

IMPROVING FLEXIBILITY AND ACCESSIBILITY OF HIGHER EDUCATION WITH WEB 2.0 TECHNOLOGIES: NEEDS ANALYSIS OF PUBLIC HEALTH EDUCATION PROGRAMS IN BULGARIA

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Abstract. The case study presented in this paper aims to address the issues related to the use of Web 2.0 technology in public health education in a particular college in Bulgaria in relation to providing flexible and accessible education consistent with the current trends in public health practices. The outcomes of the case study suggest that systematic steps are needed in order to assure effective inclusion of technology into the learning process; these steps include the completion of systematic studies of attrition rate and the reasons for student drop-out, training of administration and faculty members in effective incorporation of Web 2.0 technologies, introduction and promotion of Medicine 2.0 practices, and initiating the planning of design and development

of Web 2.0 learning applications and environments in Bulgarian which is the language of instruction.

Keywords: Web 2.0, Medicine 2.0, Public Health education, education flexibility & accessibility

Introduction

Today, seven years after the term “Web 2.0” was defined, the Internet continues to expand its capability to inform and connect people, to provide them with opportunities to form communities, co-develop applications, discourses, and knowledge. There are various definitions of Web 2.0; however, all of these definitions highlight improved communication flexibility and the increased interaction of users through Web 2.0 applications as the key attributes (Van De Belt et al., 2010), furthermore, Web 2.0 technologies are characterized by “creating network effects through an "architecture of participation" (O’Reily, 2007).

The transformative power of Web 2.0 technologies and the practices that emerged with them changed the expectations of users. Today technologies allow immediate responsiveness and flexible access to various types of information, including health information. Researchers in the field of medical studies (Eysenbach, 2008; Madl & Kohane, 2008) point out that programs such as Personal Health Application Platforms reconstruct patients and health workers involvement “as the gravity shifts away from health care providers as the sole custodian of medical data” (Eysenbach, 2008). These dynamic changes brought a new concept in the medical nomenclature: Medicine 2.0. It presents “the use of specific set of Web tools (blogs, Podcasts, tagging, search, wikis, etc) by actors in health care including doctors, patients, and scientists, using principles of open source and generation of content by users, and the power of networks in order to personalize health care, collaborate, and promote health education” (Hughes et al., 2008). One of the main structuring

themes of Medicine 2.0, defined by Hughes et al. (2008), is the educational significance of Medicine 2.0 both for general public education and professional training. Undoubtedly, such dramatic changes in the health practice pose new demands on higher education in the field of medicine, including training public health professionals. Therefore, today there is a great need for strategic planning for educating public health workers in a way that would allow them to fully participate in Medicine 2.0 communities. Undoubtedly, the Web 2.0 networks, including the networks within the Medicine 2.0 scope, tend to have a global impact; nonetheless, it is crucial to understand the specifics of particular educational settings in order to plan the training of public health professionals accordingly. Recognizing the specifics of educational setting would allow for building on existing traditions while guiding educators and learners towards the newly emerging Web 2.0 and Medicine 2.0 practices.

This paper presents an exploratory case study of a Bulgarian college which, being part of a large medical university, trains professionals in the field of Public Health (PH) and Health Care (HC). This is an exploration of the current issues related to the accessibility of the college programs and the implementation of Web 2.0 technologies in the college. We view this second issue to be directly related both to the accessibility and the provision of education relevant to the current trends of development in the field. Based on this exploration, we aim to identify specific steps that would support the development of effective educational practices in this college and will inform similar educational institutions in Bulgaria.

When defining the focus of this study, we were guided by two interrelated aspects affecting the educational processes in the European Union and around the globe: the vast influence of the constantly developing communication technologies and the efforts to promote “mobility by overcoming obstacles to the effective exercise of free movement with particular attention to... [student] access to study and training opportunities and to related services”.¹⁾

The study has been conducted as part of an Erasmus multilateral project WebWise: Web 2.0 Supported Higher Education Institutional Learning Scenarios for Collaborative Learning; the goal of the project is to facilitate the improvement of the efficiency and accessibility to Public Health Higher Education (PHE) through the structure of the Bologna Process and the inclusion of innovative methodological collaborative Web 2.0 learning tools. The research questions posed in the study were: (1) What organizational strategies are used to assure flexibility and accessibility of the education at the College; (2) How e-learning, including Web 2.0 technologies, is viewed by college administration, instructors, and learners; (3) To what extent are Web 2.0 technologies presented in the College? Why are they presented in this way and what factors determine this presentation.

Methods

In order to develop a better understanding of the current state of public health education in Bulgaria and propose specific actions that would support program flexibility and accessibility as well as effective and meaningful inclusion of Web 2.0 technologies in PHE, an exploratory case study was conducted (Yin, 2003). The data were collected through document research and series of semi-structured interviews (Patton, 2002) with stakeholders from the targeted college, the analysis focused on: (1) existing teaching and learning practices with consideration of flexibility and accessibility of education and (2) readiness for inclusion of technologies, including Web 2.0 technologies into the learning process. Based on the outcomes, approaches for further steps for supporting the accessibility and flexibility of the programs and incorporation of Web 2.0 technologies into the learning and teaching practices are proposed.

Settings

The Broad context: the health care system in Bulgaria

There have been numerous reforms in the field of health care in Bulgaria since 1990s. During this period, the centralized health care system inherited from the 1980ies socialist period started undergoing various changes in order to meet the new economic and political realities in the country. These reforms impacted the way the health system is financed, delivers services, defines users and providers, determines the relationships between them, and re-organizes the health care facilities. Fig. 1 presents an overview of the reformed health care system.²⁾

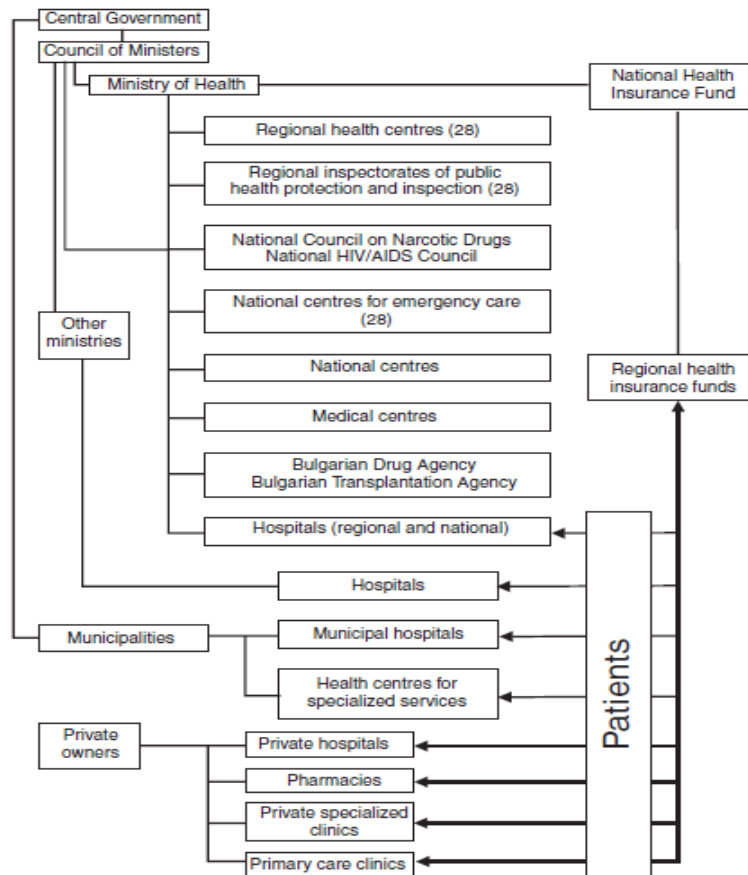


Fig. 1. Overview chart of the health system

In 1998, after the Parliament introduced the Health Insurance Act, the national compulsory health insurance which provides basic health care services to the insured population was adopted.²⁾

In terms of providing PHE, there are various pathways which are all presented in the context of university higher education. Currently in Bulgaria there are five universities which offer public health programs at different levels: the Medical Universities of Sofia, Varna and Plovdiv, the Medical School in Pleven, and the Trakia University Medical School.

These universities offer education at bachelor, master, and doctoral level. The programs are either offered by the university faculties at a bachelor, master, and doctoral level or by colleges affiliated to the university at a professional bachelor level. The difference between the bachelor and professional bachelor educational level is that the professional bachelor programs are to a greater extent oriented towards acquiring practical professional skills, in addition, the number of credits required for obtaining the degree is lower (185) as compared to the bachelor programs (240+).

Within the professional context, there are two professional categories different from medical care – public health and health care. Respectively, there are two types of educational programs that prepare specialists of these categories: classified either as public health programs or health care programs. These programs prepare specialists for the professional categories: (1) public health – which includes professionals from the following fields - *health management, nursing, obstetrics, and occupational medicine*, and (2) health care – the professional fields in this category are: *dental technicians, massage therapists, rehabilitators, assistant pharmacists, sanitary inspectors, social workers, medical cosmeticians, and x-ray laboratory assistants*. In the context of this study, we will consider both categories as sub-categories of the broader category PH.

Both, public health and health care educational programs require accreditation according to the Law for Higher Education in Bulgaria. In this accreditation, various factors related to entry criteria, curriculum, and exit criteria are considered. In general, the entry criteria for the accredited bachelor's programs are high school diploma and oral or written examination. The exit criteria are based on the skills that are defined in the national professional descriptions. Depending on the type of the program, the curricula can be either regulated by the government or non-regulated. The details of program regulation and curricula are defined in the Act of the Council of Ministers, an example of such documents are the Act N238 of September 26, 2008 (for Health Care programs) and Act N215 of August 18, 2006 (Public Health). Generally, most of the programs are government regulated: 90% of curriculum of the regulated programs is defined by the Act of the Council of Ministers, while the curricula of the non-regulated programs are designed and approved by the educational institution which offers the training. The educational institutions which train PH specialists are subjects of the Ministry of Education, Youth and Science and the Health Care Ministry of Bulgaria.

The College

The specific institution which was researched was a medical college affiliated to one of the medical universities in Bulgaria. In this particular institution only professional bachelor programmes in the field of health care are offered. The college trains dental technicians, massage therapists, rehabilitators, assistant pharmacist, medical cosmetician, and social workers. Following are the general characteristics of learning process organization: (1) *The admission criteria*: High school diploma, entrance examination; (2) *Types of programs and degrees*: All programs are delivered on full-time face-to-face basis. No fast track programs, e-learning or distance programs are offered at the College although the University with which the College is affiliated has a regula-

tory document defining the parameters for distance learning at the University;

(3) *The exit criteria*: The degree awarded upon the completion of the course of study is professional bachelor. The exit criteria are state exit examinations – oral, written, and practice. The results of the state exit examination in combination with the course examination results are considered when the decision about awarding the degree is made;

(4) *The professional specifications*: The College graduates are considered to be certified professionals in the field of health care;

(5) *Previous professional experience* accounted for in the context of PHE (fast track programs, special programs etc.): No professional experiences are accounted for when admitting students into a program, no specialized curriculum is considered for students with previous experience in the field. Only when a second bachelor degree is being obtained in the same field, certain credits may be transferred; this, however, does not result in a fast track progression through the course of studies, it rather affects the course load for the semester in which the given subjects are offered;

(6) *Access to equipment including computers*, courseware, specialized software, servers, and Internet connection: The interview data suggest that at the College the access to professional equipment is adequate for the current needs of the College. However, there is limited access to equipment related to e-learning and e-communication. There is a library computer lab with about 10 computers connected to the Internet while there are 834 students currently enrolled in the college. The college is using the server(s) of the medical university with which it is affiliated. According to the college administrators, there are possibilities to introduce courseware systems in the future, most likely Moodle; however, at this point there is no faculty training being planned and no specific information communicated to college administration and/or faculty members. Finally, only wired internet connection is available in the offices and the library;

(7) *Specific curricula requirements*: Most of the programs in the College are regulated, in other words, their curriculum is designed and approved

on a government level in terms of number of credits, ratio between core and elective courses, practicums and internships; (8) *Mobility within and between institutions* (credit transfer): The credits are transferrable between similar and programs within the country, provided that the courses for which credits are transferred have the same or similar curriculum. However, the within institution transfer from one program to another during the course of study is limited or even non-existent due to the different entry examination scores required for the admission into different programmes and the overall program curriculum differences.

Participants

The participants in the case study were representatives of three different groups of stakeholders in the college: (i) the decision makers/administration; this group includes the director, the head of the curriculum and students department, and one of the department chairs. (ii) The academics: five instructors took part in the interviews, two of them were instructors who teach courses in a regulated program and three were instructors from the two unregulated programs offered at the College. (iii) Finally, eight students participated in the interview: six professional bachelor degree students from the two unregulated programs offered at the College and two professional bachelor degree students – from one of the regulated programs.

Educational practices: flexibility and accessibility of the education at the college

Decision Makers

When discussing the accessibility of education at the College, the decision makers described the overall organization of the educational pathway at the College as rather fixed in terms of curricula and policies. They outlined that, due to the regulated nature of most of the programmes offered at the Col-

lege, the requirements are very strict and the adherence to these requirements is a key factor to success in the program. During the interview, the administrators of the College shared the following considerations that shape the learning pathway: (1) One credit is defined as a minimum of 15 hours in-class work and total 25 to 30 hour of work, which requires a full-time dedication on the side of the students during their course of study. (2) In addition, the expectations are that students will be involved in a lot of individualized hands-on learning experiences due to the specifics of their studies which also requires full-time and face-to-face engagement in the learning process. (3) While for the regulated programs the government act specifies the subjects to be included in the curriculum and the number of hours each subject to be studied, the instructor is the one that makes decisions about on the course content and the mode of its delivery (the choice of the teaching and learning strategies to support the content acquisition) and presents it to the faculty committee for approval. (4) During the semesters in which electives are planned, students can choose from at least two electives (four totals for the course of study); the core courses are regulated; the electives are proposed by the instructors and approved by the faculty committee. In the regulated programs curricula, the elective courses cannot be more than 10% of the overall curriculum.

In this context, according to the College administration, the main barrier is the lack of schedule flexibility and the attendance strictness of the programmes offered at the College. For example, during one semester, the instructor of a given course may allow one absence in exceptional circumstances; two absences are reported to the head of the program, and more than two – to the director of the college who decides on how to proceed with each particular case.

This makes the programs less accessible for students who hold full-time jobs and/or have families because they have to fully devote themselves to their studies. In addition, the interviewed administration representatives

shared their general observations that demographics of the students are changing rapidly in the past years and more “non-traditional” students who have families and change carriers are joining the college programs. We could not obtain more specific information about these changes because no systematic studies of how exactly student demographics change were conducted at the college. If we accept the administrators’ observation on the demographic changes, it would suggest that the needs of the “non-traditional” student population in terms of flexibility and accessibility are not met at all or are met in a limited way.

Academics

The instructors viewed the issue of flexibility and accessibility of PHE offered in their College within the context of the specific courses they teach. The core courses in these programmes are usually oriented towards practice. Theoretical presentations are always followed by seminars and practicum sessions during which the students can acquire practical skills related to the theoretical topics to which they were introduced. The small number of students in each group assures an individual approach during the theoretical, seminar, and practical sessions. The relation of theory to practice is approximately 1:3.

As one of the major barriers for the students in their learning, the instructors identify the high academic level of the courses and especially the amount of information presented and required to be learned, retained, and applied in practice. However, the instructors do not relate students’ attrition to this barrier; rather, they view that attrition is to a higher degree related to the specifics of the skills that need to be acquired which encompass both academic and practical/tactile skills. Finally, similarly to the administrators, the instructors pointed out that the strict attendance policy of the College makes the programmes less flexible; they also emphasized that in their opinion this policy is a key factor for assuring high-quality education in their fields.

The college instructors do not view the implementation of technology into the learning process as an instrumental approach that might support the students to overcome the barriers related to content acquisition and scheduling. Only one of the instructors mentioned that she might consider the inclusion of Web 2.0 based-teaching and learning practices into her teaching of theory but she also pointed out that she needs more training and the support of the college administration.

Students

The views of the students on the barriers were very similar to the ones shared by the administration and instructors. All interviewed students stated that the compulsory attendance makes the programmes less flexible which is definitely a barrier for some of the students because it prevents them from holding jobs and/or taking care of their families. Another barrier which they pointed out was the financial barrier when tuition payments are concerned. Further, the students from the non-regulated programs shared that the flexibility in terms of attendance of their programs are slightly better than the flexibility in the regulated programs; however, they also pointed out the strict attendance policies as a barrier. Although the students saw the high level face-to-face engagement in their studies as an obstacle, they shared their belief that the nature of their studies requires such compulsory attendance and this is the responsibility of each student to arrange their personal and financial affairs in a way that would allow meeting this requirement.

In the course of the interview, all three groups of participants expressed their keen interest in making their programs more flexible through expanding communication and collaboration with similar institutions within the country and in the European Union. However, obstacles such as lack of means to support such collaboration with other institutions as well as the language barrier, when EU collaboration is considered, were pointed out.

Overcoming the obstacles: current practices

Decision Makers

Accounting for the financial obstacles, the administration makes efforts to support students when tuition is concerned by allowing tuition to be paid in installments. No specific approaches are considered in relation with the strict attendance policy. The interviewees suggested that it is students' responsibility to find the time and means in order to successfully complete their studies. There are no systematic records of student detailed demographic profile (including family status, employment status etc.), attrition rate, and the reasons for which drop-outs are unable to complete their studies. However, according to the administrators, the drop-out rate is not high in terms of keeping the enrollment levels adequate to the requirements; therefore, they are not concerned about this issue.

Academics

As it was mentioned earlier, according to the instructors, it is the amount of information that makes the courses difficult. One of the strategies for overcoming this particular barrier is the implementation of a well-planned system for ongoing assessment that helps to prevent students from falling behind. Further, efforts are made to provide hands-on practical experiences within each course in order to support students' learning.

The instructors also pointed out that the small group size allows for individualized approach to teaching and although students are expected to have 100% attendance if a student misses a class, the instructor may schedule an individual make up session and consultations. Finally, the instructors recognized that the fact that the groups are heterogeneous in terms of age and life experience is beneficial for students' learning: the younger students model

proactive behavior, while older and more mature learners model persistency and systematic approach to their studies.

Technology as part of the learning process

Administrators and academics

At the College, there are no structured and formally organized online learning activities. In order to understand better this lack of use of online learning, we asked the interviewees about their awareness of specific learning and teaching approaches which incorporate Web 2.0 technologies. During the interview, only one of the instructors shared that she participated in a short e-learning training session organized by another university, the rest of the interviewees, both at administrative and faculty level, did not mention any training. Furthermore, except for this instructor, all participants from the administrative and instructors' groups had only general information about the nature of Web 2.0 technologies, they did not distinctly separate them from Web 1.0 technologies and did not envision the use of information technologies in PHE settings. Possibly, this limited awareness of the issues related to the inclusion of Web 2.0 technologies in PHE shaped the participants' opinion of the instructional value of these technologies in the context of the learning process.

The administration of the College shared a strong belief that for the knowledge and skills that need to be acquired during the course of study in the college, the online form of education is not appropriate. All interviewed instructors also pointed out that the specifics of the skills to be acquired by their students require exclusively face-to-face instruction. Only the instructor, who had training in e-learning, viewed the technology as a resource for additional information and effective communication between the students and the instructor outside of class. Her students actually use Skype to collaboratively work on assignments and get ready for exams. This instructor herself created a Facebook profile for the programme to inform the community and her stu-

dents about novelties and events in the field. This instructor also believes that if the necessary means and organization are in place, some of the theoretical topics could be presented online which would save time and provide more flexibility to the programs. This would also allow expanding the hands-on parts of the courses.

The other instructors view that technologies might be instrumental in providing more flexible access to learning materials, they shared that they use multimedia for lecture presentations and mobile phones for easier communication (they were referring to regular calls via mobile phones). They added that access to high-speed Internet connection would allow easy access to on-line video materials which would provide students with additional opportunities to view important techniques and analyze their elements. Currently they use video recordings of various formats (from VCR to U-tube clips) for such purposes. However, when talking about multimedia content, they perceived themselves as users of multimedia materials that are already produced, rather than being active members of community of PH educators who share materials with other colleagues and learners outside of their class. This might be related to their perception of the role of technology in PHE as well as to the lower level of their computer skills: none of them thought of her as being technologically savvy. It was interesting that two of the instructors were reluctant even to discuss the place of technologies for learning and in their teaching practice.

Considering the above, it is not surprising that only the instructor who had some training shared her support for collaborative learning with technology, she has not only implemented some approaches to promote collaborative learning through technology (Facebook and Skype) but also is looking forward to participate in training that would reveal additional opportunities for such learning. No clear opinion was expressed by the other instructors when

they were asked about their views on collaborative learning through technology.

Students

Similarly to the administrators and instructors, the students' understanding of specifics of Web 2.0 technologies was limited. They did not demonstrate familiarity with specific applications exemplifying the use of Web 2.0 technologies for learning in their field. They also viewed the principles of Medicine 2.0, when they were mentioned by us during the interview, as something that does not apply to their future professional reality. When talking about including technologies in their learning, they used the term "technology" in a broad sense without actually referring specifically to Web 2.0 but rather embracing both Web 1.0 and 2.0 technologies.

It is interesting to note that even the students who were engaged in collaborative learning interactions online did not discuss the role of technology for collaborative learning. Furthermore, the students from one of the regulated programmes expressed their negative attitudes towards learning online. One of the students stated that because computers influence quite aggressively almost every aspect of our life, it might be appropriate to provide a "computer free environment" in the classrooms.

The students from the non-regulated programmes viewed technology as means to support their learning of theory through online provision of learning materials and online submission of assignments; they believe that such use of technology would help overcoming the attendance barrier. In addition, according to the students, technologies provide opportunities to learn through multimedia – the recorded performance of specific techniques allows multiple reviews, the use of slow motion and stop frame, features that they find to be very important considering the nature of the professional skills they are acquiring.

Discussion

Based on the outcomes of the presented interview analysis, we could conclude that the view of the PHE as education which requires full time face-to-face presence is shaped by the government regulations and adopted by the main actors in the learning process in this college: the college administration, the academics, and the students. Moreover, their limited understanding of the specifics and the possibilities of Web 2.0 technologies to support self-directed, active and flexible learning, student-centered instruction, and acquisition of professional practices compatible with the emerging expectations of Medicine 2.0 prevents them from considering the implementation of these technologies. Along with the stated above, comes the lack of specific data that would further inform the decision making when strategies for overcoming the flexibility and accessibility barriers of the college programs are considered.

These conclusions lead us to suggest specific strategic approaches as being instrumental for supporting Web 2.0 inclusion into the learning process as means for overcoming existing obstacles, increasing flexibility, and providing effective PHE which would meet the demands of the immerging Web 2.0 and Medicine 2.0 communities:

I. Raising the awareness of the administration and instructors about existing teaching approaches and practices in the field of PHE supported with Web 2.0 technologies. These can include introducing them to forums for online communication and collaboration within and among communities of practice in public health. Examples of such forums could be health related blogs, wikis, social networks and the new models of Personal Health Records (Eysenbach, 2008); these forums could involve public health care professionals and patients and be part of PHE and PH practice. In addition, they can explore the existing practices involving the use of serious games and virtual learning realities and simulations in PHE. These uses of Web 2.0 technologies can help to overcome the obstacles identified in the interviews: (a) they pro-

vide basis for more flexible curricula and schedules without jeopardizing the quality of education, (b) they can provide opportunities to a greater access to other communities of practice in the field, and (c) they can support learning of highly theoretical and technical aspects through supporting the information presentation and organization and through providing meaningful and smooth transition between theory and practice.

II. Following the initial acquaintance with Web 2.0 technologies, the faculty members can participate in professional training programs that would further develop their computer and pedagogical skills when the use of Web 2.0 technologies is considered. The aim of this training will be to support the inclusion of these technologies as an integral part of the learning process with the aim to train PH professionals whose skills will meet the demands of the modern society.

III. With the consideration that there are very few if any PHE oriented Web 2.0 applications and environments in Bulgarian language, another goal of such training will be to guide professionals towards acquiring skills which will allow them to get involved in the pedagogical design of Web 2.0 applications and learning environments for their students in Bulgarian.

IV. The faculty members who start using Web 2.0 technologies in their teaching should support their students in the acquisition of the necessary computer and professional skills that would assure their success in Web 2.0 learning and professional environments.

V. Considering the expressed interest towards establishing connections with other PHE institutions in the country and especially in the EU, the administrators should seek opportunities for finding such partners and promote the Web 2.0 technologies as a tool for communication and collaboration; this would be a low-cost solution that would at the same time provide opportunities for establishing or entering flexible professional networks.

VI. The administrators should plan strategies for overcoming possible language barriers in the communication with international partners through establishing language training programs for their students and faculty members.

VII. When the flexibility and accessibility of education within the college is concerned, it is essential for the college administration to conduct a systematic study of students' detailed demographic profile, attrition rate, and the reasons leading to student drop-out. This is especially important because of the changing demographics of student population with students of various ages entering the college programmes. Based on the outcomes, strategies for meeting the needs of students who are more likely to fail to complete their studies should be planned; in this context, the role of the Web 2.0 technologies, among the other measures for improving the accessibility of education, should be considered.

VIII. Taking into account the growing role of informal education which is also marked by the presence and use of Web 2.0 technologies, it is also viewed as instrumental for the key actors in PHE in Bulgaria to consider a system for acknowledging knowledge and experience acquired outside of the specific educational institution. Such system could support the creation of fast-track programs; their accreditation can be supported by the already existing and clearly stated professional descriptions including skills, knowledge, and competencies.

NOTES

1. <http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf>
2. http://www.euro.who.int/_data/assets/pdf_file/0006/80592/E90023.pdf

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