



Institute for Statistical  
Studies and Economics of Knowledge



priority2030^  
leaders are made, not born



Human Capital  
Multidisciplinary  
Research Center

## Education and Labour

### Online education and digital technologies in education →



The National Research University Higher School of Economics Institute for Statistical Studies and Economics of Knowledge (HSE ISSEK) presents the results of a human capital trends study. The study methodology included big data mining using the HSE ISSEK-developed [iFORA system](#), expert sessions, and a Delphi survey of more than 400 leading international and Russian scientists specialising in human capital.

The project is being implemented by the World-Class Human Capital Multidisciplinary Research Centre and the UNESCO Futures Studies Chair (UNESCO Futures Literacy Chairs network). A complete list of trends is available at the unique open-access database at [https://ncmu.hse.ru/chelpoten\\_trends](https://ncmu.hse.ru/chelpoten_trends).

This trendletter is based on data obtained from [issek.hse.ru](http://issek.hse.ru), [rosstat.gov.ru](http://rosstat.gov.ru), [eshre.eu](http://eshre.eu), [pubmed.com](http://pubmed.com), [statista.com](http://statista.com), [thelancet.com](http://thelancet.com), [gminsights.com](http://gminsights.com), and [who.int](http://who.int).

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## The Trend's Structure

- **Distribution of new digital applications for education (based on AI, VR/AR, etc.)**

Artificial intelligence and machine learning technologies, 3D modeling, VR/AR/MR, etc. will contribute to a significant increase in student engagement in the educational process and the effectiveness of their learning. Education is the third sector after the gaming industry and healthcare in terms of investment in virtual, augmented and mixed reality technologies.

A person remembers on average 30% of what he hears and 20% of what he sees, while the material learned through personal experience is absorbed by 90%. New technological solutions will allow creating learning conditions as close as possible to real ones and at the same time mastering skills without the risk of harming oneself or others, which is especially important when learning professions related to dangerous work or interaction with people (professions of a doctor, engineer, etc.). The growth of the corporate online education market will be associated with mobile learning, blended formats, and the expansion of the use of artificial intelligence technologies to individualize the learning process.

An important factor is the inequality of educational opportunities. The introduction of online learning can only be effective if the "digital divide" is reduced. For example, due to the pandemic, about 1.5 billion schoolchildren in the world have faced problems in the educational process. According to the World Bank, 260 million children in the world do not go to school. Despite the fact that digitalization is considered one of the ways to ensure universal access to knowledge, progress in this

- **Inequality in education is growing despite easier access to knowledge through online learning**

matter is extremely slow – by 2030, there will be 200 million out-of-school children in the world.

The spread of online education is directly linked to other social and economic development issues that have regional and country-specific characteristics. Online education implies the availability of an Internet infrastructure that guarantees the consistency and continuity of the educational process, and electronic devices with access to the network for the population. Internet access ranges from 5% in Eritrea, Guinea-Bissau and Somalia to 95% in Norway, the Republic of Korea, and Bahrain. Approximately 1.3 billion children in the world aged 3-17 years do not have access to the Internet at home, which by default makes online education useless. The inability to use the Internet at home is not only a problem in low-income countries, where only 6% of school-age children can access the Internet from home. In high-income countries, 86% of children in this category have it, 60% in upper-middle-income countries, and 14% in lower-middle-income countries.

With the digitalization of education, the gap in access to it does not decrease, which is due to the persistent digital inequality, primarily due to the lack of electronic devices necessary for learning and the ability to access the network. Improving the sustainability of education systems, the introduction of online and hybrid learning will be determined by progress in bridging the digital divide.

## Key Estimates

# \$180 billion

will reach global digital educational content market in 2033 (\$60 billion in 2023)

# \$30 billion

could reach the artificial intelligence (AI) market in education in 2032

## The Trend's Characteristics



**Impact on human capital<sup>1</sup>**

1

2

3



**Weak signal<sup>2</sup>**

Unequal access of the population to online education



**Strongest manifestation period**

2021–2025



**Wild card<sup>3</sup>**

Global educational crisis



**Effect of COVID-19 pandemic**

Slowed down the trend



**Consequences of the wild card event actually taking place**

Stratification of society by educational and intellectual qualifications



**Presence in Russia**

Comparable to the world level

<sup>1</sup> 1 = weak, 2 = medium, 3 = strong.

<sup>2</sup> Weak signals are insignificant (rarely mentioned or discussed) events which indicate the trend may radically change in the future.

<sup>3</sup> "Wild cards" are difficult-to-predict events which, if they do happen, can significantly affect the trend.

## Drivers and Barriers



### Drivers

- Need to improve the efficiency of the educational process
- Personalization of training to meet user needs
- Development of digital technologies
- Reduction of costs for equipment and software



### Barriers

- Persistence of digital inequality
- Lack of necessary technological base for implementation of more progressive solutions
- Insufficient study of consequences of using immersive technologies for health of students
- Insufficient level of digital literacy

## Trend Effects



### Opportunities

- Improving the efficiency of education through the development of a hybrid learning format
- Transition to more interactive and diverse learning models
- Increasing the flexibility and adaptability of educational systems to possible crises (such as the COVID-19 pandemic)



### Threats

- Aggravation of data storage and use issues
- Embedding developer biases into AI-based educational technologies, the impact of algorithmic biases on learners