TYPES OF DIGITAL EDUCATIONAL RESOURCES AND THE SPECIFICS OF THEIR USE IN PRIMARY EDUCATION

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Abstract. The article examines the main types of digital educational resources and analyses the pedagogical conditions under which they can be used effectively in primary school. Drawing on international research and national policy documents, the author proposes a classification of resources by didactic function, degree of interactivity and mode of access, and describes how the age-specific characteristics of younger learners shape the choice and organisation of digital tools in the classroom. Particular attention is paid to the balance between screen-based and hands-on activities, the role of the teacher's digital competence, and the risks associated with uncritical technology use. The study concludes that digital resources contribute to learning outcomes only when they are integrated purposefully into a coherent methodological system rather than used as isolated additions to traditional lessons.

Keywords: digital educational resources, primary education, interactivity, multimedia learning, gamification, educational apps, teacher digital competence, blended learning.

Introduction

Over the past decade, digital technologies have moved from the periphery of school life to its centre. Electronic textbooks, interactive whiteboards, learning platforms and mobile applications are now part of the everyday experience of many pupils, and primary school is no exception. In Uzbekistan this shift has been reinforced at the level of state policy: the Digital Uzbekistan – 2030 Strategy identifies the digitalisation of education as one of the priority areas of national development.[1]

At the same time, the mere presence of devices in a classroom does not guarantee better learning. International experience shows that the educational value of technology depends on how, by whom and for what purpose it is used. The UNESCO Global Education Monitoring Report stresses that evidence on the added value of digital technology is often thin and that technology should serve learning goals rather than define them.[2]

This problem is especially acute at the primary level. Children aged six to ten are frequently described as "digital natives"[3] who grow up surrounded by screens, yet familiarity with gadgets is not the same as the ability to learn with them. Younger pupils are still developing voluntary attention, self-regulation and reading fluency, so the choice of a digital resource for them requires more careful methodological justification than for older learners. The purpose of this article is therefore to systematise the main types of digital educational resources and to identify the specific features of their application in primary education.

1. The concept and classification of digital educational resources

In this article, a digital educational resource is understood as any learning material or tool that exists in electronic form, is accessed through a computer, tablet or other device, and is designed or adapted to support the achievement of specific educational objectives. Such resources differ from their

[1] Decree of the President of the Republic of Uzbekistan No. PF-6079 of 5 October 2020 "On approval of the Digital Uzbekistan – 2030 Strategy and measures for its effective implementation".
[2] UNESCO. Global Education Monitoring Report 2023: Technology in education – A tool on whose terms? Paris: UNESCO, 2023.
[3] Prensky M. Digital natives, digital immigrants // On the Horizon. 2001. Vol. 9, No. 5. P. 1–6.

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printed counterparts not only in the medium of delivery but also in their capacity to combine text, image, sound and animation, to respond to the learner's actions and to record data about the learning process. Research on multimedia learning confirms that well-designed combinations of words and pictures help learners build more coherent mental models than words alone,[4] provided that the material does not overload working memory.[5]

Digital resources can be grouped according to several criteria. By didactic function, one can distinguish informational resources (electronic textbooks, encyclopaedias, video lessons), training resources (drill-and-practice programmes and interactive exercises), modelling resources (simulations and virtual laboratories), assessment resources (online tests and quizzes) and creative or constructive environments in which pupils produce their own content. By degree of interactivity, resources range from passive materials that are simply viewed, through reactive tools that give feedback on an answer, to fully interactive environments where the learner controls the course of activity. By mode of access, a distinction is drawn between proprietary products and open educational resources that may be freely used, adapted and redistributed.[6]

The main types relevant to primary education, together with their characteristic features and typical classroom examples, are summarised in Table 1.

Table 1. Main types of digital educational resources used in primary education

Type of resource	Characteristic features	Examples of use in primary school
Electronic textbooks and e-books	Structured content enriched with audio, illustrations and hyperlinks	Listening to a text read aloud while following the words on screen
Video and animated materials	Visual, dynamic presentation of processes and phenomena	Short animations on the water cycle or plant growth
Interactive exercises and trainers	Immediate feedback, repeated practice, adjustable difficulty	Mental arithmetic drills, letter and syllable matching games
Simulations and virtual manipulatives	Safe modelling of objects and processes that are hard to observe directly	Virtual fraction bars, geometric shape builders
Online assessment tools	Automated checking, instant results, game-like format	Quick formative quizzes at the end of a lesson
Creative and coding environments	Pupils create stories, drawings, animations or simple programmes	Visual block-based coding of a short animated story
Learning platforms and e-	Organisation of tasks,	Assigning homework and

[4] Mayer R. E. Multimedia Learning. 2nd ed. Cambridge: Cambridge University Press, 2009.
[5] Sweller J. Cognitive load during problem solving: Effects on learning // Cognitive Science. 1988. Vol. 12, No. 2. P. 257–285.
[6] UNESCO. Recommendation on Open Educational Resources (OER). Paris: UNESCO, 2019.

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journals	communication with parents, progress tracking	sharing feedback with families

2. Specifics of using digital resources in primary school

The first and decisive factor is the age of the learners. Thinking at this stage is predominantly visual and concrete, attention is easily distracted, and motivation is closely tied to play and emotional involvement. Digital resources can meet these needs well, since they allow abstract ideas to be shown visually and practised in a playful way. However, the same features can quickly turn into distractions: bright effects, background music and reward animations that are unrelated to the learning task compete for the child's limited cognitive resources. For this reason, resources for younger pupils should have a clear interface, short segments of content and feedback that explains the mistake rather than merely signalling it.

The second factor concerns the quality of the resources themselves. The market offers thousands of applications labelled "educational", yet many of them are built around repetitive tapping with little genuine cognitive challenge. Hirsh-Pasek and colleagues argue that an app supports learning when it encourages children to be actively involved, keeps them engaged with the task, relates new content to their own experience and promotes social interaction.[7] These four criteria can serve as a practical checklist for primary teachers when selecting digital content.

Third, the social dimension of learning should not be lost behind the screen. According to Vygotsky, a child masters new forms of activity first in cooperation with an adult or a more capable peer, and only later independently.[8] In practice this means that work with tablets or computers in primary grades is most productive when organised in pairs or small groups, accompanied by discussion and guided by the teacher. An interactive whiteboard used for whole-class problem solving, or a shared tablet on which two pupils negotiate the solution to a task, often yields more learning than individual work with headphones.

Fourth, game elements deserve special attention. Gamification, defined as the use of game design elements in non-game contexts,[9] is widely applied in quizzes, reading trackers and arithmetic trainers. Points, badges and levels can sustain interest, but if extrinsic rewards dominate, pupils may focus on collecting them rather than on understanding. A more sustainable approach is to use creative environments in which children design their own stories, games or animations. Experience with visual programming tools for young children shows that coding can be treated as a new form of literacy[10] that develops sequencing, problem solving and self-expression.

Finally, everything depends on the teacher. Effective integration requires not only technical skills but an understanding of how technology, subject content and teaching methods interact, which is captured by the TPACK framework.[11] The SAMR model is also useful for reflection, as it helps a teacher

[7] Hirsh-Pasek K., Zosh J. M., Golinkoff R. M., Gray J. H., Robb M. B., Kaufman J. Putting education in "educational" apps: Lessons from the science of learning // Psychological Science in the Public Interest. 2015. Vol. 16, No. 1. P. 3–34.
[8] Vygotsky L. S. Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press, 1978.
[9] Deterding S., Dixon D., Khaled R., Nacke L. From game design elements to gamefulness: Defining "gamification" // Proceedings of the 15th International Academic MindTrek Conference. New York: ACM, 2011. P. 9–15.
[10] Bers M. U. Coding as a Playground: Programming and Computational Thinking in the Early Childhood Classroom. New York: Routledge, 2018.
[11] Mishra P., Koehler M. J. Technological pedagogical content knowledge: A framework for teacher knowledge // Teachers College Record. 2006. Vol. 108, No. 6. P. 1017–1054.

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see whether a digital tool merely substitutes a traditional one or genuinely transforms the learning task.[12] European approaches to teacher development likewise treat digital competence as a professional skill that covers resource selection, assessment and the empowerment of learners, not just the operation of devices.[13]

3. Pedagogical conditions and risks of digital resource use

Analysis of the literature makes it possible to formulate several conditions under which digital resources benefit primary pupils. Above all, technology should complement rather than replace direct teaching. A review prepared for the Education Endowment Foundation concluded that digital tools tend to be most effective when they supplement normal instruction and when their use is tied to clearly defined learning goals.[14]

A further condition is moderation. OECD data based on PISA results indicate that students who use computers at school very frequently do not necessarily achieve better results, and in some cases perform worse than those who use them moderately.[15]

For younger children, an additional concern is the total time spent in front of screens at school and at home. Paediatric researchers note that interactive media can support learning but also raise unresolved questions about attention, sleep and the quality of adult–child interaction.[16]

In practical terms, a primary lesson may include several short digital episodes, but these should alternate with manipulation of real objects, drawing, handwriting, movement and conversation. Teachers should also pay attention to digital safety and to equity: not every family has reliable devices or internet access, so homework built entirely on online platforms may disadvantage some pupils. Finally, the resources chosen must correspond to the curriculum, the language of instruction and the cultural context of the learners, which underlines the importance of developing high-quality national digital content in Uzbek and other languages of schooling.

Conclusion

Digital educational resources form a diverse group that includes informational, training, modelling, assessment and creative tools, as well as platforms that organise the learning process. In primary education, their potential is particularly high because they make abstract content visible, provide immediate feedback and draw on children's natural interest in play. Yet this potential is realised only when several conditions are met: the resource matches the age and cognitive capacities of the learners, it promotes active and meaningful rather than mechanical activity, it is embedded in collaborative work guided by the teacher, and its use is balanced with non-digital forms of learning.

Accordingly, the key task for primary schools is not to increase the number of devices but to strengthen the methodological and digital competence of teachers, to establish clear criteria for selecting resources, and to develop high-quality content in the national language. Further research could focus on empirical comparison of specific types of resources in Uzbek primary classrooms and on their long-term influence on pupils' reading, mathematical and communicative skills.

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