Open Learning Approach with Remote Experiments Project: Learning Needs Analysis in Radom - Poland

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Radomska Szkoła Wyższa
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The opinions expressed by the authors do not necessarily reflect the position of the European Community, nor does it involve any responsibility on its part.
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“Based on e-surveys results (2.1) and other available information, target group knowledge needs analysis will be developed. Analysis of required knowledge from basic engineering knowledge in school framework based on the needs from specialised topics suggested by industry will be done. Recommendations for modules’ authors concerning the module contents will be prepared…” (WP 2_3_ Target group educational needs analysis, Open Learning Approach with Remote Experiments Project “Olarex”, application form, p. 39)
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Learning Needs Analysis
in Radom - Poland

Radom 2013
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Streszczenie

Niniejsza praca jest częścią badania przeprowadzonego w Radomiu dla Projektu “OLAREX: Open Learning Approach with Remote Experiments / Swobodny Dostęp do Nauki z Eksperymentami Zdalnymi”, sfinansowanego przy wsparciu Lifelong Learning Programme /Program Uczenie się przez całe życie/ (KA3 - ICT /TIK/).

Głównym celem projektu jest innowacyjne wdrożenie do formalnych i nieformalnych sposobów uczenia się przez całe życie materiałów do nauki opartych na TIK, eksperymentach zdalnych oraz e-dydaktycznych metodach. Dla potrzeb Analizy zostały przygotowane e-ankiety dla uczniów, nauczycieli, pracowników administracyjnych szkół oraz przedsiębiorstw partnerskich:

1. Pierwsza ankieta została przygotowana dla nauczycieli szkół ponadpodstawowych, planujących i opracowujących swój program nauczania. Głównym celem było uzyskanie informacji, jakie jest zapotrzebowanie na wiedzę i umiejętności w zakresie TIK i eksperymentów zdalnych, a w śląd za tym, jak wiedza i umiejętności uczyniłyby ich pracę bardziej wydajną

2. Druga ankieta została przygotowana dla uczniów/studentów szkół ponadpodstawowych. W tej ankicie uczniowie byli pytani o stan ich wiedzy i umiejętności w zakresie laboratoriów naukowych i eksperymentów zdalnych, jakie są braki w tej dziedzinie oraz jakie narzędzia są konieczne, aby zdobyć wiedzę i umiejętności potrzebne w ich przyszłej karierze zawodowej.

3. Trzecią ankietę przygotowano dla administracji, kierownictwa oraz dyrekcji szkół ponadpodstawowych, odpowiedzialnych za obecne i przyszłe programy edukacyjne, aby uzyskać wgląd w strukturę technologiczną/akademicką oraz dostępność laboratoriów w ich instytucji.

4. Czwarta ankieta została przygotowana dla kierownictwa firm/przedsiębiorstw, dyrektorów technicznych i wszystkich
innych pracowników odpowiedzialnych za planowanie dalszego rozwoju firmy, politykę kadrową i ustalanie wymagań odnośnie wiedzy i umiejętności oczekiwanych od przyszłych pracowników.

Ankiety zostały stworzone z wykorzystaniem encuestafacil – narzędzia dostępnego bezpłatnie online oraz były opracowane w taki sposób, aby zbadać braki w kompetencji uczniów i nauczycieli. Podczas spotkania koordynacyjnego w Hiszpanii uzgodniono, że konsorcjum przeprowadzi sondaż wśród nauczycieli i uczniów, posiadających podstawową wiedzę i umiejętności informatyczne, oraz że ankiety nie będą badać umiejętności obsługi komputera wśród uczestników sondażu.

Radomska Szkoła Wyższa [RSW] Partner nr 8 (P8), będąca liderem pakietu roboczego dotyczącego powyższego zakresu projektu, przygotowała kwestionariusze. Zanim wdrożono je jako „e-ankiety”, zostały one udostępnione partnerom projektu na wewnętrznej stronie internetowej celem wspólnej dyskusji i wprowadzenia ewentualnych uwag i poprawek.

Po zakończeniu sondażu we wszystkich instytucjach partnerskich przedstawiono raport będący podstawą do dyskusji i opracowania „Modułów edukacyjnych”, które wyjdą naprzeciw oczekiwaniom respondentów. Wynik tego badania prezentujemy w niniejszej książce.

1. Analiza potrzeb dotyczących wiedzy/umiejętności wymaganych od uczniów szkół ponadpodstawowych celem pomyślnego przejścia w edukację lub szkolenie zawodowe na poziomie wyższym, również w odniesieniu do studentów szkół wyższych jako przyszłych pracowników przedsiębiorstw.

2. Analiza potrzeb dotyczących materiałów e-learningowych i eksperymentów zdalnych oraz nowych metod edukacyjnych.

1P1 University of Deusto, P2 P. Andrés Urdaneta School, P3 Europa Media Ltd., P4 Carinthia University of Applied Sciences, P5 BG/BRG Peraustraße, P6 Националния Политехнички Музеи - National Polytechnic Museum, P7 Vytauto Didžiojo Universitetas - Vytautas Magnus University, P8 Radomska Szkoła Wyższa
1. Introduction

This work is part of the analyse research done in Radom for “OLAREX: Open Learning Approach with Remote Experiments” Project, funded with support from the Lifelong Learning Programme (KA3 - Information and Communications Technologies). The main goal of the project is to innovatively implement ICT-based learning materials, remote experiments, and e-didactic methods into formal and non-formal lifelong learning set.

For the Analysis needs were prepared the following e-questionnaires for students, teachers, administration staff of schools and industrial partners:

1. First questionnaire was prepared for the secondary school teachers who are in charge for planning and designing their curriculum. The main objective was to found out what knowledge and skills in ICT and remote experiments they are missing, respectively, what knowledge and skills would make their work more efficient.

2. Second questionnaire was prepared for the secondary school students. In this questionnaire the students were asked about their knowledge and skills in science labs and remote experimentation, what they are missing, what tools they need to get the knowledge and skills necessary for the future careers.

3. Third questionnaire was prepared for the administration, headmasters, and academic managers of the secondary schools, who are in charge of current and future education programs, and have overview of technological /academic structure and lab availability in their institution.

2Olarex application form “project No. 518987-LLP-1-2011-1-ES-KA3-KA3MP”
4. Forth questionnaire was prepared for the companies’/firms’ managers, technical directors and all other employees who are in charge for planning the future development of the company, delegate for hiring and setting the list of demanding knowledge and skills to future employees.

The questionnaires were built using encuestafacil tool available online and free of charge for academic staff and designed in a way that gaps in teachers and students competences was investigated. It was agreed during the coordination meeting in Spain that the consortium will pass the questionnaires to teachers and students that have basic computer knowledge and skills, and the questionnaires will not research the computer literacy of participants of survey.

Work package leader Radomska Szkoła Wyższa [RSW] Partner No 8 (P8) prepared the questionnaires. Before implementing them as “e-questionnaires”, they were placed on the internal web site of the project for peer review, discussion and implementation from all project partners.

After passing the questionnaires in all partner Institutions, a report was presented to be able to discuss about the reports and develop “Learning modules” that will cover the expectations of the respondents. The result of this research we present in this book.

3P1 University of Deusto, P2 P. Andrés Urdaneta School, P3 Europa Media Ltd., P4 Carinthia University of Applied Sciences, P5 BG/BRG Peraustraße, P6 Национальная Политехнический Музей - National Polytechnic Museum, P7 Vytauto Didžiojo Universitetas - Vytautas Magnus University, P8 Radomska Szkoła Wyższa
2. Methodology

The questionnaire developed for the needs of OLAREX: Open Learning Approach with Remote Experiments project was developed by Luis Ochoa Siguencia, member of research staff at partner No 8 [Radomska Szkoła Wyższa] in cooperation with all partners of the project and it was a part of the Workpackage 2.

OLAREX is a consortium of eleven partners from six European countries and is co-funded by European Union.

The aims of this survey were:

1. to analyse the knowledge/skills needs requested from secondary school students to successful transition in higher education or high-grade vocational training or to start a career, and for university students as a future employees in industry;
2. to analyse e-learning materials and remote experiments needs and education methods.

Participants of this survey were invited to take part in the free of charge online OLAREX trainings courses in January-June 2013.

OLAREX was very sensitive to privacy issues on the Internet. The questionnaire were confidential. In case the person that filled out the questionnaire decided to provide his/her e-mail address to obtain a training invitation, his/her address was never shared with anyone other than OLAREX instructors and by no means connected with other information that they provided in the questionnaire.
2.1. OLAREX Questionnaire for students

i. General information

a. Country (choice):
   Austria
   Bulgaria
   Hungary
   Lithuania
   Poland
   Spain

b. Age (choice):
   Less than 15
   15
   16
   17
   18
   19
   20
   more than 21

c. Gender (choice):
   female
   male

d. I have foreign language knowledge in (You may choose more than one):
   English
   German
   Spanish
   Other (please specify)_____________________________
ii. **Communication in English languages** (choice: very good, good, satisfactory, sufficient, unsatisfactory, inadequate, not required):
   - Ability to communicate effectively in English with other students and teachers
   - Ability to learn subjects in English as language of instruction
   - Ability to self-reflection and self-development by using English language skills and English sources
   - Ability to obtain and provide information through various media in English language

iii. **Where do you access the Internet?** (You may choose more than one)
   - Home
   - Library
   - Internet Cafe
   - Computer Room / Computer Laboratory
   - Other (Please specify)________________________________

iv. **How do you access the Internet?** (5 – very often/usually, 0 – not at all)
   - Smartphone
   - Mobile phone
   - Laptop / PC
   - Tablet (iPad, …)
v. Please estimate the number of times you use the following applications in an average week. (5 several hours a day, 4 several times a day, 3 once a day, 2 several times a week, 1 once a week, 0 never):

E-mail
Chat (e.g. MSN, ICQ, etc.)
Social networks (Facebook, Twitter, etc.)
Collaborative e-learning environments (Wiki, Moodle, Google docs, iEtherPad, TitanPad)
Newsgroups / Discussion Groups
Games Web Sites
Other special Web Sites (e.g. Sports web sites, TV web sites, etc.)
Surfing the web with no purpose
Downloading (e.g. Pictures, Games, Music, Videos, animation, text software)
Radio stations over the World Wide Web

vi. Please estimate the number of times you use the following applications. (5 several times a day, 4 once a day, 3 several times a week, 2 once a week, 1 less than once a month, 0 never):

Searching the library web site for references
Contacting teachers via e-mail for information
Contacting external teachers via e-mail for information
Contacting other students via e-mail as to school/college work
Contacting other students via MSN/ICQ concerning school/college work
Contacting other students via MSN/ICQ /e-mail without connection school/college work
Using the school/college web pages
Using the Web, excluding school/college web pages, for searching for relevant material
Posting to newsgroups & message boards
Online assignments
Downloading school/college material from the school/college web pages
Disseminating information using web 2.0 presentation tools (SlideRocket, SpicyNodes, etc.)

vii. Media use: How much does the use of the following devices help you with your studies? (5- very much, 4 much, 3 satisfactory, 2 little, 1 very little, 0 not at all)
   Smartphone
   Mobile phone
   PC
   Laptop
   Tablet (iPad, …)
   E-book reader
   Books

viii. Frequency of use: How often do you use the following technologies? (4 daily, 3 several times a week, 2 several times a month, 1 less than once a month, 0 never)
   Email
   Office (Word, Excel, …)
   Facebook
   Twitter
   Learning Management Systems (e.g. Moodle)
   Collaboration tools (Google docs, blogs, …)
ix. **Purpose of use: What do you use the following technologies for?** (5 privately, 4 mainly privately, 3 privately and study alike, 4 mostly for study, 5 only for study, 0 never)

   Email
   Office (Word, Excel, …)
   Facebook
   Twitter
   Learning Management Systems (e.g. Moodle)
   Collaboration tools (Google docs, blogs, …)

x. **Have you heard of Open Courseware/Free online Lectures before?** (choice: yes/no)

   No, I have not heard of Open Courseware/Free online Lectures before.
   Yes, I have.

xi. **If you answered ‘Yes’ in previous Question, please tick all Open Courseware/Free online Lectures from the following list that apply** (You may choose more than one):

   MIT Open Courseware
   Khan Academy
   Google Art Project
   Other ________________________________

xii. **If you answered in previous Questions, where do you use it:**

   (tick the right one):
   In class
   Privately/ for self-education
Methodology

xiii. **Have you used laboratory activity/experiments in the class?**
    (choice: yes/no)
    No, I have not used.
    Yes, I have.

xiv. **If you answered ‘Yes’ in previous Questions, please indicate your agreement or disagreement with the following statements with respect to practical laboratory experiment:**
    (strongly agree, mostly agree, neutral, mostly disagree, strongly disagree):
    I better understand learning material with laboratory experiments
    I eager to apply my theoretical knowledge in laboratory experiments
    I like to interact with the lab equipment
    I want to know/to learn more about the topic, after laboratory experiments

xv. **Have you heard of remotely accessible laboratories before?**
    (choice: yes/no)
    No, I have not heard of remote laboratories before.
    Yes, I have.

xvi. **The experiment is activity in the laboratory. In your opinion, what is remote experiment?**
    (Please do not consult to Wikipedia, your general knowledge about this subject is important to know)
    The experiment on the real laboratory equipment to which users can get over the Internet
    The experiment, simulated on the computer, to which users can get connected over the Internet
xvii.  Assuming the remote experiments will be available in your school. (not at all interested, slightly interested, interested, very interested, completely interested):
Would you use them during your studies?

2.2. OLAREX Questionnaire for teachers

i. General information
   a. Country (choice):
      Austria
      Bulgaria
      Hungary
      Lithuania
      Poland
      Spain
   b. Age (choice):
      Less than 25
      25-30
      31-40
      41-50
      51-60
      more than 60
   c. Gender (choice):
      female
      male
   d. Level of education (choice):
      Bachelor
      Master Degree
      PhD Degree
e. I have sufficient foreign language knowledge to use it in the professional context in:
   - English
   - German
   - Spanish
   - Other (please specify)_____________________________

f. **Number of years in your teacher career:** (choice):
   - Less than 1 year
   - 1 – 3 years
   - 4 – 7 years
   - 7 – 10 years
   - 10 – 20 years
   - 20 – 30 years
   - More than 30 years

ii. **Which subjects do you teach at your school (irrespective of your official School/Department affiliation)?** (primary – secondary subject):
   - Mathematics
   - Biology
   - Technology
   - Physics
   - Chemistry
   - Other (please specify)________________________________________

iii. **Have you used a practical laboratory component currently in your curriculum?** (choice)
   - No, I have not used
   - Yes, I have
iv. If you answered “Yes” in the previous question, please indicate subject name and school grade (free text)…..

Subject Name:
Grade/Level:

v. For each subject, to what extent are students required to perform the experiments individually or in groups? How large is a typical group (if applicable)? (M = Mathematics, B = Biology, T = Technology, Ph = Physics, Ch = Chemistry, O = Other)

All experiments are performed in groups.
Most experiments are done in groups, very few individually.
About half of the experiments are done individually, half in groups.
Most experiments are done individually, very few in groups.
All experiments are performed individually.
All experiments are demonstrated to the students.
Other (please specify): _______________________________

vi. Typical number of students in one group (if applicable)
(Please use numbers):
Mathematics: ----
Biology: ----
Technology: ----
Physics: ----
Chemistry: ----
Other: ----
vii. **Have you heard of remotely accessible laboratories before?**
No, I have not heard of remote laboratories before.
Yes, I have.

viii. **Assuming the remote experiments will be available in your school.** (not at all interested, slightly interested, interested, very interested, completely interested):
**Would you use them during your teaching activities?**

ix. **Competencies needed for teaching a class** (7 very good, 6 good, 5 satisfactory, 4 sufficient, 3 unsatisfactory, 2 inadequate, 1 not required):
I am able to create a course with online assignments using learning management system/ information from various sources (e.g. library, internet, etc.)
I can quickly learn and adapt new teaching methods.
I can quickly learn and adapt new technologies for education.
I can find/evaluate new ICT teaching/learning instruments
I can use them in class by myself without training

x. **Information and communication technologies (ICT) general skills** (7 very good, 6 good, 5 satisfactory, 4 sufficient, 3 unsatisfactory, 2 inadequate, 1 not required):
Using of hardware equipment (e.g. computer, plotter, scanner, digital devices).
Using of word processing programs (Word, Excel, PowerPoint).
Use of e-mail.
Using Open Courseware/Free online Lectures in classroom
Skills in internet research
xi. I have/have got a personal computer with internet connection at home (yes/no choice):
No, I have not
Yes, I have

xii. I am actively involved in at least one Internet forum / chat room (yes/no choice):
Yes, I am
No, I am not actively involved

xiii. I am actively involved in at least one Social network: Facebook, Twitter, Google+ (yes/no choice)
Yes, I am
No, I am not actively involved

xiv. Knowledge in using applications for teaching (7 very good, 6 good, 5 satisfactory, 4 sufficient, 3 unsatisfactory, 2 inadequate, 1 not required):
Learning Management system:
Moodle
WebCT
Blackboard
Other (please specify)_____________________
Collaborative e-learning environments (Wiki – Google docs - iEtherPad, TitanPad )
Social networks : Facebook, Twitter
M - Learning – using mobile phones
Simulations and serious games in classroom
xv. **Have you regularly participated in trainings?** (yes/no choice)
Yes, I have
No, I have not regularly participated in trainings

xvi. **If you answered ‘No’ in previous Question, what were the reasons why you did not participate in trainings?** Please tick all reasons from the following list that apply:
- There has no/or little such training been organised until now
- Organised training was not relevant for my subject
- Lack of time
- Lack of interest
- Other (please specify): ________________________

xvii. **What sources of continuing education do you currently use?**
Please tick all sources from the following list that apply:
- Internet
- Professional journals
- Seminars
- Courses /training outside the school but paid by the school
- Courses/training outside the school for which I pay on my own
- I continue my study as part-time learner at educational institution
- None

xviii. **Have you ever participated in any kind of organized distance/online training (training conducted only over internet)?** (yes/no choice)
Yes, I have
No, I have not participated in any kind of organized distance/online training
xix. Do you think that distance training can be efficient for acquiring professional knowledge in your field? (yes/no choice)

Yes, I do

No, I do not think that distance training can be efficient

xx. Describe the reasons why you did/would participate in continuing education. Please tick all reasons from the following list that apply:

Financial, improved income
Professional promotion
Personal knowledge and interest/Cognitive knowledge
To motivate students
To be more effective in the use of new tools/technologies in my teaching
Other (please specify):_______________________

xxi. How many hours per week could you devote to the continuing education? The training will be executed totally through Internet and at any convenient time (24h/7days a week)? (free text)…..

xxii. Which days would you have time for online training described above? Please tick all days from the following list that apply:

Monday
Tuesday
Wednesday
Thursday
xxiii. **What is your level of interest for the following learning modules in your classroom** (not at all interested, slightly interested, interested, very interested, completely interested):

- How does the current flow? – Ohm Law (using remote laboratories equipment)
- Working as a computer – Logic gates (Using remote lab equipment)
- Growing beans (Using remote lab equipment)
- What does oscilloscope give us…. representation of functions and calculating integrals (Using remote lab equipment)
- Black body radiation of common light sources
- Spectral analysis of light sources
  - Analog circuits measurements
- Simulation using existing simulation tools

xxiv. **What is your level of interest for the following courses during distance training for secondary school teachers** (not at all interested, slightly interested, interested, very interested, completely interested):

- Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom
- Empowering education: How correctly evaluate e-learning materials
- Empowering education: How choose ICT instruments and applications for purpose of your curriculum
Designing curriculum for Moodle virtual learning environment
Designing curriculum for international virtual mobility
ICT museum programs in the classroom/school teaching process
How to incorporate museum ICT programs in the classroom
ICT – Supported teaching and management
ICT – enhanced Research and Professional Development
ICT – Mediated Communication & collaboration

xxv. Please share any other information you feel might be helpful as we prepare the contents of distance training for secondary school teachers. (free text)…..

xxvi. To receive the invitation to participate in free online training for the school teachers (January-June 2013), please leave your email address below. Please note that your address will be by no means connected with your questionnaire answers. (free text)…..

2.3. **OLAREXQuestionnaire for Administration Staff of Secondary Schools**

i. **General information**
   a. **Country** (choice):
      
      Austria
      Bulgaria
      Hungary
      Lithuania
      Poland
      Spain
b. **Age** (choice):
   - Less than 25
   - 25-30
   - 31-40
   - 41-50
   - 51-60
   - more than 60

c. **Gender** (choice):
   - female
   - male

d. **Level of education** (choice):
   - Bachelor
   - Master Degree
   - PhD Degree

e. **I have sufficient foreign language knowledge to use it in the professional context in:**
   - English
   - German
   - Spanish
   - Other (please specify):_______________________

f. **Number of years in your Administrative career** (choice):
   - Less than 1 year
   - 1 – 3 years
   - 4 – 7 years
   - 7 – 10 years
   - 10 – 20 years
   - 20 – 30 years
   - More than 30 years
ii. Your position (choice):
   Headmaster
   Head of Department
   Subject Coordinator
   Administrative Staff
   Learning Support Staff
   Other (please specify)

iii. Your job descriptions for secondary school administrators (choice):
   General Administration
   Property/Site
   Manager/Assistant
   ICT/Technical Support
   Manager/Responsibilities
   Exam Officer
   Marketing
   Student Records
   Other (please specify)

iv. Do you use ICT for daily tasks? (Almost always, Often Sometimes, Seldom, Never)
   Contacting parents
   Preparing materials/resources
   Registration/Analyzing attendance data
   Administer/clerking exams/NC assessments
   Work relating to specific responsibilities
   Preparing report sets
Methodology

Processing exam/NC assessment marks
Preparing for/responding to school inspection
Work related to school policy making/target setting
Analyzing pupil performance data
Grading
Other (please specify)____________________

v. How long has ICT been used in your school for supporting educational activities? (choice)
Never
Less than a year
1 to 2 years
3 to 5 years
6 to 10 years
More than 10 years

vi. In your organization, what software for administration and education support are available? Please tick all software from the following list that apply:
Word processing
Spreadsheet/Excel
Presentation software
Designing of Graphics /Diagrams
Database
Encyclopedia/References on CD-ROM
Tutorials
Video/Audio
Music composition
Tutorials for programming languages
Recreational games
Desktop publishing
Educational games
Simulations
Drill and practice programs
Learning Management Platform/ Authorware
Communication/Collaboration tools (e.g. video conference)
Statistical / mathematical programs
Internet
E-mail software

vii. In your organization, how much educational software/applications are available for use by students in the indicated subject areas? (not at all, few programs, average, rather a lot, a lot)
Mathematics
Science
Technology
Foreign language: English
F.L: German
F.L: French
F.L: Other (please specify)
Home Economics
Social Studies
Other (please specify)___________________________
viii. Please could you estimate the number of computers with Internet access in your organization (choice):
Less than 10
10-20
21-30
31-40
More than 40

ix. Do you have science laboratory equipment at your school? (choice yes/no)
Yes, we do
No, we do not

x. Who is typically responsible for the practical design and the implementation of laboratory equipment? Please tick all statements from the following list that apply:
Ministry of Education (State)
Ministry of Education (Provincial/regional)
Director of school
Head of department
Other (please specify): ______________________

xi. In the last 3 years and the last 10 years, the ICT related expenses, (for teaching purposes only) have: (last 3 years, last 10 years)
increased
remained unchanged
decreased
I don't know
xii. In the last 3 years and the last 10 years, the laboratory related expenses have: (last 3 years, last 10 years)

increased
remained unchanged
decreased
I don’t know

xiii. Have you heard of remotely accessible laboratories before? (choice yes/no)

No, I have not heard of remote laboratories before.

Yes, I have

xiv. If you answered ‘Yes’ in the previous question, please tick all statements from the following list that apply:

I have briefly heard about remote laboratories
I am somewhat familiar with the technical concepts of remote laboratories.
I am somewhat familiar with the educational concepts of remote laboratories

xv. In your opinion, remote laboratories can enhance /enrich the practical component of the science and technology curriculum in your school (choice yes/no)

Yes, it can
No, it cannot
**Methodology**

xvi. Assuming the remote experiments will be available for implementation in your school curriculum. (not at all interested, slightly interested, interested, very interested, completely interested)

I will support the pilot of using remote experiments in the school curriculum

xvii. Did you support your teachers in distance/online training participation? (choice yes/no)

Yes, we did
No, we did not

xviii. *In your opinion, can distance training be efficient for teachers for acquiring professional knowledge* (choice yes/no)

Yes, it can
No, it cannot

xix. *In your opinion, why will teachers be interested in participating in the training?* Please tick all statements from the following list that apply:

- Salary promotion/ Financial, improved income
- Position promotion
- Personal knowledge and interest/Cognitive knowledge
- To motivate students
- To be more effective in the use of new tools/technologies in class
xx. **What is your level of recommendation for the following courses during distance training for secondary school teachers?** (not at all interested, slightly interested, interested, very interested, completely interested)

Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom

Empowering education: How correctly evaluate e-learning materials

Empowering education: How choose ICT instruments and applications for purpose of your curriculum

Designing curriculum for Moodle virtual learning environment

Designing curriculum for international virtual mobility

ICT museum programs in the classroom/school teaching process

How to incorporate museum ICT programs in the classroom

ICT – Supported teaching and management

ICT – enhanced Research and Professional Development

ICT – Mediated Communication & Collaboration

xxi. **In your opinion, what knowledge/skills should a teacher have to do their work?** (strongly agree, mostly agree, neutral, mostly disagree, strongly disagree)

Able to integrate the use of technology and technology standards for students into the curriculum

Know basic hardware and software operations

Know a web browser, communications software, presentation software

Know productivity applications software and management applications
Ability to flexibly use subject specific tools and applications in a variety of problem-based and project-based situations

Ability to use network resources to help students collaborate, access information, and communicate with external experts to analyze and solve their selected problems

Ability to use ICT to create and monitor individual and group student project plans

Ability to use ICT to support the development of students’ knowledge creation skills

Ability to experiment and continuously learn, and use ICT to create professional knowledge communities

xxii. Please indicate your agreement or disagreement with the following statements in relation to obstacles of ICT use for education purposes in your school (strongly agree, mostly agree, neutral, mostly disagree, strongly disagree):

- Insufficient number of computers
- Not enough technical assistance for operating and maintaining of computers and/or insufficient help for solving technical problems with ICT
- Not enough training opportunities for teachers
- Not enough space to place computers appropriately
- Lack of funds
- Insufficient peripherals (printers, scanners, etc.)
- Teachers lack knowledge/skills in using computers/the Internet for instructional purposes
- Not enough staff for supervising of students that use computers/Internet
- No time in teachers’ schedules to explore opportunities for using computers/Internet
Not enough copies of software for educational use
Insufficient time for teachers to prepare ICT–based lessons
Weak infrastructure (telecommunications, electricity, etc.)
Problems in scheduling enough computer/Internet time for different classes
Lack of interest/willingness of teachers to use computers/ the Internet
Inadequate administrative support or initiative at the school/division/regional level
Insufficient plans and/or resources to prevent theft and vandalism of computers
Absence of or outdated school network/LAN
Difficulty integrating computers/Internet in classroom instruction practices
Not enough types (variety) of software
Lack of knowledge on hardware/software characteristics

xxiii. Please share any other information you feel might be helpful as we prepare the contents of distance training for secondary school teachers
2.4. OLAREXQuestionnaires for enterprises management

i. General information
   a. Company name (open text)

   b. Country (choice):
      Austria
      Bulgaria
      Hungary
      Lithuania
      Poland
      Spain

   c. Position in the company (choice):
      General director
      Technical director
      Product development manager
      Strategy and business development director
      Human resources manager
      Other (please specify):_____________________

   d. Main activities of the company. Please tick all activities from the following list that apply:
      Production
      Services
      Technical advice
      Education
      Research and development
e. Numbers of years in the market /Company age/ (choice):
   1 - 2 years 
   2 - 5 years 
   5 - 10 years 
   10 – 20 years 
   20 – 30 years 
   More than 30 years 

f. Number of employees (choice):
   1 – 5 
   6 – 20 
   21 – 50 
   51 – 200 
   more than 200 

ii. Age of the workers in %: (0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90, 90-100)
   Less than 20 years 
   20 – 25 years 
   26 – 30 years 
   31 – 40 years 
   41 – 50 years 
   51 – 60 years 

iii. Estimated percentage of company’s workers with specified education level: (0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90, 90-100)
   Primary school 
   Secondary school
Methodology

Professional school
Bachelor degree
Master degree
Ph. D. degree

iv. Do you have/had any program which involves youth in your organization activity/production? (choice yes/no)
Yes, we do
No, we do not have any program

v. If you answered ‘Yes’ in previous Question, please tick all program from the following list that apply: (Students of universities, Students of professional schools, Students of secondary schools)
Open Door
Co-op (Cooperative) program
Summer Internship
Practicum
Part-time position
Full-time position
Other, please specify

vi. If you answered on previous Question, please provide/estimate an approximate number of “Students of universities” in each program/per year in your company: None, 1-5, 5-10, 10-20, More 20
Open Door
Co-op (Cooperative) program
Summer Internship
Practicum
Part-time position
Full-time position
Other

vii. If you answered on previous Question, please provide/estimate an approximate number of “Students of professional schools” in each program/per year in your company: None, 1-5, 5-10, 10-20, More 20
Open Door
Co-op (Cooperative) program
Summer Internship
Practicum
Part-time position
Full-time position
Other

viii. If you answered on previous Question, please provide/estimate an approximate number of “Students of secondary schools” in each program/per year in your company: None, 1-5, 5-10, 10-20, More 20
Open Door
Co-op (Cooperative) program
Summer Internship
Practicum
Part-time position
Full-time position
Other
ix. Have you heard of Co-op(Cooperative) program before in your or other countries? (choice yes/no)

Yes, I have.
No, I have not heard of Co-op program.

x. If your organization would be invited to participate in this program, would you accepted the opportunity to build co-op program?

Cooperative education (co-op) is a structured method of combining classroom-based education with practical work experience. A cooperative education (Co-op) experience provides academic credit for structured job experience. Cooperative education is taking on new importance in helping young people to make the school-to-work transition, service learning, and experiential learning initiatives.

Yes, I would
No, I would not

xi. If you answered “Yes” in previous Question, please provide/estimate an approximate number of students that should be involved: 1-3, 3-5, 5-10,10-15, More than15

Students of universities
Students of professional schools
Students of secondary schools

xii. In your opinion, what competence should have student to actively participate in this program? (Student of universities, Student of professional schools, Student of secondary schools)

Basics in topic “Electricity”
Basics in computer science
Engineering software; C, MATLAB/Simulink, LabVIEW, etc
Experience to work with remote experiments/devices
Able to use materials (e.g. diagrams, technical instructions) properly
Using of hardware equipment (e.g. computer, plotter, scanner, digital devices)
Using of word processing programs (Word, Excel, and PowerPoint)
Quickly adapt to new technologies
Find and select information from various sources (e.g. library, internet)
Skills in searching internet - Acquires and evaluates information
Organizes and maintains information
Have enough English knowledge to use it in the professional context English
Multitasking (perform tasks in parallel)
Time management - selects goal-relevant activities, ranks them, allocates time
Solve problems occurring during work
Interpersonal - works with others

xiii. Please specify which other knowledge/skills will be required in your company: (open text)

xiv. Would you like to make any other comments or suggestions in relation to Co-op program? (open text)
3. Learning Needs Analysis in Radom - Poland

This report has been developed for the needs of OLAREX: Open Learning Approach with Remote Experiments Project. OLAREX is a consortium of eleven partners from six European countries and is co-funded by European Union. The aims of this survey are: 1. to analyse the knowledge/skills needs requested from secondary school students to successful transition in higher education or high-grade vocational training or to start a career, and for university students as a future employees in industry. 2. to analyse e-learning materials and remote experiments needs and education methods. Participants of this survey will be invited to take part in free online OLAREX trainings in January-June 2013.

3.1. Olarex for students

Background and introduction

Figure 1: Diagram answers - students

In this survey 91 persons have participated, including 52% of male and 48% female. All of participants come from Poland.
The most of participants is more than 21 years old, which is 34% of the total. The next 32% are 20 years old. 14 students are 19 years old. The rest of participants are between 16-18 years old, which is 19% of total.

**Foreign language knowledge**

English language knowledge confirm 80% of participants. Almost half of them - 49% speak German. The second question of questionnaire concerned the communication in English. participants could answer using the six-graded scale.

In the next question, where they were requested for self-evaluation of ability to communicate effectively with other students and teachers, 48% of survey participants indicate good and satisfactory answer, 27 students which is 30% of total answer sufficient, and 14% of total indicate very good, 2% choose not required communication in this language.

Concerning the ability to learn subjects in English as a language of instruction firm half of participant assess it as good and sufficient, 18% as very good. 11 persons as unsatisfactory.

The last two abilities has been evaluated by our respondents almost identically. The most participants - 42% and 44% assess them as good and satisfactory, 20% and 24% assess them as very good and sufficient.
Internet access

Place of Internet access

Almost all participants i.e. 96% access Internet from Home, 60% uses it in Library and 58% in Internet Cafe, 56% declare Internet access in Computer Room/Laboratory. A few persons uses it in restaurants, shopping malls, by friends.

Method of Internet access

In the next question the survey participants were asked to evaluate based on scale 1-5, how often they use the mentioned tools for Internet connection. The results are presented in the following way:

Smartphon is often used by only 13%, rarely was declared by 12%, 34 persons do not use it at all for this purpose. At the same level are the
results concerning the using of Tablet or iPad by survey participants. Definitely the most often i.e. 89% of respondents use Laptop or PC. No one indicated „rarely” or „not at all”. The questionnaire has presented also that 38% of participants occasionally use the Mobile phone for Internet access - 12% often and similar quantity i.e. 15% and 14% rarely or very rarely.

**Figure 3: Place of Internet access**

### Usage of Internet applications

#### Weekly use of applications

The next question concerned the frequency of using the various Internet applications. According to responders’ answers 59% of total use e-mail sever hours a day, and 23% once a day. Similar result is presented in relation to social networks (Facebook, Twitter, etc.) A little lower has been estimated the frequency of using the collaborative e-learning tools (Wiki, Moodle, Google docs, iEtherPad, TitanPad). 34% of responders use them several times a day, 23% once a day, and 21% several times a week. What is interested there has been highly evaluated surfing the web without no purpose. More than half of participants do it several times a day or every day.
It should be noted also the Downloading (e.g. Pictures, Games, Music, Videos, animation, text software). 32% of participants use it once a day, and at most several times a week almost half of respondents. Only 1% never use this applications. Use of special Web Sites (e.g. Sports web sites, TV web sites, etc.) at least once a day is reported by more than half of students.

The results received from question about use of various Chats, Newsgroups / Discussion Groups, Games Web Sites, or Radio stations over the World Wide Web spread quite evenly. There are some persons that use these applications very often, as also more or less the same quantity declare very low frequency of using before mentioned applications.

Detailed data are presented by Figure.

![Figure 4: Number of times you use the ICT applications](image-url)
Frequency usage of Internet application

The participants answered for question how often they use of mentioned applications. The results of survey are following: Searching the library web site for references less than once a month declare 38% of responders. 25% once a week, 20% several times a week. 9% of respondents have never had the contact with this kind of applications.

Also more than half of survey participants less that once a month contact teachers via e-mail. 20% once a week and 14% never did it. Similar results were obtained considering the Contacting external teachers via e-mail for information.

The participants answers in question of Contacting other students via e-mail concerning school/college work spread quite evenly. 24% of responders use it several times a week and once a week 34% declares very low frequency of using before mentioned application.

In the next two questions the obtained answers are very similar. Regardless of using the application MSN/ICQ for contacting other students concerning school work or private matters the most of participants answered that they use it less than once a month. The same quantity of respondents indicated the frequency of several times and once a week. 31% of respondents use of websites at school only several times a week, 26% once a week and 33% less than once a month.

The most od participants i.e. 31% use the Web, excluding school/college web pages, for searching for relevant material less than once a month. 26% indicated several times a week, the next 22 persons use it once a week ,only 9% use it every day.

Almost half of participants admit to Posting to newsgroups & message boards several times or once a week, 34% of respondents do it less than once a month. 35% of participants less than once a month use the online assignments, 18% do it never or several times a week.

The vast majority of survey participants less than once a month use school/college web pages, for searching for relevant material, 25% do it several times a week 23% declares this activity less than once a month.
Our research sample is the least interested in using web 2.0 presentation tools (SlideRocket, SpicyNodes, etc.). The remaining part use this application several times a week or less.

**Media devices and Studies**

**Degree of media devices help in studies**

The survey participants answered for question how much the use of the particular media devices help them with studies. The results are as follows: 33% respondents does not use Smartphon for education purposes. 20% of participants affirm that this device help with learning 5% indicated that very much, and 10% - a little.

Comparing to the previous device the mobile phone is more helpful for the most group of respondents. Only 13% declared that they do not use it for education purposes. For 28 students it has a little effect, 18% are satisfied and 20% affirms that it helps them with learning.

Concerning Laptop and PC the results are very similar. The vast majority answered that this kind of devices help them with learning very much. For the most of them i.e. 62% laptop appeared very helpful but PC is very helpful for 56%. 21% respondents find PC as a helpful and 22% indicate the same about laptop, so the difference is insignificant 7% of PC users is satisfied of this device help with learning, the same for laptop amount to 8%.

Tablet or iPod do not help at all with studies for 38% of respondents. 18% affirm that it helps, for 5 students is very helpful and 8% is satisfied.

For E-book the results are as follows: help very much – 11%, much – 18%, satisfactory – 12%, little – 9%, very little – 19%, not at all – 32%.

Book is the device that helps with studies for 44% of respondents. For 25% helps and 12% of respondents are satisfied or affirm that it helps a little in learning.
The below Figure will represent answers the best.

Figure 5: Media use

Usage of Internet technologies

Frequency of listed technology usage

The next question directed to survey participants referred to frequency of the following technologies usage. It appeared that E-mail is used every day by 81% of respondents, 13% use it several times a week. Concerning usage of Office the results are more differential. 55% of respondents use it every day, 23% several times a week, and 18 persons several times a month. It is worth mentioning that there is not any person among the research sample who has never used both of analyzed technologies. 44% of respondents have never used Twitter. 15% of Internet users visit this portal at least several times a month, and 18% several times a week. Only 8% of participants use this technology every day.
According to the survey results Learning Management System is the least known technology by students, 44% of them have never used it. 18% and 22% of respondents use this system several times a week or month. Only 4% use it daily.

More than half of respondents (58%) use the various Collaboration tools daily. 13% declare using it several times a week, 10% several times a month, and 14% have never used it.

Detailed data on the below Figure.

![Frequency of use](image)

**Figure 6: Frequency of use**

**Purpose of listed technology usage**

Subsequently the respondents were asked to specify the purpose of the below analyzed technologies usage. Thus E-mail is used by the much of respondents i.e. 78% privately and study alike. The remainder indicated the answers privately and mostly privately.
Office similarly to E-mail is used by much of respondents privately and study alike. 21% of survey participants use it mostly for study, and only 4 persons privately or mostly privately. Facebook for more than half of respondents is used privately and study alike. 23% use it only privately, and 12% mostly privately. Twitter is used by most of students privately and study. The second half of respondents do not use this portal at all.

The same results as Twitter received the Learning Management System. Likewise the most of students use this system privately and study alike. The remainders have never used it, and 9% of respondents use it only for study.

The last described technology i.e. Collaboration tools, like the previous ones is used by the vast majority of respondents privately and study alike. 15% do not use it at all, and only 4% declares that they use it only privately. Figure shows the rest of results.

![Figure 7: Purpose of use](image-url)
Open Courseware and Free Online Lectures

Open Courseware and Free Online Lectures knowledge

In the next question students were asked if they had heard about the Courseware or free online lectures before.

The vast majority i.e. 68% of respondents have never heard about this kind of Programs Only 29 persons i.e. 32% of total gave a positive answer.

The sample Programs knowledge

The next question was directed to the persons who answered YES for the previous question only They were asked to tick all the below listed Courseware or free online lectures that apply.

82% of respondents indicated Google Art. Project, the next 36% - Khan Academy. MIT Open Courseware is known only for 2 students.

Place of Open Courseware and Free Online Lectures usage

For the next question concerned the place of the previously listed Programs usage the respondents appointed that more than half of them (54%) used it privately for self-education, and 46% only in class.

Laboratories

Laboratory activities and experiments in a class

The respondents answered if they had ever had laboratory experiments in a class. Most of them i.e. 54% used such an activities in a class. The remainder of the respondents have never had any contact with them.
Learning needs analysis

The respondents’ opinion about practical laboratory experiments

In the next question the persons who gave an affirmative answer for the previous question were asked about their experience about practical laboratory experiments. 44% of respondents strongly agree that they better understand learning material with laboratory experiments, 37% mostly agree, and 11% are neutral.

Subsequently 43% of respondents strongly agree, and 35% mostly agree with opinion that they eager to apply their theoretical knowledge in laboratory experiments. 13 persons are neutral.

The vast majority of respondents like to interact with the lab equipment.

Concerning the opinion that the students want to know/learn more about the topic after laboratory experiments 40% of respondents strongly agree with it, and only 35% mostly agree. 15 persons are neutral.

Figure shows the rest of results.

- Figure 8: Practical laboratory experiment
**Remotely accessible laboratories knowledge**

More than 2/3 of survey participants have never heard about remotely accessible laboratories before, 33% gave an affirmative answer.

**Comprehension of „remote experiment” definition**

In the next question the students were asked to choose one of two definitions of remote experiments according to their general knowledge without consulting to Wikipedia. The answers were varied. 62% of respondents correctly provided the definition that this is an experiment on the real laboratory equipment to which users can get over the Internet. The remainder of responders indicated the second definition.

**Level of interest in remote experiments**

In the last question of our survey the respondents were asked about their interest in usage of remote experiment, assuming that they would be available at school. The answers are varied. However most of respondents are interested. 18% of respondents are completely interested, 23% very interested. 5 persons are not interested at all.
Conclusion

This research was developed for the needs of OLAREX: Open Learning Approach with Remote Experiments Project. OLAREX is a consortium of eleven partners from six European countries and is co-funded by European Union.

The survey is financed by Education, Audiovisual and Culture Executive Agency of European Commission. The subject of research is to develop indicators, collect and analyze data concerning the students’ competencies, usage and attitudes to ICT. Survey was worked out and conducted among the students from 5 European countries. The aims of this respondents’ group survey were:

✔ Analysis of knowledge/skills needs requested from secondary school students to successful transition in higher education or high-grade vocational training or to start a career, and for university students as a future employees in industry.

✔ Analysis of e-learning materials and remote experiments needs and the new education methods.
The knowledge-based society is becoming ubiquitous, with more daily activities, products and services available electronically and increasingly *online* only.

Digital competences are increasingly becoming a vital skill in life, and the lack of access or inability to use information and communication technologies are the real obstacles to social integration and personal development.

People without sufficient ICT skills are at a disadvantage in the labor market. To live, learn and work successfully in a society increasingly complex, rich in variety of information and knowledge-based, students need to use effectively the information and communication technologies. Due to invention of ICT in education the students have opportunity to:

- using of advanced information technologies,
- searching for needed information and their analysis,
- efficient problem solving and making a decision,
- communication, collaboration, publishing and activity in the community,
- developing and becoming responsible citizens of the State,

The main goal of the project is to innovatively implement ICT-based learning materials, remote experiments, and e-didactic methods into formal and non-formal lifelong learning settings.

It will enhance and modernize science, technology, engineering and mathematics (STEM) curricula, foster student creativity and motivation, and develop professional skills and insights about the impact of evolving technologies.

Secondary school students who complete their education at this level will receive the knowledge and skills to use of ICT and remote labs which will influence positively their further education or professional life.
3.2. Olarex for teachers

![Diagram answers - teachers](image)

*Figure 10: Diagram answers - teachers*

**Background and introduction**

57 teachers participated in this survey, all of them work in high schools. Most of respondents (35%) are 25 to 30 years old, the next 25% are 31-40 years old, and at the age of 41-50 and 51-60 years old are 18% of teachers. The women prevail in survey. There are 37 females, what is 65%, while there are 20 males, what is 35%.

**Level of education**

The vast majority of respondents i.e. 82% have Master Degree.

**Foreign Language knowledge**

The most popular language among the participants (59%) is English, chosen by 33 persons. The second appointed by respondents language is German (35%), chosen by 20 persons.
Learning needs analysis

Teaching experience

Number of years in teacher career
The most participants i.e. 28% answered that they have 11-20 years of teaching career, 21% have 1-3 years and 18% have 4-7 years of teaching career.
**Taught subject**

Irrespective of official School or Department affiliation the most popular subjects are Biology appointed by 42% of respondents and Physics indicated by 26% of respondents.

While the least popular subjects are Chemistry 17%, and Mathematics 15%.

![Figure 13: Area of teaching](image)

**Laboratory usage**

**Practical laboratory component in curriculum**

44 participants, what is 77% of respondents answered that they apply laboratory experiments in the class, while 13 participants, what is 23% responded negatively. Most of respondents that answered YES use the practical laboratory experiments in Biology and Physics in secondary schools.

**Which subject, to what extent requires to perform the experiments in groups?**

There are split participants’ opinions. According to 37% of respondents all the experiments are performed in groups for Biology,
22% for Physics, while 17% of teachers answers that there is not necessary to perform all of the experiments in groups.

The vast majority – 89% of respondents declared that there is not necessary to perform the most of experiments in groups. The results related to perform the experiments „fifty-fifty” are similar, since 87% of respondents choose this variant. According to 91% of respondents there is not required to perform the experiments individually.

The same results are for answer that all experiments are performed individually. About demonstration of all experiments to students the opinions are split. The most quantity of respondents – 39% appointed all demonstrated experiments for Biology, next 25% for Physics, and by 15% for Chemistry and Mathematics.

![Figure 14: Extent students are required to perform the experiments individually or in groups](image)

**Typical number of students in one group**

The most respondents answer that two-person groups work the best for Mathematics, Biology, Technology and Chemistry. For Physics they
organize two- and three-person groups. While completely different are results for the other subjects, where fifteen-person groups prevail.

**Remotely accessible laboratories**

63% of respondents i.e. 36 persons declared that they have heard of remotely accessible laboratories before, while 37% i.e. 21 persons have never heard about them.

Assuming the remote experiments will be available in the school 51% of respondents is interested, 25% slightly interested and 23% very interested in this method. Only one person i.e. 2% of respondents is not interested in such a type of experiments.

![Figure 15: Remote experiments available at school](image)

Teaching competence

Competence needed for teaching a class

The respondents self-evaluate their competences to create a course with online assignments using learning management system/information from various sources in the following way: satisfactory -33%, good - 23%, very good- 16%, sufficient - 14%, inadequate – 7%, unsatisfactory – 5%. 2% of respondents find this competence as not required

The most of teachers i.e. 44% estimate that they are very good in quick learning and adaptation of new teaching methods, 33% estimate it as satisfactory, and 14% as only good. 2% of respondents find this competence as not required

Concerning the ability to quick learning and adaptation of new technologies for education the most- 46% of respondents estimate their competence as very good, 32% as satisfactory, while only 12% as good. 2% of respondents find this competence as not required.

Most of respondents - 44% estimate as satisfactory their competence to find and evaluate new learning instruments, 23% as very good, 19% as good. 2% of respondents find this competence as not required.

There are 39 % of teachers that can use their competence in class by themself without training, while 25% of respondents estimate their competence as good and 19% as very good. 2% of respondents find this competence as not required.
Information and communication technologies (ICT) general skills

The respondents evaluated their skills in using of hardware equipment mostly as very good - 33%. Answer “satisfactory” was appointed by 30%, and “good” by 26%. No one of respondents answered that this knowledge is unsatisfactory, inadequate or not required.

Using of word processing programs like Word, Excel or PowerPoint the teachers evaluate mostly as very good - 37%. While “satisfactory” choose 26% of respondents, and „good” - 23% . No one of respondents answered that this knowledge is unsatisfactory, inadequate or not required.

Concerning the use of e-mail 42% of respondents appointed their skills as very good, 28% as satisfactory, and 21% as good. No one of
respondents answered that this knowledge is unsatisfactory, inadequate or not required.

As to using Open Courseware/Free online Lectures in classroom 30% of respondents estimated their skills as satisfactory and very good, 25% of teachers as good. Only 2% of respondents find this competence as not required, while nobody indicated the answer “inadequate”.

39% of teachers self-estimated their skills in Internet research as very good, 28% as satisfactory and 26% as good, only 7% as sufficient, while no one of respondents answered that this knowledge is unsatisfactory, inadequate or not required.

**Internet Access**

**Personal computer with Internet connection at home**

Among the respondents the vast majority have a personal computer with Internet connection at home, i.e. 96%. Whereas only 4% do not have access to this facility.

**Use of Online applications**

**Involvement in Internet forum / chat room**

67% of respondents is actively involved in at least one Internet forum/chat room, while the rest answered negatively.
Involvement in Social network

The most popular Social network chosen by 95% of respondents is Facebook. The other portals obtained the following results: Twitter – 65%, Google+ - 67% and Wiki 60%.

Knowledge in using applications for teaching

The knowledge in using LMS Moodle is as follows: 30% of respondents estimated as sufficient, 23% „satisfactory”, 19% as “good”, 14% as “very good”. Much less teachers answered “unsatisfactory”, “inadequate” and “not required” i.e. analogously 7%, 4% and 4%.

As to WebCT there is very similar situation to above, only answer “very good” obtained 7% what increased the answers “insufficient” to-9% and “not required” to- 9%

Very similar level of knowledge refers to Blackboard and other.

The Collaborative e-learning environments knowledge was estimated much better than above, since answer “very good” was indicated by 21% of respondents, “good” - 19%, “satisfactory” - 25% and “sufficient” - 25%, whereas the rest of answers obtained only a few percent.

The Social networks like Facebook or Twitter obtained the best results among the other applications, since 23% of respondents estimated
their knowledge as „very good”, only 16% as “good”, while “satisfactory” and “sufficient” answers obtained analogously 21% and 28%.

Knowledge about M-Learning – using mobile phone for teaching has been estimated by the same 21% for answers “satisfactory” and “sufficient”, “very good” was indicated 8 times i.e. 14%, while “insufficient” 12%. Answer “inadequate” has been chosen by 5 respondents i.e. 9% of total.

In case of Simulations and serious games in classroom the most respondents i.e. 32% answered ?, the second choice was “satisfactory” – 25%, then “very good” -21%, “good” obtained 14%. The rest of answers received 2%.

Training experience

Participation in trainings

70% i.e. 40 respondents do not participate regularly in trainings, only 30% participate in them what is 17 persons.

84% of teachers that answered they have not participated regularly in trainings explained that there have not been/or little such a trainings
organized until now. Similarly by 86% obtained the answers “lack of time” and “organized training was not relevant for my subject”.

**Long Life Learning experience**

**Sources of continuing education**
The most popular sources of continuing education are: Internet-86% and Professional journals - 88%.

*Figure 19: Sources of continuing education*

**Distance trainings**
75% of respondents participated at least once in distance/online training. According to 84% of participants distance training can be efficient for acquiring professional knowledge in their field.
Reasons of continuing education

86% of respondents indicated Financial, improved income as a reason of continuing education, 82% appointed Personal knowledge and interest, 77% declared Professional promotion, and by 75% to motivate students as also to be more effective in use of new tools/technologies in teaching.

The respondents can spend 3h/week for online training. Tuesday is the most convenient day appointed by 75% of respondents, and Sunday appeared the least convenient day with 7% result.

![Reasons why you did/would participate in continuing education](image)

**Figure 20: Reasons why you did/would participate in continuing education**

Level of interest for the learning modules in classroom

40% of respondents indicated that they are slightly interested in module” How does the current flow? – Low Ohm”, a little less i.e.
35% declared their interest in this module, 14% is not interested, and 11% very interested.

As to module “Working as a computer Logic gates” the answers “slightly interested” and “interested” obtain by 39%. Such an answer as “very interested” and “not at all interested” received by 11%. 37% of respondents appointed that they are interested in module “Growing beans”, next 28% are “slightly interested”, only 2% indicated that they are completely interested in this module.

Considering the answers referring to module “What does oscilloscope give us... representation of functions and calculating integrals” we noticed the most popular answer was “interested” with the result of 44%, then there were 32% of slightly interested, while the least were “completely interested” i.e. only 2%.

The module “Black body radiation of common light sources” is slightly interesting for 35% of respondents, while nobody chose “completely interested” answer.

Very similar answers concern the modules: “Spectral analysis of light sources”, “Analog circuits measurements, “Simulation using existing simulation tools”.

**Course design**

**Level of interest for the following courses during distance training for secondary school teachers**

Most of surveyed teachers were interested in all of the listed courses i.a. “Empowering education: How correctly evaluate e-learning materials”, “ICT – Supported teaching and management”, “ICT museum programs in the classroom/school teaching process “. The answers suggesting lack of interest of respondents reached several percent.
Learning needs analysis

**Figure 21**: Level of interest for the courses (a)

**Figure 22**: Level of interest for the courses (b)
Conclusion

The secondary school teachers from Poland could spend 4 hours per week dedicated to online training. The hours are distributed equally through all working days.

The secondary schools of Poland do not use remote experiments in the curriculum. Offering online courses with theoretical and practical contents for the several schools subjects can introduce this new learning and teaching approach.

As a most frequent reason for not participating in the training, teachers mentioned the “lack of such training courses”. The OLAREX online training can improve or even solve this problem. 6 survey participants out of 57 left their email address to obtain an invitation to OLAREX training, which we are planning to organize at the beginning of 2013.

3.3. OLAREX for Administration Staff of Secondary Schools

Background and Introduction

All of administration Staff of secondary schools come from Poland (100%). 62% of respondents are 25-40 years old, 38% are 41-60 years old. More females answered for the questionnaire (69%) than males (31%). Most of respondents have Master Degree (77%), the few have Bachelor Degree.
Language knowledge

71% of respondents have sufficient English knowledge to use it in the professional context, only 25% indicated this knowledge in German language.

Administrative experience

The respondents have worked in administration 11-20 years (23%). 19% of participants have worked in administration 1-3 years and 21-30 years.
The survey has been performed mostly among the Administrative Staff 58%, the minority were Directors/Headmasters and Learning Support Staff 15%.

39% of respondents are responsible for General Administration in secondary school, and 20% deal with Student Records.
ICT use

Most of participants (38%) occasionally use ICT for contacting parents and preparing materials and sources, 42% occasionally use ICT for registration and analyzing attendance data. 31% of them often use it for administration, clerking exams, NC assessments and work relating to specific responsibilities. 42% of respondents occasionally prepare report sets and school inspection, analyze pupil performance data, 27% process exam/NC assessment marks using ICT, 58% use it occasionally for work related to school policy making/target setting, and 46% for grading.
62% of respondents working in secondary schools have used ICT for 5-10 years for supporting educational activities.

**Software for Administration and education support**

*Figure 30: Software for administration and education support are available (a)*
The most used software and support available for administration and education are Word processing and Internet (100%), a little less popular is E-mail (96%) and Spreadsheet/Excel (85%).
There is a medium availability of educational software/applications for use by students for Mathematics (42%) and Technology (46%). Several programs are available for Science (46%), English language (46%), German language (42%) and the other (54%). There is no access to software for French language (38%), Economics (38%) and Social studies (35%).

**Computer with Internet access**

![Pie chart showing distribution of computer access](image)

Figure 33: Number of computers with Internet access

In institutions where respondents are employed there are 10-20 computers with Internet access (46%). 35% of respondents have 21-30 computers with Internet.

**Laboratories**

88% have science laboratory equipment at school and the Director of school is the most responsible person for the practical design and the implementation of laboratory equipment (73%) as also Ministry of Education (Provincial/Regional) - 69%. 


In the last 3 years the ICT related expenses (for teaching purposes only) have remained unchanged (31%), and during 10 years have increased (38%) or remained unchanged (38%).

Average 36% of respondents think that for the last 3 and 10 years the laboratory related expenses have remained unchanged.
58% of respondents have heard of remotely accessible laboratories before. From this group, 62% of respondents have heard something about remote laboratories but they are not familiar with their concepts. 88% of respondents believe that remote laboratories can enhance/enrich the practical component of the science and technology curriculum in their school.

Assuming the remote experiments will be available for implementation in respondents’ school curriculum. They would be
interested (38%) and slightly interested (35%) in supporting the pilot of using remote experiments in the school curriculum.

**Teaching support**

58% of respondents would support their teachers in distance/online training participation. 73% of respondents think that distance training can be efficient for teachers for acquiring professional knowledge.

*Figure 38: Distance training and acquiring professional knowledge*

**Course design**

*Figure 39: Reasons why will teachers be interested in participating in the training*
The teachers will be interested in participating in the training because they will develop personal knowledge and interest (73%), will be more effective in the use of new tools/technologies in class (54%), for Salary promotion/ Financial, improved income (46%), to motivate students (38%) and for position promotion (35%).

During distance training for secondary school teachers the respondents are slightly interested in transforming curriculum with remote experimentation: how to integrate it in secondary school classroom (50%), empowering education: How correctly evaluate e-learning materials (38%) and How choose ICT instruments and applications for purpose of your curriculum (46%), designing
curriculum for international virtual mobility (31%), ICT museum programs in the classroom/school teaching process (35%), ICT – Supported teaching and management, ICT – enhanced Research and Professional Development, ICT – Mediated Communication & Collaboration (35%). Participants are interested in designing curriculum for Moodle virtual learning environment (38%) as also how to incorporate museum ICT programs in the classroom (35%).

The respondents mostly agree that the teachers should: be able to integrate the use of technology and technology standards for students into the curriculum (54%), know basic hardware and software operations (50%), know a web browser, communications software, and presentation software (50%), know productivity applications software and management applications (50%), have ability to flexibly use subject specific tools and applications in a variety of problem-based and project-based situations (50%), ability to use network resources to help students collaborate, access information, and communicate with external experts to analyze and solve their selected problems (50%), ability to use ICT to create and monitor individual and group student project plans (58%), Ability to use ICT to support the development of students’ knowledge creation skills (54%), Ability to experiment and continuously learn, and use ICT to create professional knowledge communities j (50%).
Figure 41: Obstacles of ICT use for education purposes at school
The respondents mostly agree that the obstacles of ICT use for education purposes in their school are: insufficient number of computers (65%), not enough technical assistance for operating and maintaining of computers and/or insufficient help for solving technical problems with ICT (73%), not enough training opportunities for teachers (62%), not enough space to place computers appropriately (46%), insufficient peripherals (printers, scanners, etc.) (58%), lack of teachers’ knowledge/skills in using computers/the Internet for instructional purposes (58%), not enough staff for supervising of students that use computers/Internet (54%), no time in teachers’ schedules to explore opportunities for using computers/Internet (42%), not enough copies of software for educational use (54%), Insufficient time for teachers to prepare ICT –based lessons (42%), weak infrastructure (telecommunications, electricity, etc.) (35%), problems in scheduling enough computer/Internet time for different classes (54%), lack of interest/willingness of teachers to use computers/ the Internet (65%), inadequate administrative support or initiative at the school/division/regional level (54%), insufficient plans and/or resources to prevent theft and vandalism of computers (58%), Difficulty with integrating computers/Internet in classroom instruction practices (38%), not enough types (variety) of software (46%), lack of knowledge on hardware/software characteristics (58%). The respondents strongly agree that the obstacle is lack of funds (58%). They are neutral about absence of or outdated school network/LAN (38%).

**Conclusion**

The purpose of this survey is to analyze the needs for knowledge. The obtained data shows that the respondents – the secondary school administration staff, use English language at work. So we can conclude that there is need for participation in language courses to improve the language skills. Another important point is the professional experience
that can be obtained through the internships or courses for future employees to be better acquainted with the administration work. According to research results administration staff uses ICT to a small extent. They use it mostly for contacting parents and grading. ICT is not very popular, some schools have used it only for 5 years. Such a programs as Word and Internet mainly help administration and education, a little less popular is e-mail and spread sheet – Excel. Educational software applications are available for small number of employees or not available at all. Schools should provide students with greater number of programs to make lessons more attractive and information more accessible. The programs should establish the change of teaching model to develop creativity, cooperation skills and critical thinking, including the searching, evaluation and creative use of available knowledge sources.

According to survey the schools have fewer computers than staff and students needs. The result is the limited access to Internet and information. In the frame of project there should be foreseen the improvement of school equipment with educational aids, as the technological basis to build digital competencies of students and teachers, as also the other equipment necessary to curriculum realization using ICT. Program consisting in implementation of ICT in the teaching process should include teachers training and provide the school computer network administration services. Training that will be implemented are necessary to better performance of the duties, to increasing employees efficiency and improving their skills. Secondly the employees strive to improve their qualifications in order to strengthen their position in the labour market. It also fosters the professional development of staff.

A small number of administrative staff has heard about remotely accessible laboratories. Whoever had contact with e.g. physics at school is aware of the importance of learning the rules of the world around us through the experimentation.

However, schools not always have the necessary instruments for this purpose, and some experiments simply could not be performed at school
or home. This problem can be resolved by remote (distance) laboratories implementation. In order to use of remote-controlled laboratory only computer with Internet connection and web browser are necessary. Internet experiments are very good complement the lessons. Remote laboratories can enhance and enrich the practical part of the curriculum in science and technology in school as also may be effective to acquire the professional knowledge.

Additional advantage of remote laboratories is impossibility to destroy anything, be injured – all the experiments are properly secured. Remote laboratories are safe, fun, and thanks to the fact that we can do something ourselves we quickly acquire knowledge and remember it for a long time. Distance training allows develop the knowledge and interest, improve efficiency in the use of the new tools and technologies.

Insufficient number of computers (58%), difficulty integrating computers/Internet in classroom instruction practices (38%), not enough types (variety) of software (46%), lack of knowledge on hardware/software characteristics (58%). The respondents strongly agree that the obstacle is lack of funds (58%). They are neutral about absence of or outdated school network/LAN (38%).

3.4. Olarex for enterprise management

Figure 42: Diagram – enterprise management
Background and introduction

Currently e-learning is one of the main fields of application the distance learning technologies, knowledge gathering and management by means of Internet.

Possibility of remote training allows to develop the intellectual capital and employees potential. It enable the individualization of the educational process by the training of employees, customers or business partners in any place, time or needs.

First of all success depends on: the readiness and openness of the work environment to share information in a comprehensive manner, willingness to invest in means ensuring the development and solid infrastructure, the involvement of managers in training and readiness to meet the employees expectations and needs.

Benefits following from use of learning remote systems:

- access in one place to all resources concerning the topic
- clearly defined tasks and requirements by superiors
- the possibility of effective knowledge and skills of employees management
- employees time savings
- quick finding of subject matter experts
- in case of difficulty, ability to find the module with the topic and remind the question

Work experience

In the survey participated respondents from Poland. According to the below Figure most of respondents (40%) represent such a positions as: specialist, electro-automatic, financial advisor, warehouse manager, clerk and department manager.

The next group is represented by technical directors and managers. Only 15% of respondents are product development managers. The least
group are Strategy and business development directors. There were not among the participant general directors.

The next question concerned the main activities of the companies. The most (48%) and (33%) of participating companies deal with production and services activities. Remainder (10%) and (5%) of enterprises specialize in technical advice, education, research and development.

The most of companies (28%) work on the market 6 – 10 years, that is relatively short comparing to the companies existed 11 – 20 years, which quantity is only 4% less. The least quantity (5%) is represented by companies that start their activity with 1 -2 years of experience, which period is the time of familiarity the milieu with new business/product

**Enterprise characteristics**

According to answers concerning number of employees the most companies (38%) employ 21 – 50 workers.

29% of researched enterprises employ 51 – 200 workers, a little less i.e. 24% companies have more than 200 employees. Only 5% of
respondents appointed that their companies employ 1 – 5, and 5 – 20 workers.

The next question presents percentage of company workers’ age and number of companies with selected range of age employees.

![Figure 44: Age of the workers in %](image)

On this basis we can define the age structure of employment. According to the respondents answers it can be concluded that the employees younger than 25 years old and older than 50 years old are a minority in the most of responding companies (0-20% of all workers). In most of the surveyed companies 10% to even 60% of employees are 25 -50 years old, and in a few cases almost whole employed personnel is located in this age range.

The next question presents the education level of employees, defined by percentage dependent on whole employed personnel and number of companies.
Figure 45: Estimated percentage of company’s workers with specified education level

It shows that both the employees with primary education only, and with the academic title of doctor are the minority in the most of companies (0 - 10% of employees ). Total number of employees with secondary and professional education as also Bachelor and Master degree is similar to each other and together form the majority of employees in the surveyed companies. However individual companies have different structure of employment, which usually depends on their activity profile.

**Youth practical placement**

Further questions concerned companies offer directed to young people to enable them the professional practice and gain experience for the position Unfortunately, more than half (62%) of companies do not have any programs involving youth in their organization activity or production.
The remaining companies (38%) have the various programs. It is easy to note that the students of University are a target audience of most of the programs, especially Practicum and Open Door program are the most popular. The poorest offer is directed by companies to secondary school students.

It follows from the general curriculum in secondary schools. While professional schools prepare their students to the specific profession, that young people can better learn by means of such a programs as placements and internships, cooperative programs or working in part-time business which allows them to combine work, professional experience with the school duties.

In the subsequent questions the companies were asked to provide/estimate an approximate number of students participating in programs. In case of students of University no company involves more than 20 students. For the 10-20 person groups only 10% participate in such a programs as part-time and full-time positions and practicum, and 20% in Open Door activity.

30% of 5-10 person groups participate in summer internship, and 10% in practicum. Half of the companies involve 1 to 5 students in practicum, 30% to summer internship, Open Door and part-time position. Within a year 40% of companies have not involved any students in half- and full-time position, 30% in summer internship and Open Door, and 20% in cooperative program and practicum.
Learning needs analysis

In case of students of professional schools, 10% of respondents invite more than 20 person to participation in cooperative program, 20% involve 10-20 person in summer internship and Open Door program. Only 10% of companies involve the same quantity of student in practicum as full-time position. 20% of companies involve 5-10 students in full- and part-time position, practicum and Open Door program, and 10% offer them cooperative program. 40% of enterprises declared that they involve 1-5 person in practicum, 30% in summer internship, only 20% of companies employ such a quantity of students to on full-time position and cooperative program, and only 10% invite to Open Door program.

Up to half of respondents appointed that within a year they have not involved any professional school students in Open Door and Cooperative program, and 40% of companies have not taken anybody on summer
internship nor half- and full-time positions In 20% of enterprises there have not been the practicum participants neither.

Secondary school students are the last youth group involved in activity and production of the selected companies. Yearly small percentage of the companies (12%) involve more than 20 person groups in cooperative and Open Door programs. Smaller groups of 10-20 students are taken by 38% of companies in Open Door program, and only 12% of the companies involve both groups of 10-20 and 5-10 person in practicum and half- and full-time position.

More of companies (38%) involve the secondary school students in a summer internship, but these are the groups of 5-10 person. Such a quantity is involved yearly in cooperative programs by 25% of companies. A smaller 1-5 person groups are taken within a year by 12% of companies on summer internship, cooperative and Open Door programs. The same quantity is involved by 38% of companies in practicum.

Half of respondents appointed that within a year they have not taken anybody on half- and full-time positions. 38% declared that they have not involved any secondary school students in summer internship, Open Door nor Cooperative program. While 25% of surveyed enterprises have not had any practicum participants in that period.

**Cooperative program**

Further question was designed to check if companies participating in the survey had heard about Co-op (cooperative) program before in their or other countries. The results show that majority (86%) have never heard of such a program. Despite such a much companies’ lack of knowledge about Co-op program only just over half of respondents (62%) declared that they would be interested in opportunity to build co-op program in their enterprises.
The program involves cooperation between schools and universities with reputable companies specializing in various branches. The program purpose is the best preparation of young people for work on the selected position by combining theoretical knowledge with practical work experience.

The companies that declared their interest in opportunity to build co-op program were asked to provide/estimate an approximate number of students that should be involved in the program. In case of university students the most companies (36%) appointed that they would involve 1–3 students, similar results were obtained by professional school students (29%) and secondary school students (21%). 14 % of respondents would involve the larger groups of 4–5 and 6-10 of professional school and university students. As to the secondary school students for the same quantitative group they would be chosen by 21% of enterprises.

Only 7% of surveyed companies would involve 11-15 person group of university and secondary school students. As to the more than 15 person groups 29% of respondents would invite to cooperation the university students, only 14% would invite professional and secondary school students

**Student competences needs on practical placement**

The next task was designed to indicate the competence that student should have to actively participate in this program. The obtained results show that more than half (52% - 71%) of the companies participating in the survey require from university students the following competences: multitasking, time management, enough English knowledge to use it in the professional. Moreover they should have the skills related to using of software programs and hardware equipment, quick adaptation to the new technologies, finding and selection of information from various sources, including searching Internet, organization and maintenance of information, using of engineering software as also interpersonal skills.
The competences from professional school students are required to a lesser extent (33% - 43%), about which the companies were not as consistent as in the case of university students.

The respondents indicated as the most important the following competences: ability to use materials e.g. diagrams, technical instructions properly, basics in topic “Electricity” and basics in computer science.

The companies indicated and estimated the competences expected from secondary school students similarly to professional school students. (29% - 33%). Again the required competences are: basics in computer science, using of software programs, finding and selection of information from various sources, including searching Internet skills.

The enterprises participating in survey had the opportunity to appoint the knowledge and skills that will be required in their companies. Among the responses there were additional skills such as: have having the appropriate permissions to perform the job, professional service that
Learning needs analysis

consists of combining the information and pass it onto the relevant body in order to achieve a satisfactory financial transaction for both of parties. It appeared that very important criterion for employers was also knowledge of the thermal energy and the production and delivery of fuel in form of natural gas, as well as technical and practical skills.

Ideal candidat eshould also characterize the patience, perseverance, and orderliness.

The enterprises participating in the survey had no objections, comments or suggestions concerning the cooperative program.

![Figure 48: competence should have a student to actively participate in this program (b)](image)

**Conclusion**

In the survey participated the companies from whole Poland territory, in the vast majority representing production and service industry. Average employment is between 21 - 200 people aged 25 - 50 years with different levels of education. Unfortunately, more than half of companies do not participate various programs that would allow young
people to use their knowledge and apply it in practice as well as give the opportunity to start their own career.

The survey shows that the companies mostly and preferably involve the university students in such programs as Open Door and practicum. Studies are the last stage of education in life, therefore the future employers select rather the persons with the knowledge and skills targeted to specific job, than, for example, secondary school students, where the acquired knowledge is too broad and general.

Relatively small number of people cooperating with company in form of practicum or internship have a chance to get a full-time positions in this company. Additionally these opportunities are restricted by employers' lack of knowledge concerning the programs enabling to create the new platforms of cooperation.

Despite the growing popularity of such programs, it appears that not all of the companies are interested in cooperation, while the companies that declared their interest in participation in Co-op program estimated that the most effective group will be maximum three-person group. Again the highest requirements and expectations as to the competence refer to university students. Based on survey we can conclude that the best target group participating in this experiment are the students, who need the most help in entering the labor market and gaining the experience in the current market situation. Also employers first of all are looking for graduates whose theoretical knowledge acquired through the years of education can be used in practice, becoming the same desired employees in the labor market.
4. Conclusion and recommendations

The main goal of the project was to innovatively implement ICT-based learning materials, remote experiments, and e-didactic methods into formal and non-formal lifelong learning settings. This project enhance and modernize science, technology, engineering and mathematics (STEM) curricula, foster student creativity and motivation, and develop professional skills and insights about the impact of evolving technologies.

4.1. Conclusion

The organized training courses for teachers, students, administrative staff built the e-didactic competences in the STEM by providing remote lab work explanations, offering practically-oriented approaches for strengthening educational programs and technical practices.

The principle results of the surveys are:

- Participants of the survey have a need for knowledge that must be still developed. By knowledge that they represent and share with their students they teach the future generations, and therefore this knowledge should be constantly improved.
- Many participants do not participate regularly in trainings for various reasons. Mostly this is the lack of time or organization such a trainings. The survey analysis shows that such a training could be arranged at the convenient time, in order to most of participants had a chance to participate in it, to develop their knowledge.
Conclusion and recommendations

- The performed research has been designed to recognize the current knowledge and ways of its application, in order to improve the teaching methods.

The new teaching - training methods become more and more popular and characterize by great interest of teachers and academics. Nowadays almost every one has an access to computer and Internet, and therefore such a need for distance learning increases. It is more convenient, less time-consuming and can be more effective. The research represents using the tools of instruction, as also the reasons of possible trainings participation. Through the survey we can also find out which trainings are interesting for teachers, mentors…, as well as the extent to which they use of internet forums, social networks or on-line applications.

The teacher should adapt to the new technologies in order to interest the student in their knowledge and transfer it efficiently and effectively. The teacher should also help the students to create conditions for learning and quick communication.

During the training the teachers will integrate at least one learning module into their curriculum, test them in their classrooms, and encourage their students to apply what they learned.

The six comprehensive learning modules with remote experiments – in English and the national languages of the project partners – will be prepared based on the target groups’ requirements. The learning and teaching materials will be incorporated in an e-platform with personalized learning environment.

The remote experiments as a part of the OLAREX museum exhibition will emphasize hands-on experience, and context-based learning, making this output a unique non-formal e-learning tool.

The surveyed teachers have the knowledge in scope of new applications in teaching. Most of them is satisfied with their knowledge. However they would like to participate in distance/online trainings in order to improve their skills.
4.2. Recommendations

Based on the results of the questionnaires and other available information in Poland, we (P8- Radomska Szkoła Wyższa) are proposing to develop the following learning modules:

- How does the current flow? – Ohm Low (using remote laboratories equipment)
- Biological experiment (Using remote lab equipment)
- What does oscilloscope give us…. representation of functions and calculating integrals (Using remote lab equipment)

This list corresponds to the list of the courses for which the participants expressed highest interest (section 3.10). The three modules will be developed in such way that teacher can apply and integrate one of them in their classroom during online training as an element of project-based learning. The primary target group of these modules are secondary school students.

For the teacher we would propose to create the online training module:

- Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom.

The primary target group of these modules are secondary school STEM teachers. All target audiences of the survey stated high interest in the remote laboratory and experiments believing that this tool can enhance STEM curriculum and teaching methods in schools, at the same time can develop a student competence which are required by industry.
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### Anexes

#### Anex 1: E-learning development

<p>| 1. Competent actors (Learning sources) | The course is developed by Luis Ochoa Siguencia PhD, Vice-Rector for Science and International Relations at Radomska Szkoła Wyższa and an academic researcher at University of Physical Education in Katowice, Department of Tourism Management. Received a PhD degree in Research and Innovation in Education from the “Balearic Islands University”, Mallorca, Spain in 2011. Has many years’ experience in the implementation and coordination of online course projects and provide courses like: Project management /ICT in Education/ Public Relations / Management and marketing planning and Marketing in trade and services. Research interests include Information and Communication Technologies in Education and in the Workplace. Has published 4 books and about 30 scientific papers in this areas. |
| 2. Effective tools for the access and use of resources (Learning sources) | The content of the e-course will consist of 4 units – with some theoretical and practical activities. All four units will have good practices, examples found on the web: papers, videos, clips etc. The access to materials will be direct and ease to pass from one activity to other. Each unit will |
| 3. Awareness of learners (Learning sources) | This course will cover the research process, the primary research output for proposal purposes, an overview of qualitative and quantitative methods, data collection, recording and analysis and final output of a research proposal research component. The units of the course are prepared according to the results and analyses of the WP2 research. The participants are teachers and students interested of applying ICT as a research instrument for educational purposes and professional development. Following the results of the WR2 analyses, the participants have ICT literacy and the course will enlarge their knowledge in their practical implementation. |
| 4. Documentable processes (Learning processes) | By the end of this course, participant should understand the research process and the rules that guide it, including the identification of a topic, preparation of a research proposal and final research report. The learning process has been planned following strict scientific scheme. The participant will have an overview of the research process and the various outputs such as problem statement, literature review, research question. |
| 5. Transparent method (Learning processes) | RWS, the Polish partner has experience in e-learning course development and use of Pbworks for cooperative learning but in this course we will use Moodle platform and we will use the experience of our OLAREX project partners for the implementation of this course. |
| 6. Documented results (Learning processes) | The learning results of the e-course will be the presentation of a small paper in a theme chosen by the participant. By the end of the course the participant should be in a position to prepare his/her research proposal within four weeks period. At this stage of the preparation of the course we expect to be useful for teachers and students. |
| 7. Relevance of learning results achieved to the context of use (Learning context) | The following course has been divided in four parts that outline a simple and effective strategy for finding information for a research activity and documenting the sources you find. Depending on the topic and the familiarity with the library, the participant may need to rearrange or recycle the steps proposed during the course. The course will be analysed and tested with a small group before passing the course to all partners countries. |
| 8. Supportive learning environment (Learning context) | It is important to foster a learning environment in which participants feel safe, relaxed, and willing to take risks, especially for learners who may have had negative experiences in traditional classroom environments. To develop a “supportive learning environment” we will: 1 Be Constructive 2 Suggestions for Students Having Difficulty 3 Make ourselves available 4 Offer review sessions out of class 5 Post Past examples on the homework’s |</p>
<table>
<thead>
<tr>
<th>9. Recognised identity of learners (Learning context)</th>
<th>For this we will use the following social media: Skype /google docs /Olarex Moodle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing contexts needs the change of learning and teaching environments. The new generation of learners or digital kids are no longer the people of traditional educational systems that were designed to teach in the 20(^{th}) century, their needs and expectations differ fundamentally. That is why the participants of this e-course will be teachers with an interest on the use of ICT for educational purposes.</td>
<td></td>
</tr>
</tbody>
</table>

| 10. Value sinthony (Learning context) | As a part of the OLAREX main products, the e-course “\textit{ICT – ENHANCED RESEARCH AND PROFESSIONAL DEVELOPMENT}” has been designed as an instrument of support for the participants in their attempt for including extra ICT competences and skills in their work. The continuing development of ICT skills among teachers is crucial to promoting positive educational outcomes for pupils. The knowledge of when, where, how and why to make use of the new technologies in teaching is crucial. ICT will as such become inextricably linked, integrated and embedded into all aspects of education and training and have a positive impact on learning processes and outcomes. |
Anex 2: ICT – enhanced Research and Professional Development Course structure

The course was designed as an instrument of support for the participants in their attempt for including extra ICT competences and skills in their workplace. The continuing development of ICT skills among teachers is crucial to promoting positive educational outcomes for pupils / students. The knowledge of when, where, how and why to make use of the new technologies in teaching is crucial. ICT will become inextricably linked, integrated and embedded into all aspects of education and training and have a positive impact on learning processes and outcomes.

**Course Outcomes:** By the end of this course, students/teachers will better understand the research process and the rules that guide it, including the identification of a topic, planning a lesson, preparation of a research proposal and final research report.

The course has been divided into four parts that provide a simple and effective strategy for finding information for a research activity and documenting the sources you find. Depending on the topic and the familiarity with the library, the participant may need to rearrange or recycle the steps proposed during the course.

**Course overview**

- Part 1: Identify and develop your topic
- Part 2: Find background information
- Part 3: Cite what you find using a standard format
- Part 4: Write and present your research
**Target groups:** Students, teachers and school staff interested in using ICT for research and professional development purposes

**Preliminary requirements:** Some knowledge and insight into Information and Communication Technology in Education and the workplace. *Read: How to Write a Good Paper in Computer Science and How Will It Be Measured by ISI Web of Knowledge*[^4]

**Finishing Course Requirements:**

- Obligatory activities on the Moodle / Internet platform: 75% [Participation in online discussion forums. Participants to the course will be expected to post comments and responses to an online forum]
- Final work: 25% [Participants will be expected to write a research paper and make a Power Point presentation and post it in Olarex Moodle platform.

---

**Anex 3: Course Implementation**

**Author institution(s)**

- Radomska Szkoła Wyższa (Poland, http://rsw.edu.pl/);

**Training organizer institution(s)**

- Radomska Szkoła Wyższa (Poland, http://rsw.edu.pl/);

**Tutor(s):** English, Spanish and Polish

- Luis Ochoa Siguencia, Radomska Szkoła Wyższa (Poland)

**Target group/intended audience:**

secondary schools teachers, developers of learning materials/ courses/ modules

Pre- requisites:
- Basic computer skills
- Basic knowledge and insight into Information and Communication Technology in Education and the workplace

Languages: Polish, English, Spanish

Learning outcomes addressed by the module
At the end of learning, having successfully implemented all tasks and assignments, learners will be able to:
- Understand the research process and the rules that guide it including the identification of a topic, preparation of a research proposal and final research report.
- Find background information
- Cite an e-document using a standard format
- Write and present a paper

Duration: 20 learning hours (distributed in 4 weeks)

Topics covered by the module and learning schedule:

<table>
<thead>
<tr>
<th>Learning topic</th>
<th>Weeks</th>
<th>Learning outcomes</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Identify and develop your topic</td>
<td>1</td>
<td>Set your research objectives</td>
<td>Activity 1: Use of Google Advanced Search [<a href="http://groups.google.co.uk/advanced_search">http://groups.google.co.uk/advanced_search</a>] and practice with two topics of your interest.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formulate the objective</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Select a Research Topic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>State the topic idea as a question</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Develop the topic</td>
<td></td>
</tr>
<tr>
<td>2: Find background information</td>
<td>2</td>
<td>Secondary data research</td>
<td>Activity 2: Find and search online catalogues like “Libdex”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Primary data research</td>
<td>Activity 3: Use “encuestafacil” and build an e-questionnaire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analyse and act on the results</td>
<td></td>
</tr>
<tr>
<td>3: Cite what you find using a standard format</td>
<td>3</td>
<td>Citation of sources</td>
<td>Activity 4. Use the “Citation machine ” and practice formats APA and MLA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Citation machine</td>
<td></td>
</tr>
</tbody>
</table>
Anexes

| 4: Write and present your research | 4 | Writing the paper Presenting the research | Activity 5: Write a short paper and present it using PowerPoint |

**Assessment Methods and Weightings:**

| Activity 1: Use of Google Advanced Search [http://groups.google.co.uk/advanced_search] and practice with two topics of your interest. | 20 % |
| Activity 2: Find and search online catalogues like “Libdex” | 20 % |
| Activity 3: Use “encuestafacil” and build an e-questionnaire | 20 % |
| Activity 4: Use the “Citation machine” and practice formats APA and MLA | 20 % |
| Activity 5: Write a short paper and present it using PowerPoint | 20 % |
| Total | 100 % |

**Registration to the module “ICT – Enhanced Research and Professional Development” is available in:**


**Module started:** March 1, 2013

**Length of learning – 4 weeks**

**Address of the module:** [http://www.olarex.eu/moodle/](http://www.olarex.eu/moodle/)

**Recognition of learning results** (certification or other):

*Certificate issued by the University of Deusto (Coordinator Institution) and Radomska Szkoła Wyższa*

Anex 4: Feedback form

Your review as a learner will be useful to improve the quality of the course/module. Please answer the questions.
*Required

PERSONAL DATA

Age: *

Your Country: *

Organization: *
(e.g. school, university, training organization)

Gender: *

LEARNING OUTCOMES

Define your level of achievements acquired according to the set learning outcomes of the course

Learning outcome achieved *

<table>
<thead>
<tr>
<th>Learning outcome achieved</th>
<th>Strong/well developed</th>
<th>Satisfactory</th>
<th>Minimal</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set your research objectives, Formulate the objective, Select a Research Topic, State the topic idea as a question, Develop the topic</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Secondary data research, Primary data research, Analyse and act on the results</td>
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<td></td>
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</tr>
</tbody>
</table>
Citation of sources, Citation machine

Writing the paper, Presenting the research

<table>
<thead>
<tr>
<th></th>
<th>Strong/well developed</th>
<th>Satisfactory</th>
<th>Minimal</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citation of sources, Citation machine</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Writing the paper, Presenting the research</td>
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<td></td>
<td></td>
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</tbody>
</table>

**ORGANISING OF COURSE**

Was the module consistent and coherent (from strongly agree to totally disagree) *

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content of module was understandable</td>
<td></td>
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<tr>
<td>The volume of activities was equally distributed during the module</td>
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<tr>
<td>Activities were clear</td>
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<tr>
<td>Tools were accessible when they were necessary</td>
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<tr>
<td>Support and help was accessible when it was needed</td>
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<tr>
<td>It was clearly stated to me what and when will be assessed</td>
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<tr>
<td>The learning material was structured clearly and user-friendly</td>
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<tr>
<td>There were enough tools for interaction when it was needed</td>
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</tr>
<tr>
<td>I needed more active communication with the teacher</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I needed more active communication with the learners</td>
<td></td>
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</tbody>
</table>
How important have the below stated communication and collaboration methods and tools been in the course? *

<table>
<thead>
<tr>
<th>Communication and collaboration tools and methods</th>
<th>Very important</th>
<th>Important</th>
<th>I have no opinion</th>
<th>Not important at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail</td>
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<tr>
<td>Video conference tools</td>
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<td>Social networking tools</td>
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<tr>
<td>Face to face consultations with national tutor</td>
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<tr>
<td>Real time chat</td>
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<tr>
<td>Consultations in virtual learning environment</td>
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<tr>
<td>Discussion forums</td>
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</tbody>
</table>

Other tools or methods (please indicate)

OTHER questions

Please, write here the most positive aspects of the course:

Please, write here the aspects that need to be improved:
Enter here any suggestions or comments:

Would you recommend this course to others? *
   Yes
   No