ӘЛ-ФАРАБИ АТЫНДАҒЫ ҚАЗАҚ ҰЛТТЫҚ УНИВЕРСИТЕТІ
БИОЛОГИЯ ЖӘНЕ БИОТЕХНОЛОГИЯ ФАКУЛЬТЕТІ
БИОАЛУАНТҮРЛІЛІК ЖӘНЕ БИОРЕСУРСТАР КАФЕДРАСЫ

КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ УНИВЕРСИТЕТ имени АЛЬ-ФАРАБИ
ФАКУЛЬТЕТ БИОЛОГИИ И БИОТЕХНОЛОГИИ
КАФЕДРА БИОРАЗНООБРАЗИЯ И БИОРЕСУРСОВ

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ТҰРАҚТЫ ПАЙДАЛАНЫЛУЫН ЗЕРТТЕУ ПРОБЛЕМАЛАРЫ»
атты халықаралық ғылыми конференция
МАТЕРИАЛДАРЫ

МАТЕРИАЛЫ
международной научнаой конференции
«ПРОБЛЕМЫ ИЗУЧЕНИЯ И СОХРАНЕНИЯ БИОРАЗНООБРАЗИЯ
И УСТОЙЧИВОГО ИСПОЛЬЗОВАНИЯ БИОРЕСУРСОВ»,
посвященной 70-летию доктора биологических наук, профессора
Нуртазина Сабира Темиргалиевича

MATERIALS
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«PROBLEMS OF BIODIVERSITY CONSERVATION STUDY
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Professor Nurtazin Sabyr Temirgalievich

Алматы
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3. БИОЛОГИЯЛЫҚ ЖӘНЕ МЕДИЦИНАЛЫҚ ДИСЦИПЛИНАЛАРДЫ ОҚЫТУ ӘДІСТЕРІНІҢ ҚАЗІРГІ УАҚЫТТАҒЫ ТЕНДЕНЦИЯЛАРЫ
3. СОВРЕМЕННЫЕ ТЕНДЕНЦИИ МЕТОДИКИ ПРЕПОДАВАНИЯ БИОЛОГИЧЕСКИХ И ЭКОЛОГИЧЕСКИХ ДИСЦИПЛИН

Сондықтан бұл таңдамалы пәндерді негізгі міндетті пән етіп енгізу керек.

Бір кездері ғылыми-практикалық маңызы зор бұл пәндер міндетті пәндер түрінде жүргізілуі арқасында кәсіби деңгейі жоғары қаншама ғалым-ботаниктер осы күнге дейін еліміздің түкпір-түкпірінде, алыс-жақын шетелдерде қызмет етуде. Аталған пәндерді оқу бағдарламасына міндетті пәндер етіп кіргізу арқылы ғана оқу-білім саласында үлкен жетістіктерге жетуге болады. Ал болашақ мамандар айналамызда өсетін өсімдіктер түрлерін анықтау, танып-білу арқылы, өсімдіктердің анатомиясы мен морфологиясын, таралу аймағын, қорларын бүге-шігесіне дейін толық сіңіріп, меңгереді.

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NOW YOU SEE ME: ART OF SCIENCE IN EDUTAINMENT COMES HANDY

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A long growing social concern of kids too much into digital technologies and less into real communication calls for coming up with something funny, interactive and highly educational, making communities, positive personal and group communication stronger

[1]. As we all know entertainment is something what catches attention and touches our feelings, while education permits to learn something new in order to grow and develop. Educational entertainment (or edutainment) is a way to provide and share information, which might serve both for education and entertainment purposes. It includes popular science television productions, movies, museum exhibits, and computer software, which use entertainment to attract and maintain an audience, while incorporating deliberate educational content or messages. But, we also know that it is better to do it once personally, especially closer to "natural conditions" than to hear about it a number of times, but never get a chance to actually give it a go, since with the first a complete set of all learning objectives is implied, and we are getting closer to Know, Feel, Practice, Share, Enrich and Set into Action with one basic principle "Quality education for everyone, everywhere" [2-4], that is why such structures as Open Science School (http://opensciencеschool.org/) are so inspiring: "We believe at that core science and arts are both creative fields of study. We encourage scientists to value and learn artistic approach and design thinking. We bring artists, designers, and scientists together to explore the possibilities of scientific design and designing science. Interdisciplinarity is a tool to solve complex problems that are beyond the reach of any discipline alone. To be able to do this, many soft-skills need to be developed. However, we believe that they are central to face the challenges of this new world: conceptualization, inter-cultural communication, project-based learning, adaptation, and willingness to learn. Being able to exchange knowledge is the most valuable tool that a community can have. Being able to use the skills that we have learned from our field in another discipline makes us valuable."

According to Van Eck there are three reasons why games are considered learning tools: 1. Ongoing research that has included the last 20 years of educational findings have proven that digital games can be educational; 2. The new generation of today wants "multiple streams of information", which includes quick and frequent interaction that allows inductive reasoning; and 3. The mere popularity of games has created a billion-dollar industry. The idea of playing a game assumes the person is engaging in that activity by choice. The activity

should have some value of "fun". This does not mean that the person is engaging in the activity only for leisure pursuits; it can also include the desire to learn a skill, connect with other gamers (social community), and spend time in a chosen activity. The activity needs to remain one of choice for the gamer. Further on it has been shown that the off-the-shelf games with meta-cognitive strategies provide an increase in students' cognitive performance [5].

Using small real-life projects to demonstrate scientific concepts improves the learning process and allows the users to directly experience what is written in textbooks, for example using ethanol and liquid soap for DNA isolation from different plant objects (so called Genetics in the kitchen) or Coca-cola and coloured balls to simulate a volcano explosion, well shown at the Science Fair, taking place on October 18-30, 2016 in the Forum Norwich, UK (Figure 1).

Figure 1 – Volunteers from the John Innes Center at the Science Fair in Norwich on October 30th

Maddie Moate: What is a scientist? In one week in 2016 Science Camp 10 year students got to experience working as scientists across multiple scientific institutions of John Innes Centre (Crop Genetics, Molecular Microbiology, Cell and Developmental Biology, BioImaging, Molecular Biology) and the University of East Anglia. In this week they got to find out what it REALLY means to be a scientist (https://www.jic.ac.uk/year10/). Some responses include: “I could see myself doing the work and it was a great opportunity”, “Thanks for the awesome experience”. Another interesting school experience is a

blended learning classroom at David Boody Jr. High School in New York City, where in one room, about the size of a basketball court there more than 100 students, all plugged into laptops with 15 teachers and teaching assistants (http://www.npr.org).

In ancient societies, there was no arts/science split. The development of materials was driven both by aesthetic and technological goals. At the end of the 19th century, things changed dramatically. Scientists started being able to analyse composition, detect structure, and make a link between structure and properties. The subsequent 20th-century revolution in new materials changed almost all aspects of human activity. An attempt to mix biology and material science with design thinking and rapid prototyping was performed by PILI (http://www.pili.bio/), a fabrication revolution company in Paris producing living colors with the help of tiny microorganisms in order to replace the non-renewable, toxic to work with petrochemical versions and non scalable, expensive, dependant on weather vegetal ones shares its experience on startup, which went so well "A lot of industrial sectors have been waiting for such a product and now cooperate with us, eager to use our living colors, from textile to cosmetic factories, to develop the future of colors in which we can already predict that affordable and sustainable products will lead the way… Everything started in the framework of La Paillasse in 2012 where we made our first proof of concept and created workshops for adults and kids to introduce them with those new modes of production. Workshops took place at the Science Gallery (Dublin), Gaîté Lyrique (Paris), Victoria and Albert Museum (London), Opéra Bastille (Paris), La Paillasse (Paris), Genspace (New York). The enthusiasm people showed gave rise to an ambitious project: to bring these biofabricated colors to the many, and to include them in our everyday life's products."

Most important questions in current higher education is research-informed teaching and proactive contact. To try something new, Newcastle University Business School Management Consultancy 6 months Project instead of a Dissertation Practice Module for Business Management and Management and Marketing undergraduate students in their final year, working in groups of 7-8 people for external organizations, acquiring insight skills for their further employability,

with a focus on regional businesses, which in turn note that the work of the student groups is comparable or better than professional agencies. This is how a module leader Sarah Carnegie describes it: "I start identifying appropriate organizations which would be willing to take part and collaborate about six months before the start of the projects. This is normally done through networking, personal contacts and CIPD links. Usually most of the companies are identified and contacted proactively, but sometimes a company may approach us. We then discuss the research scope, as it has to be sensible and realistic for the students to carry out. After the companies and their research aims are confirmed, the students engage in speed networking with companies' representatives and are able to choose two, which they would prefer to work with and one they would wish not to work with. The companies also take notes on which students they would prefer to work with and based on these factors, and others such as team type, gender and nationality, the project groups are formed. The student group is then responsible for developing an explicit research plan and all ongoing communication and interaction with the companies; including arranging primary research activities. It is a great opportunity for students to learn through working and applying their skills in practice. It is a good experience and a way to enhance employability for graduates. Several students have been offered a job at the company they did the research for at the end of the project. Newcastle University Business School is also getting more recognition among the regional companies for the quality of our students' work".

A nice example of successful implementation of ideas to innovation in the educational process is Purdue's i2i Learning Laboratory in the School of Engineering Education, which supports interactive technologies and team-based activities that enable first-year engineers to build their knowledge through required gateway courses and explore authentic problems relevant to society. Innovative teaching and learning technologies are at the heart of this enterprise to ensure that students from all walks of life have every opportunity to succeed. Seven spaces (design studio, innovation studio, prototyping studio, artisan and fabrication laboratories, demonstration studio) clustered at one end of Neil Armstrong Hall (along with a companion

classroom) take students through each stage of the design cycle. Like professional engineers, students identify design criteria for a particular problem, come up with potential alternatives, plan for a chosen solution, build and test a prototype, evaluate their work, and refine their solution (https://engineering.purdue.edu).

Good example of supporting innovations for teachers is a Global Impact Grant of $125,000 from Cisco Systems, Inc. for Engineering is Elementary®; a project of the Museum of Science, Boston, USA; funding a pilot project to create digital professional development resources for teachers of elementary engineering nationwide (http://www.eie.org/news/cisco-awards-125k-museum-science-boston-digital-initiative). Another attempt to transform science learning to better resemble the authentic practice of science through computer technologies was introduced by Learning through Collaborative Visualization (CoVis) Project initiated at Northwestern University, USA, resulting in creating a community of thousands of students, hundreds of teachers, and dozens of researchers all working together to find new ways to think about and practice science in the classroom. Participating students study atmospheric and environmental sciences through inquiry-based activities. Using state of the art scientific visualization software, specially modified to be appropriate to a learning environment, students have access to the same research tools and data sets used by leading-edge scientists in the field (http://www.covis.nwu.edu/).

Allen Institute, created in 2014 by $100 million funding of Microsoft co-founder Paul Allen, is a new kind of cell research center, aimed at creating tools for better understanding and prediction of cellular behaviour in normal, pathological, and regenerative contexts as well as development of dynamic, visual data on cell organization and activities, open and empowering to academic community. One of the big projects the Allen Institute plans to tackle is a “Google Earth” for the inside of cells, its Executive Director Rick Horwitz, Horwitz said in his recent interview to the American Society for Cell Biology science writer Christina Szalinski (http://www.ascb.org/cellular-google-earth-first-big-project-allen-institute-horwitz-tells-ascb-council), applying new methods of high-resolution 3D imaging with increased resolution in order to determine molecular organization,

activities, dynamics, and localization, using CRISPR/Cas9 to endogenously add a fluorescent tag to proteins in induced pluripotent stem (iPS) cells so they can be watched in real time in order to spot major differences between endogenous and transfected cell lines. "We've improved efficiency of endogenous labelling 40-fold; we can produce about 25 [cell lines] a year," Horwitz said. Machine learning is applied to help them scale up and differentiate healthy cell colonies from unhealthy cell colonies. Will interdisciplinary or large teams with focused goals or resource-rich centers replace the traditional, individual initiated research that has served us so well? Likely not, because small focused research enterprises addressing specific process are the lifeblood of research, effectively crowdsourcing discovery, leading to deeper understanding, and fuelling translation. Nevertheless, questions and issues remain that are not easily addressed by individuals or small collaborations [6].

Medical students at Columbia University, USA are using digital technology to breathe new life into a process hundreds of years old: dissecting a cadaver from head to toe. That is what The Wall Street Journal is saying: "As first-year student Ben Schrank uses a scalpel to cut and probe his way into the neck of the cadaver assigned to his team, his lab partner, Emma Gilmore, holds up an iPad with a thin plastic cover protecting its screen. Ms. Gilmore pinches her fingers on the screen to enlarge the digital image displayed, then positions it so her partners can see it better: a startlingly detailed photograph of the same type of tissue that her team needs to find for their anatomy lab."

Good news on the other side of the globe are not long to wait for. In 2016, master students attending Prof. Rafis Abazov's National Education Program MDP/Global Classroom on Sustainability at Al-Farabi KazNU hold in Association with the Columbia University, USA, won "Innovations for Youth" («Жастар Innovation») competition and a 500,000 tenge money prize in nomination "Energy for the Future", suggesting to bring the chemoluminiscence capacity of the foreign plants by crossing them with the local ones.

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