course training will be essential for the successful implementation of new teaching and learning methods into normal conditions and extensions online learning opportunities. A wide range of tools, programs, technology and information sources can make it difficult for teachers to understand where to start. New technologies and related pedagogical methods require a completely different set of skills compared to more traditional training, and this can put additional pressure on the teaching staff. Not all instructors are technology experts, and in many in some cases, they did not receive pedagogical training at all. They need special training, guidance and support if they want to provide quality teaching. This is especially true since the integration of these new ways of teaching leads to a change in the role of teachers, from carriers of knowledge and subject matter experts to critical thinking mentors[7].

Most traditional electronic materials do not take into account various parameters that affect learning and learning habits human; because of this, students cannot influence the course of their learning. By this reason, within the framework of the proposed project, we will develop and implement Intelligent Learning Systems (ITS), a generation of new learning systems, which take into account the individuality of the student in the learning process, similarly what happens in a traditional individualized lesson with one teacher and one student. This traditional process of teaching people turned out to be successful and represents the most effective teaching method and teaching from the very beginning. It is enough to mention Platon and his teachers Socrates, and then Socrates and Aristotle, Aristotle and Alexander Great, etc[8].

The results obtained were analyzed using descriptive statistics methods. Preliminary studies have successfully verified the technical operability of TECH8. It was found that the SCAMV system operated successfully and collected metadata. Problem found in stability of the system sending metadata. Due to the large number data (300-400 elements per student) some data intended to evaluate the content itself. Metadata and variables designed to adapt TECH8 to learners worked on destination. In the full-scale study, the main research question was deviation between knowledge levels in TECH8 groups (individual student learning) and traditional learning groups[9].

Conclusion. Our main goal is to change the philosophy of transferring knowledge in our educational system and achieve some positive social movements. Among other things, we would like to increase the speed of implementation technologies for the modernization of education and training, to promote the emergence of the creation of a digital learning



ecosystem in Europe, to contribute contributing to the achievement of the goals of the Open Education initiative and increasing the quality and efficiency of the educational process (achieving higher cognitive levels of knowledge). Information and communication technologies (ICT) are already an integral part of all school systems, while e-education and e-materials are concepts without which we cannot imagine schools today. This is why it is even more important that e learning materials were prepared with high quality and were designed for active learning without direct presence teacher or with limited teacher participation; moreover, it should not perceived as an end in itself, as is often the case today. Modern studies of educational processes show that higher educational goals cannot be achieved without active participation student[10].

Therefore, in order to follow the corresponding development potential of the student, it is imperative that we constantly monitor and assessed the educational process, and also made adjustments when it necessary. This way of working is largely ensured by modern (intelligent) electronic learning materials, but only if it is correctly developed (from the point of view of pedagogy and didactics) and technologically implemented. Such material should also be evaluated user and, in case of poor results, change the path to achieving the intended goals.

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