

## Information technologies in higher education of the Republic of Kazakhstan

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**Abstract.** The article deals with modern models of the higher education system based on the application of contemporary technologies. The research has been performed of the modern education models based on the use of information technologies. It is remarked that mobile education is a novel teaching technology in the digital epoch created due to the wireless technologies supporting any flexible accessible individual education. The mobile education obviates the need of special computer classes and provides educators full freedom to supply to the students online applications when they are necessary. In other words, the mobile education is an easy provision of resources: the students gain access to audio materials, exchange with text messages, participation in online polls, text chats, conduct and scrutinize summaries. The research has highlighted the problems of mobile education and measures to develop it.

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### Introduction

The target of higher education in Kazakhstan is the educational function: development of personality and training of specialists with a high level of professionalism. The modern condition of development of Kazakhstan and its development tough stage dictate the need to adapt graduates to fundamentally new market environment when professionalism, education and specialist personality are considered main components of future performance in many spheres.

Today we deal with the novel system higher education characterized by different types of ownership of educational institutions (national, state, private, religious), different types of institutions (university, academy, institute, college) and having different duration and level of curriculum (incomplete high, baccalaureate, magistrate) and post-diploma education (doctorship studies, extra training, qualification improvement).

At present time, there are 148 institutions of higher education function in Kazakhstan (9 national, 2 international, 32 state, 12 noncivilian, 93 private, including 16 incorporated).

Kazakhstan lacks institutional types of innovation structures dealing with development and adaptation of research and designing results for implementation. It is due to the shortage of university science financing and extreme administration of educational process by injunction prevailing flexible responding to scientific and technological

achievements with the account of production needs [1].

In accordance with the international education classification system (MECS) proposed by UNESCO in 2012, the education system in most countries is subdivided into seven levels [2]:

- 0) Preschool education.
- 1) Primary education (general education first step).
- 2) Basic education (general education second step).
- 3) (Full) secondary education (general education third step).
- 4) Secondary vocational education.
- 5) Higher education first step (baccalaureate).
- 6) Higher education second step (majoring and MA course).

It should be taken into account that the difference in the horizontal system of higher education between vocational and academic higher education is designated MECS 5B and 5A. When considering the changes in approaches to methods of education in the digital epoch the top priority occupy the levels of general education which is obligatory and secondary vocational and higher education (with the account of integration of levels 5 and 6 in the university system) which virtually covers all school leavers and forms the personnel potential. Therefore, five modern models of education can be outlined in the global information environment [3].

Let us consider the examples of implementation of modern education models based on the application of information technologies.

### **Virtual universities**

The virtual university implies a higher education institution (MECS 5 or 6) where students most time learn online, as a rule, at home, sometimes at working places, very few attend classes. Virtual universities are an alternative system of correspondence classes originated in the 1800s (London university). The second stage of virtual education dates back to 1969 when the First Open University of Great Britain was inaugurated. It is considered the first modern virtual university without personal attendance. The Open University prototype rapidly spread over the entire world and now they number nearly one hundred, though their title has no open designation. The Open University implied that it was open to all, everywhere, with open curriculum access, but the modern political realities compel to compromise the cultural restrictions and financing. The third phase of virtual universities is gradual replacement of educational resources (press, television and communications) with education via internet resources and Web 2.0.

### **Virtual school**

Virtual school implies the school (MECS 2 or 3) in which the school age students most of the time study online at home (sometimes at hospital, boarding school or, for a time, at another school) physically attending the premises least time. This mechanism is applied to students living in hard accessible locations (on islands, in mountains) [4].

It suits the students who are sick, unable or unwilling to attend due to mental reasons. This education model is often preferred by the students wishing to acquire additional subjects under individual plan (not only the obligatory subjects – STEM), inaccessible at local school and, of course, the young people in jail willing to obtain better opportunities.

Virtual school is becoming more essential alternative and applicable throughout the world. These schools are numerous in North America (over five hundred in the USA and Canada) and quite spread in Australia and New Zealand, Asia and Latin America. They are quite popular in Europe, notwithstanding some restrictions (which are discussed hereinafter) – about 100 by current estimate. They are fewer in Africa (the proper internet access at home lacks), but it is more surprising that it is not popular in island areas (for instance, Oceania and Caribbean), even though communications are effective.

The listed modern education models are successful when implemented.

The least popular models so far are the following.

### **Virtual colleges**

Virtual colleges imply the institution of secondary vocational education (SVC) are intended to teach profession (in other words, is not higher education – MECS 4) when students are educated online usually at home (sometimes at working place) most of their class time. All students should be matured to be independent. The world has much fewer virtual colleges than virtual institutions of other main types and students experience more hardships. There are several different reasons in each country: lack attention on the part of educational policy, lack of common comprehension of the sphere secondary vocational education by different countries, the IT innovations are viewed as too risky, the brain outflow to universities due the rating of most successful colleges with the status 5 MECS (usually 5B). These matters are more or less resolved only in several countries (for instance, the USA and Scotland, may be in Australia) where colleges are more integrated into MECS 5. It is demonstrative that education supervision bodies in some countries begin to view the research and designing differently in view of modernizing colleges for instance, engineering colleges at the University of England [5].

### **Mixed education**

Mixed education is the educational process combining attendance of classes with research and designing. Its partisans believe [6, 7] that this strategy can provide a more effective education by eliminating the isolation of correspondence student to team studies in purely virtual institutions. Opponents insist that this model implementation is more expensive (the cost of maintenance of class rooms, the cost of research and designing) without expanding the teaching scope as it is. So far there is no common idea about the terms of mixed, hybrid and combined education and they still remain interchangeable. There matters subject to discussion. If the class room burden is relieved (to save cost), will it affect the campus quality and the institution brand value? If the correspondence interaction with educator is replaced with indirect online interaction (for instance, through forums), will it increase the actual educator time cost (and possibly the cost of educator's qualification improvement)? All these matters undergo the stage of exploration in this practice [8].

### Education based on resources

MOOC (mass open online courses) resulted from movement for open educational resources in the university practice. The model of education through MOOC possesses specific features [9]:

1. Open access. The MOOC participants do not have to enroll at university to use MOOC and do not have to pay for the course use.

2. Scalability. Most of traditional courses (even online) depend on modest ratio between students and educator (often about 20:1), but the massive MOOC participation manifests that the course is intended to serve unlimited number of students.

3. MOOC are equipped with large sets of electronic materials, like Wikipedia with various built-in instruments.

UNESCO determines open educational resources (2012) as educational, teaching or research materials which are issued with the intellectual property license permitting free use, adaptation and multiplication. The open educational practice is determined in ICDE as the practice supporting production, utilization and repeated use of open educational resources (OER) through institutional policy. Then it implies the policy of encouraging innovation pedagogical models considered educational as co-producers of training throughout lifetime; it has quite little common with OER which for decade precedes the open educational resources [10].

### Computerized evaluation system

This model envisages model relieved burden on educators when rating marks and it is proposed to replace it with computerized rating of marks. Some open universities have done for years, but many educators at common universities resisted this approach, possibly, fearing for jobs, meanwhile loudly complaining about the burden of rating they have to bear. The computerized testing system, for instance, enables to intensify the rating process by using several variants of rating in the system, but .excepting several MOOC, these endeavors are relatively rare. Considering the worry recently expressed regarding the students' level of thinking and the need to expand the practice of writing essays (more text tasks), restrictions of technologies still continue to worry [11].

Mobile education is a novel educational technology at the digital epoch created due to wireless technologies supporting flexible accessible individual education.

Mobile education relates closely the education with life and work, in addition, this type of education ceases to be related solely with teach

classes of a particular institution. It causes friction between the traditional education system oconcentrated on the curriculum and individual achievements, and mobile education built around students' interests and needs in various situations and circumstances, while using personal digital mobile devices and individual teaching trajectories.

The device choice is determined by the age, location, tasks and other factors. Youth and teenagers commonly use mobile phones and personal media players. Students can use many books, pocket personal computers, smart phones and notebooks they use in work.

The range of devices for mobile education is continuously expanded: they include digital consoles, digital voice recorders, electronic books and dictionaries, auxiliary technologies for handicapped students.

The devices grow multifunctional to support oral speech, reproducing audio and video materials, reading, writing, data surfing, calculating, playing and many other items.

Nets and infrastructures are as essential mobile education resource which enables to connect devices and get access to internet, the wireless solutions permit students to travel maintaining mutual connection. The GPS-navigation (satellite navigation system) enables to locate students and exchange context specific resources and the information relating to particular route or site.

Many education institutions ban the use of mobile phones indoors compelling students to use them secretly. Clear administrative and legal norms are needed so that the students can use mobile phones only for private communication and should learn to use them correspondingly in educational purposes. The integration is necessary to combine mobile education and traditional systems of managing education and virtual educational environment.

The mobile education obviates special computer classes making educators fully free when providing students with online-applications as far as necessary. In other words, mobile education is a universal tool of resource access: students can access audio materials, exchange text messages, participate in online polls, text chats, record and survey essays. Bellow is mobile education problems revealed by conducting research works [2, 5, 7]:

1. Problems of financing. After a number of endeavors of introducing mobile education, the producers of mobile devices were attracted as sponsors due to whom the institutions were able to provide these devices to considerable groups of students. It enabled a rapid start when the matters of property right and maintenance of devices in working condition appeared. At present it is preferable that

students have own devices or helped to procure cheap models.

2. Problems of organization. Educational institutions have to convince educators that mobile technologies are a great education assistant rather than mere fun. Experienced educators apprehend that the education process may run out of their control when mobile education is initiated by students outside the class room. Uncertainty of copyright of electronic data may inhibit formation of information suitable for reproduction with mobile devices. Development of mobile applications requires qualification improvement or involvement of specialists.

3. Lack of competence. Educators often lack knowledge to enable student's use of mobile education. The methods of rating teaching effectiveness are to be revised because the mobile education can lead to ambiguous results. Students may be able to handle mobile devices for simple communication rather than as educational means. Educators may feel insufficiently competent to focus students more on practical education in the hope that mobile education satisfies individual preference and needs.

4. Inconvenient to use. The need to recharge mobile device after prolonged use remains still a problem. A small display may inhibit reading, though many students accept the display size. The cost of accessing mobile net adds to the mobile device cost requiring financing the access. Educators and students consider these overheads as the obstacle to use mobile device to access internet. Weather conditions, like sun light or rain, affect the application of teaching in open air (for instance, OLPC). Objectionable noise and communication interruptions may impair the teaching quality in public places or when traveling.

5. Limitations of mobile education in the countryside. The available broad band technologies, like DSL (Digital Subscriber Line), using telephone lines and cable internet using the cable television infrastructure are less spread in the areas with low population density. Wire internet providers grant broad band access alongside with wireless nets, but the access points are small and the coverage is insignificant unless the roaming is used. Satellite internet is able to provide broad band access everywhere on the globe but it is more expensive. It is projected that the dominating broad band technology in the countryside will be in the nearest future the WiMax, mainly due to its cheap employment.

6. Likely negative effects of mobile technologies in education. Intensive use of mobile technologies may threaten human relations and cause

stress of overburden sensation. Universal use of mobile devices may affect private life and personal security. Mobile education requires financial investments and training of educators. From the pedagogical viewpoint, the education may be compromised and reduce to self-education and the grazing land philosophy (surface culling of random facts), while the subject comprehension depth is ignored.

A number of measures are to be undertaken to develop mobile education:

1. To admit the value of education in nontraditional informal or every day environment encouraging the drive of students to self-realization through use of mobile teaching means.

2. To provide to the students spread geographically the necessary mobile technologies for knowledge and experience exchange.

3. To finance further research of mobile education, particularly long term and large scale projects aimed at vital education purposes.

4. To develop administrative and legal norms of mobile education jointly with educational institutions.

5. To train educators and encourage those who lean they continuously with private mobile devices improving own instruction methods.

6. To promote and develop sponsorship initiatives of financial help during adoption and encouragement of mobile education among socially destitute and needy public.

7. To discuss with telecommunication companies the matter of cutting costs of mobile access to internet for mobile education.

8. To cooperate with publishers in the development of business models capable to assure more flexible and cheaper access to electronic manuals, books, teaching materials, their reprocessing and repeated use of manuals with mobile devices.

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