

**NEW DISCOVERIES IN SCIENCE WITH THE APPLICATION OF 3 D TECHNOLOGIES, PERSPECTIVES OF MODERN PEDAGOGICAL TECHNOLOGIES****Babayeva Zarovshan Yashar,***Prof. Nakhchivan State University, Azerbaijan*ORCID: <https://orcid.org/0009-0009-3004-8455>**Aysel Məmmədova***Master degree Nakhchivan State University,**Azerbaijan***Abstract**

In the article, the analysis of the perspectives of the application of 3D technologies in the teaching of biology, the work done in this direction and the achieved achievements are discussed. Since the use of technologies in the field of education is already considered a priority, the changes occurring in the fields of biology and medicine are also brought to attention. The article mainly emphasizes the need to realize that scientific knowledge alone cannot take us far enough to compete in our rapidly evolving world. The solution to these problems is not only the responsibility of educators, but also depends on a collective effort that requires a synergy between the evolving global education reforms and the dynamic application of ever-changing educational technologies. The article also shows that traditional teaching approaches, such as lectures, visual aids and multimedia presentations, are no longer sufficient considering the experimental nature of biology. The work claims that many scientific hypotheses that were once considered proven today are losing their relevance due to the continuous application of advanced technologies. The idea that this dynamic evolution in scientific understanding will result in the creation of new scientific and professional fields in the near future is brought to the attention of educators.

**Keywords:** 3D technologies, biology, education.

21st century education requires training the founders of tomorrow, young people who can create radical changes in the society and solve the problems that will be faced flexibly. For this reason, the importance of transitioning to a new approach format in the education of learners in classrooms and auditoriums was also taken into account in the article. A school digital development approach. Məktəbin rəqəmsal inkişafının konseptuallaşdırılması və ölçülməsi üçün qəbul edilmiş yanaşma texnologiyasının məktəbə daxil edilməsi ilə bağlı üç ölçüdəndən ibarətdir: İKT infrastrukturunu, IT-nin idarə edilməsi və təhsildən istifadə və ya onun xidmətlərini təmin edən bütün texnoloji avadanlıq. IT management consists of all the actions a school undertakes to manage, use and benefit from its technological resources in order to efficiently allocate them and support the necessary administrative and educational work within the institution. Educational use refers to the use of ICT especially by teachers and students to support and enrich the educational process, with special emphasis on the teaching-learning component (Laugasson, Quaicoe, Jeladze, & Jesmin, 2016).

Therefore, in order to determine the level of development of these different dimensions, it is very important to consider aspects related to the quantity, scope, availability and operational status of the technology available in the school. The purpose, physical location, and effective use of technology in an enterprise must also be considered, as well as the attitudes of its various agents toward its potential uses and benefits (Drossel, Eickelmann, & Vennemann, 2020). To measure the digital development of the school system, Chile implemented the National Census of Education Enumerations (in Spanish, CENIE) at two separate times, in 2008 and 2012. It has empirically

shown that the country has seen a reduction in the first generation digital gap. primary and secondary schools (Claro & Jara, 2020; Severin, 2016). This was mainly due to the implemented public policies (Donoso, 2010, Jara, 2007), but also due to the transfer effect of explosive and constant technological development from society in general.

Over time, to satisfy the need for measuring the effects of the incorporation of ICTs into the school system, having a framework for interpreting its dynamics and scope became indispensable. Thus, the school digital development approach was adopted (Labbé, Matamala, & Donoso, 2010) as a perspective that, in addition to setting a relevant conceptual and analytical framework, offered a measurement methodology for explaining the phenomenon across the different contexts seen in primary and secondary schools in Chile. Hence, the school digital development is defined as the degree of penetration, understood as access, availability, frequency and effective use, of ICTs for educational purposes in school environments. In theoretical terms, its components may go through a series of successive states, grown and become more mature, advanced, or elaborate.

The school digital development approach originated from the synthesis of several strands of the specialist literature. A first conceptualization has often been used to establish the reach and depth of the implementation of ICTs in the development of the information society, with special emphasis on the expansion and growth of the population with access to these technologies (ITU, 2009, 2017; Minges, 2005; van Deursen et al., 2017). The desired or undesired consequences of unequal access to ICTs are termed "first generation digital gap" (Selwyn, 2004, 2010; Talae & Noroozi, 2019). A second strand in this field

focuses on the identification of approaches and practices related to the effective incorporation of ICTs into the teaching learning process, the relationship between contexts and educational transformation, and teacher practice development and innovation. A third area of research addresses concepts related to the cycle of technology appropriation in institutional contexts (Fraillon, Ainley, Schulz, Friedman, & Duckworth, 2020; Venkatesh, Thong, & Xu, 2012), both at the and at the education system levels.

In Chile, the approach adopted to conceptualize and measure school digital development is composed of three dimensions associated with the incorporation of technology to a school: namely, ICT infrastructure, IT management and educational use (MINEDUC, 2013). ICT infrastructure refers to all technological equipment available on the premises of a school, whether stationary or mobile, that provides connectivity, network, computing and IT solutions or services. IT management consists of all actions that a school undertakes to manage, use and take advantage of its technological resources, in order to allocate them efficiently and assist necessary management and educational tasks within the institution. Educational use refers to the use of ICTs, especially by teachers and students, to support and enrich the educational process, with special focus on its teaching-learning component. Therefore, to establish the development level of these different dimensions, it is crucial to consider aspects related to the quantity, coverage, availability and operating condition of the technology existing in the school. Account must also be taken of the purpose, physical location and effective use of the technology within the establishment, as well as the attitude of its different agents towards its potential uses and benefits.

To measure the digital development of the school system, Chile applied the National Census of Educational Computing (in Spanish, CENIE) at two separate times, 2008 and 2012. This empirically demonstrated that the country experienced a decrease in the first generation digital gap across its primary and secondary schools. This was mainly thanks to the public policies implemented, but also due to the transfer effect of explosive and constant technological development from society in general.

The second generation digital gap is linked to people's ability to use ICTs, as a result of its complexity. To be adequately addressed, this construct requires the application of measuring instruments specifically designed to simulate the daily digital environment of ICTs. Consequently, a standard assessment was created (Claro et al., 2012), which allowed researchers to measure students' digital skills and examine the factors related to their development. The evidence indicated that, among the factors that influence the development of digital skills, the most important are access to a computer at home, linguistic capital, and length of experience in the use of computers. These, in turn, are related to a family's socioeconomic status.

In a school system that is, despite continuing to be highly segregated, and that experiences progressive digital development, there is a growing concern that

fundamental aspects of the subjective well-being of students could be being affected, positively or negatively, by growing technologization in schools and society as a whole. As a construct, subjective well-being consists of the different evaluations people make of their lives, the events happening in them, their bodies and minds, and the circumstances in which they live. On a theoretical level, subjective well-being is made up of cognitive judgments and emotional responses (Diener, Oishi, & Tay, 2018). The debate in the field shows mixing and contradicting results. Thus, in some cases, negative associations are found between the use of digital technology and well-being and, in other cases, it is possible to found positive or blended associations. Although the evidence is not conclusive, many results indicate that children's use of the internet is often associated with several risks, linked to loneliness and social anxiety, cyberbullying, unsafe sexual behaviors (McBride, 2011; Vannucci, Simpson, Gagnon, & Ohannessian, 2020), and psychological pathologies. Other works found that the high use of social media and online games are related to low subjective well-being (Devine & Lloyd, 2012), or also suggests that internet use may affect children's academic performance (Wells, 2006). In many research outcomes, there are stronger negative associations for girls than boys (Twenge & Martin, 2020).

As a counterpoint, the literature indicates the existence of benefits for some children and young people regarding the use and exposure to digital technologies and relationships with their mental well-being (Clifton, Goodhall, Ban, & Birks, 2013). Indeed, some scholars (McBride, 2011) argues that there are clear benefits for children's internet use, like enhancing communication, broadening social connections, learning technical skills, increasing self-esteem, social capital, social support, safe identity experimentation and increased opportunity for self-disclosure (Best, Manktelow, & Taylor, 2014). Also, the innovative use of digital technologies could be beneficial to the children's and young people wellbeing (Stephens-Reicher, Metcalf, Blanchard, Mangan, & Burns, 2011). Furthermore, the widespread access and use of ICTs could benefit social integration, the use of both productive and free time, and personal learning and development opportunities. However, from a social-ecological perspective, to examine the subjective well-being of schoolchildren, it is fundamental to observe the immediate social context where they operate, and how two closely related concepts are expressed. On the one hand, the social well-being at school, and on the other hand, the school climate. Social well-being is understood as the evaluations individuals make of their circumstances and roles within society (Keyes, 1998). The social well-being of school members is measured in that specific scenario, adapting instruments to a school context (López et al., 2017, López et al., 2014). The school climate is defined as a multidimensional construct that encompasses the perceptions, thoughts, and values that members of an educational community build on it, as well as the social relationships that occur within it (López et al., 2014). The school climate is a trait emanating from the perceptions that the different agents have of variables related to the modality, type, frequency, and depth of the social interactions and

individual behaviors of educational community members. Therefore, it can be expressed, on the one hand, at the classroom level and, on the other hand, at the school level (López et al., 2018), as spaces for consistent application of norms and treatment between peers, and between students and teachers. The favorable or unfavorable perception of the climate, in turn, is closely linked to the ability of the school to manage, actively and democratically, environments conducive to learning and the well-being of the community. The school climate has an institutional environment component, which considerate infrastructure and access to educational resources, including ICT.

### References

1. Babayeva Z. (2023). STEAM-21st century education. Teaching materials, "Ajami" Publishing and Printing Union, Nakhchivan 2023, p. 312
2. Babayeva Z. (2023). Biology teaching methodology. Textbook, "Ajami" Publishing-Polygraphy Union, Nakhchivan 2023, p. 224
3. Babayeva Z. (2023). Determination of teaching strategies considered necessary in teaching biology. Dergi Park Akademik. Tübitak -Ulakbim. International Journal of Educational Spectrum. Turkey, 2023, volume 5, number 2, p.51-67 <https://dergipark.org.tr/tr/journal/3734/article/1273211/author/files>
4. <https://dergipark.org.tr/tr/download/article-file/3044384>
5. Babayeva Z. (2024). Use of the concept of digital education and 3D technologies in the organization of modern biology lessons. The Scientific Heritage (Budapest, Hungary), No 135 (135) (2024), p. 24-26
6. Babayeva, Z. 2023. <https://aem.az/index.php?newsid=3461>
7. Babayeva Z. (2024) Application of new methods in biology education, interactive learning and its mechanisms. German International Journal of Modern Science. №78 2024, 54-57
8. Babayeva Z. (2024). Use of technology skills in the education system and development of digital skills. International Journal of Multidisciplinary and Current Educational Research (IJMCER), Volume 6, Issue 2, pages 224-228, 2024
9. Babayeva Z. (2023). Perspectives of using 3D technologies in teaching biology. Revista Universidad y Sociedad/Universidad @cienfuegos/ VOS – Havana, Kuba, 2023; <https://rus.ucf.edu.cu/index.php/rus/article/view/4155>
10. ACDC. Análisis Competencias Digitales Comunes; Santiago Campión, R., Saenz de Jubera, M., Martín, D., Chocarro, E., Eds.; Available online: <https://es.surveymonkey.com/r/acdcv2> (accessed on 4 February 2021).
11. Tourón, J.; Martín, D.; ASECIO, N.; Pradas, S.; Íñigo, V. Construct validation of a questionnaire to measure teachers' digital competence (TDC). Rev. Española Pedagog. 2018, 76, 25–54.
12. The European Parliament and the Council of the European Union (2006/962/EC) 18 de diciembre. Recommendation of the European Parliament and of the Council on Key Competences for Lifelong Learning. 2006. Available online: <https://bit.ly/3n5ext6> (accessed on 14 April 2020).
13. Brynjolfsson, E.; McAfee, A. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies; Norton y Company: New York, NY, USA, 2014.
14. Vuorikari, R.; Punie, Y.; Carretero, S.; Van den Brande, G. «DigComp» 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model; Luxembourg Publication Office of the European Union: Luxembourg, 2016. Available online: <https://bit.ly/21320Fl> (accessed on 4 February 2021).
15. Ferrari, A.; Punie, Y.; Redecker, C. Understanding Digital Competence in the 21st Century: An Analysis of Current Frameworks. In 21st Century Learning for 21st Century Skills. EC-TEL 2012. Lecture Notes in Computer Science; Ravenscroft, A., Lindstaedt, S., Kloos, C.D., Hernández-Leo, D., Eds.; Springer: Berlin/Heidelberg, Germany, 2012; Volume 7563. [CrossRef] [https://link.springer.com/chapter/10.1007/978-3-642-33263-0\\_7](https://link.springer.com/chapter/10.1007/978-3-642-33263-0_7)
16. Redecker, C. European Framework for the Digital Competence of Educators: DigCompEdu; Punie, Y., Ed.; Joint Research Centre; Publications Office of the European Union: Luxembourg, 2017.
17. M. Claro et al. Teaching in a Digital Environment (TIDE): Defining and measuring teachers' capacity to develop students' digital information and communication skills. Computers and Education (2018)
18. Digital technology use, technological self-efficacy, and subjective well-being among North Korean migrants during the COVID-19 pandemic: Moderated moderation, 2023, Digital Health
19. The Policy of Inclusion of Digital Technologies in the Chilean School System. A Systematic Review 2023, Pensamiento Educativo
20. The term well-being in Technology-Enhanced Learning: A systematic literature review 2022, SIIE 2022 - 24th International Symposium on Computers in Education
21. Risks in Adolescent Adjustment by Internet Exposure: Evidence From PISA, 2021, Frontiers in Psychology
22. Mediation of Problematic Use in the Relationship Between Types of Internet Use and Subjective Well-Being in Schoolchildren 2021, Frontiers in Psychology
23. In other words, higher digital development could open up opportunities for the subjective and social well-being of its students (Cabello et al., 2020), or reproduce inequalities already existing in schools, or that originate from them (Helsper, 2017; Helsper & van Deursen, 2017; Helsper, van Deursen, & Eynon, 2015; Livingstone et al., 2017).