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TsomkoElena;

Ph.D, Assistant Professor,
Division of Computer Engineering,
Global Studies Institute,
Dongseo University, Republic of Korea

TECHNICAL EDUCATION IN FOREIGN COUNTRIES ON EXAMPLE OF SOUTH KOREA

Annotation. This paper is going to be an overview of higher educational system in a foreign country on example of South Korea (further – S. Korea). Special features of teaching technical disciplines will also be described in this paper, based on the personal experience of its author.

Keywords: education, digital technologies.

ЦомкоО.А.,

к.т.н., доцент,
Відділення Комп'ютерної Інженерії,
Інститут Міжнародної Освіти,
Університет Донгсу, Республіка Корея.

ТЕХНІЧНА ОСВІТА В ЗАРУБІЖНИХ КРАЇНАХ НА ПРИКЛАДІ ПІВДЕННОЇ КОРЕЇ

Анотація. Дана стаття являє собою огляд системи вищої освіти в зарубіжних країнах на прикладі Південної Кореї (далі - П. Корея). Особливості викладання технічних дисциплін будуть також наведені в даній статті, ґрунтуючись на особистому досвіді автора.

Ключові слова: освіта, цифрові технології.

Цомко Е.А.,

к.т.н., доцент,
отделение Компьютерной Инженерии,
Институт Международного Образования,
Университет Донгсо, Республика Корея.

ТЕХНИЧЕСКОЕ ОБРАЗОВАНИЕ В ЗАРУБЕЖНЫХ СТРАНАХ НА ПРИМЕРЕ ЮЖНОЙ КОРЕИ

Аннотация. Данная статья представляет собой обзор системы высшего образования в зарубежных странах на примере Южной Кореи (далее – Ю.Корея). Особенности преподавания технических дисциплин будут также приведены в данной статье, основываясь на личном опыте автора.

Ключевые слова: образование, цифровые технологии.

Introduction. In order to start introducing educational system and special features of teaching technical disciplines in S. Korea, first, let me show some examples of technologies (e.g. digital ones) used in daily life of citizens of this country.

One of the most important parts of our life is transportation. In S. Korea it is all digitalized – subway, buses, and taxis. Everywhere people are using cards to pay for public transportation – either special transportation cards, or credit cards, or usual debit cards. Furthermore, if someone needs to use multiple transportation connection, for example, bus-subway-bus, when getting off the first bus, taking subway, and then getting to another bus, the amount of money taken from the card is not as $\text{price1} + \text{price2} + \text{price1}$. For connecting transportation the amount is taken differently. The smart system knows that this is connected route and it takes much less money as it would be paying separately for each vehicle used. The basic amount is taken only once, at the beginning of the route, and then it only takes amount according to the distance passed till the destination.

Another example is about riding bicycles. Many Korean people enjoy riding bicycles, especially for the long distances. There are many bicycle roads built through the country and connected. Therefore, if someone wishes to get, for example, from Seoul to Busan (about 560 km), it is possible to find the bicycle road in the GPS map application and follow it.

A lot of mobile applications are developed in order to ease the life of citizens. Even paying for utilities (gas, electricity, etc.) is possible through such applications. People don't even need to receive large paper bills to check how much of gas, water or electricity they used and what should they pay for it. All this information is possible through special mobile applications. Though, it is not totally changed to digital version yet, since it takes time for citizens to get used to it, especially for senior ones.

Much more examples of digital technologies used in daily life of S. Korean citizens can be given in this paper, but let us go to the origin of it – education.

Higher education system. Here I would like briefly introduce the system of higher education in S. Korea. Basically, it is the same as in many other countries all over the world – bachelors (B.S.), masters (M.S.), and doctoral (Ph.D.) degrees. Originally, the study year in S. Korea starts from spring semester, i.e. March 2nd (March 1st is a national holiday). However, students can be enrolled into universities 2 times a year – to start studying from spring (March 2nd) or from fall (September 1st) semester. The studying process is usually semester based, or, to be more precise, credit-based. In order to get degree, students need to pass specific amount of credits through the whole process of studying, but normally they successfully pass it within 4 calendar years. In some universities, in selected departments they suggest a system where students pass more credits in major disciplines while acquiring bachelor degree and further they can get master's degree just in one year instead of standard two. There are also programs called “combined” where students are able to pursue M.S. and Ph.D. degrees within five years instead of regular six or more.

A lot of universities in this country develop international programs where the foreign students take the full list of courses in order to get desired degree or

foreign students are employed in exchange program, visiting a university for a short period of time.

Another direction of international cooperation is developing in S. Korea as well – a program called “2+2”. This program is developed for acquiring bachelor degree from two universities. The program works as follows: international students study 2 years in their home university and then they come to S. Korean university to study the last 2 years and get two certificates of graduation, i.e. from both universities they have been studied at. Of course, preliminary steps should be taken by two universities before launching this program. Departments of both universities should review and discuss a studying process for specific specialty and agree on the subjects to be taught by each one. The courses taught in Korean university are all given in English language.

Technical education. A wide variety of technical disciplines is taught in S. Korean universities. Various departments suggest a range of tracks in order to become a specialist in specific area, including Computer Engineering, IoT (Internet of Things), Digital Contents, Mobile technologies, Software Development, Information Communications and Security, Games, 3D Modeling and Animation, Virtual and Augmented Reality, etc.

Generally, the studying process is developed in such way that students get more practical skills while acquiring their degrees. Starting from Bachelor degree, students learn how to apply new theoretical knowledge practically, i.e., they develop some new applications (including mobile ones), software or other technical products. By the end of studying, departments organize exhibitions of graduate students' products. Depending on complexity of the product it can be a group work (up to 4-5 students) or a personal work made by one student. Acquiring bachelor degree is an undergraduate program.

According to graduate program, it implies getting master or doctoral degree. Here students learn more theoretical disciplines and do some research in order to improve existing technological methods or to invent new ones. While studying in graduate program, students are often involved in some technical or research projects assigned by their advising professors. Therefore, along with theoretical development students are involved in practical implementation of some new technologies as well. Projects can be not only local but international as well, i.e. cooperation with some foreign university in another country. Graduate students are also encouraged to participate in local and international workshops and conferences in order to exchange knowledge and get more useful information and insights for their future work.

Along with major courses on technical disciplines students may also be suggested to take some optional courses such as entrepreneurship or alike. These courses are developed for students to know how to start their own business on digital technologies. Furthermore, technical departments organize for their students “field trips” to such large and famous technical conglomerates in S. Korea as, for example, Samsung Electronics and LG Electronics.

Courses taught in technical departments are always synchronized with according development in technologies, which is reflected in the contents of disciplines.

In order to show personal experience in teaching technical disciplines in S. Korean university, let me describe example on teaching a subject called “Augmented Reality”. A group consisted of junior students (3rd year of studying for Bachelor degree). The outline of this course was built in such way that first 3-4 weeks were theoretical only and the rest of the study (11-12 weeks) was devoted to practical implementation. Preliminary required knowledge was 3D modeling (and animation) and programming. By the end of the course students had to present their final product on Augmented Reality, and group work was allowed as well. As an example, the following final products were made by the students:

- Virtual Fairy Tale: students printed pages of some fairy tale with pictures, used as markers for camera, and when the camera looked at the markers a story got “alive” by showing some simple 3D animation according to the text on that page.

- Virtual Interior Design: the purpose of this application was to help users to think about their home interior design. Various markers had been developed for specific types of furniture. Moving those markers across the virtual room users could see 3D prototypes of those furniture and decide how to set their interior in better way.

- Virtual Real Estate: this application was designed to help real estate agents introduce desired properties and areas around in 3D space. Houses, complex of apartments along with surrounding infrastructure as shops, hospitals, schools, roads, etc. could be overviewed with this product.

As one can see, this class was quite practical. In the first weeks of this course students were introduced with ARToolkit – a simple toolkit for developing augmented reality applications. In these theoretical hours they learned the principles of using it. Of course, while implementing their projects within the rest of the course, they could ask questions if some problems arose.

Conclusion. In order to summarize overview of technical education in S. Korea I would like to point out the importance of practical implementations using state of the art technologies existing in according period of students’ studying process. The main accent is made on developing specialists in digital technologies ready to work immediately after graduation. International cooperation of universities in S. Korea is also one of the keys to success in developing future technologies.

Рецензент: д.ф.-м.н., проф.Дубко В.О.