



Open Learning Approach with Remote Experiments

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Multilateral Projects

RADOMSKA SZKOŁA WYŻSZA

Target groups education needs analysis

OLAREX project report

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This report has been developed for the needs of OLAREX project. Based on the national analyses have been done by the consortium the education needs of target groups, were evaluated. Based on the conclusions of report " The current and estimate future knowledge and skills need" (D2.2) and this report (D2.3) the Conceptual design of the learning materials and training courses will be designed and use in WP4 and WP5.

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1 Introduction

Analysis of education needs of target groups will be important for evaluation of the structure of learning methods, education styles and methodology concept. e-Didactic methods into formal and non-formal lifelong learning setting is one of the main aims of the project. In order to reach this goal the four sets of the questionnaires (D2.1) for different target groups: (1) students secondary school and university; (2) secondary school teachers; (3) managing and administration staff of the secondary school and (4) managing staff of the enterprises. The questionnaires were developed in order to study educational requirements, training methods, availability and motivation of teachers.

This report represents the main outcome from the e-surveys responds. The each partner of the consortium drawn up the analysis of the study made in their country based on the survey results and other available sources of information. The national analysis report of the each partner is enclosed as Annexes to this document.

The report is divided on the chapters corresponded to the consortium countries. Each chapter includes the summary of the education needs of each country and suggested learning modules and training courses.

The final outcome – Chapter 8 Conclusion provides summary tables and diagrams based on the national reports for each country. These results will be a fundament for the conceptual design (D2.4) of the learning modules and training courses as well for identifying of structure and flow of the online methods of education.

2 POLAND

2.1 Summary of the educational needs in Poland

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.

2.2 Suggested learning modules

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 Law (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 is 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 is 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.

3 SPAIN

3.1 Summary of the educational needs in Spain

The secondary school teachers from Spain could spend 2 hours per week dedicated to online training. The hours are distributed equally through all working days.

The secondary schools of Basque Country 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.

The most interesting comment was "I think the main problem is finding training activities that encourage teachers and equip them by tools they can apply in the normal teaching practice."

63 survey participants out of 93 left their email address to obtain an invitation to OLAREX training, which we are planning to organize at the beginning of 2013.

3.2 Suggested learning modules

Based on the results of the questionnaires and other available information in Spain, we (P1- University of Deusto) together with P.Andrés de Urdaneta school (P2) are proposing to develop the following learning modules:

- (1) How does the current flow? – Ohm Law (using remote laboratories equipment)
- (2) Biological experiment (Using remote lab equipment)
- (3) 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 is secondary school *students*.

University of Deusto (P1) together with Carinthia University of Applied Sciences (P4) is also going to create the online training module for the teachers:

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

The primary target group of these modules is 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.

Final list of modules, which will be prepared by University of Deusto will be discussed and arranged with other consortium partners.

4 HUNGARY

4.1 Summary of the educational needs

Students and also teachers have Internet access at home or in the school and they use mostly their personal PC or laptop to access the Internet. Applications on mobile phones, tablets or smartphones are not widely used and if they are, only for personal purposes, not for learning. Collaborative learning tools are used and liked by the students.

Secondary schools in Hungary almost never use remote experiments, nevertheless we know that they are available. But as mentioned, there is interest, so offering online courses with theoretical and practical contents in schools' subjects with this new learning and teaching approach will be welcome. The two most mentioned school subjects are mathematics and biology.

62% have never attended online courses, but 82% of the teachers find efficient the distance learning courses. Their main motivation to attend these online courses derives from personal interest (31%); to be more efficient to use new technologies (29%); and 27% would like to use the obtained knowledge to motivate students.

Around half of the teachers responding participate in courses, they mostly update their knowledge from online websites and journals. The reasons for that were mostly the lack of organised trainings and lack of time. Most of them stated that they would participate in the OLAREX training (in comments and deriving from the number of e-mail addresses showing interest), which will be online, thus flexible regarding their time availability.

4.2 Suggested learning modules

Based on the results of the questionnaires and other available information in Hungary, Europa Media is proposing to develop learning modules that include:

- (4) Biological experiments, e.g. Grooving beans-biological experiment (Using remote lab equipment)
- (5) What does oscilloscope give us.... representation of functions and calculating integrals (Using remote lab equipment)
- (6) Working as computer-logic gates and other mathematical teaching material
- (7) Experiments from the borderline of natural sciences (atomic analysis, sound and optics) (Using remote lab equipment)

This list corresponds to the list of the courses for which the participants expressed highest interest. The modules should be developed in such way that teacher can apply and integrate one of them in their classroom as an element of project-based learning. The primary target group of these modules is secondary school *students*.

Europa Media is going to create the online training module for the teachers:

- ii. Information on available ICT tools, remote applications that can be used in the classroom (how to select them and use them).

The primary target group of these modules is secondary school *STEM teachers*.

Teachers as well as administrative staff of the survey showed 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 student competences.

Final list of modules which will be prepared by University of Deusto, will be discussed and arranged with other consortium partners.

5 LITHUANIA

5.1 Summary of the educational needs in Lithuania

Most secondary school teachers from Lithuania could spend up to 5 hours per week dedicated to online training (60%), the rest could spend up to 10 hours per week. The best days for training are working days, the middle of the week (Tuesday, Wednesday, Thursday), and only very few would like to be trained on Saturdays or Sundays.

Teachers mentioned that most frequent reason for not participating in training is "lack of such training courses" or "training was not relevant of my subject" . The OLAREX online training can improve or even solve this problem.

18 teachers out of 22 were interested in OLAREX training, which we are planning to organize at the beginning of 2013, and they left their email addresses to get more information about these trainings.

5.2 Suggested learning modules

Based on the results of the questionnaires and other available information in Lithuania, it is obvious that the most popular learning management system (LMS) is Moodle and many teachers would like to know how to use Moodle in their curriculum. OLAREX project coordinators also chose Moodle as their LMS. Vytautas Magnus university (P7) Innovative Studies Institute is responsible for university Moodle system, which is used by more than 10 000 students and teachers. Innovative Studies Institute constantly consults university teachers how to improve their courses in Moodle, how to make them more functional, more attractive, more informative to students.

Vytautas Magnus university in OLAREX project will create three courses for teachers, to help them make their own Moodle courses. In these courses, the curriculum will train teachers to create quality Moodle courses. There will be presented practical and theoretical information, how to prepare well looking and informative course to students. There will be methodology and a lot of examples on curriculum designing.

6 BULGARIA

6.1 Summary of the educational needs in Bulgaria

The secondary schools in Bulgaria do not experience with 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.

The secondary school teachers could spend 2 - 5 hours per week dedicated to online training. The hours are distributed equally through all working days.

As a most frequent reasons for not participating in the training, teachers mentioned that the “Organized training was not relevant for my subject” (52%) as also- “There no training organized until now”(48%). The OLAREX online training can improve or even solve this problem.

54 survey participants out of 58 left their email address to obtain an invitation to OLAREX training, which we are planning to organize at the beginning of 2013.

6.2 Suggested learning modules

Based on the results of the questionnaires, are proposing to be developed the following learning modules:

- How does the current flow? – Ohm Law (using remote laboratories equipment)
- Black body radiation of common light sources
- Spectral analysis of light sources

This 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 is secondary school *students*.

For the online training module for the teachers we offer:

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

The primary target group of these modules is 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.

7 AUSTRIA

7.1 Summary of the educational needs in Austria

The number of hours that the teachers would devote for continuing education through internet varies from 1 hour per week to 7 days per week and the preferred days for such activities in our study were Monday and Thursday.

PERAU Gymnasium from Villach, Austria has no remote experiments in the curriculum but they are opened to the idea of using this teaching technics.

The reasons why the teachers were not taking part in the training were different: 50% of them gave as a reason the lack of time and 33% of the teachers said that such training had never been organized before or that the training was not relevant for his/her subject.

25 survey participants out of 12 left their email address to obtain an invitation to OLAREX training, which we are planning to organize at the beginning of 2013.

7.2 Suggested learning modules

Based on the results of the questionnaires and other available information in Austria, we (P4-Carinthia University of Applied Sciences) together with PERAU school (P5) are proposing to develop the following learning modules:

- Module 1 - Optics
- Module 2 – Electrical circuits and oscillations
- Module 3 – tbd by the students of Perau gymnasium

This list corresponds to the list of the courses for which the participants expressed highest interest and the needs of the school according to their curriculum. 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 is secondary school *students*.

Carinthia University of Applied Sciences (P4) together with University of Deusto (P1) is also going to create the online training module for the teachers:

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

The primary target group of these modules is 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.

8 CONCLUSION

To have a clear idea of the learning modules and courses to be developed in the consortium, we have prepared to tables:

Table 1: Level of Interest for the proposed learning modules

<i>Level of interest for the proposed learning modules</i>												
	Poland		Spain		Austria		Hungary		Lithuania		Bulgaria	
	Not interested	<i>Interested</i>	Not interested	<i>Interested</i>	Not interested	<i>Interested</i>	Not interested	<i>Interested</i>	Not interested	<i>Interested</i>	Not interested	<i>Interested</i>
How does the current flow? – Ohm Law (using remote laboratories equipment)	14%	86%	68%	32%	52%	48%	21%	79%	55%	45%	16%	84%
Working as a computer. – Logic gates (Using remote lab equipment)	11%	89%	52%	48%	35%	65%	25%	75%	18%	82%	12%	88%
Growing beans (Using remote lab equipment)	19%	81%	60%	40%	74%	26%	32%	68%	55%	45%	50%	50%
What does oscilloscope give us.. representation of functions and calculating integrals (Using remote lab equipment)	12%	88%	75%	25%	43%	57%	32%	68%	64%	36%	22%	78%
Black body radiation of common light sources	16%	84%	60%	40%	52%	48%	29%	71%	45%	55%	24%	76%
Spectral analysis of light sources	18%	82%	62%	38%	39%	61%	21%	79%	50%	50%	24%	76%
Analog circuits measurements	16%	84%	76%	24%	48%	72%	36%	64%	64%	76%	21%	79%
Simulation using existing simulation tools	9%	91%	49%	51%	43%	72%	16%	84%	18%	82%	19%	81%

Figure 1: Level of Interest for the proposed learning modules

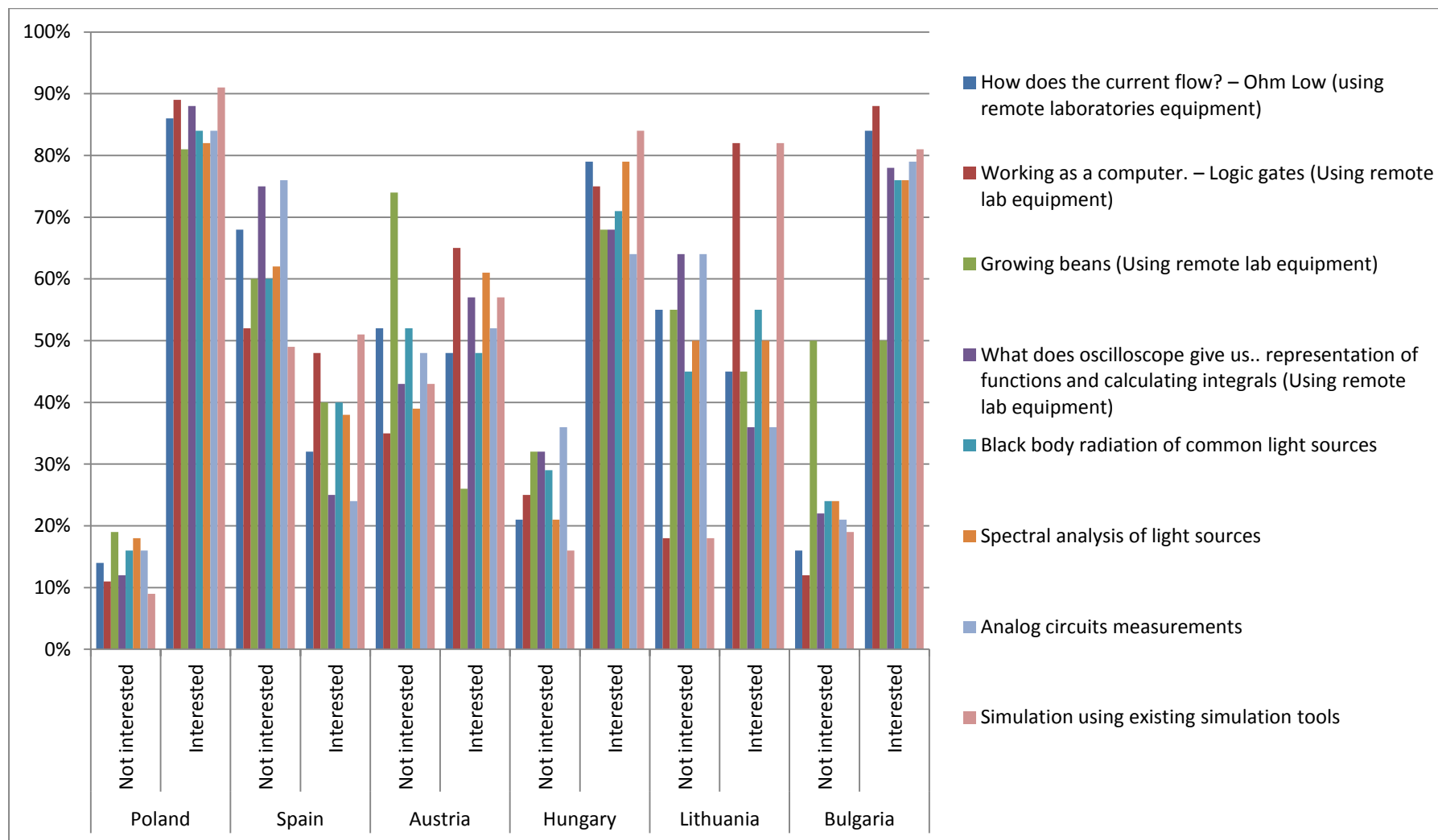
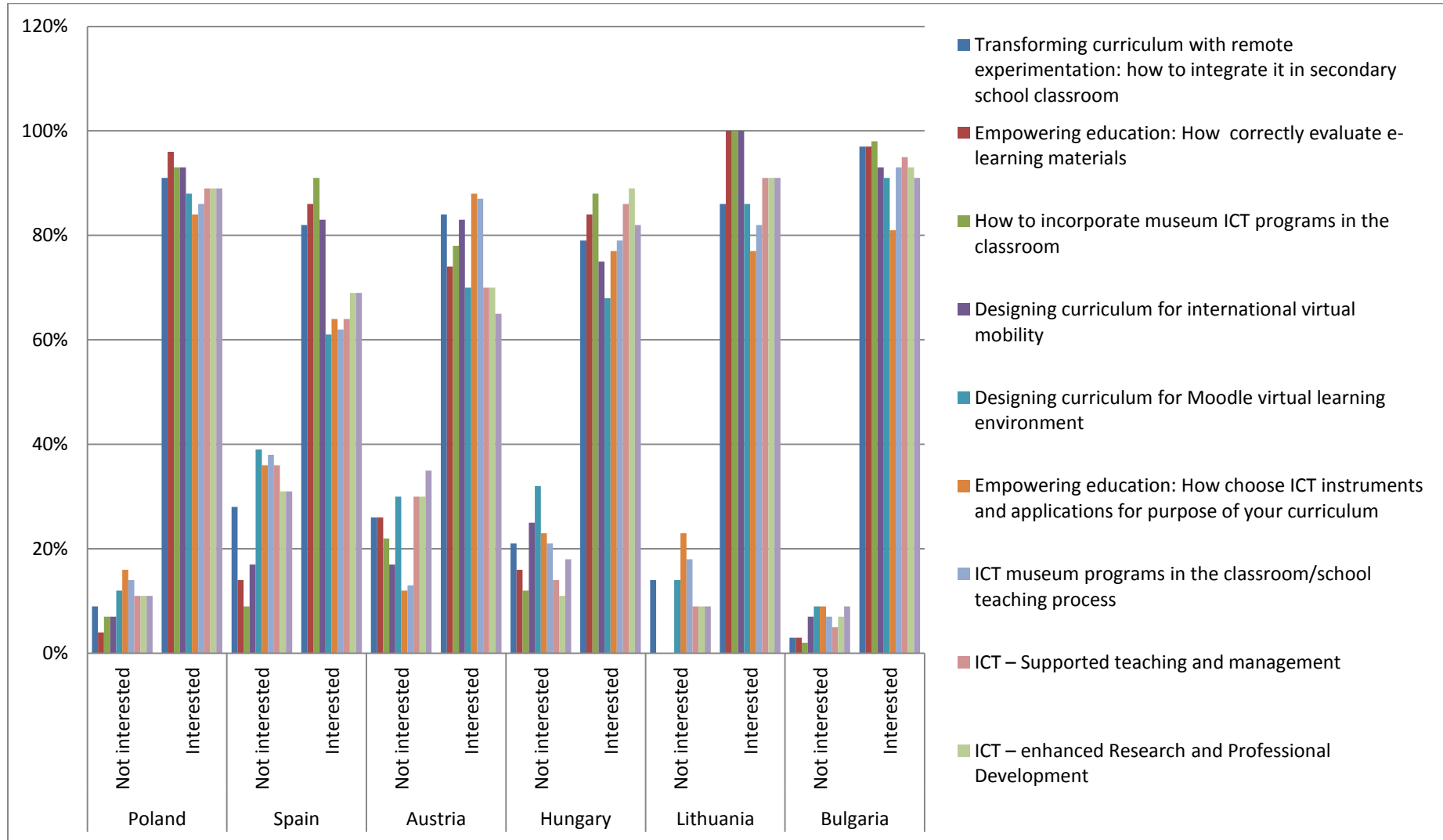


Table 2: Level of interest for the proposed courses during distance training

<i>Level of interest for the proposed courses during distance training</i>												
	Poland		Spain		Austria		Hungary		Lithuania		Bulgaria	
	Not interested	Interested	Not interested	Interested	Not interested	Interested	Not interested	Interested	Not interested	Interested	Not interested	Interested
Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom	9%	91%	28%	82%	26%	84%	21%	79%	14%	86%	3%	97%
Empowering education: How correctly evaluate e-learning materials	4%	96%	14%	86%	26%	74%	16%	48%	0%	100%	3%	97%
How to incorporate museum ICT programs in the classroom	7%	93%	9%	91%	22%	78%	12%	88%	0%	100%	2%	98%
Designing curriculum for international virtual mobility	7%	93%	17%	83%	17%	83%	25%	75%	0%	100%	7%	93%
Designing curriculum for Moodle virtual learning environment	12%	88%	39%	61%	30%	70%	32%	68%	14%	86%	9%	91%
Empowering education: How choose ICT instruments and applications for purpose of your curriculum	16%	84%	36%	64%	22%	88%	23%	77%	23%	77%	9%	81%
ICT museum programs in the classroom/school teaching process	14%	86%	38%	62%	13%	87%	21%	79%	18%	82%	7%	93%
ICT – Supported teaching and management	11%	89%	36%	64%	30%	70%	14%	86%	9%	91%	5%	95%
ICT – enhanced Research and Professional Development	11%	89%	31%	69%	30%	70%	21%	89%	9%	91%	7%	93%
ICT – Mediated Communication & collaboration	11%	89%	31%	69%	35%	65%	18%	82%	9%	81%	9%	91%

Figure 2: Level of interest for the presented courses during distance training



As we can see in the above tables and figures, the interest for modules and courses are very high. To summarize, we have created the following table.

Table 3: Summary Table

Country	Modules	Courses
Bulgaria	88% Working as a computer. – Logic gates (Using remote lab equipment) 84% How does the current flow? – Ohm Low (using remote laboratories equipment) 81% Simulation using existing simulation tools	98% How to incorporate museum ICT programs in the classroom 97% Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom 97% Empowering education: How correctly evaluate e-learning materials
Poland	91% Simulation using existing simulation tools 89% Working as a computer. – Logic gates (Using remote lab equipment) 88% What does oscilloscope give us.. representation of functions and calculating integrals (Using remote lab equipment)	96% Empowering education: How correctly evaluate e-learning materials 93% How to incorporate museum ICT programs in the classroom 93% Empowering education: How correctly evaluate e-learning materials
Spain	51% Simulation using existing simulation tools 48% Working as a computer. – Logic gates (Using remote lab equipment) 40% Growing beans (Using remote lab equipment)	91% How to incorporate museum ICT programs in the classroom 86% Empowering education: How correctly evaluate e-learning materials 83% Designing curriculum for international virtual mobility
Austria	65% Working as a computer. – Logic gates (Using remote lab equipment) 61% Spectral analysis of light sources 57% Simulation using existing simulation tools	88% Empowering education: How choose ICT instruments and applications for purpose of your curriculum 87% ICT museum programs in the classroom/school teaching process 84% Transforming curriculum with remote experimentation: how to integrate it in secondary school classroom
Hungaria	84% Simulation using existing simulation tools 79% How does the current flow? – Ohm Low (using remote laboratories equipment) 79% Spectral analysis of light sources	89% ICT – enhanced Research and Professional Development 88% How to incorporate museum ICT programs in the classroom 86% ICT – Supported teaching and management

<p>Lithuania</p>	<p>82% Simulation using existing simulation tools 82% Working as a computer. – Logic gates (Using remote lab equipment) 55% Black body radiation of common light sources</p>	<p>100% Empowering education: How correctly evaluate e-learning materials 100% How to incorporate museum ICT programs in the classroom 100% Designing curriculum for international virtual mobility</p>
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9 ANNEXES

Annex 1. Andreas Pester, Diana Pop, “Target audience analysis from online survey: Austria.”

Annex 2. Svetozara Kararadeva, “Target audience analysis from online survey: Bulgaria.”

Annex 3. Gabriella Lovász, Rita Balazs, “Target audience analysis from online survey: Hungary.”

Annex 4. Marius Sadauskas, Airina Volungeviciene, “Target audience analysis from online survey: Lithuania.”

Annex 5. Luis Ochoa Siguencia, “Target audience analysis from online survey: Poland.”

Annex 6. Olga Dziabenko, Olatz Alzola Colinas, “Target audience analysis from online survey: Spain.”