FOSTERING THE LOCAL DEVELOPMENT THROUGH INFORMATION AND COMMUNICATION TECHNOLOGY EDUCATION PROGRAMMES

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Abstract
Information and Communication Technology (ICT) degree programs in private and public universities remain very popular and attract very good students. In recent past, there has been an increase in the enrolment in ICT degree programs in the traditional areas of computer science, electronic engineering, computer engineering and in the newer areas of information systems and software engineering. This paper identifies some of the local and global drivers of this demand. It then uses the open networking model to analyze the future demand for ICT graduates. Using the model, the paper concludes that the focus of Kosovo universities should be in the academic areas of computer science, information systems and electronic engineering. In order to have an impact on the Kosovo economy and the ICT industry, there is an urgent need for universities to seek professional accreditation of the different ICT degree programs and therefore achieve international standards of quality. The paper recommends adopting the E-campus concept to develop a world-class learning environment for students and faculty that overcomes the low penetration of ICT in Kosovo. Although ICT profession will remain popular because of the increasing use of ICT applications in businesses and governments in the region, the challenge for the universities is to attract, retain and develop doctoral-level ICT faculty. In an innovative first for Kosovo, the European Dukagjini College has embarked on a major initiative that will transform education and could boost the local and state's economy. The Institution is investing to improve education through the use of ICT, training, and support. The project will provide every Program and Department with technology, digital educational content, professional teacher training, and infrastructure for ongoing support. This Paper presents the research based on a Program to transform education through ICT, which brings 21st century education and economic opportunities to Republic of Kosovo.
Keywords: Information Technology, ICT, Education, knowledge flows, local development, democratization of knowledge, local systems of innovation

Introduction

This paper utilizes the context of an innovative ICT project in the heart of Newborn Republic of Kosovo to discuss the challenges of partnering disadvantaged communities both in project development and in this evaluation of case project. The efficacy of the project, though not under discussion, was important because it provided the evaluation with a credible vehicle in which to establish community discussion with people from a diverse range of age groups and backgrounds. Their engagement was essential not only to the research but to the overall success of the project. In a community with very low social capital, engagement in a community project takes time, commitment and good community development practice. The paper describes the process of the research in this community, reminding us that community goals can only be met if we engage the stakeholders in enacting community change.

European College Dukagjini (ECD) is also collaborating with other departments of the Corporate departments, local enterprises and institutions to build a sustainable economic model. Boosts to the Education of the students include a need to supply notebook PCs to the students, providing local jobs and education opportunities.

The idea of founding of a Private Provider of Higher Education in Peja came from the fact that no such private institution existed in the entire region of Dukagjini. The founding of this higher education institution was based on Market Demand, specifically the need to meet the present demand for higher education for youth from this region.

This institution will contribute to the development of Kosova, especially the development of Dukagjini which, based on available statistics, includes approximatelly half of Kosova with 800 000 to 1 million inhabitants, with no institution of education in this region. This institution will fullfil the needs for higher education within the region of Dukagjini, Kosova, neighboring countries and further abroad. English language education is offered in several departments which opens the possibility of having international students in some fields from the region and from the world.

At this moment the "Private Provider of Higher Education Dukagjini" has the following Accredited Programs:

1. Computer science - Applied IT
2. Management and Informatics,
3. Economics-Banking, Finance and Accounting
1. The prospect for operation will also be researched for the following:
4. Agroprocessing of food
5. Political sciences and Journalism
6. Law

The rationale for the founding of the Higher Education Provider "Private Provider of Higher Education Dukagjini" is as follows:

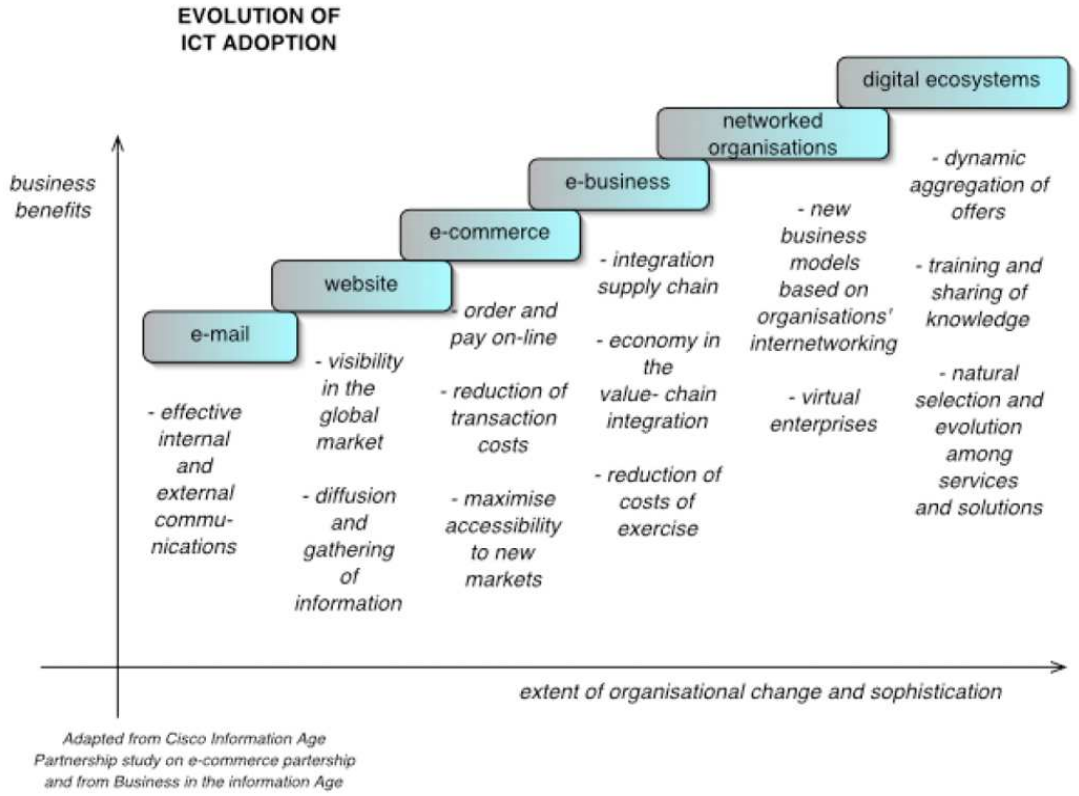
- The overwhelming need with the aim of establishing an institution of higher education based on market demand,
- Such an institution will contribute to the development of Kosova;
- This institution will contribute to the development of Kosova, especially development of Dukagjini which, based on available statistics, includes approximately half of Kosova with about 1 million inhabitants, with no private institution of education in the region.
- This institution will help Kosova to be integrated fully into the European Area of Higher Education (with respect to the Bologna Declaration, and the Lisbon Convention on Academic Recognition), and in the Area of European Research, by taking the necessary reforming steps to achieve these objectives;
- This institution will contribute to Kosova by becoming a leading centre for the advancement of knowledge, thought and scholarship in Kosova; by playing a leading role in the educational, scientific, cultural, social and economic development of Kosova; by assisting in the process of promoting democratic citizenship; by seeking to create and maintain the highest standards in teaching and learning; by making the most effective use of the resources available to

it; and by participating fully in the regional and international community of higher education

Education Transformation in the Region

Over the past 10 years, technology—and especially the Internet—has changed the way we live, work, and play. Using technology is no longer a skill for the few; it has become a necessity, especially for students who will graduate into a world where using computers and the Internet is an essential part of any skilled job. Governments around the world recognize that they must transform their education systems to integrate technology into learning, and provide their students with the skills necessary to succeed in today's global economy.

set up to support the initiative.



The adoption of Internet-based technologies for e-business is a continuous process, with sequential steps of evolution. The steps could be classified in 6 phases: (1) e-mail, (2) web-presence, (3) e-commerce, (4) e-business, (5) networked organizations, (6) digital business ecosystems.

European College Ducagjini education initiative consists of the following elements:

- Educational content. Localized content and learning texts were converted into digital format. The Computer Science Department has already started to pre-install the digital textbooks on classmate PCs.
- Training. Teacher training development was adopted, enabling teachers to integrate technology effectively into classroom teaching and learning activities. Working with a College training Center, more than 200 teachers are expected to benefit from this program over the years. Additionally, 50 ICT graduates were enrolled to provide continuing support and training to teachers and students.

Several Professional groups were brought together to develop a comprehensive, sustainable program, with the goal of promoting education transformation. This program represents a first step towards "harnessing the benefits of technology to make education more efficient."

ECD education initiative will bring technology to the Departments and Programs, including notebook PCs, interactive whiteboards and servers. This ICT boost will help students, teachers and schools engage in interactive e-Learning programs. Internet connectivity, digital curricula and teacher development are also part of the educational ecosystem being

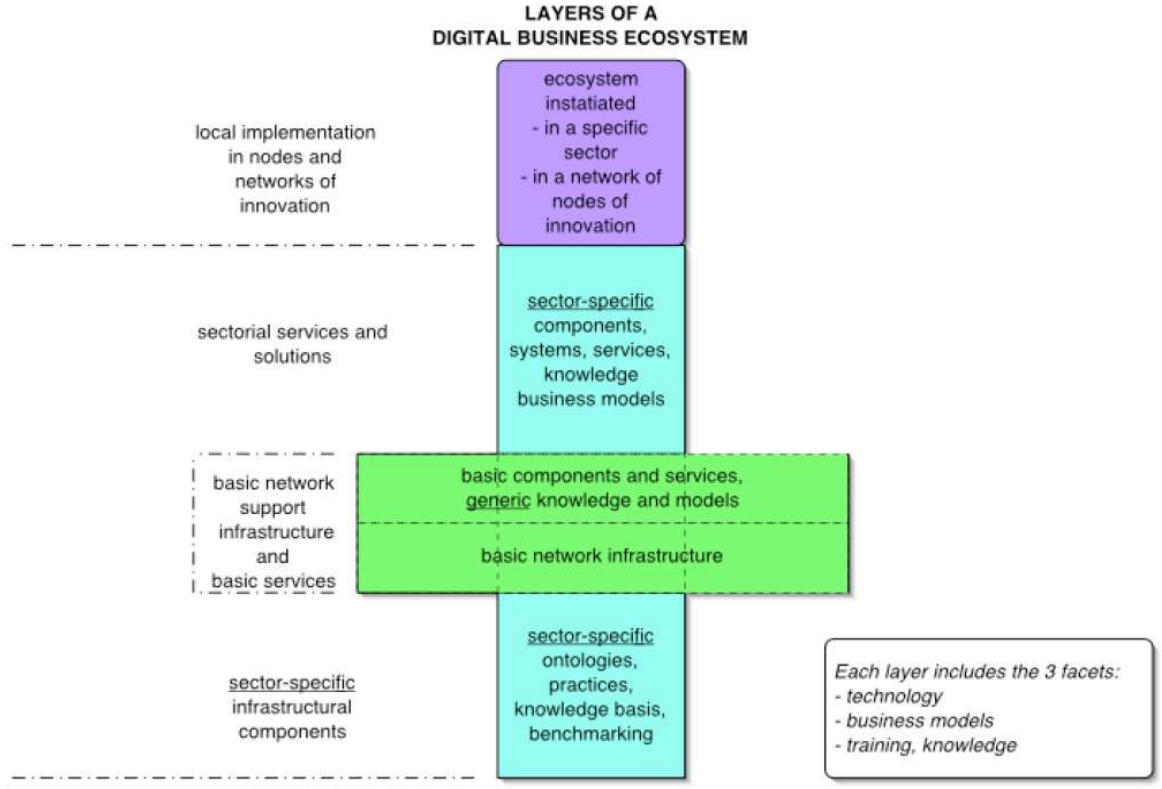
- Technology. Provision of hardware, software and services designed specifically for education, to address education technology needs. In Phase 1, Dukagjini College plans to equip all it's students with the laptops within 3 to 4 years. While the main focus now is to deliver classmate PCs to students, expansion plans are being developed for next year. Phase 2 plan is to support school administration and data activities. Phase 3 will be to implement true One-to-One Learning, where teachers will be able to more easily interact with students and use technology to enhance learning.
- Connectivity. Internet access is provided to the College via IpkoNet, a nation-wide local ISP.

Classmate PCs are Wi-Fi enabled to take advantage of wireless connectivity when it is rolled out in classrooms in the future.

General Architecture of digital educational ecosystem in Kosovo

The digital business ecosystems are based on an evolutionary systemic process; they may be composed of three different layers:

- *The generic ecosystem infrastructure:* a common support environment and a generic basic infrastructure, which includes basic services components, generic integrated solutions and infrastructure components.
- *The sector-specific ecosystems:* services, solutions and components specialized for a specific sector (e.g. agro-food, tourism, manufacturing) or transversal applications (e.g. logistics) that use the services of the common support environment.
- *The instances of the sector-specific ecosystem* applied to a specific node of innovation, geographical area (or to a network of them), supporting, and being supported by a local community. These networked instances forms the network of ecosystems instrument for networking the Kosovar and European enterprises and organizations in a business excellence network



In a digital business ecosystem some services could be considered required component of basic infrastructure (e.g. micropayment system, credit-card payment system, fidelity card system) in others are included in the group sectorial or even in the local services.

The following table presents the parallelism among natural ecosystem, economic business ecosystem and digital business ecosystem, providing examples and showing the constitutive elements with examples.

Natural ecosystem	*Examples in natural ecosystem*	Economic Business ecosystem	Digital Business ecosystem	*Examples in digital business ecosystem*
Biological basis	*Cells amminoacids*	Laws, WTC regulations	Basic protocols, network infrastructure	*TCP/IP XML, ebXML*
organs			Software components, business models	*Open source models, operating systems*
Simple species	*Grass, worms, tiger*	Small organizations, universities, chambers of commerce	Basic e-services, Simple services	*Accounting sys, Payment sys, Groupware sys.*
Group of species in symbiosis	*Species in symbiosis: …*	Networked organizations, specific value chains	Aggregated services	*CRM, ERP, user profiling*
Local ecosystem/s	*Savanna, jungle / ecosystems of Amazonas*	Regional economy / multiregional economy	Local digital ecosystem / network of local digital ecosystems	*Digital environment + services for agrifood in 3 innovation nodes*
ecosystems	*Global natural environment*	Global world business	Network of digital ecosystems	*Network of local digital ecosystems for innovation*

Computer science Program towards the Model For Economic Success

The Program Computer Science - Applied Informatics offers modern theoretical and practical knowledge in the fields of Applied Informatics, required for businesses, public services and institutions of a wide range.

This Program's program offers the chance to students to obtain knowledge and skills in software development and implementation in the conditions and dimensions of an advanced market economy. Knowledge offered in the field of Applied Informatics will enable students themselves to apply their own knowledge for an effective management of their projects and software for the needs of business in SME.

Students shall acquire a high degree of knowledge on fundamentals of IT, networking, Information Systems, Hardware, Softwere development, DBMS, management, finance, writing and expression skills, human resource management, international business and other fields, enabling them to complete a skill set for management in a wide range and at a rather advanced level.

The mission of the "Private Provider of Higher Education Dukagjini" – Peja is to provide programs of study and research to the highest European educational standards combining theory and practice with active participation in local, regional, and global economies.

The strong bond between theoretical knowledge and practical courses is the groundwork of this Program. Students will be able to research and manage successfully in conditions of a market economy, able to adapt their managerial actions with specific demands presented in Kosovo and wider. On the other hand, skills in information technology open possibilities for easy employement of these students.

With the knowledge obtained, students will be enabled to research and continue education in Master level and to work successfully in business enterprises, management of information systems, management of private and public enterprises, bank management, public institutions, and information technology courses, especially in programming, research institutes, consultancies and other business support services.

The Master in Applied Informatics – Social Media and Web Technologies Program introduces a fundamental graduate study in the Institution. Its objective is to create and develop further knowledge in contemporary theory of Information, Informatics, Computer science, networks, Management, Leadership, managerial finance, methodology of economic science and analysis of different economic phenomenon in management and Informatics. YouTube, Facebook and Twitter are just some examples of social web services that are changing the current media landscape. These web platforms have created needs and demands that require new skills, knowledge and expertise in order to tackle current and future social and technical challenged.

Initiating *European College Dukagjini* to simply provide PCs to students was not enough for the Board of Directors of this Higher Education institution. The project needed to be sustainable over the long term. The Management has been

working in collaboration with Computer Science Department and other different agencies to ensure a sustainable economic model that will not only transform education, but also generate economic benefits for the Region of Dukagjini.

Local Industry Involvement

A key aspect of sustainability is involving local industries in the project. From the Dukagjini College point of view, involving local businesses right from the start helps develop a sense of ownership in the project, generate local jobs and opens new economic development opportunities:

- The European College Dukagjini worked with local IT suppliers to be able to supply more than 500 classmate PCs a year. These would supply PCs to the rest of the students as well as open trade opportunities for the Region of Dukagjini in Kosovo.
- Content in the form of digitized University texts were provided by local experts for pre-installation into classmate PCs.
- The Computer Science Department drove participation among education Heads of Programmes, and published general guidelines to help the schools' administration manage the assets. The department also worked with Top IT suppliers to ensure program continuity and optimal use of the PCs by both students and teachers in daily teaching and learning.

From this experience, Plan also produced a 10-step process for integrating ICTs into development initiatives:

1. Context Analysis: what is happening with ICT (for development) in the country or region?
2. Defining the need: what problems can ICT help overcome? what opportunities can it create?
3. Choosing a strategy: what kind of ICT is needed? direct? internal? strategic?
4. Undertaking a participatory communications assessment: who will benefit from this use of ICT and how?
5. Choosing the technology: what ICTs/applications are available to meet this need or goal?
6. Adjusting the content: can people understand and use the information provided for and by the ICTs?
7. Building and using capacity: what kind of support will people need to use and benefit from the ICT, and to innovate around it?
8. Monitoring progress: how do you know if the ICT is helping meet the development goal or need?
9. Keeping it going: how can you manage risks and keep up with changes?
10. Learning from each other: what has been done before, and what have you learned that others could use

Economic Benefits

Building the modern University in this region with programmes based on market demand has raised Dukagjini's economic profile. In addition to providing employment to the local population, the Program has provided opportunity for skill building with Top IT Industries' staff. Together with the *Project* and the need to provide ongoing support for the program and the collaboration between private and public enterprises, the European College Dukagjini aims to attract ICT graduates and professionals into the workforce.

Benefits To Provincial Education In the schools, educators are discovering greater opportunities for teaching and learning that is afforded by the technology. The technology makes it easier for teachers to teach and students to learn and interact with their teachers, Students are motivated to come to school and get engaged in the learning process.

For teachers, technology enablement has improved the way they teach. Teachers do not simply present information, but become facilitators to the natural inquisitive learning desires of their students. The learning experience is becoming more student-centered and project focused—a departure from the passive learning methods of old.

Enabled by the technology, young students are taking a more active part in their own learning experience, exploring the world around them through the Internet, and using the tools of technology that will serve them well in the future.

Finally, the use of classmate PCs in the classroom will have a positive impact on the critical thinking, communication and digital literacy skills of students."

Conclusion

The result of research in this paper presents that this education transformation project is a major step by the European College Dukagjini to infuse technology into the core of teaching and learning in Kosovo. Besides providing access to technology and the means to prepare their students to acquire 21st century skills, the European College Dukagjini also sees this as an opportunity to build up Kosovo economy through the flow-on effects of the project. This is shown through the employment of many ICT graduates to help with ongoing training and support for the *Project* to supply the classmate PCs. This project is currently under way, and as deployment continues over the next 2 to 3 years, ongoing collaboration between the industry and other sector enterprises will surely see more opportunities opening up for Kosovo's economic prosperity.

Finally, building a Kosovan network of digital ecosystems is an ambitious objective, which could be achieved only with a long-term vision and through an integrated approach able to exploit all available financial means and instruments and all the potential synergies.

A digital ecosystem implementation plan could be build upon existing Community programmes aimed at the research, at the regional innovation, at the specific needs of small organizations and local communities. The initial step could be the creation of a consensus among a community of players which refines and improves the concept and the vision, builds a large community, identifies the initial enabling technologies (subject to a continuous evolution), identifies the business sectors and geographical areas which will act as initial nodes of innovation and testbed.

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