UDC 0.37.01/.37.02[001.18]

MAIN COMPONENTS OF DEVELOPING A NATIONAL EDTECH STRATEGY

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Introductions. EdTech are projects in the field of educational technologies. In other words, Edtech is digital technology, such as computer hardware or software, designed to improve teaching and learning [7]. It can also be elements of offline education, for example, interactive whiteboards, laptops or tablets. This may include software such as virtual reality applications or online learning platforms.

The purpose of Edtech is to facilitate teaching and learning. In particular, Edtech helps students with disabilities, such as those with sensory or cognitive impairments, to have access to learning materials and to learn them better [4]. They can listen to materials if they have trouble reading, or read subtitles, watch a virtual tour or watch experimental laboratory experiments without harming their health.

Aim. Summarize and characterize the main components of «Developing a national EdTech strategy», developed by members of the «EdTech Hub» research group.

Results and discussion. Note that the EdTech industry was developing dynamically long before the COVID-19 pandemic, but its appearance actualized this process. As of 2021, investment in the EdTech industry has exceeded $14 billion. The demand for digital tools for education and training is increasingly attracting investors [5].

Currently, the international project «EdTech Hub», created in partnership with Unicef, Ukaid, Bill & Melinda Gates foundation, The World Bank [1].

The EdTech Hub is a global research partnership that aims to expand the technological capabilities of society by providing support for the adoption of immersive technologies in education.

BETER (Building EdTech Evidence and Research) is a working group of 52 researchers from influential organizations conducting or funding EdTech research in low- and middle-income countries. This group discusses and exchanges ideas every month, bringing researchers from different countries into the dialogue.

Note, that a ***«Developing a national EdTech strategy»*** has been developed as part of the EdTech Hub [3]. This strategic document is intended for education stakeholders who make educational policies and decisions, including officials from ministries of education and the main development agencies that work with them. This is also true for other government stakeholders, such as ICT, infrastructure and communications ministries, who are often involved in strategy development and implementation.

The Developing a national EdTech strategy covers the following ***components:***

1. Vision and planning (countries need to articulate and disseminate a clear vision for the use of technology to support education. EdTech strategies should also align with the goals of education sector plans in addition to broader, cross-sectoral digital transformation or ICT strategies or plans in a country. EdTech strategies should address how EdTech will be funded, including costs beyond infrastructure or devices. EdTech strategies should also identify and create accountability mechanisms for those responsible for implementation);

2. ICT infrastructure (depending on a country's level of development, issues around reliability and affordability of power may affect the feasibility of using different forms of EdTech. Access to internet connectivity and affordability of data, and existing inequities in this access affect whether and how EdTech can be used to support educational goals, and by whom. Whether and how technology devices can be used for educational purposes is dependent on the specifications of those devices themselves (e.g. offline functionality) as well as available ICT infrastructure);

3. Educator and teacher professional development (strategies should address how teachers will be provided with technical and pedagogical professional development support to use EdTech, in both pre-service and in-service environments. Importantly this should also include supporting teachers' ability to integrate

technology into their pedagogical practices and their capacity to use tech in the classroom more generally. Strategies may also address competency standards for teachers, which may evolve over time as EdTech is integrated into teaching and learning activities. Strategies may also cover training and support for school administrators, coaches, or other staff who play a role in enabling and supporting changes in practices to use EdTech at the school level. Finally, they may cover how technology will be used not just in teaching and learning activities, but also to facilitate teacher continuous professional development itself);

4. Skills and competencies (many EdTech strategies or plans address the identification and development of digital literacy skills, competencies, or standards. This is also a common motivator for investment in using EdTech. Basic digital literacy skills include digital navigation, technological safety, and tech-based communication, while skills related to more complex digital literacies include content creation, contributing to the tech workforce, and problem-solving / filling technological gaps. Some strategies also identify opportunities for learners to use EdTech both inside and outside of formal classroom education. EdTech approaches also have potential to support foundational literacy and numeracy skills for students at diverse stages of learning, including lifelong learning initiatives);

5. Learning resources (EdTech strategies should address how a country will support the development, curation, curriculum alignment, dissemination, and utilisation of digital learning resources and content. While strategies usually cover provision of devices, digital content is often an afterthought. Digital learning resources may include Open Educational Resources, which can take the form of any medium (text, image, audio, etc.) and are legally, technologically, and socially free. In response to Covid-19, countries have put in place national digital learning platforms or adapted existing platforms to provide educational continuity during school closures. It is important these resources are maintained and adapted and that strategies continue to consider how digital learning content is disseminated across education systems);

6. Assessment and examinations (as part of monitoring and evaluating EdTech, it is critical that strategies consider how assessment and examination processes can

utilise technology-based approaches (like computer-based testing or online exams), and relatedly how these appraisals can be used to understand the efficacy of EdTech. EdTech-enabled assessments can also help inform more effective teaching approaches by supporting assessment-informed instruction and personalised learning. Contextual constraints, limitations, and resource gaps must be carefully considered to determine if these forms of assessment are applicable for the intended purposes);

7. Data for decisionmaking and EMIS (EdTech strategies typically also address uses of EdTech to support education systems, not just teaching and learning activities. This can include the use of data for decision-making, specifically through Education Management Information Systems (EMIS). Initial policies may focus on the establishment of EMIS and / or collection of data on key indicators such as enrollment, retention, and learning. Over time, this focus can evolve to include collection, processing, analysis, dissemination, and usage of education-related data);

8. EdTech ecosystem and role of the private sector (National EdTech strategies should be informed by an understanding of the broader EdTech ecosystem, which includes the private sector. A robust understanding of the EdTech ecosystem allows for strategic planning for both the development and deployment of EdTech. Engagement with private sector actors can ensure that national strategies make best use of relevant innovation and help maximise the use of scarce financial resources. Collaborating with the private sector can also offer potential for more sustainable and diverse streams of funding for plans);

9. Equity and inclusion (while many EdTech strategies reference 'digital divides', to truly address inequalities, they must prioritise pro-equity approaches and principles. As part of making strategies contextually relevant and applicable, the specific needs of historically minoritised or underserved communities must be addressed along with efforts to serve broader user groups. With respect to the specificities of EdTech, these groups typically include (but are not limited to) girls and gender minorities, rural or remote communities, individuals surviving poverty or financial hardship, transient or refugee students, or students with disabilities, and linguistic or ethnic minority communities);

10. Safety and privacy (it is also critical that strategies prioritise ethical approaches and practices related to EdTech including data safety and security, privacy provisions, and digital ethics. Although this is relevant for all EdTech users (i.e., educators, administrators, caregivers, etc.) it is of particular importance when planning for educational tools and materials that aim to serve children and young people (students) who face unique challenges related to safety in digital spaces) [3].

Recommendations for the introduction of EdTech industry in education:

– enhance a systemwide and institutional readiness to use ICT for teaching, learning, and administration (build an education and training system to support ICT integration in teaching and learning);

– ensure systemwide integration of ICT into teaching and learning (build teacher and manager confidence in the use of ICT, build a framework for competencies for teacher development in the integration of ICT into the curriculum);

– ICT integrated at all levels of the education system – management, teaching, learning, and administration (establish an ICT presence in schools).

Conclusions. Edtech industry take educational activities to a new level with many options of online educational games, as well as online courses. This can be particularly useful for encouraging and engaging learners in learning.

Foreign experts predict that Edtech technologies will fully enter the market of educational services in the coming years. According to BlueWeave Consulting, the global market for immersive educational technologies will grow by at least 29% by 2027 and already in 2020 it amounted to 697.26 million dollars [2].

The introduction of Edtech technologies in education will contribute to its significant innovative development, as they involve different human senses, which allows the simultaneous use of different channels of information perception [6].

Of particular importance for the implementation of Edtech technologies in education is the development of the «Developing a national EdTech strategy», developed by members of the «EdTech Hub» research group. The prospect of further research is a more thorough analysis of this document.

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