

MODERN TEACHING – DISTANCE LEARNING

**A guide to online and blended learning
with case studies from public health**

Produced by the Working Group on Innovation and
Good Practice in Public Health Education - ASPHER
In cooperation with ASPHER members

Brussels, 2013

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The views expressed in this
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FOREWORD

This first edition of a Guide for Distance Learning has been developed, based on the ASPHER Survey on Schools and Departments of Public Health (SDPH) 2011/2012. Institutions from all corners of Europe contributed with their experience in the new and rapidly developing field of Blended Learning. There are many different and partly overlapping terms like Distance Learning (used here as an umbrella term), e-learning, on-line teaching/learning, Problem Oriented Learning, Problem Based Learning, Continuing Professional Development etc. used by our authors in different ways. One additional term is emerging recently "Continuing Online Training", which perhaps captures best the new philosophy of Lifelong Learning and is one of the essential pre-conditions for its broad acceptance, i.e. the availability of training modules on-line. Knowledge and skills once acquired are rapidly outdated and have to be updated and developed each year throughout the lifecycle.

If we look at the European SDPH we have to admit that less than a fourth of them has implemented the essential technologies and translated their teaching materials for the use via Internet. This limits not only the national outreach but also limits the European relevance globally - with the exception of a few SDPH - especially if comparing to the United States. We hope that this first edition of a Guide for Distance Learning will inspire training and teaching of public health throughout Europe. The Working Group for Innovation and Good Practice in Public Health Education (WGIGP) is grateful for comments and helpful criticism and looks forward to a second edition.

Belgrade, 22 June, 2013

On behalf of WGIGP

Prof. Vesna Bjegovic-Mikanovic (Chair)

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List of Acronyms

ASPHER Association of Schools of Public Health in the European Region

CC Current Contents

CE Continuing Education

DALY's Disability Adjusted Life Years

DL Distance Learning

EHEA European Higher Education Area

EPHF Essential Public Health Function

EPHO European Public Health Operation

EPHS Essential Public Health Service

EUPHA European Public Health Association

FTE Full Time Equivalent

IANPHI International Association of National Public Health Institutes

ISI Institute for Scientific Information

LLL Lifelong Learning

MHA Master of Health Administration

MPH Master of Public Health

MSc Master of Science

NPHPSP National Public Health Performance Standards Program

PH Public Health

PAHO Pan American Health Organization

SDPHs Schools and Departments of Public Health

SPH School of Public Health

UK United Kingdom

WG Working Group

WGIGP WG on Innovation and Good Practice in Public Health
Education

WPHF Western Pacific Essential Public Health Functions

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A. INTRODUCTION

Functions, Competences, and Performance in Public Health Education¹

VESNA BJEGOVIĆ-MIKANOVIC, DEJANA VUKOVIC, ROBERT OTOK, ULRICH LAASER

Nowadays SDPHs and public health professionals are searching for interface and synergies between public health science and practice. Following the Bologna process, through Berlin (2003), Bergen (2005), London (2007) and Leuven/Louvain-la-Neuve Communiqués (2009), the European Ministries of Education have adopted the Budapest-Vienna Declaration on the European Higher Education Area in March 2010. Higher education priorities in the decades to come are the following²:

- Social dimension: equitable access and completion;
- Lifelong learning;
- Employability;
- Student-centered learning and the teaching mission of higher education;
- Education, research and innovation;
- International openness;
- Mobility;
- Data collection;

1 adapted from the report on the SURVEY OF EUROPEAN SCHOOLS AND DEPARTMENTS OF PUBLIC HEALTH AND EMPLOYERS OF PUBLIC HEALTH PROFESSIONALS; February 2012

2 Communiqué of the Conference of European Ministries Responsible for Higher Education. Leuven and Louvain-la-Neuve, 28-29 April 2009.
http://www.ond.vlaanderen.be/hogeronderwijs/bologna/2010_conference/ (accessed January 31, 2012)

- Multidimensional transparency tools; and
- Funding.

In the same lines are all actions of the European Union in the field of higher education, starting from Lisbon Strategy and “The role of education in a fully-functioning knowledge triangle”³. Priorities for Action in the EU are the following:

1. Developing more coherence between policies in the fields of education, research, and innovation;
2. Accelerating pedagogical reform;
3. Partnership between universities and business and other relevant stakeholders;
4. Measures to develop an innovation culture in universities;
5. Creating incentives for universities to develop transferable knowledge;
6. New approaches to quality assessment;
7. Developing the European Institute of Information Technology.

Furthermore, important documents such as the “Strategic framework for European cooperation in education and training” (“ET 2020”)⁴ have established respective strategic objectives:

1. Making lifelong learning and mobility a reality;
2. Improving the quality and efficiency of education and training;
3. Promoting equity, social cohesion and active citizenship;
4. Enhancing creativity and innovation, including entrepreneurship, at all levels of training.

3 Official Journal of the European Union 2009; C302/3. <http://ec.europa.eu/education> (accessed January 31, 2012)

4 Official Journal of the European Union 2009; C119/5. http://ec.europa.eu/education/lifelong-learning-policy/doc1120_en.htm (accessed January 31, 2012)

Achievements of these strategic objectives are supported by performance standards in the field of education, namely reference levels of European average performance in general education (“European benchmarks”)⁵. Out of five benchmarks two are certainly relevant for Schools and Departments of Public Health (SDPHs):

- Adult participation in lifelong learning : By 2020, an average of at least 15% of adults (25-64) should participate in lifelong learning.
- Tertiary level attainment: By 2020, the share of 30-34 year olds with tertiary educational attainment should be at least 40%.

Looking at the environment of SDPHs mobility, employability and language learning could also be recognized as important.

Recently the European Commission and WHO Regional Office for Europe agreed on a Joint Declaration covering partnership for health in the European Region⁶ as follows:

- Innovation and health;
- Health security;
- Modernizing and integrating the public health information system;
- Investing in health;
- Health inequalities; and
- Strengthening in-country cooperation in non-EU countries.

In addition, the newly adopted document of EURO WHO about Essential Public Health Operations (EPHOs) – “Strengthening public health capacities and services in Europe: a framework for action” is also a stimulus for further strengthening of public health education,

5 Official Journal of the European Union 2009; C119/5. <http://ec.europa.eu/education> (accessed January 31, 2012)

6 WHO Regional Committee for Europe. Sixtieth session. Moscow, 13-16 September 2010 (EUR/RC60/12 Add. 1)

research and practice⁷. Now also in Europe, the health systems comprise public health services and workforce to be one of their main components. The same is underlined within the new European Health Policy “Health 2020” and the whole-of-government and whole-of-society approach in it⁸.

Throughout the world agreement is sought as concerns standardized lists of competences required to act in order to perform specified service functions. Moreover, they must be continuously evaluated and updated by use of performance measurement in everyday public health practice. So far schools and departments of public health were less involved than public health institutes, non-governmental or voluntary networks in worldwide and European discussion groups on public health performance standards.

Following the European and global experience as well as experience in the development of public health performance standards, several perspectives can be envisaged:

1. Development of academic public health programmes, based on mobility of students and professionals in the EHEA to allow personal development and employability in public health;

7 WHO. Strengthening public health capacities and services in Europe: a framework for action. As agreed upon in the sixty-first session Baku, Azerbaijan, 12–15 September 2011. + EUR/RC61/Conf.Doc./3 Copenhagen: WHO Regional Committee for Europe. <http://www.euro.who.int/en/who-we-are/governance/regional-committee-for-europe/sixty-first-session/documentation/working-documents> (accessed January 15, 2012), later formally adopted in a slightly edited version at the sixty-second session in Malta 14th September 2012 (<http://www.euro.who.int/en/what-we-do/health-topics/Health-systems/public-health-services/news/news/2012/09/european-countries-adopt-action-plan-for-strengthening-public-health-capacities>; accessed 06.01.2013). The listing of Azerbaijan compares to the one finally adopted EPHOs in Malta (Malta) as follows : 1 (1); 2+3 (2); 4 (3); 5 (5); 6 (4); 7 (7); 8 (6+8); 9 (9); 10 (10).

8 WHO. <http://www.euro.who.int/en/what-we-do/event/first-meeting-of-the-european-health-policy-forum/health-2020> (accessed January 15, 2012).

2. Expansion of lifelong learning, which involves extending knowledge and gaining skills –acquisition of competences – in the SDPHs, and application of innovation in training, particularly with regard to information technology for Web 2.0 (*Internet and Mobile technologies, OpenCourseWare* on selected topics, and supportive elements of *Distance Learning* in general); and
3. Increasing the potential of higher education programmes, based at all levels on state of the art research fostering changes by innovation and creativity in the public health society.
4. Therefore, understanding of the different settings involved is of great importance for accountable performance in public health. Public health practitioners are expected to be effective in different environments. They have to work with many different partners and paradigms. The main questions in strengthening public health services are:
 - Who employs the public health professionals and what are their agendas? And
 - What is the performance of public health professionals?

The steps in Figure 1 summarise the recent dialogue among public health professionals, which started from core public health functions to approach efficient and accountable performance.

Figure 1. From Core PH Functions to Core Competences, Teaching Curricula and PH Performance



The public health workforce includes all those responsible for providing the services identified within essential public health functions.

Essential Public Health Functions/Operations can be considered as a set of fundamental activities that address determinants of health, maintain and protect population health through organized efforts of society. There are several lists of PH functions, and services, which are global or region specific.

Table 1 shows the Essential Public Health Operations (EPHO's) of WHO-EURO agreed upon at the WHO European Regional Committee 61 (Baku, Azerbaijan, 12-15 September 2011; for comparison with the final listing in Malta see also footnote 6)⁹ in the first column. Three other sets are included for comparison: The Western Pacific Essential Public Health Functions (WPHF), CDC's Essential Public Health Services (EPHS's) and the Essential Public Health Functions (EPHF's) as published by PAHO^{10,11}. For comparison with the EPHO's the other 3 examples are rearranged to fit as far as possible with the EPHO's, however the numbers of their original sequence are

9 Regional Committee for Europe EUR/RC61/Inf.Doc./1 Sixty-first session: Baku, Azerbaijan, 12-15 September 2011.

<http://www.euro.who.int/en/who-we-are/governance/regional-committee-for-europe/sixty-first-session/documentation/information-documents/inf-doc-1-strengthening-public-health-capacities-and-services-in-europe-a-framework-for-action> (accessed January 23, 2012).

10 Essential public health functions: a three-country study in the Western Pacific Region, ISBN 92 9061 082 4 (NLM Classification: WA 525), World Health Organization 2003.

http://www.wpro.who.int/NR/rdonlyres/7472FD5D-BBD0-4640-8EB8-3EAC8A2276B9/0/Essential_public_health_functions.pdf (accessed January 23, 2012).

11 A comparison between CDC's Essential Public Health Services and PAHO's Essential Public Health Functions.

http://www.health.gov.on.ca/english/public/pub/ministry_reports/walker04/appendices2.pdf (accessed January 23, 2012).

maintained. Similar sets of basic characteristics for improving the public health are missing especially for the African continent whereas the Pacific EPHF's are based on a study of 3 countries only (Fiji, Malaysia, and Vietnam). While the headline terminology differs in terms of Functions, Operations and Services as well as the total number of items, also the areas listed are not always analogous. However, all four sets start with health monitoring and continue with identification of priority health hazards in the community as the second item. For the 3rd EPHO only the EPHF's of PAHO contain a corresponding function, interestingly at the end of their list as No. 11. Out of the subsequent EPHO's 4, 5 and 6, i. e. Health Protection, Disease Prevention and Health Promotion only health promotion is covered by all four sets whereas Health Protection is not covered by PAHO and Prevention not by CDC. EPHO 7 on assuring a competent public health and personal health care workforce is taken wordily from the CDC set and amended by the word "Training" in the PAHO functions (No. 7). However, education and training as well as continued education in public health are extensively covered by the sub-objectives in appendix 1 to the EPHOs source document.

EPHO 8 deals with good governance (it is less obvious what is meant by *core* governance in the document), quality assurance and the necessary financial means. However, the formulation is restricted to public health whereas the three other sets refer also to personal health services. CDC adds effectiveness and accessibility. Again these issues are covered as sub-objectives in the appendix 1 of the EPHOs source document. EPHO 9 on communication (again it is not immediately clear what is meant by *core* communication) is not mirrored in the Western Pacific functions but covered by analogous wording in the CDC and PAHO sets. Finally all 4 lists cover health or public health research. Interestingly the key areas of health policy and planning, management and accessibility are all covered explicitly by one EPHO – EPHO 8 conceptually dealing with good governance. Public health functions – operations are essential everywhere and services to provide these functions are required in all countries.

The term of competences may be understood as “a complex set of measurable behaviors made up of knowledge, skills and attitudes that can be shown to predict and measure effective performance”¹². Critical reasons why competences have become important are that they have refocused the entire training, development and human resource function around achieving organizational objectives. So qualifications (education, credentials) become less important than the ability to perform (experience, behavior and attitudes towards the job). Performance is to be addressed through performance measurement, management and standards, which means a good practice to actively use performance data to strengthen the public health system. Performance standards will be objective formats of measurement that serve as a rule (benchmark) against which an organizational or individual level of performance can be compared.

12 Nelson J, The Public Health Competency Handbook: Optimizing Individual & Organizational Performance for the Public’s Health, Atlanta, GA: Centre for Public Health Practice of the Rollins School of Public Health; 2002.

Table 1. Comparison of original numeration in the lists of WHO-EURO's Essential Public Health Operations, the Western Pacific Essential Public Health Functions, the CDC's Essential Public Health Services and PAHO's Essential Public Health Functions

WHO-EURO's Essential Public Health Operations (EPHOs) ¹	Western Pacific Essential Public Health Functions (EPHF) ²	CDC's Essential Public Health Services (EPHS) ³	PAHO's Essential Public Health Functions (EPHF) ³
1. Surveillance of diseases and assessment of the population's health	1. Health situation monitoring and analysis	1. Monitor health status to identify community health problems	1. Monitoring, evaluation and analysis of health status
2. Identification of priority health problems and health hazards in the community	2. Epidemiological surveillance/ disease prevention and control	2. Diagnose and investigate health problems and health hazards in the community	2. Public health surveillance, research and control of risks and threats to public health
3. Preparedness and planning for public health emergencies	-/-	-/-	11. Decreasing emergencies and disasters in health including prevention, mitigation, preparedness, response and rehabilitation
4. Health protection operations (environmental, occupational, food safety and others)	5. Regulation and enforcement to protect public health	6. Enforce laws and regulations that protect health and ensure safety	-/-

5. Disease prevention	See in part No. 2		See in part No. 11
6. Health promotion	7. Health promotion, social participation and empowerment	4. Mobilize community partnerships to identify and solve health problems 5. Develop policies and plans that support individual and community health efforts	3. Health Promotion
7. Assuring a competent public health and personal health care workforce	6. Human resources development and planning in public health	8. Assure a competent public and personal health care workforce	8. Human resource development and training in public health
8. Core governance, financing and quality assurance for public health	8. Ensuring the quality of personal and population based health services 3. Development of policies and planning in public health 4. Strategic management of health systems and services for population health gain	9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services 7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable	9. Quality assurance in personal and population based health services 5. Development of policies and institutional capacity for planning and managing public health 6. Strengthening of institutional capacity for planning and management in public health 7. Evaluation and promotion of equitable access to necessary

			health services
9. Core communication for public health;	-/-	3. Inform, educate and empower people about health issues	4. Social participation in health
10. Health-related research	9. Research, development, and implementation of innovative public health solutions	10. Research for new insights and innovative solutions to health problems	10. Research on public health

Compiled by Bjegovic-Mikanovic 2012 (based on the draft version of EPHOs which was slightly modified at the 62nd Regional Committee for Europe of WHO in Malta, 10-13 September 2012)

Source:

1) Regional Committee for Europe EUR/RC61/Inf.Doc./1 Sixty-first session: Baku, Azerbaijan, 12–15 September 2011.

<http://www.euro.who.int/en/who-we-are/governance/regional-committee-for-europe/sixty-first-session/documentation/information-documents/inf-doc-1-strengthening-public-health-capacities-and-services-in-europe-a-framework-for-action> (accessed 17 September, 2011).

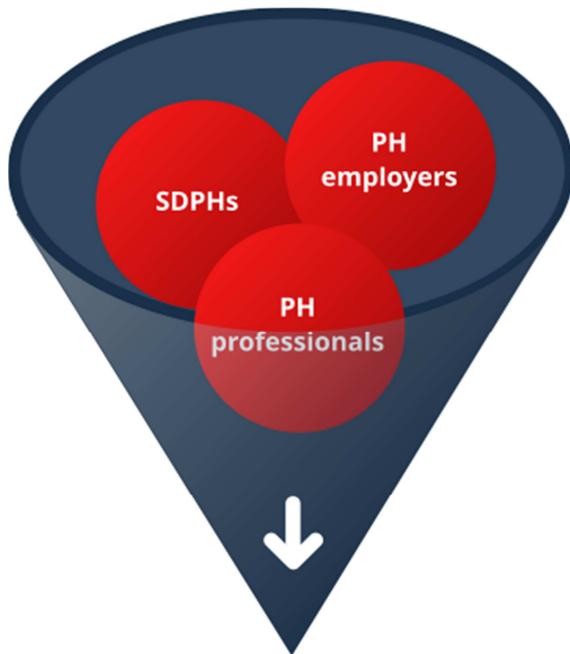
2) Essential public health functions: a three-country study in the Western Pacific Region, ISBN 92 9061 082

3) (NLM Classification: WA 525), World Health Organization 2003.

http://www.wpro.who.int/NR/rdonlyres/7472FD5D-BBD0-4640-8EB8-3EAC8A2276B9/0/Essential_public_health_functions.pdf (accessed January 23, 2012).

4) A comparison between CDC's Essential Public Health Services and PAHO's Essential Public Health Functions.
http://www.health.gov.on.ca/english/public/pub/ministry_reports/walker04/appendices2.pdf (accessed January 23, 2012).

Figure 2. Simple model of public health performance



After these clarifications of basic terms, the group developed a model, which includes a triangular approach for the survey population: SDPHs, employers and individual PH professionals. Relationships between the three subgroups were developed in a simple model, which would instruct performance assessment in the survey and later (Figure 2). This simple model also served to establish an interface between functions – operations, competences and performance in such a way that experience was integrated. Supply and demand for competences should guaranty the best possible performance of public health services in different environments.

For employment in an organization performing public health services, it is necessary to have one of the basic degrees in public health (bachelor, master or doctoral level), while additional competences public health professionals are gaining trough Lifelong Learning (LLL).

While there are different published models of health system performance, which are dealing with its various dimensions^{13,14,15}, very few of them are developed in the field of public health and very often relate to the concept of management as a basis for measuring performance¹⁶. Performance management then is used as practice for strengthening public health services. The model of performance assessment employs performance standards, measures, progress reports, and ongoing quality improvement efforts to ensure that public health organizations achieve desired results. Preferably, these dimensions of performance are integrated into EPHOs at multiple levels¹⁷. Since its inception in 1998, the National Public Health Performance Standards Program (NPHPSP) in the US has provided public health leaders at the local/community level and state level with the opportunity to assess their individual public health system (defined as all governmental, non-profit, and community organizations that contribute to public health in a particular jurisdiction) measured against model standards for the 10 Essential Public Health Services. The assessment provided valuable data that allow leaders to work with their community partners and make decisions regarding health priorities, collaborative strategies to

13 Smith PC, Mossialos E, Papanicolas I, Leatherman S, eds. Performance Measurement for Health System Improvement. Cambridge: Cambridge University Press; 2009.

14 WHO. The world health report: working together for health. Geneva: World Health Organization; 2006.

15. Santric Milicevic M, Bjegovic-Mikanovic V, Terzic-Supic Z, Vasic V. Competencies gap of management teams in primary health care. The European Journal of Public Health. 2011;21:247-53.

16 Public Health Foundation. Turning Point Performance Management Collaborative. From Silos to Systems. Using Performance Management to Improve the Public's Health Washington, DC: Turning Point National Program Office; 2003.

<http://www.turningpointprogram.org/toolkit/content/silostosystems.htm> (accessed January 31, 2012)

address them, sharing of resources, and measurement of improvements. A stated goal of the NPHPSP is to build the relationships and networks within communities (or across states) to enhance public health services and improve overall performance. Evaluation studies suggest strong impacts across the public health system including an increased ability to leverage system staff for priorities, pooling resources, more coordinated decision-making and securing more multi-agency grants. In addition, further analysis indicates a high proportion of users of the NPHPSP achieved the following objectives – identify strengths and weakness of their public health system (85-100%); create awareness of the interconnected public health system (78-100%); develop community health plans to make improvements (70-75%); create a better community-wide understanding of priority health issues (73-100%); create system collaboration (75-88%); and engage system partners in a performance improvement process (58-78%). In conclusion, the NPHPSP's tools and processes allow public health leaders a means to engage system-wide partners in a meaningful assessment, analysis, and prioritization of their system which leads to improved performance and community health outcomes.

Similar assessments of public health performance do not exist in Europe, hence in this survey, the framework for public health performance assessment is based on the WHO approach published in the World Health Report 2006¹⁵. Starting from this WHO model, WGIGP assumes that performance varies and has different success in achieving long-term objectives in the improvement of population health, due to different public health workforce; therefore all 4 dimensions of the WHO-model should be included in a comprehensive assessment of public health performance in the future¹⁵:

- **Availability** in terms of space and time: encompasses distribution and attendance of existing workers;
- **Competence** as the combination of technical knowledge, skills and behaviours;

- **Responsiveness** related to people that are treated decently, regardless of whether or not their health improves;
- **Productivity** connected the maximum effective public health services and health; reducing waste of staff time or skills.

B. DISTANCE LEARNING

B.1 E-Learning for Education

CLAUDE MARTIN-RAINAUD, JADRANKA BOZIKOV

A road map for the marketing and long term sustainability of academic programmes has often been seen in the enhancement through innovative educational technologies. Institutions of Higher Education across the world are responding to the challenges and opportunities presented by the availability of new Web 2.0 applications. The diffusion of technological advances and the adoption process has varied widely, barriers to change being linked more to the resistance associated with human behavior rather than to limitations of computer capabilities. However, the new generation of learners has an acceptance and utilization of technology that can be much more advanced than that of their tutors.

In a recent survey on the Schools and Departments of Public Health (SDPH) in Europe¹⁷ it appeared that almost all 66 participating institutions indicated that they are involving active methods of learning. But only 16 or 24% indicated the availability of modules for distance learning in order to support active and blended learning of students, in average 7 of such modules per SDPH. Out of all participants 46 or 70% indicated the presence of a computer Laboratory (LAB) with a median of 25 computers per LAB, all computers connected to the Internet with different systems, usually LAN or a combined type of connection (LAN and wireless) (Table 1).

17 Bjegovic-Mikanovic V, Vukovic D, Otok R, Czabanowska K, Laaser U. Education and training of public health professionals in the European Region: variation and convergence. Int J Public Health 2012; DOI: 10.1007/s00038-012-0425-2

Table 1. Support to teaching methods and learning process

Item	Number of institutions out of 66	Median in units or percent	Range
Number of computers	46	25	3 – 400
Number of modules for Distance Learning	16	7	1 – 102
Access to up to date library specialised in public health literature	35	53%	/
Access to bibliographical databases (Scopus, Web of Science, etc.)	42	64%	/

New forms of collaborative learning platforms, based on cloud technology have been developed and are now common place enhancements to virtual learning environments such as Moodle. Some of SDPHs in this survey use these new technologies; as an example one such provider is mentioned here: Blackboard Collaborate, a new venture formed from the two previous market leaders: Wimba and Elluminate. However, this technology relies on open source programs and new competitors are a feature of the market. Some new SDPHs stated their experience in negotiating excellent contract terms for pilot trials e.g. linked to one programme of study or one application. Some SDPHs, also have a reputation for

innovate content and delivery and would be an excellent candidate to trial software applications.

E-Learning¹⁸ as understood today is “any electronic tool, method and system used to design, develop, deliver, assess and manage more or less methodically and systematically the overall teaching and learning process”. The educational use of any specific or generic software application working on a Computer Hard-drive, or from a USB Key, from a CD-Rom or a DVD can be considered as e-Learning. But in its most common sense, e-Learning is connection to the Internet or any other telecommunication network, as Teleconferencing, Videoconferencing, Wide Area Network, Local Area Network, VoIP¹⁹ or Mobile telephone. E-Learning covers school, university, vocational and professional education and training as well as lifelong learning, as a formal or informal process.

In fact e-Learning is “Information and Communication Technology Application to Learning”, and it can include all possible modalities: Face-to-face learning in the traditional classroom setting, Distance Learning and any mix of the two called “Blended Learning”. But it can also be called “Computer-Supported Collaborative Learning”, “Technology Enhanced Learning” or many other possible denominations.

E-Learning is today promoting fast and evolving science and technology research and development areas in many universities, International and European scientific or development projects and national or international organizations devoted to standards

18 Taken from Claude Martin Rainaud: “Training in Health Service Management in Serbia” EAR funded project

19 VoIP: Voice over Internet Protocol as used by Skype for instance.
<http://en.wikipedia.org/wiki/Voip>

specifications definition worldwide. From these important activities new educational technologies and methodologies are emerging and providing opportunities that can be possible approaches or options in educational projects.

As digital technology changed the face of communication, finance and economical activities, it is also modifying educational practice and context. We present briefly below what main perspectives have been opened.

1) Learning Management System²⁰ (or Virtual Learning Environment²¹)

Learning Management Systems are now ubiquitous in most universities as well as in any kind of school around the world to manage many administrative, communicative, educational and statistical aspects. Such systems implemented through web applications related to databases are facilitating many different management activities, as for instance student registration and fees payment, information and documents dissemination; educational resources distribution, tracking of student activities in discussion forums, individual or group assignments; results to assessment as well as individual, group or global statistical reports. Each of these functions can be activated or not. On top of such generic options many features are available as plug-ins or optional functions.

Learning Management Systems can be downloaded free of charge on the Internet, or acquired from commercial companies with different kind of free or proprietary licenses. Moodle²² and Blackboard²³ are

20 http://docs.moodle.org/en/Online_Learning_History

21 http://en.wikipedia.org/wiki/History_of_virtual_learning_environments

22 <http://moodle.org>

the most prominent options in each category. According to the selected option it can also be freely installed and maintained on a server relying on permanent technical staff or relying on external commercial services.

2) Collaborative Learning

Scientific research in educational psychology carried out since the last century is concluding that learning is achieved better by individuals through tutored activities in collaborative groups. Combinations of different face-to-face and virtual learning environments are looking to be more efficient and attractive than the traditional academic course model. Many possible software solutions and options are available to design and provide such collaborative environments to carry out individual or group activities implementing socio-constructivists approaches to teaching and learning. Web-based applications such as Wikis²⁴ and Blogs²⁵ are very appropriate.

3) Free Open Source Software and Open Educational Resources²⁶

Two different major models are in competition today for software development and dissemination. The “Proprietary” model relies on the traditional commercial perspective where the product is sold as ready to be installed, developed internally and protected by a

23 <http://www.blackboard.com> (Blackboard inc. is claiming for a controversial patent on e-Learning that was recently rejected by the United States Patent and Trademark Office <http://campustechnology.com/articles/60271/>)

24 <http://en.wikipedia.org/wiki/Wiki>

25 <http://en.wikipedia.org/wiki/Blog>

26 FOSS tools for OER development, management and dissemination (IIEP-UNESCO) [http://oerwiki.iiep-unesco.org/index.php?title=Appendix: FOSS tools for OER development%2C management and dissemination](http://oerwiki.iiep-unesco.org/index.php?title=Appendix:_FOSS_tools_for_OER_development%2C_management_and_dissemination)

“Proprietary” license. This kind of license prevents the user from “opening” the source code of the software to see how it works and make modifications for any reason. It also prohibits copying and redistributing this software as it is, or modified. Copying is in fact very easy and costs nothing, as the product is immaterial.²⁷ Many such pirated copies of proprietary software are used in education, but this is illegal.

At the opposite there is the “Free Open Source Software” model that is developed collaboratively through peer review, by individual volunteers and/or companies making the source code freely available to all on the Internet. It is protected by an “open” license that guarantees the free (as in freedom of) access to the software source code to everybody; and the free use of the software, (learning, modifying and redistributing), but under the same license. This allows any individual or organization to get free software, to use it and adapt it freely to one’s use and redistribute it eventually. Which also means that such software being reviewed by so many persons is evolving and improving faster than proprietary means.

Based on the same assumption, it is the same for textbooks contents and educational resources. If it is developed and published as “Open Educational Resources”, not only it is free and open to be modified and adapted, but also it can improve faster and be more efficient. A huge movement has started to publish entire lists of courses and educational resources under “Creative Commons” licenses²⁸ or other

²⁷ Digital code is immaterial, software industry has made software artificially scarce by declaring it a material commodity to be sold as any material product.

²⁸ <http://creativecommons.org/about/license/>

licenses, as “Open Educational Resources” in many universities worldwide²⁹.

4) Learning Design³⁰

Based on different scientific research, efficient instructional design methods and technologies are providing today a consistent platform to design and develop sound “Units of Learning”³¹. For instance Benjamin Bloom’s taxonomy³² of learning objectives and Robert Gagné’s “nine events of instruction”³³ are providing an efficient basis to structure learning in a coherent system.

A Competence-based approach also presents a convincing model to define, through a needs analysis initial step, the competences to be acquired by the targeted population, using a structured model including all necessary information to design the entire learning system. In this model, competences may be divided in taxonomy with several levels, each element of competence being described in terms of performance, criteria of performance, and indicators of performance. Those indicators may be classified using Gagné’s

29 http://www.ocwconsortium.org/index.php?option=com_content&task=view&id=17&Itemid=32

30 http://en.wikipedia.org/wiki/Learning_Design

31 “An abstract term used to refer to any delimited piece of education or training, such as a course, a module, a lesson, etc. A unit of learning represents more than just a collection of ordered resources to learn—it includes a variety of prescribed activities (e.g., problem solving activities, search activities, discussion activities, peer assessment activities), assessments, services and support facilities provided by teachers, trainers and other staff members”
<http://www.lornet.org/Glossaire/U/tabid/350/language/en-US/Default.aspx>

32 Taxonomy of Educational Objectives, B. Bloom, 1984
http://en.wikipedia.org/wiki/Benjamin_Bloom

33 The Conditions of Learning, R. Gagné, 1995 ; Principles of Instructional Design, R. Gagné, 1992.
http://en.wikipedia.org/wiki/Robert_M._Gagn%C3%A9, http://www.e-learningguru.com/articles/art3_3.htm

Taxonomy of learning outcomes³⁴, or other suitable models. The Cheetham & Chivers³⁵ model is currently very popular.

Having achieved such competence definition, all necessary information to design the learning will be available:

- from the performance definition it is possible to derive directly the learning objectives;
- from the performance criteria we get the different topics to be addressed and possible contents;
- from the indicators of performance we get all necessary information to design the assessment tools.

5) Learning Styles and Usability

Learning is achieved by individuals through specific psychological typical settings called "learning styles"³⁶, and also through declared or implicit preferences. There are different models to identify and manage learning styles - David Kolb's Learning-Style Inventory³⁷ is one of the most famous psychological approaches.

Learning preferences or Media preferences deal with preferred personal learning strategies / heuristics and if the student learns better with speech, text, graphics, video or any multimedia combination. These considerations can impact on the design of the Units of Learning, not only in their didactical structure but also in the

34 <http://my-ecoach.com/idtimeline/theory/gagne.html>

35 Professions, Competence and Informal Learning, Cheetham & Chivers, 2005 (ISBN-10: 1843764083)

36 "Learning-styles theories have been criticized by many. Some psychologists and neuroscientists have questioned the scientific basis for these models and the theories on which they are based." http://en.wikipedia.org/wiki/Learning_style

37 http://en.wikipedia.org/wiki/David_A._Kolb

ergonomic dimension of the media design and functional environment that is called “usability”³⁸.

E-Learning media and environments are based on computer interaction, and their efficiency is directly related to the usability of the design. So usability is efficiency in the intuitive learning of the interface’s commands (also called “Learnability”³⁹), and efficiency in the learning achieved by the student. Units of Learning designed with poor usability create more difficulties to the learner not related with the topic to be learned. The learner may be distracted from learning by having to learn how to use the contents or the system. That can have a negative impact on course completion rates and post-test scores.⁴⁰ As a conclusion, usability of learning media and environments must be tested with a sample of targeted users.

6) Learning Technology Standards

From an economical perspective, in order to be able to share, reuse and adapt learning resources in the same system or in any other, different international consortia have specified a set of standard metadata⁴¹. Produced by an instructional designer, a teacher or a

38 “The International Organization for Standardization, defines usability as: The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” <http://en.wikipedia.org/wiki/Usability>, <http://www.usability.gov/basics/whatusa.html>

39 In software testing learnability, according to ISO 9126, is the capability of a software product to enable the user to learn how to use it. <http://en.wikipedia.org/wiki/Learnability>

40 “Designing for usability from the very beginning increases the likelihood of a more usable product and reduces the need for testing at the end, when it is often too late or costly to make substantial changes. Designers can be educated on basic usability principles that they can apply from a project onset.” <http://elearnmag.org/subpage.cfm?section=tutorials&article=24-1>

41 IMS : <http://www.imsproject.org/aboutims.html>, SCORM : <http://en.wikipedia.org/wiki/SCORM>

learner, a "Learning Object" can be compliant to such standards when "packeted" with specific tools as Reload⁴² or eXe.⁴³

7) LifeLong Learning⁴⁴

In our globalized knowledge-based economy, e-Learning is providing new opportunities for adults to cope with competences they need to adapt to necessary evolutions in their practices, or to access new responsibilities. Lifelong Learning is a flexible concept for educational and training institutions, projects, enterprises etc to offer any kind of training, competence development service and qualification to anyone: young not yet employed, worker in activity, unemployed, all through his or her professional life.⁴⁵

The characteristics of anywhere-anytime networked collaborative learning based on competence definition and IMS Learning Design⁴⁶ standards are very attractive in this perspective. Important research and development European projects are currently ongoing - TENCompetence is one of the most important.

42 "RELOAD focuses on developing the following set of open source tools for learning objects packaging and delivery." <http://www.reload.ac.uk/tools.html>

43 "The eXe project is developing a freely available Open Source authoring application to assist teachers and academics in the publishing of web content without the need to become proficient in HTML or XML markup." <http://exelearning.org/>

44 http://en.wikipedia.org/wiki/Lifelong_learning

45 OECD report Qualifications and Lifelong Learning: "In the work arena, adult learning is important for the individual to maintain employability and improve career prospects, since employers need workers with an ever-expanding skills base to keep up with the latest developments." <http://www.oecd.org/dataoecd/10/2/38500491.pdf>

46 "IMS Learning Design (IMS LD) is a specification for a metalanguage which enables the modelling of learning processes." http://en.wikipedia.org/wiki/IMS_Learning_Design

“TENCompetence is a 4-year EU-funded Integrated IST-TEL project that will develop a technical and organisational infrastructure for lifelong competence development. The infrastructure will use open-source, standards-based, sustainable and innovative technology.”

“The TENCompetence infrastructure will support the creation and management of networks of individuals, teams and organisations in Europe who are actively involved in the various occupations and domains of knowledge. These 'learning networks' will support the lifelong competency development of the participants from the basic levels of proficiency up to the highest levels of excellence. The network consists of learners, educational institutes, libraries, publishers, domain specific vendors, employers, associations, and all others who deliver services or products in the specific field.”⁴⁷

8) Challenges in e-Learning and Educational Innovation Adoption⁴⁸

Implementing an e-Learning project in an educational institution may be challenging. It is proposing different methods for people with comfortable strategies, attitudes, methods, tools and habits already in place. Changing to something new that they don't know will not be easy for them. It will be necessary to promote the solutions selected, to convince and motivate all targeted users and deciders to be part of the project. Training of trainers and specific training resources and activities will be necessary to train all intended users to use efficiently the system. It is risky to implement a system that is not yet negotiated and prepared with the intended users. Resistance to change must be managed cautiously, because “the inherent nature of

⁴⁷ <http://www.tencompetence.org/node/13>

⁴⁸ http://en.wikipedia.org/wiki/Technology_Adoption_LifeCycle

organisations is to be conservative and protect them from constant change".⁴⁹

⁴⁹ http://en.wikipedia.org/wiki/Resistance_to_change

B.2 Blended Learning for Public Health Education and Training

MICHAEL JONES

The concept of blended learning is not new, or even recent. DeZure⁵⁰ et al described the development of blended learning in 2000. However, it is a more recent development that blended learning has emerged as a model of learning in medical specialties. It can be defined as : *Blended learning [also] is used to describe learning that mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning.....*⁵¹

Valiathan, P (2012)⁵² distinguishes three approaches/modes of blended learning:

- skill-driven learning, which combines self-paced learning with instructor or facilitator support to develop specific knowledge and skills
- attitude-driven learning, which mixes various events and delivery media to develop specific behaviours
- competency-driven learning, which blends performance support tools with knowledge management resources and mentoring to develop workplace competencies.
- All three categories have relevance in the context of learning the practice of public health medicine.

A more operational working definition is: "...blended learning combines the engaging benefits of traditional instructor-led training with the advantages brought by a variety of technologies to create an

50 DeZure (ed), (2000), Learning from Change: Landmarks in Teaching and Learning, 1966 – 1999, Change Magazine, Stylus Press, Va.

51 NIIT, (2012)

52 Valiathan, P (2012), Blended Learning Models, NIIT, New Delhi.

optimum program. many “ingredients” can comprise a blended learning model, including instructor-delivered content, e-learning, webinars, conference calls, live or online sessions with instructors, and other media and events.”⁵³ or : “combining online delivery of educational content with the best features of classroom interaction and live instruction to personalise learning, allow thoughtful reflection, and differentiate instruction from student-to-student across a diverse group of learners.”⁵⁴

There is a number of reasons why blended learning is an appropriate mechanism for enhancing the quality of PH education.

First, students want control of their own learning. Students do not expect online courses to be easier. They do however, expect the online learning environment to facilitate their success because they can review materials when they want and are more comfortable asking teachers for help. Online teachers see great benefits to student online learning. 76%⁵⁵ of educators believe that online learning benefits students by putting them in control of their own learning :*this model is effective, affordable, and responds to students’ and teachers’ growing interest in technology-based learning experiences.....*⁵⁵ .

Second, it is efficient. A comparison of outcomes of learning in face-to-face settings, through fully online learning and through blended learning showed that blended learning produced superior outcomes

53 Blended Learning Solutions, Encyclopedia of Educational Technology., <http://coe.sdsu.edu/eet/Articles/blendedlearning/index.htm>, San Diego University

54 Watson, John(2008), Blended Learning: The Convergence of Online and Face-to-Face Education, iNACOL Promising Practices in Online Learning..

55 Eduviews, (2009)., Blended Learning: Where Online and Face-to-Face Instruction Intersect for 21st Century Teaching and Learning, Blackboard K-12, Washington DC

(measured in terms of the percentage of students succeeding at grades A-C) than either of the other conventional learning styles in 6 from 7 semesters between 2001 and 2003.⁵⁶

Wenger and Ferguson (2006)⁵⁷ describe the “ecology” of learning opportunities and mechanisms (see Figure 1). They go on to commend five important credentials to enable the learning ecology framework:

- Quality of the learning experience
- Control over the learning experience
- Formal versus informal learning
- Social nature of the learning environment
- Cost effectiveness.

These credentials can largely be delivered efficiently and effectively through the medium of blended learning.

56 Research Initiative for Teaching Effectiveness, <http://cdl.ucf.edu/research/rite/>, Center for Distributed Learning, University of Central Florida

57 Wenger, M., S. and Ferguson, C. (2006) ‘Chapter 6: A Learning Ecology Model References For Blended Learning from Sun Microsoft Systems’, In Bonk, C., J. and Graham, C., R. (Eds.) Handbook of Blended Learning: Global Perspectives, Local Designs. San Francisco, CA: Pfeiffer Publishing.

Figure 1: Credentials to Enable the learning Ecology Framework

	Studying	Learner Self-Navigation	Practicing
Content Delivery Focus	<ul style="list-style-type: none"> ▪ Books, articles, guides ▪ References ▪ Whitepapers ▪ Asynchronous content ▪ Job aids ▪ Glossaries ▪ FAQ 	<ul style="list-style-type: none"> ▪ Authentic tasks ▪ Role play ▪ Projects ▪ Case studies ▪ Peer discussion ▪ Discussion forums 	Experience and Practice Focus
	<ul style="list-style-type: none"> ▪ Classroom lectures ▪ Synchronous Content ▪ Demonstrations ▪ Reviews / Discussions ▪ Video ▪ Videoconferencing 	<ul style="list-style-type: none"> ▪ Exercises ▪ Diagnostic labs ▪ Practice labs ▪ Mentoring / tutoring ▪ Experiments 	
	Teaching	Guided Navigation	Coaching

A number of institutions offer blended learning routes in public health education, including Manchester Metropolitan University (UK),

Tufts University (US), London School of Hygiene and Tropical Medicine (UK), Education for Health (UK) etc.

The evidence⁵⁸ so far is that this mode of learning suits PH education well : “.....student satisfaction with the quality of this blended course was high. Large percentages of students indicated that they would recommend this course to others and would be willing to take another distance learning course in the future. The satisfaction level was related to students' age and the number of previous distance learning courses that they had taken. Face-to-face interviews revealed that the success of this blended course was associated with the opportunities for face-to-face interaction and meaningful collaborative learning, the integration of technology components, and the course instructors”.

Significantly, the Public Health Leadership Programme is a blended programme, managed by Sheffield Hallam University, subsidised by the EU Erasmus Mundus Programme and offered through the Leadership for Public Health project (LEPHIE)⁵⁹. The Project is delivered by other European Centres.

Plainly blended learning as a mode of PH learning has already developed, has become established, and is respectable.

Schools of Public Health have to consider the current trends in designing blended learning programmes.

58 So, Hyo-Jeong (2009), Is Blended Learning a Viable Option in Public Health Education? A Case Study of Student Satisfaction With a Blended Graduate Course, *Journal of Public Health Management & Practice*:

January/February 2009 - Volume 15 - Issue 1 - p 59-66. doi:
10.1097/01.PHH.0000342945.25833.1d

59 www.lephie.eu

Littlejohn and Pegler (2007)⁶⁰ consider, “one of the biggest challenges for educators is to design blended learning activities that motivate students and capture their imagination”.

Chew, E (2009)⁶¹, when considering “how to blend”, discusses and summarises opportunities for learning mechanisms which could be blended to deliver a mix appropriate to discipline, environment and learner needs.

Chew argues that learners need to be involved in planning, designing and negotiating the blend of learning modes appropriate to them and their personal needs. This does, of course, present challenges to educator institutions in terms of resource mobilisation, in terms of the availability of a range of skills and technologies and in terms of assessment mechanisms applicable to different modes of learning. For disciplines requiring evidence of competence, this is a particular difficulty.

However, the benefit of self-paced, self-planned learning as well as instructor/learner, learner/learner, and learner/learning-community interactions is thought to more than compensate for the difficulties (see Figure 2).

Chew (2009) goes on to describe the conditions which are required to ensure that the blend of inputs (see above) is effective. The conditions are:

60 Littlejohn, A. and Pegler, C. (2007) Preparing for Blended e-Learning:

Understanding Blended and Online Learning (Connecting with E-learning). London: Routledge.

61 Chew, E (2009), A Blended Learning Model In Higher Education: A Comparative Study Of Blended Learning In Uk And Malaysia, A submission presented in partial fulfilment of the requirements of the University of Glamorgan/Prifysgol Morgannwg for the degree of Doctoral of Philosophy.

- *Live Events*: Synchronous, instructor-led learning events in which all learners participate at the same time, such as in an online or virtual classroom;
- *Self-Paced Learning*: Learning experience that the learner completes individually, at his own speed and in his own time, such as interactive, Internet-based or CD-ROM training;
- *Collaboration*: Environments in which learners communicate with others, for example, e-mail, threaded discussions or online chat;
- *Assessment*: A measure of learners' knowledge. Pre-assessments can come before live or self-paced events, to determine prior knowledge, and post-assessments can occur following live or self-paced learning events, to measure learning transfer;
- *Performance Support Materials*: On-the-job reference materials that enhance learning retention and transfer, including downloads, and printable references, summaries, and job aids

Figure 2: Main problem zones in blended learning

Face-to-face (Live)	Technology (Virtual)			
	Synchronous (In community)	Asynchronous (In community)	Self-Paced Asynchronous	
<ul style="list-style-type: none"> ▪ Instructor-led classroom (lectures) ▪ Tutorials ▪ Hands-on lab ▪ Workshops ▪ Seminars / Conferences ▪ Coaching/ mentoring ▪ Field works / Site Visits ▪ Work-place learning / Placements ▪ 1-to-1 consultation ▪ Examinations 	<ul style="list-style-type: none"> ▪ Virtual Classroom / Online Lecture ▪ Online chat / Instant Messaging ▪ E-Conference ▪ Online assessment ▪ Interactive Whiteboard 	<ul style="list-style-type: none"> ▪ Discussion board / e-Forum ▪ Announcement / Bulletin Board ▪ Offline message in online chat ▪ Online assessment such as Turnitin ▪ Emails ▪ Search engine ▪ User groups / News groups ▪ Polling and questionnaire or webforms ▪ Blog ▪ Wiki 	<ul style="list-style-type: none"> ▪ Online Learning Materials ▪ Online Tutorials ▪ Online self-assessment such as QMP ▪ Podcasts ▪ DVD/CD 	
				• VLE or PLE that consist of more than one element of the above.
				• Online video and photos sharing such as youtube.com, vimeo.com and flickr.com.
				• Social Networking such as Myspace, Friendster, Facebook and Ning.
				• Immersive virtual world such as secondlife.com
				• Proprietary software packages and simulations for different disciplines such as programming simulator, Matlabs and etc.
				• Other general tools such as Powerpoint, flashcard, Camstudio and etc.

B.3 Problem Oriented Learning by Distance – a Model for Lifelong Learning

MILENA SANTRIC-MILICEVIC, ZELJKA NIKOLIC, KASIA CZABANOWSKA

The World Health Organization Report 2004 focused on the bridging of the "know do" gap that is central to achieving the health-related Millennium Development Goals by 2015.⁶² Learning is the premise of health improvement and overall progress of a human being and society.

According to Kilpatric (1918,1921) and Dewey (1938) Problem Oriented Learning (POL) or Problem-Based Learning (PBL) argues for the importance of practical experience in learning. As a general model, POL was developed in medical education in the mid-1950s and since that time it has been refined and implemented in over sixty medical school. POL approach has the greatest significance during the first two years of medical science curricula where replaces the traditional method especially in anatomy, pharmacology, physiology etc. Unfortunately, faculties in developing countries are often concerned with increased demand on resources for faculty training and program implementation and resistant to modifying the existing traditional curriculum, teaching and learning methodologies.^{63,64,65} The model has been adopted in an increasing number of other areas

62 World Report on Knowledge for Better Health. Geneva: World Health Organization, 2004.

63 Thompson DG, Williams RG. Barriers to the acceptance of problem-based learning in medical schools. *Studies in Higher Education* 1985;10:199-204

64 Kiguli-Malwadde E, Kijjambu S, Kiguli S,GM, Mwanika A, Luboga S, Sewankambo N. Problem Based Learning, curriculum development and change process at Faculty of Medicine, Makerere University, Uganda. *African Health Sciences*. 2006;62(2):127-130.

65 Finucane P, Nichols F, Gannon B, Runciman S, Prideaux D, Nicholas T. Recruiting problem-based learning (PBL) tutors for a PBL-based curriculum: the Flinders University experience. *Medical Education* 2001;35(1):56-

such as business schools, schools of education, architecture, law, engineering, social work and high school.⁶⁶

POL is part of tradition of meaningful, experimental learning,^{67,68,69,70} which bases on ill-structured problems as the first step in this process. A complex problems which cannot be solved by a simple algorithm is defined as ill-structured problem (Box 1). In 1980, Barrows and Tamblyn considered students learn by solving problems and reflecting on their experience. Later, POL is defined as a well-designed tool to help students become active learners in solving problems in the real world and make students responsible for their learning. It has a dual emphasis on helping learners develop strategies and construct knowledge.^{71,72} There are five goals of POL.

66 Barrows H.S. Problem-based learning applied to medical education. Springfield, 2000; IL: Southern Illinois University School of Medicine.

67 Kilpatrick WH. The project method. Teach Coll Rec 1918; 19: 319-335.

68 Kilpatrick WH. Dangers and difficulties of the project method and how to overcome them: Introductory statement: Definition of terms. Teach Coll Rec.1921; 22: 282-288.

69 Dewey J. Experience and Education, New York: Macmillan, 1938.

70 Barrows HS, Tamblyn R. Problem-Based Learning: An Approach to Medical Education. New York: Springer 1980.

71 Hmelo CE, Ferrari M. The problem-based learning tutorial: Cultivating higherorder thinking skills. J Educ.Gifted 1997;20: 401-422.

72 Kolodner JL, Hmelo CE, Narayanan NH. Problem-based learning meets case-based reasoning. In Edelson DC, Domeshek E A (eds.), Proceedings of ICLS 1996, AACE, Charlottesville, VA, pp. 188-195.

They are:

1) *Construct an extensive and flexible knowledge base* implies that students go beyond the framework of basic information and tend to integrate the multiple domains. "It is also flexibly conditionalized to the extent that it can be fluently retrieved and applied under varying and appropriate circumstances". Actually, learner is expected to possess skills from different domains in order to solve any given problem. Understanding, in this context, places knowledge of a domain in a toolbox that can be used frequently to assist in further problem solving.^{73,74}

2) *Develop effective problem-solving skills* involves introducing problems that require the use of these skills. This goal requires the ability to apply appropriate metacognitive and reasoning strategies. Metacognitive refers to the learners ability to reflect on and create a problem solving plan, monitoring progress, and evaluating whether goals have been reached.⁷⁵

3) *Develop self-directed, lifelong learning skills* is also related to metacognitive strategies. Learners must be able to identify what they understand and what they do not understand. They must be able to set learning goals, and finally they must be able to select appropriate learning strategies.

73 Bransford JD. et al. (1990). Anchored instruction: Why we need it and how technology can help. 1990; In Nix D. Sprio R (Eds), Cognition, education and multimedia

74 Hmelo-Silver CE. Problem-based learning: What and how do students learn? Educational Psychology Review 2004:16, p.235-266.

75 Schoenfeld, A. Mathematical Problem Solving. 1985; New York: Academic Press.

4) *Becoming effective collaborator* means knowing how to function well as part of a team. This includes establishing common ground, resolving discrepancies, talking mutually agreed upon action and coming to agreement.⁷⁶

5) *Becoming intrinsically motivated to learn* occurs when learners are engaged on the tasks which are based on their own interests, challenges, or sense of satisfaction. When educational activity is implicated in personally meaningful tasks and when students consider the final outcome under their control they become more motivated. To be intrinsically motivating problems should provide students with "the proximal and tangible goal of applying their knowledge to solve a concrete problem".

Box.1 Characteristics of well organised POL problems are :

- complex, ill-structured, and open-ended
- realistic and resonating for the learner
- good enough to get the feedback
- promote conjecture and argumentation
- complex enough to require interrelated pieces
- to require multidisciplinary solutions
- should help build extensive and flexible knowledge

Students who learned from POL curricula are better able to apply their knowledge to new problems as well as utilize more effective self-directed learning strategies in comparison to students who learned from traditional curricula.⁷⁷ Literature has shown that POL

76 Barron BJS. Achieving coordination in collaborative problem-solving groups. *J.Learn. Sci* 2002;(9): 403-437.

77 Schmidt HG, Machiels-Bongaerts M, Hermans H, ten Cate TJ, Venekamp R., Boshuizen HP. The development of diagnostic competence: Comparison of a problem based, an integrated, and a conventional medical curriculum. *Academic Medicine* 1996;71, p.658-664.

increases student motivation, knowledge application and interest in subject matter.⁷⁸

This method is conducted in small, facilitated groups and takes advantage of the social aspect of learning through discussion, problem solving, and study with peers. Small problem solving groups are a key feature of POL. Small group structure may help distribute the cognitive load and may also widen the spectrum of expertise available to solve the problem. Research also suggests that small group discussion enhance problem solving, and higher order thinking.¹³ Other strengths and weaknesses of POL are compiled in the Table 1.

The POL learning cycle begins with the tutorial process. The first step in this process is the presentation of a problem and the last is student reflection. The problem requires the drop to collaborate together as well as question the facilitator as the go through a process leading to a solution. A method tool used in the process is whiteboard broken into 4 columns: Ideas, Facts, Learning Issues and Action Plan. The "Facts" section keeps track of information embedded in the problem. "Ideas" serves to follow the ongoing hypothesis about actual solutions to the problem. "Learning Issues" tracks the issues which need further research or explanation from the facilitator.

78 Albanese MA, Mitchell S. Problem-based learning: a review of literature on its outcomes and implementation issues. *Academic Medicine* 1993;68(1):52-81.

Table 1 Strengths and weaknesses of Problem-oriented learning

Strengths ^{79,80}	Weaknesses ^{81,82}
<p>Encouraging breadth of learning and integrating knowledge from different subjects, disciplines and sources</p> <p>Encouraging learner motivation and creativity</p> <p>Encouraging learner interactivity</p> <p>Focus on: team work, problem-solving and independent thinking</p> <p>Model can be changed to fit instructors goals and needs</p> <p>Students learn problem before learning how to solve it, giving them the chance to explore options and possible solutions</p> <p>Helping student retention</p> <p>Developing students thinking skills</p> <p>Developing students key skills relevant to employment (e.g. interpersonal communication skills, information seeking skills and presentation skills)</p> <p>Fostering professional competence and</p>	<p>Types of students engaged in POL</p> <p>Type of problems included in POL</p> <p>Facilitator`s commitment</p> <p>Sometimes criticized for having an "inflexible" and "linear" model</p> <p>Some research has shown that this approach may increase certain skills but often results in poorer performance on "traditional tests" based on specific subject content</p> <p>Available resources for this type of approach are limited and sometimes POL is unrealistic in its expectations for such materials</p> <p>From students` point of view learning can be frustrating without proper facilitation</p> <p>There may be conflicting or confusing information at times</p> <p>It could be difficult to change traditional method to POL especially when some or most of the students and /or staff are products of didactic teaching methods</p>

79 Strengths and weaknesses of Problem-based learning
<http://integratingtech301.pbworks.com/> Accessed February 2013.

80 Barrett T. Freelance Education Developer. What is problem-based learning?
<http://www.aishe.org> Accessed February 2013.

81 Bransford, J.D. et al. (1990). Anchored instruction: Why we need it and how technology can help. 1990; In D. Nix & R. Sprio (Eds), Cognition, education and multimedia.

82 Schoenfeld, A. Mathematical Problem Solving. 1985; New York: Academic Press.

confidence together with professional identity

Linking theory and practice

Having fun with a sense of belonging and friendship

Responding to research evidence on the benefits of PBL

Increasing competitiveness in the higher education market

The "Action Plan" column track of plans for resolving the issue. In POL, the teacher's role is to facilitate collaborative knowledge construction. The facilitator leads students through the learning process, forcing them to think in detail and to connect things. He encourages them to ask themselves questions and form a cognitive apprenticeship.⁸³ As a cognitive apprenticeship, POL situates learning in complex problems. „Facilitators make key aspects of expertise visible through questions that scaffold student learning through modeling, coaching, and eventually fading back some of their support.“²³ In PBL the facilitator is an expert learner, able to model good strategies for learning and thinking, rather than providing expertise in specific content. This role is crucial. Being the facilitator means continually supervise and monitor discussion, adapt and apply the appropriate strategy.⁸⁴

As students become more experienced with PBL, facilitators can be drawn down until finally the learners adopt much of their questioning role. Student learning occurs while students together are engaged in constructive processing.⁸⁵ Schmidt and Moust's review of studies of facilitation found three important, interrelated factors that contributed to effective facilitation. Effective facilitators had a "suitable knowledge base regarding the topic under study, a willingness to become involved with students in an authentic way, and the skill to express oneself in a language understood by students".²⁴ Reflection on the relationship between solving and

83 Collins A., Brown J.S., Newman S. Cognitive Apprenticeship: Teaching the Crafts of Reading, Writing and Mathematics. 1989; In Lauren B. Resnick (Ed.), *Knowing, Learning, and Instruction*

84 Hmelo-Silver, C. E. & Barrows, H. S. Goals and strategies of a problem-based learning facilitator. *Interdisciplinary Journal of Problem-based Learning*. 2006:1.

85 Schmidt, H.G. & Moust, J.H.C. Processes that shape small-group tutorial learning: A Review of Research. 2000; In D.H. Evensen & C.E. Hmelo (Eds.), *Problem-based learning: A research perspective on learning interactions* (pp. 19-52). Mahwah: Lawrence Erlbaum.

learning in a integral component of POL. The point is that one successfully resolved task is not the goal in itself but a means towards achieving self-defined learning goals. There is need to support the construction of extensive and flexible knowledge. Reflection helps students relate their new knowledge to their prior understanding, mindfully abstract knowledge, and understand how their learning and problem-solving strategies might be reapplied.

Some example problem-based learning environments include: research projects, engineering design projects that are more than a synthesis of previously learned knowledge. The traditional and well-known "Case approach", popular with business schools, may or may not be problem-based learning. Often the case is used to integrate previously-learned knowledge and hence would not be, according to this definition, problem-based learning.⁸⁶

A really good example of integrating PBL (or POL) into curricula is Maastricht approach, which is based on McMaster. PBL has been transferred and adapted to the Integration module and the particular language and training through close collaboration between Europubhealth and Maastricht University. Within the Maastricht PBL framework, students take responsibility for their own learning by passing through the 7 steps (Figure 1).⁸⁷

86 Woods DR. Problem-based learning: how to gain the most from PBL. Waterdown, On: Donald R Woods; 1994.

87 Sherlaw W, Hobbs S, Sychareun V, Marquez S, Volel C, Magdelaine A et al. Using problem-based learning in development of crosscutting competencies for global public health practice. 4th International Conference of Education, Research and Innovations. Madrid, 2011.

Figure 1: The Maastricht 7 steps⁸⁸

The PBL Cycle



The most productive learning outcomes are most likely to occur when learners perceive that their actual learning environment matches their preferred learning environment. That is the essence of the concept of Distance Learning (DL).^{89,90} The increased use of

88 Modified by: Moust: (2008) and Deborah Allen D. Chamany K. (2005) Pedagogies of Engagement

89 Yarrow A, Millwater J & Fraser, BJ. Improving university and primary school classroom environments through preservice teachers' action research. *International Journal of Practical Experiences in Professional Education* 1997;1:68-93.

90 McNaughton, M. Distance learning: one student's perspective. *Academic Exchange Quarterly* 2001;5(i4),

computer for education and training purpose is a result of advances in and decreasing costs of computer technologies (software, hardware, Internet and the World Wide Web), which together with the World Wide Web are receiving increased attention in education because of their potential to support new forms of (collaborative) inquiry.^{91,92} More people are choosing to study online because of increased flexibility it provides in terms of study time and location, and it saves travel costs and less time is lost at the workplace while taking an e-Learning course.⁹³ E-Learning, also called distance learning, web-based training, and computer-based training includes training conducted through the Internet, through a local or corporate intranet and combinations of the above. The simplest definition is "any form of training that uses a computer network for course delivery, interaction, or facilitation and a browser for learner interaction."⁹⁴

Distance learning could be asynchronous or synchronous. Asynchronous training overcomes problem across time zones, jobs shifts, and personal schedules. It includes regular interaction with the instructor and possibly other students using forums, e-mail, bulletin boards, dialogs and similar tools. Synchronous is a real-time training and assumes that an instructor and students are logged into the same place at the same time and interact more or less

91 Evans C. & Fan PF. Lifelong learning through the virtual university. *Campus-Wide Information Systems*, 2002;19(4),

92 Slotta JD Linn MC. (2009). *WISE science, web-based inquiry in the classroom*. New York: Teachers College Press *WISE science, web-based inquiry in the classroom*. New York: Teachers College Press).

93 Wang M J. Online collaboration and offline interaction between students using asynchronous tools in blended learning. *Australasian Journal of Educational Technology* 2010, 26(6), 830-846.

94 Chronos Communications 2002. *The Business Case for E-Learning: A Working Definition of E-Learning*. (<http://home.teleport.com/html>, accessed January 10 2013)

simultaneously through the Web (web seminars, on-line chat like AOL Instant Messenger, video-, satellite-, or teleconferencing, Microsoft NetMeeting, and similar tools). Although learning in such dynamic learning environments is much more engaging, learning is also much more challenging.⁹⁵

A significant body of the literature has been devoted to the performance levels of distance learning students compared with their classroom counterparts together with their related advantages and disadvantages^{8,96,97,98,99} There is a general believe that the use of modern communication technologies (i.e. computers, mobile phones, teleconferencing, etc) for education through the web (internet and intranet) will never completely eliminate human instructors and other forms of educational delivery due to medium limitations.¹⁰⁰ However, it is not the intention of any design and form of e-Learning to replace the methods that already work well. E-learning is a significant

95 Raes A, Schellens T, Wever BDe, Vanderhoven E. Scaffolding information problem solving in web-based collaborative inquiry learning *Computers & Education* 2009; 59 (2012) 82-94

96 Bernard RM, Abrami PC, Lou Y, Borokhovski E, Wade A, Wozney L, Wallet PA, Fixet M, & Huant B. How does distance education compare with classroom instruction? A Meta analysis of the empirical literature. *Review of Educational Research* 2004; 74(3), 379-439.

97 O'Donoghue J, Singh G, Green C. A comparison of the advantages and disadvantages of ITbased education and the implications upon students. *Interactive Educational Multimedia* 2004; 9:63-76.

98 Radović-Marković M. Advantages And Disadvantages Of E-Learning In Comparison To Traditional Forms Of Learning. *Annals Of The University Of Petroşani, Economics* 2010, 10(2):289-298.

99 Them C, Schulc E, Roner A, Behrens J. Comparison of frontal teaching versus problem-oriented learning at the school of healthcare and nursing: nursing neurological patients. *International Journal of Medical Informatics* 2003; 71:117-124.

100 Tayebinik M, Puteh M. Blended Learning or E-learning? *IMACST* 2012, 3(1):103-110.

component of course delivery in education today¹⁰¹ and mainly assists the learning process and increases the accessibility of various education forms.. It accommodates the three distinct learning styles of auditory learners, visual learners, and kinesthetic learners of a globally dispersed audience.

The movement towards Problem Oriented Learning by Distance or Problem Oriented E-Learning (hereinafter POeL) is driven by the many benefits offered by problem based learning and e-learning. The variety of design and study methods used in POeL is built upon human motivation for development. The motivation to learn begins with a challenging problem. The motivation to solve a problem grounds learning efforts. POeL²⁷ focuses on both, the learning process and the result, so as to increase a participant's ability to generate problem solving strategies and solutions.

Box 2

POeL increases motivation to learn, enhances retention of information, develops critical thinking, writing and communication skills, and demonstrates the power of working cooperatively.

POeL design is inductive and shares learning responsibility between instructors, design, and medium used for knowledge translation and learners.

Motivated participants usually overcome the differences inherent in a new, on-line teaching medium. Therefore, POeL design and methods should be collaborative, participant – centered, relevant to the

101 Napier NP., Dekhane S, Smith.S. Transitioning to Blended Learning: Understanding Student and Faculty Perceptions. *Journal of Asynchronous Learning Networks* 2010;15(1).

participant goals and to their learning pace regardless of their prior learning (i.e. the participants can choose to participate when they are highly motivated and/or prepared to participate). The literature widely mentions a communicative approach and cooperative and collaborative learning as methods that encourage an active and constructive learning and enhance the learner's self-esteem and intrinsic motivation to learn. Collaborative learning is based on knowledge building that is possible thanks to the opportunities the participants have for between themselves and tutors in an on-line environment.^{102,40} The course method can be a self-study (learners work largely on their own), or an instructor-led training and it is not an electronic page turner with lecturers that provide easy answers. Well designed POeL builds up learner role in an active and iterative process; participants learn the content as they try to address a problem.

Assignments and activities that require participants' input increase the motivation to learn. That is why "problems" in POeL are real-world challenges common to the discipline being studied. Highly context-specific cases similar to one they might encounter engage participant' curiosity, and to find and use appropriate learning resources. They are typically presented in the form of case study, puzzle, or narratives of complex scenarios. The case information is disclosed gradually allowing the participants to develop progressive learning issues and reasonable solutions based on the application of knowledge and skills deemed necessary to address the issue.^{103,104}

102 Yarrow A, Millwater J & Fraser BJ. Improving university and primary school classroom environments through preservice teachers' action research. *International Journal of Practical Experiences in Professional Education* 1997; (1): 68-93.

103 Roisin Donnelly. Interaction analysis in a 'Learning by Doing' problem-based professional development context *Computers & Education* 2010;(55) 1357-1366

A number of computer simulations have been developed for use with problem-based learning, some of which are being used in blended forms of problem-based learning.¹⁰⁵ Blended learning or hybrid learning is a combination of a face to face and online teaching and learning. There are numerous examples of how to prepare the e-learning material.¹⁰⁶ Chernobilsky E, Nagarajan A and Hmelo-Silver CE offered eSTEP system for Collaborative Knowledge Construction in POeL¹⁰⁷:

“The goal of this system is to provide preservice teachers with an opportunity to engage with learning sciences concepts while using video cases as contexts in collaborative lesson re-design. The system consists of three components that are intended to mediate student learning. One component is the online learning sciences hypertext, the Knowledge Web (KW). The second component is a library of video cases that present examples of classroom instruction. These video cases serve as the basis for instruction as they present opportunities for discussion and improvement of instruction depicted in the cases. The video cases are intertwined with the KW. Finally, there is PBL online student module. It is a collection of tools that scaffold students’ online individual and group work following a PBL format

104 Allen D. Problem-based learning in Undergraduate science. What works, what matters, what lasts - a pedagogy. Project Kaleidoscope, Volume IV 2004. Retrieved January 10 2012 at <http://www.pkal.org>.

105 Zaidi Z, Zaidi SM, Razzaq Z, Razzaq Z, Luqman M, Moin S Training Workshops in Problem-based Learning: Changing Faculty Attitudes and Perceptions in a Pakistani Medical College. *Education for Health* 2010, 23(3)

106 As-Sanie S, Zolnoun D, Wechter ME, Lamvu G, Frank Tu F, Steege J. Teaching residents coding and documentation: Effectiveness of a problem-oriented approach. *American Journal of Obstetrics and Gynecology* 2005; 193, 1790-3

107 Koohang A, Riley L, Smith T, Schreurs J. E-Learning and Constructivism: From Theory to Application. *Interdisciplinary Journal of E-Learning and Learning Objects* 2009; 5:91-109.

(Hmelo-Silver, 2004). Some of the tools that are presented in this environment include a personal notebook where students record their initial observations, a threaded discussion board, where students share their research and analysis of the video cases, and a white board where the students post their proposed solutions for the lesson redesign. eSTEP is a complex system because learning occurs during a combination of nine intermingled face-to-face and online steps.”

Through POeL participants can improve their problem-solving skills, research skills, social skills (it addresses written and verbal skills and ability to working collaboratively with other professionals), and critical thinking skills (i.e. to analyze, synthesize, and evaluate information, as well as to apply that information appropriate to a given context). The improvement level will depend on training design, instructor competence, learner’s personal traits, objectives and background knowledge, time devoted, and technological capacities. Therefore it is important to consider all the drawbacks related to POL and e-Learning.

The instructors’ work methods rely on instructional models, namely behaviorism, cognitivism (“cognitive apprenticeship”), humanism, and constructivism.¹⁰⁸ The instructional design of POeL base promotes active learning with support of instructors who facilitate group process and learning in an interaction with the course software, instructors, and other students. A lack of face-to face facilitation can hinder participant attempts to learn new information, or decrease learner’s willingness to participate. Thus, POeL educators has to support classmates collaboration (often from all around the world) in networked communities (large group forums and / or subgroups forums for 6-9 students) in order to exchange views and solutions,

108 Savin-Baden M. A Practical Guide to Problem-Based Learning Online. UK: Routledge, 2007

and learn about different approaches and/or culture methods while solving a complex problem.

Instructors have to create strong and real world problems that lead students to “learn to learn,” working cooperatively in groups to think critically and seek solutions.^{109,110} An instructor’s role is to pose the meta-cognitive questions (“What might be the assumptions?” “How do you know that?”) that help finding the needed information and to define how it relates to the problem resolution, and to get students to become self-reflective about their learning processes. The Box 3 offer compilation of literature referring to what makes an effective POeL course.

Learners are required a great deal self-motivation in order to identify issues that are familiar to them or unknown, and if led by instructors and e-colleagues they become more engaged in finding, comprehending and use new knowledge and skills. Participants are supposed to work in small groups to organize their ideas and previous knowledge related to it. They should assign one another the responsibility for investigate the information needed. The forums can be used for brainstorming initial hypotheses and resources needed to define problem’ broad nature, for discussion best sources (textbook, library, Internet, etc.), and collected results of their research. Thus, while teaching one another they are ideally integrating new knowledge and skills into the context of the problem.

Conclusions: The combination of multimedia and instructional design (POeL or blended training) can produce a very rich learning

109 Kruse K. The Benefits and Drawbacks of e-Learning Originally published at www.e-learningguru.com/

110 Butler R, Inman D, Lobb D. Problem-based learning and the medical school: another case of the emperor's new clothes? *Adv Physiol Educ* 29: 194–196, 2005;

experience that is repeatable. A richer POeL context enables different learning styles and provides a model for lifelong learning. In time to come, the evolving of social media will brought larger benefits to knowledge management in POeL online. POeL with technology that can support innovative forms of interactive learning will be the good space for its translation into practice. Finally, as Ginns and Ellis highlighted "the quality of teaching, resources, workload, and student interaction are associated with the quality of students' approaches to study and learning outcomes."¹¹¹

Box 3. Tips for instructors - what works for POeL

- Target audience should justify the costs of POeL development!
 - POeL like all self-paced learning requires strongly motivated and self-starting learners. If your learners don't fit this profile, consider another learning method.
 - The wider the range of learner backgrounds, the more material has to be designed into the course, which increases costs and development time.
- Examine is POeL a good fit for the subject and situations being taught?
 - Just about any topic that can be reasonably taught can be at least partially taught using POeL if carefully planned.
 - Some training topics are not best served by computer-based training and require a more personal touch (for instance team building activities).
- Ensure management support!
 - Prepare evidence that POeL is easier, faster, cheaper, safer, or more engaging than alternative delivery methods.
 - Staff development training workshops are integral to the introductory process of a PBL-based curriculum! A conversion requires a different set of skills from developing an instructor-led class.
- Be aware of technology issues!
 - Technophobia (and negative *cultural predisposition*), unavailability of required technologies, Internet / intranet where more traffic jams occur, or complex managing computer files and online learning software are frustrating. They cause slower performance for sound, video, and intensive graphics, long download. If this is a concern, consider a gradual introduction of the technology.
- Make sure that necessary computing resources are available in time for target learners!
 - Access to the Internet and Lab equipment (what, if any, will be needed e.g. searching

111 Ginns P, Ellis R, Quality in blended learning: Exploring the relationships between on-line and face-to-face teaching and learning. *Internet and Higher Education* 2007; (10): 53–64.

Cochrane Database of Systematic Reviews, ACP Journal Club, etc.).

- Computer speed, disk space, and available RAM
- Size of monitor and available color depth and resolution (also a function of the video card)
- Sound capabilities (speakers, microphone, sound card, etc.)
- Printer (if students going to be printing out a lot of materials)
- Necessary software (browsers, e-mail programs, instant messaging programs, word processors, etc.)
- Improve retention!
 - With the right feedback you create a great learning environment. Throw in some good practice activities with feedback and you have a learning environment that's going to help your learners retain the course content which will produce results.
 - Without the routine structures, students may get lost or confused about course activities and deadlines
- Proof of completion and certification is essential elements of training initiatives!
 - It can be automated.
- Personalize learning!
 - Real-time access does not require that those who participate align their schedules to the instructor's schedule. It can even be saved onto a CD or DVD and viewed by learners off-line through a web browser.
 - Learners with low motivation or bad study habits may fall behind. No one likes to fail in a classroom full of other people. E-learning lets you fail without fear, one can always start over. Something you can't always do in class.
- Encourage sharing!
 - Incorporate a forum or wiki, or interesting findings. For instance: Britain's Open University's "study found that producing and providing distance learning courses consumes an average of *90% less energy* and produces *85% fewer CO2 emissions* per student than conventional face-to-face courses."
- Do personal best!
 - While never perfect, keep in mind that the level of interactivity is gradually improving, and as it does the impact of the training on performance improves also.

C. CASE STUDIES

C.1 Teachers' perceptions of working with the online environment and some learning points based on the LEPHIE project

KATARZYNA CZABANOWSKA, KAREN D KÖNINGS, TONY SMITH

Transfer from the traditional teaching to the online teaching or using the elements of online-environment is a challenging task and requires some discipline and focus. A good example of the effort to achieve success is the Leaders for European Public Health (LEPHIE) Project n° 510176-LLP-1-2010-1-NL-ERASMUS-ECDCE, supported by the European Commission Lifelong Learning Program. www.lephie.eu). The project was devoted to the development and design of a part-time module, lasting for eight weeks. The total expected workload was about 110 hours (including self-study).

Problem-based learning was used as the instructional model. A blended learning approach was used for providing the instruction. One and a half days of face-to-face learning constituted the introduction to the module. The face-to-face learning contained a combination of didactic input, participative and interactive group work and sessions with guest speakers. These were supplemented by lectures, seminars and facilitated small group activities delivered live online in a number of half-day sessions. For the online parts, Elluminate (a web-conferencing program), Skype (a software application for voice and video calls and chat over the internet) and Blackboard or Moodle (learning management systems) were used. Group discussions, practical exercises and a range of e-learning activities and assessment were used during the module to assist in the application of theory to practice. The programme finished with a one-day face-to-face meeting including a final assessment related to an academic assignment and presentations.

Different sessions were devoted to different topics, that are systems thinking, political leadership, building and leading interdisciplinary

teams, leadership and communication, leading change, emotional intelligence and leadership in teams, and leadership, organisational learning, and development.

Although it is predominantly a positive experience for the teachers who took part in the course, they report some critical aspects such as: interaction, making comments in a chat box, using camera, timing and duality of control. Here are some reflections of the teachers after the first experience of teaching and tutoring within the Module on Public Health Leadership using the computer assisted technology Elluminate.

Box 1

Personal communication of teachers/tutors after the delivery of the first session using online environment (April 2011)

"My first point- overall I did really enjoy the experience, I feel that I could, with more experience, become competent at teaching with this technology and that this technology is a workable and valuable educational tool."

"Interaction- I did miss the interaction with people in the room; I enjoy and feel relatively competent about picking up visual clues from students regarding their engagement with the content, although the video does help, it is really difficult to get a feel of levels of engagement with the content, the two minutes timer that I used at the end of the session did seem like a very long time and looking at the video screens at that time, people did not appear to be doing anything. They may have been thinking, however because of a lack of other visual and audio clues I may have become a little hyper-sensitive to the visual information, maybe moving into a breakout room at that point would have been more useful."

"Using the comments box- I think it is important to respect and give value to the comments that students make (I hope that they gain confidence and feel able to contribute more often, if I really listen to their comments.) It is difficult to do this with the text box, reading the comments out live as they have been written is very different from listening to comments. It is difficult to give the comments the appropriate context, I missed the level of understanding that was needed and in fact it felt a little superficial, I don't think I would be so keen to invite written comments on material because of this. The text box seemed to be more useful for chat. I would perhaps look for audio comments only"

"Video Camera- We are used to seeing TV presenters look at the camera and talk, they may have the benefit of an autocue. I tried to look at the camera to appear to be talking directly to the students. The need to keep checking my notes, the text box and the question box meant my eyes were not focusing on the camera, it must have looked as if I was looking all over the room. Maybe moving further away from the screen would allow a wider perspective but still appear as

if I was talking directly to the student.”

“Timing - things do seem to take longer, making sure that equipment is set up properly, allowing people the time to switch on and off their microphones all did seem to add to the timings of the session. Clearly this was only a short session anyway and maybe timing would have been addressed over the course of a longer session and as people become more familiar with the equipment; however I need to be aware of this in planning sessions.”

“Presenting a session on Elluminate for a first time was interesting, though a little nerve-wracking and unnerving. There are a number of elements that make it very different from the normal lecturing experience.”

“Dually controlling the event process through the software interface whilst simultaneously delivering the content, is challenging. It is impossible, at least at first, to see all areas of the Elluminate interface at the same time whilst lecturing. Do you focus on your notes, the webcam pictures (for some virtual human contact), and the slides on the screen, the question window, or the status window? This is the same process of perception preference often goes on in a classroom and you are controlling the process at the same time. However Elluminate is different - all communication has to be initiated and controlled by the presenter in the most conscious way. You ask for questions; take a poll; instruct participants to switch on and off their microphones before and after speaking etc.”

“I think the big difference is that there is little of the usual two way communication that one gets in a face-to-face teaching situation. You can see some people, via webcams, and are aware that they are connected, but you do not receive any of the normal social cues that are usually delivered by body language: - people stopping their conversations before you begin; nods; eye contact; real time questions; shuffling in seats when it is getting time for a break, lack of energy. All these things that one takes for granted, but are a vital element of communication, are missing, and that feels distinctly odd.”

“On the other side, one gets comfortable after a while in talking to the camera. There are no interruptions. It feels like a performance: like one is delivering a speech, or a monologue. I even found myself starting to focus things like: the dynamics and meter of my voice; and the emotional force of what I was saying. These are things that I learned about a long time ago in actor training and used as a performer”

“So what did I learn from the session? I think the big lesson for me was that, interaction needs to be planned into the session to keep it interesting for the students, utilising the various facilities that Elluminate has to offer. Things like asking yes/no questions, taking polls, having formal question and answer sessions, setting reflective exercises, utilising breakout rooms. All these need to be planned into the sessions (at least for the novice presenter). A second issue is about context. Students need to know at the start - or be aware of exactly what the session is about. The lecturer has to be more formally explicit about all this.”

“In conclusion, I enjoyed the session and felt it was a very useful learning experience. Delivering learning through this medium requires that one really thinks in detail about the content and structures sessions to ensure that there is enough interaction, both to keep students fully engaged, and to allow them to fully engage with the content of the session.”

Box 2

Summary of the reflections from the students participating in the first pilot of the LEPHIE course run by the Sheffield Hallam University (UK) in collaboration with Maastricht University (NL), Medical School Graz(AT), Kaunas University of Health Sciences(LT) and Association of the Schools of Public Health in European Region(ASPHER).(based on the results of the evaluation report October 2011)

Students did not have much experience with blended learning before. Overall it was a valuable essential and enjoyable learning experience for them. Those who had experience, stated that this programme was better than a previous one in which they participated. It was because of the group of participants, who contributed to others' learning.

Students enjoyed this way of learning, though they found the beginnings of it difficult, as this was a something new for them.

Students stressed that initial face-to-face meeting was extremely useful. It was vital to get to know whom they would be working with for another couple of months (who they are, what they are, etc.). It gave them confidence in further contacts.

There were also comments that blended learning was much more challenging and intimidating than they expected. Some students had technical problems, which might have contributed to such opinions. Technology used was not unknown to (the majority of) students (like skype-type of contacts) as such, but using it for a new purpose: learning, professional activities proved to be difficult. Seeing their own faces on the screen, not having an immediate emotional feedback (nodding, smiling, etc.) from other participants and the trainer/tutor made them feel uncomfortable and isolated. The new environment created some kind of artificial behaviour – people tended to behave more formal, that they would normally do.

They also thought that doing the next course in the same way would be easier for them. They recommended having initial informal, adaptation session on Elluminate before taking the "normal" session.

It is worth mentioning that developing an integrated educational curriculum using a blended learning and PBL approach in which each session is delivered from a different institution requires a lot of team work and coordination. If not well structured, designed and supported by a clear and constructive communication, the program may fall apart and contribute disconnectedness of both teachers and participants which constitutes the main challenge. In the case of the Lephie program piloting of the course in Sheffield on the group of Public Health professionals and thorough evaluation helped the partnership improve the course and address weak points. The Public Health Leadership curriculum was piloted three more times in three different locations in Maastricht, Kaunas and Graz. Each time the evaluation of the module was performed. There were two aims: to evaluate the implementation of the programme using PBL/Blended learning approach and to study whether differences exist between the students from the different countries in these aspects. A few questions were used to acquire some information from the students about their participation in the programme and their skills. Students were asked to indicate how many online sessions they followed and how many hours on average they spent on self-study for the programme per week. They were also asked to rate

their English and computer skills. In the evaluation the researchers tried to measure general programme satisfaction, quality of the course, functioning of the tutorial group, functioning of the tutors/teachers and quality of e-teaching¹¹².

Generally the development of the BL/PBL Leadership curriculum, its implementation and subsequent assessment has been a very rewarding and learning experience both for teachers and students who want to introduce and make best use of the innovation in the teaching and learning practice.

112 Karen D. Könings, Ingrid A. E. Spanjers, Jeroen J. G. Van Merriënboer Leadership for European Public Health Professionals. End Report. Evaluation LEPHIE Module. January 2013). The results of the evaluation study will be available in the form of a publication.

C.2 Public health student' experience with Problem Oriented Learning by distance in Serbia

ZELJKA NIKOLIC

Nowadays, modern technology and globalization has brought rapid changes in all aspects of human life. It is almost impossible to imagine learning without the Internet. E-learning allows users to participate in high-quality teaching and even if attendance is not possible. We can choose the time that we devote to learning, and the place where we observe the learning materials.

In 2011, as a young physician I took part in online module Healthy Plan-It¹¹³, which was a part of the three-year specialist studies in Social medicine and public health in Serbia. This online module was the first learning by distance that was used for specialist medical studies at Medical Faculty University of Belgrade. That was also my first participation in an online training. I realized that I have to attend lectures and exercises in and virtual space (classrooms) called *reticulum* and based on the Moodle platform.

Generally, this platform is very practical and easy to use, but the opinions were different among users. At first, I was thinking how hard it would be to adopt this new approach for learning, but later I realized that was useful experience for me in many ways. We had lectures presentations, tasks, some internet sources and readings about public health problems in a population, for which we had to make an action plan for public health improvement. There were very

113 Healthy Plan-It © model is a tool that is used by the CDC' Sustainable Development Program. The planing tool kit uses a data-based decision-making process for planing and managing public health program. This model focus on preventing and controlling diseases, disabilities and premature mortality through quality management of planning, organizing, monitoring and evaluating the use of time, personnel and money.

clear instructions and worksheets for study in small groups we were divided, and we had our moderator/instructor for consultations. We had a deadline for presenting our action plan for public health problem we critically estimated as the priority in selected population group. Each students group had to present its work and a solution strategy in oral and in written form in a classroom in front of other peer groups and moderators. Student summaries, questions and answers, reports, study groups, case studies were only some of methods used in this course. Instead of Skype chat we used discussion forums per each session, and face-to-face consultations with instructors and colleagues.

I would like to stress the following points I got aware during the online training: E-learning requires the user's specific knowledge and skills to be able to use it. Without some computer literacy, curriculum integrated into the electronic learning system becomes useless. In addition to these skills, participant must have certain equipment for this type of learning as well as technical support. For me personally it was not a problem because I had all the necessary conditions for e-learning but other colleagues made the complaints about technical problems, usually about Internet connection at home and accessing some websites or downloading documents.

I believe that even the best equipment on which to run the e-learning is not one hundred percent reliable. Even when possible technical problems do not lead to interruptions in e-learning, long time spending in Internet will certainly contribute to the decrease of concentration of users, and thus the decline in the quality of e-learning.

Also, e-learning brings students more responsibility in sense of different ways of determining the time of learning. In certain forms of e-learning participants have to be self-motivated and individually assess need for learning, which sometimes can lead to poor results and the objective slow progress in the learning process.

Why do I like this way of learning?

I like that e-learning allows users to participate in high-quality teaching even when distances, scheduling and similar circumstances make it impossible. The wide availability also allows simultaneous participation of a large number of users. As a completely modernized e-classroom opened 24 hours a day, e-learning provides the most effective use of time. Users choose when and how to access e-learning because they have permanent access.

System of forums and discussion groups where each participant makes own contribution related to the respective topic is so acceptable for me. During my experience within *Healthy-Plan-It* course I noticed that I enjoyed the variety of ways the information was presented.

It is so useful that system provides easy integration and access to other resources essential to the work being taught. In this course teachers were very dedicated in charge of setting material and communication with students. Every suggestion or a piece of advice was more than helpful.

At the first glance this method looked like very anti-social but by the time interaction between instructors and students, and also among students have become more and more dynamic. Once you start reading and learning about something you are really interesting in, you can continue to search whatever you want and then you realize that you have spent several hours in front of computer and even did not notice.

Having in mind all the advantages and disadvantages of e-learning, I agree that this platform and this way of learning are very practical and easy to use. Unlike some of my colleagues who do not share my opinion entirely, majority of the group considered e-learning as a future learning tool.

I strongly recommend this type of learning to everyone, especially people who are busy and those who value their time.

C.3 E-learning - complementary or a back-up to the classroom training: Serbian experiences with development of the e-learning on human resources planning

MILENA SANTRIC-MILICEVIC

In the course of the EU funded project "Training in Health Service Management in Serbia", the Master of Health Management programme was established at Faculty of Medicine University of Belgrade (Center-School of Public Health and h Management). Within this Master programme, the Human Resources Planning (HRP) Course, accredited with 5 ECTS, was delivered three times during 2009-2011. The HRP course last three weeks plus one week for assignment.

For the third generation of the Master of Health Management (2010) we have already developed instructor-led HRP Course, but the two students approached us with the information that they will be absent from our classes, one had to go to a business trip and the other had a broken leg. They were very motivated to read the whole course material and to pass the exam (test) and deliver assignments so to be able to finish their Master studies in time, without any additional payments. That was announced approximately three weeks before our course start. We were thinking what could be done and how to help them?

Among several options, we (three instructors, web designer and Master studies Project coordinators) discussed issues in migrating (or converting) our already developed instructor-led course to e-Learning delivery. Some of us had previous experience in designing and / or participating in distance learning so we shared with others the knowledge, skills and experiences. With enthusiasm for this endeavor, we agreed that this topic – Human Resources Planning

might be suitable for distance training. With regard to key issues of distance learning, its advantages and disadvantages¹¹⁴ we acknowledged that some parts of the HRP course would be easier to start over rather than to convert, while the rest should not be difficult to convert into e-learning course (teaching materials – documents like tests, case studies, worksheets).

The instructor's role is considerably different in the e-Learning^{115,116}, mainly because the participant's interactivities, besides self-learning is expected. Namely, instructors are supposed to carefully plan what is needed to the subject, what is engaging and effective for the learner in the same time, and to engineer the e-course. Since one instructor decided to opt out, the agreement was made with Master study coordinators that other two instructors work out the idea with the web designer¹¹⁷. Web designer had to take in consideration what is

114 Bernard RM, Abrami PC, Lou Y, Borokhovski E, Wade A, Wozney L, Wallet PA, Fixet M, & Huant B. How does distance education compare with classroom instruction? A Meta analysis of the empirical literature. *Review of Educational Research*, 2004, 74(3), 379-439.

O'Donoghue J, Singh G, Green C. A comparison of the advantages and disadvantages of ITbased education and the implications upon students. *Interactive Educational Multimedia* 2004, 9:63-76

115 Radović-Marković M. Advantages And Disadvantages Of E-Learning In Comparison To Traditional Forms Of Learning. *Annals Of The University Of Petroşani, Economics* 2010, 10(2):289-298.

116 Tayebinik M, Puteh M. Blended Learning or E-learning? *IMACST* 2012, 3 (1):103-110.

117 Health Management Master study Project coordinators were Michael O' Rourke, Team Leader of the Training in Health Service Management in Serbia and Nina Lukic - Project Management Expert. Course-Web designer was Dr. Milos Bajcetic, Associate Professor at School of Medicine University of Belgrade. Course lecturers/teachers/instructors were Dr. Milena Santric Milicevic, Associate Professor at School of Medicine University of Belgrade and late Mr Peter Hornby, Senior Fellow at the Queens University of Edinburgh and former HR expert with the World Health Organization.

available for all learners given the assumptions made about their computer's capabilities, Internet access, computer knowledge, etc.

Our idea was to provide the complete e-learning training as a back-up of already developed traditional, instructor-led course in the classroom. In that way, we realized that we could support participants at traditional classroom training with the e-learning skills. In addition, those who are not able to participate full time in face-to face learning will be able to participate in the e-learning sessions.

The teaching was supposed to concentrate into a number of sessions at which lectures combined with case studies, seminars, discussions and group work. Therefore, the content of interactive presentations and exercises were supplemented with a variety of questions, interactions, visual aids, and instructional materials. We strived to have rich discussion, so the quality of interactive approach will yield issues that were relevant to participant particular organisation. Thus, there was a request and advice for participants to share information and ideas and to use of print resources, databases and other online resources to acquire familiarity and expertise in support of course objectives. At all time participants were allowed to contact teachers/instructors by emails / telephone or to schedule face-to-face consultations if preferred. During two weekends, students had to deliver homework, which was closely related to their organizational problem and final assignment paper. Therefore independent work on assignment papers and the reading relevant legislative and regulatory acts was expected as well.

We decided to provide participants face-to-face introduction session to show how to approach and use e-learning methods. We prepared the same instructions in a paper and electronic form as a back-up.

Building e-learner' skills included overcoming computer and moodle terminology¹¹⁸; instructions for downloading and use of the topics material per sessions and days; and enhancing participants to make attempts, engage in forums, complete their personal information (profiles and photos in adequate size and formats); and to pose questions during the introductory session.

Conversion into e-learning material included additional efforts for lecturers. Each lecture had to have a brief introductory – explanatory text with hyperlinks to Power Point Presentations, required readings, worksheets and /or case study and referenced literature. If we had enough time we would have convert introduction text for each lecture into a video introduction. However, it was not possible to organize camera shooting on such short time notice.

Though Power Point presentations of lectures were already prepared, we had to go through the slides to improve information provided where needed (e.g. to include links for readings and notes for assignments). Besides presentations, we developed forum discussions (separate for general information, and a theme-based group forums, subgroup forums, and dialogs), information and instructions (for example, how to download case studies / task worksheets and where and how to write / upload answers and assignments, how to answer the quizzes and multiple choice questionnaires, use e-mails), folders with learning material per week and sessions (lecture text including quiz / questions, presentations, worksheets, case studies, tasks, readings, references and web links list for further reading, downloadable literature, week' wrap-up and short test), final examination (multiple choice questionnaire) and course conclusion.

118 In 2010, the web address of HRP course was <http://moodle.med.bg.ac.rs/moodle/>. The web address of new HRP course delivery will be announced.

To increase group dynamics and avoid bored watching at the computer screen (when participants weren't working in pairs and groups) we used gallery where we uploaded their photos taken in the classroom during classes, some animations and cartoon skits (some of that per each week).

Since evaluation was supposed to be anonymous, Master study project coordinators used the standard questionnaire form to be completed in the classroom. We - instructors and web designer were very satisfied with participants' reflections during the e-learning course and in the classroom, and some of their comments were repeated in the evaluation (Box 1).

Great interest was shown for the e-learning style of HRP Course, and 75% students used it almost every day during the week. E-learning was not obligatory but complementary to the face-to-face learning as it provided available all the time all HRP Course documentation, including presentations, exercises, tasks, forum discussions, dialogs, up-to date-information, readings, links and other hyperlinked resources (books and online resources), light box galleries, tests and quizzes. Even more, some of participants saved the complete e-learning HRP Course on CD format for the future reading.

In summary, well designed e-learning course is time consuming and requires team-work and creativity. Finally it turns into more rewarding teaching experience and closeness between instructors and participants than that would be the case with traditional classroom training.

Box 1. Participant comments on face to face training and complementary e-learning:

- The comprehensive approach;
- I appreciate the opportunity to learn new issues and to discuss problem in my organization with lecturers in an informal way;
- Something new, interesting and still unclear in overall.
- It was new and very interesting topic for me.
- Very good explanations, excellent interactive approach;

- Practical training and some used tools;
- Teachers are experienced, kind and have very good presentation skills;
- In some parts it was very abstract to me. It requires active participation;
- Short time concerning the volume of the Course;
- Hot and stuffy classroom, uncomfortable chairs;
- This course is something completely new in our education
- I liked the way you involved all the students in lessons and I liked opportunities for e-learning.
- The working methods (communication and answers from professors) and presentation style was good
- Little time regarding the material and relevancy of the topic
- Some parts of less value but I am incapable now to define it.
- Frank and straightforward. In general I like this course very much.

C.4 Evaluation of distance education in public health

OLEG LOZAN

Distance education leads to establishment of a joint area of education in public health. This area, due to modern communication technologies, can be extended to global dimensions. Present achievements in the field of information technologies make possible to assure high quality of public health education, which may be, at the same time, very close to traditional system.

In the Republic of Moldova, this field is approached as a didactic premiere, the implementation of distance education, at this stage, will serve as a theoretical and practical basis for extension of network on the local, national and international level.

The School of Public Health Management (SPHM) from Republic of Moldova was performed the study (2012) of the problem of implementation of different methods of distance education through video-conferencing and web-based platforms – all of which are new domains for the national area of public health education.

The subject of research included quantitative and qualitative indices of distance public health education; accessibility; economic benefits: efficiency and effectiveness, etc. The experience of implementing distance learning in public health projects in the Republic of Moldova is at the development stage, but the importance, significance and value of these technologies for professionals, public health and society at large are major.

A. National experience and achievements in the implementation of distance learning via videoconferences.

During the research period, since 2003 the most important events in distance learning in public health via videoconferencing were as follows:

February-March, 2005 - the first weekly class of distance learning class in public health management via videoconferencing;

September-December, 2006 - the first series of nationwide distance learning seminars via videoconference on "Retraining in tuberculosis control" for doctors and nurses of the primary healthcare network, supported by American International Health Alliance;

October 2006 - till present - weekly the international program of distance education in public health via videoconferences between East Carolina University, USA and SPHM, Republic of Moldova.

Till present the School of Public Health Management have a experience in about 1300 videoconferences, both at national and international level concerning different aspects of public health area.

B. Achievements in the implementation of web based distance learning in public health education.

Started in 2002 as a project, since June 2005, the School of Public Health Management, with the support of Soros Foundation-Moldova, launched the first Web Based Distance Learning System in public health in the Republic of Moldova. This first system was extensively used for years and constituted an integral part of the Master's program in the domain of Public Health and Management.

During years the student contingent involved in web based distance public health learning studied using 2 web platforms:

1) RemoteProfi interface version 1.0 (local product), years 2005-2009, there have been trained family doctors who initially practiced the method of web based distance learning, carried out the training in the domain of Health Promotion and masters of the School of Public Health Management.

2) Moodle interface version 2.1.2 and higher (open source product), September 2010 - present, there were trained public health professionals, doctors, family physicians and healthcare system

managers - participants of the project "Distance learning in the domain of HIV/AIDS", which is implemented with the support of the Global Fund to Fight AIDS, Tuberculosis and Malaria grant and masters of the School of Public Health Management.

The design of the presented materials allowed the masters of the School of Public Health Management to study independently with individual speed and pace. The course of study is of a new type, focused on promoting national and international standards and provides for the use of modern teaching methods and training techniques.

We should mention that the experience of this project was the subject of interest to the representatives of the WHO, and it was recommended to multiply it at the regional level.

Within the framework of present paper there was carried out a sociological study of the attitude, social status, degree of preparedness of various groups of public health professionals to the implementation of distance learning.

According to the survey there were analyzed 1,200 questionnaires of public health professionals, medical workers, participants in the study, of which 66.4% are women and 33.6% - men.

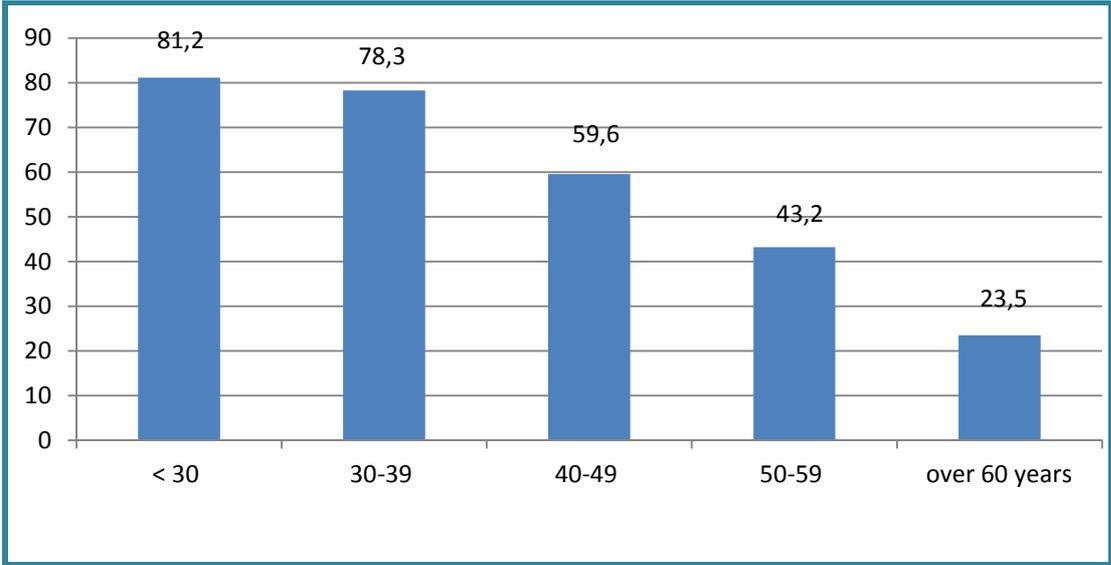
With regard to age, the respondents were divided as follows: persons under 30 years constituted 12,6%, 30-39 years - 20,4%, 40-49 years - 31,8%, 50-59 years - 28,5% and 60 years and over - 6,8%.

By the place of residence - 44.4% of medical workers were from urban areas and 55.5% - from rural areas.

It was observed that out of all interviewed medical and public health workers 24.4% had work experience up to 10 years, 30.7% - 11-20 years, 21.9% - 21-30 years, 23.0 % - more than 31 year of work in medicine.

There were obtained significant data while analyzing the level of knowledge about distance learning in public health and possibilities they provide, depending on the age of workers. Based on data obtained, we conclude on the presence of serious shortcomings regarding information of public health and medical staff older than 40 years.

Figure 1 Knowledge about distance learning depending on the age (%)



The attitude of professional staff to distance learning technologies differs depending on the degree of computer literacy. Accordingly, among computer literate persons the share of those who have positive attitude towards DL is 89%, compared with 47% among those who are not computer literate.

Analysis of the use of information technologies showed that 38.3% ± 1.4% of medical and public health staff regularly work on the Internet, and 41.5% ± 1.42% use e-mail for business purposes, that is, undoubtedly a positive factor for the development of distance learning, but shortcomings are still more than considerable.

Active users of information technologies express the greatest desire to participate in distance learning activities and highly appreciate probable participation in distance learning projects.

All participants of the survey were questioned regarding their attitude towards the method of distance learning education.

It is significant that, being fully unanimous, the participants reported that this method can and must be implemented in postgraduate medical and public health education. The need for such technologies was estimated on average to 9.7 points of 10 possible. This fact was also confirmed by evaluating of the distance education method compared with the traditional one. Therefore, 43.8% of participants reported that distance learning is as well effective, while 56.2% have appreciated it as even more effective than traditional one.

This attitude was also confirmed by the question “How would you feel if you were to attend the same course, but with application of the traditional method?”, to which 32.4% of participants answered – “equally satisfied” and 67.6 % - “less satisfied”.

In general, the quality of distant education method based on the web was appreciated as “high” - in 86.8% of cases and as “average” - in 13.2% of cases.

The majority of participants (89.4% ± 0.89%) have emphasized the increase of education accessibility through distant education method based on the web.

It should be noted that the overall positive attitude to the method of distance education was more evident in young people and those from rural areas, which demonstrates the fact of overcoming the phenomenon of professional isolation through distance learning.

Prioritizing of benefits (according to the opinion of participants) of the method of distance education based on web revealed high appreciation of:

1. saving of resources (for travel, accommodation etc.);
2. possibility of training at the workplace;
3. training intensity and regime, etc.

In terms of disadvantages of the distance education method it was emphasized in particular the absence of computers at the workplace and insufficient knowledge on their use.

Finally, assessing the need for and prospects of distance learning in the public health area, all participants unanimously gave the maximum number of points.

The distance learning method, used for the first time in the system of professional public health education in the Republic of Moldova, has proven to be effective, convenient and with a considerable economic effect. It is also important to mention that the distance learning method was accepted unreservedly by the participants.

This experience will serve as an essential support for the prospects of development of this method of training for all kind of specialties.

Following the development of the concept of distance education and the experience gained in the last 10 years in the implementation of video-conferencing and web-based distance medical education, there have been proposed the draft law on the Status of distance education for public health professionals, which will serve as a tool for the management of this didactic direction in the Republic of Moldova.

Conclusions:

- Professional, social and economic benefits resulting from the implementation of distance learning in public health technologies are considerable.
- Evaluation of the experience in the use of distance learning in public health shows the necessity for massive implementation of aimed technologies.
- The major barriers to the development of distance learning in public health in the Republic of Moldova are of legislative, managerial and economic nature.

- The gains resulted from the use of video-conferencing and web-based distance public health education will make possible to increase the quality and the access to services, as well as to cut the costs.
- The attitude towards distance learning in public health depends on the knowledge in the domain, on the demographic characteristics, on the level of computer literacy and constitutes an obstacle for implementation.
- The analysis of the present state of the process of distance learning implementation led to the identification of the following major problems:
 - lack of a legal-normative framework to regulate the organization of distance education and of the process of certification of theoretical knowledge and practical abilities;
 - insufficient knowledge of the users for the use of web-based distance education programs;
 - insufficient experience of the didactic staff in development of interactive multimedia courses needed for distance education and proper learning.

C.5 Bachelor programme in Public Health Science with an emphasis on community planning

EWY OLANDER, LENA KRANSBERG

The courses in our programme are run on a distance learning basis via a dedicated learning management system called "Itslearning" for the course (180 ECTS):

http://edu.bth.se/utbildning/utb_program.asp?lang=en&PtKod=FHGFS12hDIHE

The education use the student's experience as a starting point and are founded on personal responsibility for actively retrieving knowledge, and to critically analyse and document knowledge. The working approach comprises supervised individual study as well as individual and group assignments which are followed up in group discussions and seminars on the course learning management system or in the video conference system Adobe Connect.

The Learning Management System Itslearning has an overall "program classroom" and in this there are "classrooms" for each course. The students in a class are divided into groups and each group has its own group folder which contains both a discussion forum for study assignments and the group's internal discussion as well as publishing folders for the groups work.

In general, the courses are made up of several elements with individual and group assignments as well as an exam task. The course elements are based on each other and provide a basis for a comprehensive exam task where the parts are integrated and form a whole in order to create a contextual understanding.

The courses use multiple teaching methods that complement each other in order to create the opportunity for students to attain both the national goals for a bachelor's degree as well as the local objectives for programs and courses at the university.

Methods being used are:

- Course introductions in the form of recorded introductions by PowerPoint with audio, video recorded lectures that are posted on Itslearning as well as lectures in Adobe Connect in real time.
- Video recorded lectures of both in-house and external experts in different fields
- Discussion forums for presentation and discussion of assignments in the course as well as for the groups project work and internal discussions
- Workshops, seminars, group meetings and presentations of group- and individual projects in Adobe Connect
- Publishing of newspaper articles in *Salutis*, www.salutis.se, which is the programme's public online journal, as well as a peer-review with feedback and answering of readers' comments on the articles.

Example of the course organization for the course: Threats and Risks in a Modern Community:

Course element 1. Group Task: Concepts and the role and work of local actors

- Identifying concepts and the role and work of local actors.
- Literature studies, empirical studies including contacts with local politicians and leaders in local municipal government on how they handle threats and risks in society.
- Presentation and discussion in forums on Itslearning.

Course element 2. Individual assignment: Role of the media

- Contact with media (TV, radio, newspaper, etc.) concerning the study of how the reporting of messages about health risks are conducted with questions of What, How, Why and When.
- Presentation in the form of a separate written report in Itslearning as well as the publication of a summary of the written assignment in *Salutis*, including peer review and feedback.

Course element 3. Individual- and group task: Vulnerability in an IT society

- Identification of threats and risks in an IT-intensive society with a particular focus on the implications for health and welfare as well as benefits in the IT-intensive society for a sustainable development and how these can be reached despite several threats and risks.
- Literature studies and research on the web as well as with IT experts as a basis for the overall issues.
- The issues are discussed in the groups and the group work their way towards a fictional plan for threats and risks with health and sustainability as key aspects. The group appoints one of the students to moderate the discussion.

The examination for the course is carried out as a joint workshop in Adobe Connect.

Experiences "lessons learned":

We use Adobe connect (web conferencing software) to quite a large extent.

The difficulties in the beginning were, for example, that the sound was not working well and that the students had poor bandwidth. This meant difficulties in conducting seminars and lectures.

As a response to this we learned a few simple tricks and support measures to get the sound to work well. We also make use of the backup that is available both locally and centrally.

We don't use the camera if the bandwidth is poor. Sometimes the students are advised to make use of any of the learning centres that are available all over the country.

The advantage of Adobe connect is that student / teacher and student / student can talk to each other. Nowadays, students have their own Adobe connect room which they can use for group work

for example. Another advantage with Adobe connect is that we can vary the teaching methods.

The students had some difficulty finding their way in the navigation tree in Itslearning and there was a demand for relevant and clear instructions.

Measures have been taken to create a solid and similar structure in the individual "rooms" for each course. The reason for this being that the student should recognize the surroundings.

The teachers have also adapted a proactive approach in planning courses in order to minimize misunderstanding and instructions in Itslearning take the form of images, text and speech.

There were sometimes incidences when the discussions in Itslearning were difficult to follow, for both students and teachers.

As a response a clear structure was implemented. By posting questions in the form of discussion threads, it became easier to follow and to post contributions to the discussions.

From the beginning, we often posted asynchronous discussions during about two days. This could sometimes mean that the discussion was lengthy and with isolated posts (it took on a life of its own).

The solution to this was to try to look to the content of the discussion whether or not it should be an asynchronous or synchronous discussion.

It has sometimes been unclear who will take part in the discussions. The solution was to try and make it more clearly to the student if it should be the students' own discussions or if it is a discussion in which the teacher will take an active part. What determines this is dependent on the type of discussion.

Some of the students are living in other countries during their time of study which means that we have different time zones to take into

account. This may mean that some students are unable to attend a lecture, discussion or an introduction.

As a response to this we record the lectures if the lecturer permits, using the functions for recording in both Itslearning and Adobe connect. Discussions are held over at least 24 hours and seminars are held at times that will suit everyone.

To study at a distance means a great responsibility for the student to plan their studies in a good way. They may sometimes feel that the teacher is “too far away” and that it takes some time to get a reply.

The response has been to create a clear study guide and to have course introductions and introductions to each course element, making the student feel surer of what to expect.

At times the students may experience isolation and vulnerability in not being on campus.

As a response we have seen that there is a clear advantage in working as a team in the distance education i.e. to always be at least two teachers in each course. This means that teachers can help each other and take turns being available for students. By having both teachers involved in jointly developing the study guidance there is a consensus on the content.

In order to achieve the objectives of the courses and the training, it is beneficial to use different strategies by varying elements of the course as well as the examinations. One of the missions of a university is to connect education to the society that we live in. As a response to this, students conduct interviews in the community. They also give presentations in different ways both orally and in writing. They are training to work as a team as well as to work independently. The use of the online journal *Salutis* trains the students in communication with non-experts, to write popular science and to address comments and feedback on a text.

In essence the collaborative learning is an important part throughout the program.

C.6 National Institute of Public Health: Case study on distance learning

LAURA MAGAÑA-VALLADARES, CYNTHIA ROSAS-MAGALLANES

The School of Public Health of Mexico (ESPM) of the National Institute of Public Health (INSP) has contributed to the training, retraining and forming health professionals in Mexico for 90 years: "Since its inauguration on March 23, 1922, with the esteemed merit of being the first institution of its kind in Latin America, the School began the gradual process of preparing students who were trained in the field, practiced preventive medicine and prepared as public health professionals. "(Gudiño Cejudo & Magaña Valladares, 2012)

In 1987, the National Institute of Public Health was established through the merger of the ESPM, formerly known as the Mexico School of Health, with the Centers for Public Health Research and Infectious Diseases. It was not until 2005, after an educational reengineering focused on educational innovation and technology; thus with the decline of the physical boundaries of the classroom environment and incorporation of virtual classrooms, the ESPM consolidated into the most innovative institution in the health sector.

The origin of this educational change included the technological development at the time, the demand for education in the health sector, and the political will of the leaders of the institution.

According to Fullan & Sitegelbauer (1997), the change was significant because it occurred within the three dimensions necessary to have the potential to affect the outcome, which entailed: a) new educational models; b) innovative teaching systems strategies or activities; and c) integrating novel resources.

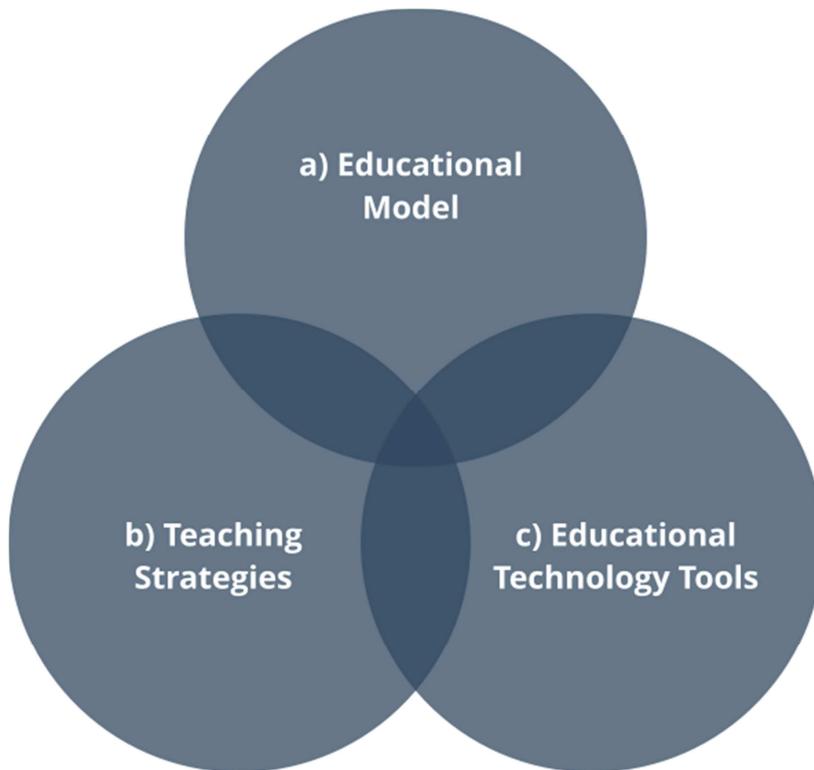
1. Educational needs in the health sector

The public health challenge in emerging economies like Mexico is great; on one hand the resources for health are insufficient, and on the other hand, chronic non-communicable diseases such as diabetes and its complications are the leading cause of death among Mexicans, generating a huge expense for society. Education of health personnel and the dissemination of knowledge to the general population are needed to reverse this trend through disease prevention, early detection, and health promotion.

According to the National Health Information System, in the annual statistical report published in 2009 (the most recent one found on the site), there are 305,068 health professionals in the public sector, where the majority are doctors (27.46%) and nurses (35.22%), (National System of Health Information, 2009). This information provides an overview of the number of health professionals who could potentially benefit from additional training and updating.

In response to this need and utilizing the technology developments of the time, it was decided to conduct a significant educational change that involved modifying the following three dimensions:

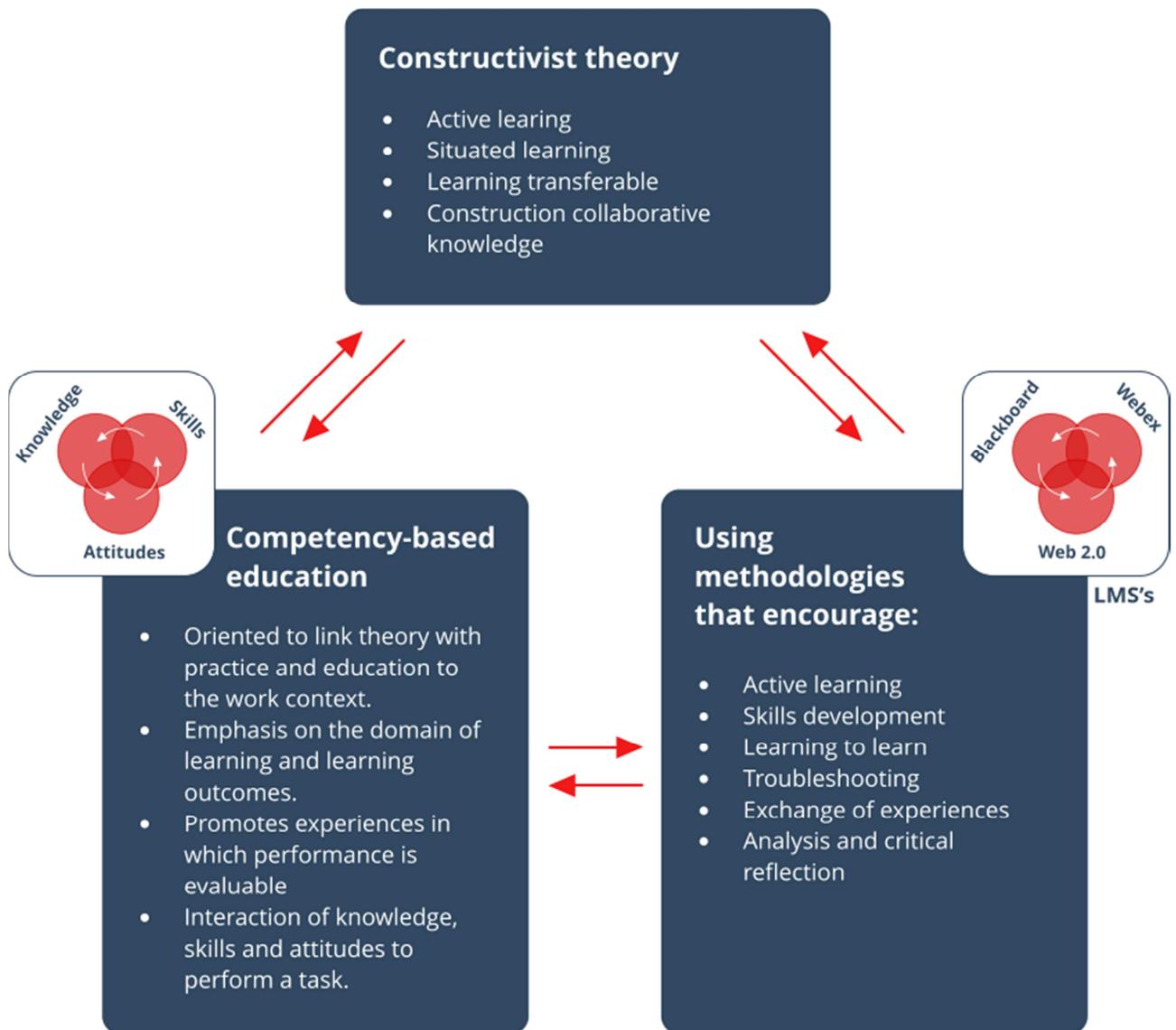
Figure 1 Dimensions of educational change in the INSP (2005)



A pedagogical model was incorporated, shown in Figure 2, based on aptitudes. The pedagogical model is committed to quality and innovation in education through strong academic programs, relevant and pertinent. The pedagogical model is comprised of three essential components:

1. the perspective taken towards teaching and learning reconsidering elements of the constructivism theory;
2. the orientation given to training health professionals from a competency-based educational approach, and
3. the emphasis on innovation in educational practice and in the performance of the teacher as a learning facilitator, through the application of methodologies that support collaborative work, as well as resolve specific public health problems.

Figure 2 INSP Pedagogical components model

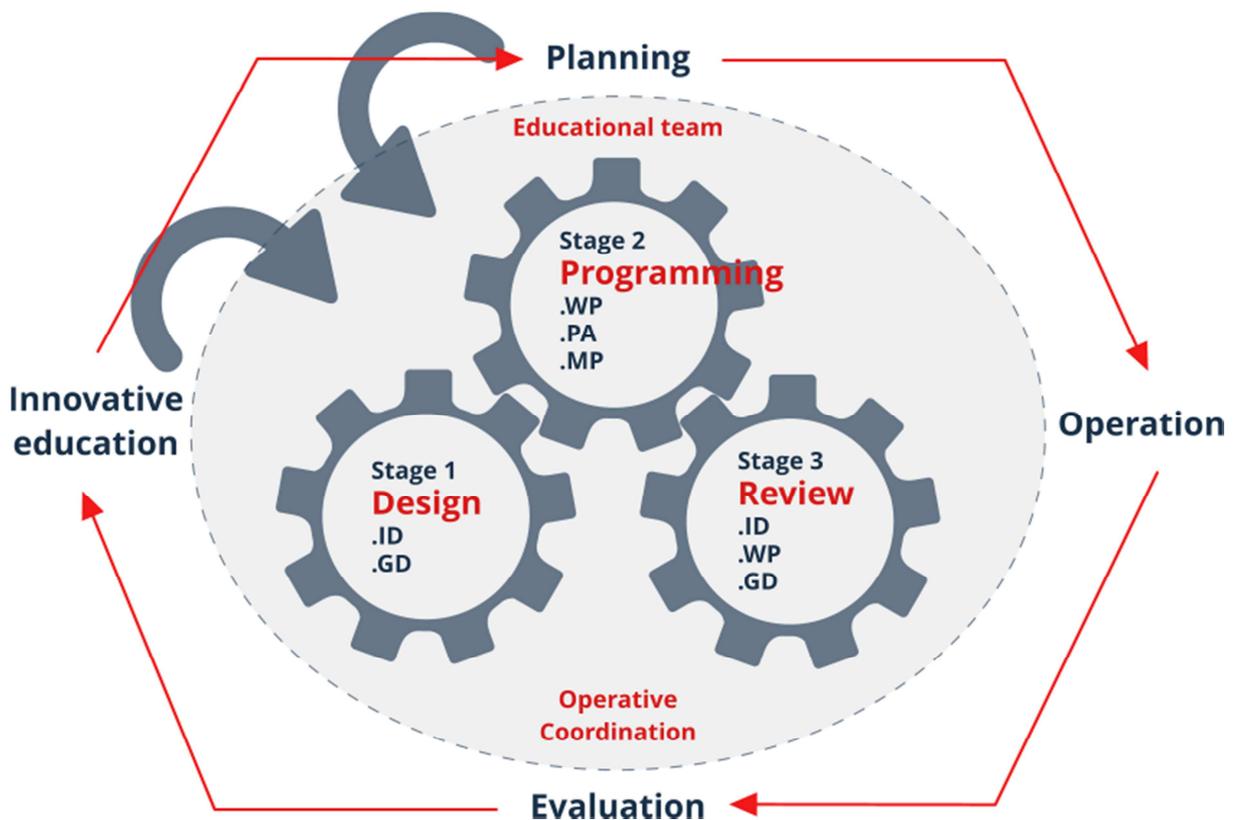


2. Teaching strategies and using educational technology tools

The use of educational technology tools such as Blackboard, Moodle and WebEx were incorporated, thus creating a consolidated team of educational technology to conduct the use of the tools and operation of the pedagogical model for creating virtual learning environments.

Figure 3 provides a general description for creating a learning environment by dividing into 4 major stages: planning, production, operation, and evaluation.

Figure 3 Production process for learning environments



Stage 1, Planning:

Initially planning consists of educational or curriculum planning. In planning, the curriculum is designed, and the income profiles and objectives or general aptitudes of the academic program are defined. One of the most important aspects of any successful instructional design approach is to design a specific population according to Mendez (2001).

Stage 2, Production:

The second stage is the production where a multidisciplinary group with the following profiles works together:

1. Instructional Designer.
2. Graphic designer.
3. Web Programmer.
4. Multimedia producer and developer.

Stage 3, Operation:

The third stage is operating the learning environment, at which point the professors and tutors are fundamental (Cabero, 2002). Operating the courses requires operational coordination, academic coordination, and a professor and a tutor for every 20 students.

Stage 4, Evaluation:

Once the course has been given, it must be evaluated which is not only linked to the assessment of student learning but also includes an assessment of the learning environment itself and the work of the tutors.

3. Challenges

There have been different types of challenges and all have been remedied during these years:

- Resistance to change among stakeholders: teachers, students, researchers and administrative staff.
- Lack of ability to purchase resources by government regulations.
- Lack of connectivity and access to technology in some regions of Mexico.

4. Results

The results have been encouraging and positive, and have worked with various organizations and institutions in the region such as the National Center for Preventive Programs and Disease Control (CENAPRECE), and the National Institute of Respiratory Diseases (INER) in courses on Tobacco control and the impact of medical advice that a practitioner can give to patients to quit smoking; with the Mexican Health Foundation to train promoters and midwives in the early detection of breast cancer or themes such as HIV that are aimed at public officials or civil society organizations; and with the federal entities on a variety of topics focused on early detection and disease prevention and health promotion.

The work to create learning environments within the INSP has not only been directed toward health personal, but there have also been various projects aimed at the general public as part of strategies for disseminating science.

Approximately 10,000 students currently enroll in the INSP virtual programs every year, which offers about 200 courses annually.

The INSP has positioned itself not only nationally but internationally as a leading institution in education, creating an innovative-friendly environment where the pioneering actions of education improve the assessment of learning outcomes, equity, cost-effectiveness, and student satisfaction. In the years to come, it is expected that the School of Public Health of Mexico will increasingly develop the fundamental premise of providing personalized global learning with state-of-the-art technology.

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C.7 E-learning and open access strategy in Spanish training courses of Health Management

JR REPULLO, LA OTEO, P TAMAYO, M CARRASCO, JR MORA, JM ANTEQUERA

In 1996 the Spanish National School of Public Health (Escuela Nacional de Sanidad-ENS-) began to cooperate with the Spanish National University for Distance Learning (Universidad Nacional de Educación a Distancia -UNED-).

A year course in Clinical Management was launched in 1999 using distance learning, with written study units and quarterly sessions. In 2003 it was upgraded as Master Degree in Medical and Clinical Management. Study units were published in 8 books. In 2008 another course, the Master in Health Administration began to use the this study units, and combine distance learning with monthly sessions.

Objectives: Implement an additional step in the process of learning innovation, building synergies between the courses, improving the e-learning interactive tools, editing new updated and improved web2.0 study units, and publishing in open access for the use of all Spanish speaking interested public. All this innovation must be done without additional economic resources, based in the academic interest of authors and the some future minor returns as course e-lecturers.

Results: In 2010 a website was opened for current students and alumni; forums and discussions of students are open to registered participants of the website (www.esuelanacionaldesanidad.es); In 2011 around 150 study units were assigned to 75 authors (faculty members, external lecturers and experts) with a very detailed guideline to optimize the pedagogy (friendly language of small size study units with easy use of reference and webpage). The Master in Health Administration has been renewed and submitted for approval as Bologna-Official MSc; both Masters will run in parallel to share resources and to gain interaction in forums and discussions. Alumni of former courses now enjoy the possibility to engage in activities,

and to update the study units. The wider community of health and clinical management, have a collection of on-line study units for consultation; at the international level, there is a clear prospect for cooperation with Latin-American schools and institutions.

Conclusions: Technological innovation, academic altruism, and strategic redefinition of learning processes, allow low-cost reengineering of public health and health management training.

C.8 Distant learning training on health information & knowledge management

LUIS A SABOGA NUNES

What problem was addressed?

Continuing education programs for health professionals are a challenge today since these professionals face specific constraints like irregular working hours. Flexibility and the possibility to access these programs from different locations are some of the issues that have to be addressed today in order to guarantee that health professionals are supported in their needs.

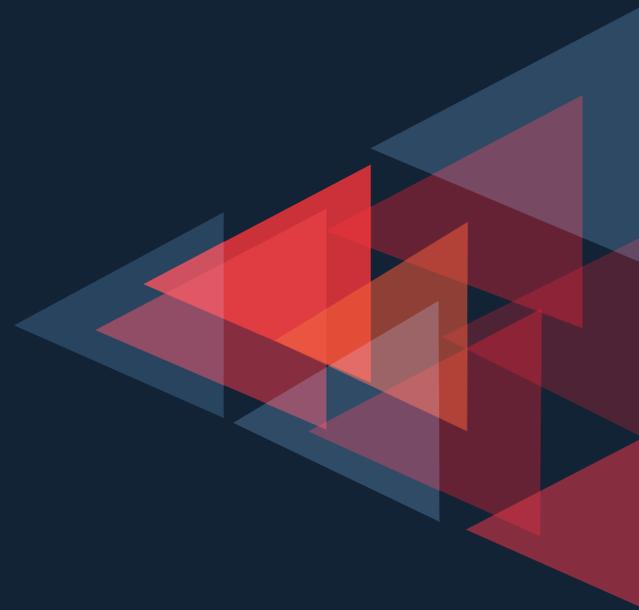
What was tried?

The National School of Public Health (New University of Lisbon) a leading post-graduation institution in Portugal implemented its first distant learning training focusing health information & knowledge management in 2004. Other experiences have been developed such as the training to intervene in smoking prevention and cessation, a post-graduation training for health professionals with 4 ETCS. This course attracted participants not only from Portugal but as far as Brazil, and counts on the participation of teachers from different parts of the world like Canada.

What lessons were learned?

- Although programs can be idealized in a short time, using face to face experiences, technology supported programs with platforms that are not flexible became very easily obsolete. The costs to maintain up-to-date solutions are very high.
- Current conditions confront security and bandwidth particularities.
- End users are often impatient with technicalities and experiment some delay in adapting to current conditions such as installing plugins or other components to allow communications to take place normally.

- Providing additional technical staffs, to administer and support e-learning platforms become a burden to small institutions. Nevertheless the pressure from technological stakeholders that favour the purchasing and installation of expensive servers that need permanent control and up-dates are a reality that hinders the sustainability of these projects.
- Scalability is a goal that is often compromised with solutions that at the entry-level offer very limited resources. Scaling up is mandatory to offer minimum quality. Nevertheless new products emerge offering other solutions that become very tempting to jump between platforms searching for better solutions.
- The needed flexibility to sustain the requirements of organizations and emerging new technologies, demands a very high capability of adaptation.



This is the first edition of a guide to online and blended learning, produced by the ASPHER Working Group on Innovation and Good Practice in Public Health Education, with 8 case studies from European academic institutions and beyond. The booklet is introduced by a contribution about functions, competences and performance in education for public health. In the subsequent contributions leading professionals explain e-learning and blended learning in education for public health, and problem based learning by distance. The use of advanced teaching techniques is still a great deficit in Europe as only about 25% of Schools of Public Health make use of them. This limits not only the national outreach but also limits the European relevance globally. The authors hope to contribute closing the gap and to initiate further editions in the same field.