O1-A2: Results - Beneficiaries' Skills Gap and Training Needs Analysis

Beneficiaries' Skills Gap and Training Needs Analysis

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Results Overview

As set out in the Research Guidelines, the context and use of Online Collaborative tools by teachers in Estonia, Germany, Latvia, and Lithuania were explored. Three research tools were employed:

- **Desktop research** to investigate national policies and activities relating to ICT-facilitated education
- **Quantitative survey research** to gather information from teachers relating to their use of online collaborative tools
- **Structured interviews** of national experts or stakeholders to add context and depth to the topic of the use of online collaborative tools by teachers

Outputs from each of these research activities will help to structure the curriculum that will form the basis for the Online4EDU programme, ensuring that it is relevant and fit-for-purpose. The research outputs will serve to highlight the importance of developing teachers' competence in this area, and could potentially be used to highlight this as a policy objective at both a national and European level.

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Country-Level Analysis

Overview

Each national partner carried out desktop research relating to the prevalence of skills and knowledge in the areas of ICT in education in general, and collaborative tools in particular. Specifically, this research focused on national policies and activities relating to ICT-facilitated education, in particular the use of online tools to support education, for example government policies and initiatives, stakeholder initiatives, and best practices by educational institutions or peer networks.

The national reviews, which were carried out during January and February 2015, provided information relating to:

- National context (overview of educational sector and any trends / changes in structure)
- Government policy on technology in education (including references to EU policy)
- Public sector initiatives to promote the use of technology in education, with a focus on any of specific relevance to online collaborative tools
- Other teacher-training programmes and their focus on technology and online collaborative tools.
- Peer-led initiatives, resource sharing, and best practice in this area

The research was carried out using the "Desktop Research Template" set out in Appendix 1 of the Research Guidelines for Beneficiaries' Skills Gap and Training Needs Analysis.

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Estonia

Overview:
Estonian school system includes three school types in general education:

- 73 elementary schools (grades 1-6), 47 of which include preschool
- 265 basic schools (grades 1-9), 73 of which include preschool
- 203 gymnasiums (most with grades 1-12, only 12 with grades 10-12)

Basic education is the compulsory educational minimum which is provided by basic schools (grades 1-9). Children reaching the age of seven have to attend school. On completion of basic education, studies may be continued in an upper-secondary general school (grades 10-12) or in a vocational institution.

General secondary education is acquired at the upper secondary school level. The study programme at upper secondary school is arranged into mandatory and voluntary courses. Graduation from upper secondary school requires the student to complete a curriculum consisting of at least 96 individual courses passed at a satisfactory level as a minimum. Attaining general secondary education entitles students to continue their studies at a higher educational institution or to obtain vocational education.

The number of basic schools has increased, mainly due to the decrease in the number of gymnasiums. In the academic year 2012/2013 there were 279 basic schools and 210 gymnasiums, while in 2013/2014 the corresponding figures were 300 and 198. The reason is the continuous decline in the number of gymnasium students – in the last five years it has fallen by nearly 5,000.

The number of young teachers has been a problem in Estonia for many years now. The exact breakdown by age group can be seen in the chart below.

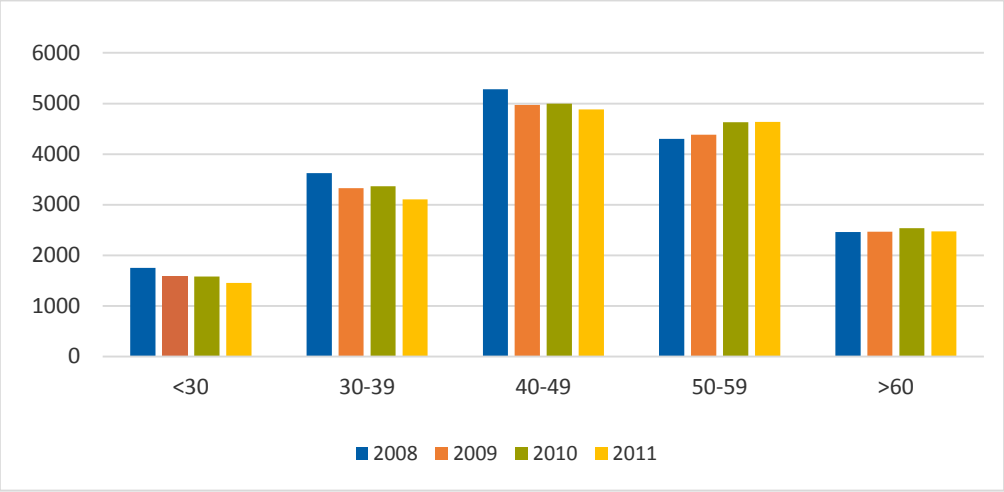

Figure 1: Teachers (primary, lower- and upper-secondary education) in Estonia by age group, 2008 to 2011. Source: Eurostat

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Surprisingly, the number of teachers – especially younger teachers – increased slightly in the academic year 2013/2014. This may be related to the increase in the number of basic schools, but could also be the result of several teacher recruitment programmes, such as "Noored kooli[1]" and "Õpi Õpetajaks[2]", which was launched in November 2013 (the goal is to promote the teaching profession and to encourage talented people to enter teacher training). The success of these programmes is also reflected by the substantial rise in the admittance to teacher training and education sciences – compared to 2012, there were about 100 entrants more in 2013.

Teachers' Competence Requirements:

Estonian policy-makers have chosen ISTE NETS-T as the most suitable framework for developing the national educational technology competency model for teachers. It was adapted for the Estonian context by a group of experts in 2011. The model aims at in-service teachers' competency development in primary, secondary, vocational and higher education level.

The model consists of five core areas of educational technology competencies in the digital age.

- Facilitating and inspiring learners in a digital environment
- Designing and developing learning experiences and learning environments
- Modelling and designing work environments
- Promoting and modelling digital citizenship and responsibility
- Engaging in professional growth

Each of these competencies includes 3 to 4 sub-competencies, which define the particular area of competency more precisely. Competencies need to be recognized in practice through the fulfilment of clearly established performance criteria, which allows for judgement of mastery of a competency. For assessment purposes, this model has been extended into an assessment matrix. Five levels of competencies have been identified as appropriate for different stages of professional development in teacher education. The assessment matrix consists of competency benchmarks across five levels of teachers' professional development emphasizing competency benchmarks from the beginner to the expert level.

The Teacher EQF 7 Occupational Qualification Standard [3]states the following required ICT skills and competence:

- Uses appropriate ICT tools and resources, develops the learning environment and conducts teaching activities,
- Uses suitable e-learning environments and teaching and learning methods; uses innovative ICT communication tools, evaluates and develops his education technological competences according to the International Society for Technology in Education (ISTE)

[1] http://www.nooredkooli.ee/?lang=1
[2] http://www.ut.ee/et/opi-opetajaks
[3] http://www.kutsekoda.ee/et/kutseregister/kutsestandardid/10494558

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Government Action Supporting ICT in Education:

In 2014, Estonia developed its own Lifelong Learning Strategy, which is a valuable support for ICT in Education. The Estonian Lifelong Learning Strategy 2020[4] strongly emphasizes the digital focus in the lifelong learning. One of the objectives of the strategy is to apply modern digital technology in learning and teaching in a more efficient way and with better results, to improve the digital skills of the general population and to guarantee access to the new generation of digital infrastructure.

The program **Digital Turn**[5] under the LLL Strategy aims to design a consistent approach to develop digital competences and purposeful use of digital tools in the learning process in order to support the new approach to learning. One of the specific goals of the program is to have 90% of teachers use digital tools and learning materials in more the 25% of their conducted lessons. This goal is to be reached by the year of 2018.

The program **Competent and motivated teachers and school leadership** under the LLL Strategy aims to make the evaluation and compensation of teachers and school leaders proportional to their professional qualifications and their effectiveness in the performance of their work. It includes different teacher trainings in accordance with the new learning approach, which lead to the use of different ICT tools.

The program **Equal opportunities and increased participation in lifelong learning** under the LLL Strategy includes also the renewing the infrastructure of some upper-Secondary Schools. The program foresees a budget of 7 million EUR for the years 2015-2019.

Tiigrihüpe (Estonian for *Tiger's Leap*) was a project undertaken by Republic of Estonia to heavily invest in development and expansion of computer and network infrastructure in Estonia, with a particular emphasis on education. An important primary effect of the project was rollout of Internet access to all Estonian schools, which effectively ended UUCP usage in Estonia, combined with installing computer labs in most schools, and replacing those that already existed with IBM PC based parks. The project also included a 40 hr long ICT training for 10,000 Estonian teachers.

Teacher Training and CPD:

Teacher Training is regulated by the Estonian Government Regulation [6] that appoints the conditions of teacher training. Teacher training is conducted by Tallinn University and University of Tartu. The required qualification can be obtained at master's level. The regular initial teacher education capacity is 300 ECTS credits.

ICT subject in teacher formal education:

- Compulsory ICT skills, those who do not pass the test have to take a course "Computer as a tool".

[4] https://www.hm.ee/sites/default/files/estonian_lifelong_strategy.pdf
[5] The Digital Turn program (will be published later in 2015, now available only to the developers team)
[6] Õpetaja koolituse raamnõuded https://www.riigiteataja.ee/akt/122032011015

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- Compulsory subject “Learning Environment”
- Elective subject “ICT in school”
- Subject-specific ICT courses for teachers.

After formal education, teachers are able to acquire the teacher`s occupational qualification.
The professional area of teacher includes the following professions:

- **The profession of teacher, level 6**, acquired upon passing of basic training of a nursery school teacher (applied higher education or Bachelor’s study) or certification of the competency of a person as compliant with professional standard by the authority awarding the profession;
- **Teacher of level 6** is working in a pre-school child care institution
- **The profession of teacher, level 7**, acquired upon passing of basic training of a teacher (Master’s study) or certification of the competency of a person as compliant with professional standard by the authority awarding the profession;
- **Senior teacher, level 7,** who in addition to carrying out learning activities supports the development of other teachers and the organisation and develops methodology of the field in his/her own organisation;
- **Master teacher, level 8**, who in addition to carrying out learning activities participates in development and creative activities in and outside the organisation and operates in tight cooperation with a university.

Continuous teacher training is organised based on the concept of continuous education of teachers and heads of school, adopted at the end of 2013 by the Ministry of Education and Research in cooperation with its partners. After formal education teachers are obliged to take 160 hr of continuous professional development training during every five years.

The continuing training programmes for teachers are mainly funded from European Social Fund. The programmes are implemented by:

- Foundation Archimedes – Eduko programme
- Foundation Innove - “Raising the Qualifications of General Education Teachers” and “Substantive development of vocational education” programmes

The training for teachers is provided by Tallinn University, University of Tartu, Estonian Academy of Music and Theatre, Tallinn University of Technology and Estonian Academy of Arts.

Informal Competence Development:

HITSA is an organisation that assist in preparation of the highly qualified IT specialists and to support information and communication technology-related education development in Estonia. HITSA focuses on the smart and effective use of ICT in education providing different courses to teachers and spreading best practice, but also creating and introducing evaluation models to evaluate the quality of digital competences. HITSA stands behind a skilful use of the created digital teaching

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materials, e-environments and digital tools, the expansion of digital competences of teachers and professors, and the dissemination of best practices.

HITSA and previously Tiger Leap Foundation (now an integral part of HITSA) have supported the development on teachers' online communities. Mostly they are subject based discussion and development groups gathered for dissemination of information and teaching content and also for personal development on teachers themselves. With the support of Tiger Leap, teacher-to teacher trainings have also been organized. The widest of these have been DigiTiger – for the trainings focused on educational technologies - and DigiDirector – trainings for headmasters and head teachers. There have also been private initiatives driven by private companies and technology providers as corporate and social responsibility initiatives. Examples of these include the Microsoft Annual Conference on Technology in Education, and the Samsung initiative DigiTurn, a contest for schools to introduce new teaching practices.

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Germany

Overview:

The German education system is very complex – there is no such thing as a single education system due to the federal organisation of the country. Each federal state is in charge of its respective education policies and can decide about the structure and content of education. Although there are many differences among the federal states, there is still a *basic structure of the education system* which serves as the basis for all education systems in the federal states: there are five *education areas* with their respective education institutions, education *degrees* that can be acquired in institutions, and the *transition* possibilities that graduates can chose.

Most interesting are the five education areas: elementary area, primary area, secondary area I, secondary area II and tertiary area. The **elementary area** comprises Kindergarten and similar preschool institutions and is the first step for children into the education system. The age, in which the children enter those institutions, varies in every case. That is different for **the primary area** which persists of the school classes 1 to 4 (in some federal state that might also be from 1 to 6) and where the age for entering is determined by law to the age of six (compulsory school attendance). After four years, the teacher will give a recommendation for the school type in the secondary area I. In Germany, this area is divided into three types that lead the students to a specific degree: Hauptschule (lowest degree), Realschule (middle degree) and Gymnasium (highest degree with access to University). The secondary area I comprises the classes 5 to 10, whereas the secondary area II starts after graduating from class 10. This area includes the classes 11 to 12 in Gymnasium and vocational trainings. There is another school type: Gesamtschule. This type combines the three types and allows the students to make all three degrees. The tertiary area consists of universities and applied science institutions, thus institutions where the student can acquire an academic title[7]. For the project Online4EDU the primary area and the secondary area I and II are the most interesting ones.

In Germany there are 15,749 primary schools with 222,502 teachers (full and part time). The secondary area I and II comprises 15,141 schools (all types included) with 504,728 teachers (full and part time).

Actually most of German teachers are between 50 and 59 years old. The group of teachers between 40 and 49 years follows as second group, third group are teachers between 30 and 39 years and fourth group are teachers older than 60 years. The smallest number of teachers is less than 30 years old. That is due to education time teachers need to be certified which is very long. Thus most of the teachers are certified in the late twenties or after they are 30 years old.

[7] Bundeszentrale für Politische Bildung (bpb)(2013): Das Bildungsystem in Deutschland, URL: https://www.bpb.de/gesellschaft/163283/das-bildungssystem-in-deutschland, (accessed 09.01.2015)

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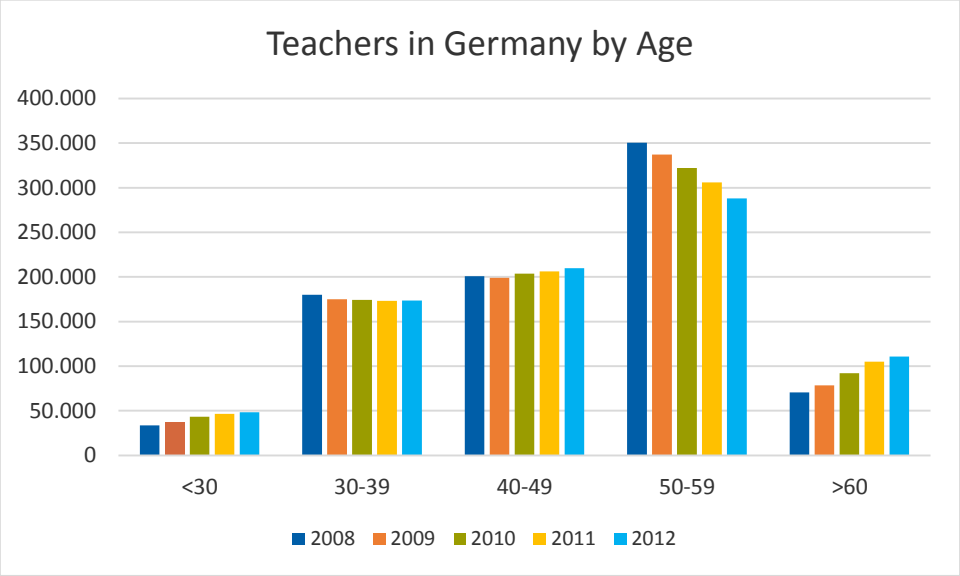

Figure 2: Teachers (primary, lower- and upper-secondary education) in Germany by age group, 2008 to 2012.Source: Eurostat

The so called PISA shock in 2002, wherein results of the German students were disastrous and showed, that the parental home was decisive for the performance of the children, started a huge debate about improving the education system. After the discussion, the education and further education of teacher was supposed to improve qualitatively but as the media puts it, the education of teachers is still confused[8]. The problem can be found in the federal structure of the education system. The structural conditions of the federal states are very different due to demographic differences or decision-making processes and therefore general improvements cannot be made for the whole country. The continuous professional development of teachers is also regulated by the federal states.

Teachers' Competence Requirements:

To become a teacher in Germany, it is obligatory to study two subjects (e.g. Mathematics, Biology) at university or pedagogical schools in which future teachers want to teach their pupils. The pedagogical and educational science part during the teacher education differs and depends on the requirements in different school types. Thus, the pedagogical part for teachers in primary school is much higher than it is for teachers in upper schools like Gymnasiums.

After passing the first state examination teachers run through an internship mostly for two years. They work in schools and attend school lessons in order to augment their practical experience with

[8] Füller, Christian (2012): Nach dem Pisa-Schock: Zehn Jahre Wirrwarr, URL: http://www.spiegel.de/schulspiegel/wissen/nach-dem-pisa-schock-zehn-jahre-wirrwarr-a-801187.html (accessed 09.01.2015)

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pupils. Afterwards student teachers have to pass the second state examination in order to finalise their studies.

A current study shows the portion of Digital Media in teacher education in coherence with the teacher's age. The longer teachers are working in their profession the lesser they were educated in Digital Media. Teachers and student teachers (internship) who were educated in the last five years came mostly in contact with Digital Media while studying. That means that Digital Media was mostly implemented in teacher education in Germany during the last five years. For teachers that were studying before this period, Digital Media was not prioritised. Digital media did not affect their education.

Working years of teachers	Internship (0 years)	1 – 4 years	5 – 14 years	15 – 24 years	More than 25 years
Digital Media covered **in detail** in teacher education	41.7 %	28 %	9.4 %	1.8 %	0.4 %
Digital Media covered **briefly** in teacher education	38.9 %	44.7 %	27.5 %	5.3 %	2.1 %
All	**80.6 %**	72.7 %	36.9 %	7.1 %	**2.5 %**

Table 1: Digital media in teacher education. Source: Wetter at al[9]

In 2009, nearly every second teacher in Germany was older than 50 years (Key data on education in Europe, p. 184). There is a reason to believe that most of the German teachers are not well educated in implementing Digital Media in their lessons due to low requirements.

[9] Wetter, Burghart, Rave (2014): Medienbildung an deutschen Schulen, http://www.initiatived21.de/portfolio/medienbildung_an_deutschen_schulen/ (accessed 09.01.2015)

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Government Action Supporting ICT in Education:

The ministry of cultural affairs defines media education within teacher education. Due to the federal system in Germany, each federal state decides how to prioritise media education. The institution "Kultusministerkonferenz (KMK)" (Conference of 16 ministers for education and culture) decides about the frame of education. It provides an education plan which has to be realised by each federal state. It includes two aspects of digital media education of teachers:

"Teachers learn about media pedagogical concepts and how to use it while teaching students with the usage of media. They should integrate in a didactical way modern ICT to their lessons and reflect their own media usage."[10]

"While studying teacher students have the opportunity to try out the usage of different media in university, preparatory classes and schools."[11]

Each federal state provides in its curricula for teaching at least the integration of media education and formation as a central task for schools. In nearly all curricula, the Internet as source for information research, E-Mail communication, and usage of databases are mentioned. At a minimum, these topics should be imparted in school lessons.

Due to Germany's federal system, media education in schools is anchored differently within school curricula. The chart below reflects the media education in German schools according to federal states and its anchoring within school curricula. It shows the diversity, the different approaches and decisions which result out of the provided guidance of KMK all over Germany.

In four federal states the media education in school lessons is obligatory and anchored directly in school curricula (green). In five federal states, the media education in school lessons is project oriented (blue). Thus, the use of media is organised in different projects that each school provides together with external help of media pedagogical associations or other institutions. In seven federal states, media education is not directly anchored in school curricula which mean that there are less or no structural guidelines for schools to implement digital media in school lessons.

[10] Kultusministerkonferenz (2004): Standards Lehrerbildung, page 7. URL: http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2004/2004_12_16-Standards-Lehrerbildung.pdf, (accessed 09.01.2015)

[11] Ibid page 6.

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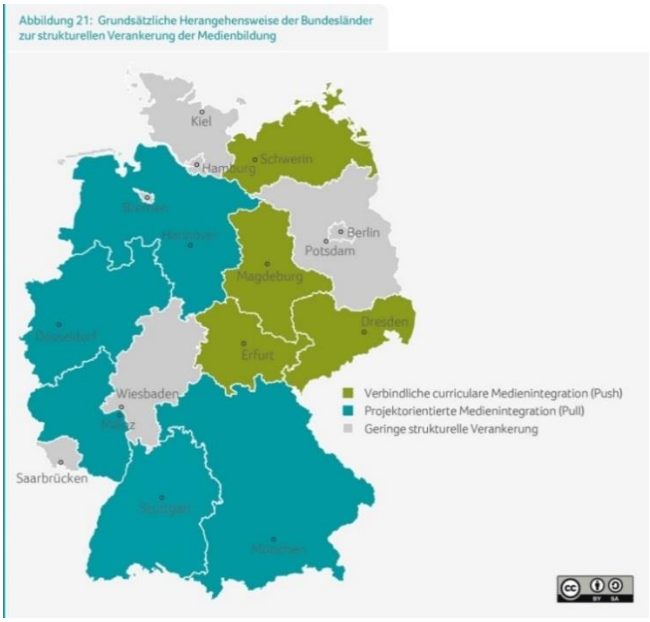

Figure 3: Media education in German states. Source: Wetter, et al[12].

Each federal state provides its own strategy for media education. There are three actors per federal state that provide the concept for media education: Governmental institution (Ministry for education, senate), Media institution (Landesmedienanstalt), Association for continuing teacher education. As we cannot cover the whole German education system and its implementation of media education, we decided to present three strategies from three federal states, with reference to Figure 3 above.

Firstly, we want to present the strategy for media education from Thüringen (capital: Erfurt) which is one of the federal states where media education is anchored directly in school curricula (green). For primary schools, a manual for teachers does exit: The “Media literacy in primary schools” which describes learning objectives and educational content for the usage of computer and internet. In the secondary level there is a course called “media science” (Medienkunde) which each school is obligated to offer. Children learn about media literacy[13]. Each school provides one continuing training day per school year in which all teachers from one school do take part.

Secondly, we present the strategy for media education from Nordrhein-Westfalen (capital: Düsseldorf) which is one of the federal states where media education is provided through project activities (blue). In this federal state, no overall concept, which defines media education in schools, does exist. Nevertheless, schools are obliged to provide individual media concepts regarding the development of media education, the needs for facilities and the planning for continuing education of teachers. In a second step, schools and their educational authorities (Schulträger) create plans for

[12] Wetter, Burghart, Rave (2014): Medienbildung an deutschen Schulen, http://www.initiatived21.de/portfolio/medienbildung_an_deutschen_schulen/ (accessed 09.01.2015)
[13] Ibid, pg 61

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the development of media education on a municipal level. They are supported by the institution of media counselling NRW[14].

Thirdly, we present the strategy for media education from Brandenburg (capital: Postdam) which is one of the federal states in which media education is not clearly anchored in school system/curricula (grey). Since 2012 a concept, which is provided by the Brandenburg Ministry of education, youth and sport and the media institution, is in existence. It declares strengthening media literacy. The syllabus in this region foresees the course "computer science" which will be voluntarily or obligatory for secondary schools[15].

Teacher Training and CPD:

Due to the federal education system in Germany, the difference in education classes continues to differ immensely. Teachers have the possibility to take part in continuous professional development activities and learn about and how to use Web2.0 tools. Various organisations, which also differ in each federal state, offer trainings for professional development.

German teachers are responsible of taking part in continuing education classes but they are not controlled nor do they have to collect points in most of federal states. However, each school organises its own continuing educational day for teachers during a school year. The topic of continuing education day is selected individually by each school. On one of these continuing education days in school, the continuing media education is obligatory in some federal states.

Informal Competence Development:

For the huge number of federal states and their difference to one another, we can only provide a short list of services for teachers.

Active teacher networks and services for CPD:

- The portal provides information about CPD services and courses: http://www.bildungsserver.de/
- Collection for training material with digital media which can be used in classes: http://www.lehrer-online.de/lehrer-online.php
- The platform provides books in digital files which permits teachers and students to access the content of bought printed books in digital versions also: https://www.scook.de/
- Platform which offers different Moodle courses for teachers. Moodle.bildung-brandenburg.de

Examples of Media education projects in different federal states:

- Example from Berlin: Explorarium – e-learning course for teachers

[14] Ibid, pg 55
[15] Ibid, pg 49

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- Media driving license in Bayern provides prepared lessons for educating media literacy to students: https://www.medienfuehrerschein.bayern.de/
- Mediapedagogical association which helps schools to develop media projects: http://tlm.de/tlm/medienkompetenz/tlm_medienwerkstatt/index.php

Platforms which support the collaboration of the teacher and its students:

- Primolo: social network for classes to make pupils work together online accompanied by their teachers. Teachers can generate and create websites.

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Latvia

Overview of Education System:

The school system in Latvia is relatively small. There are variations in the number of grades (determining the length of stay) within individual schools. In year 2012, 324 200 students (excluding tertiary education) attended 605 kindergartens (93 293 children) and 832 general schools which consist of 48 primary schools (grade 1 to 6), 337 single-structure basic schools (primary and lower secondary; grades 1 to 9), 361 general secondary schools (142 633 students in basic and upper secondary education from grades 1 to 12), 65 vocational secondary education schools (32 086 students), 61 special education schools, and 25 evening and distance education institutions (11 727 students) (Central Statistical Bureau of Latvia, 2014)[16]. Due to the demographic changes, the absolute number of educational institutions has continually decreased since 2005 as schools were closed or reorganised (Central Statistical Bureau of Latvia, 2014). These measures concerned especially small rural schools.

The education system is administered at national, municipal and institutional levels. The Parliament (Saeima), the Cabinet of Ministers and the Ministry of Education and Science are the main decision-making bodies at a national level. The Ministry of Education and Science is the education policy-making institution that accredits comprehensive education institutions and sets educational standards and teacher training content and procedures (Ministry of Education and Science, 2014). Both the state and local governments ensure funding for human, operational and capital resources.

Latvia has a relatively small teaching staff. According to the Central Bureau Statistics of Latvia, the number of comprehensive schools and teaching staff from 2011 to 2013 is seen in Table 3.

	2011/12	2012/13	2013/14
Number of Schools	839	832	832
… of which high schools	362	361	358
Number of teachers	28843	29028	29197

Table 3: Comprehensive schools and number of teachers[17]

In 2012, there were 6,845 teachers working in pre-primary education and 26,094 working at primary and secondary levels: 10,296 in primary, 7,636 in lower secondary, 8,162 in upper secondary and 200 in post-secondary non-tertiary education (Eurostat, 2014).

[16] http://www.csb.gov.lv/sites/default/files/nr01_latvijas_statistikas_gadagramata_2013_statistical_yearbook_of_latvia_13_00_lv_en_0.pdf

[17] ibid.

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Analysing the age structure of teachers in Latvia there is a low proportion of young teachers. Only 7% of teachers were less than 30 years old in 2012. Between years 2008 and 2012 the proportion of teachers below 30 years has fallen from 10% to 7%. More than one third of teachers (41%) were of age 50 or older (Eurostat, 2012). Figure 1 shows the decreasing proportions of teachers below the age of 39 and the growing proportion of teachers above the age of 50. This tendency has accelerated during the years 2008 to 2012.

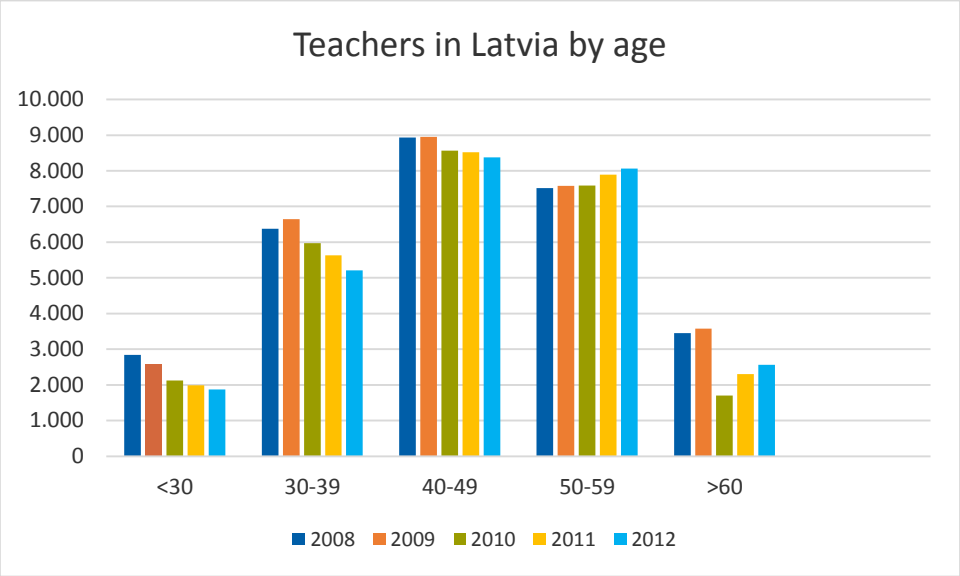

Figure 4: Teachers (primary, lower- and upper-secondary education) in Latvia by age group, 2008 to 2012. Source: Eurostat

Teachers' Competence Requirements:

Teacher qualifications in Latvia equal those of OECD countries, as teachers at all levels are required to have a tertiary degree (equivalent to ISCED 3 level 5A or 5B) to obtain the rights to teach.

The Cabinet regulations Nr.662 require educational and professional qualifications of teachers and professional competence development policy (28 October 2014):

"Person can work as a teacher if she/he has a bachelor's degree or second-level higher education in the subject's relevant sector and a mastered curriculum pedagogy (including leadership , change and educational leadership), if the amount is not less than 650 hours, and it is implemented in two years alongside a teacher's work."

The Cabinet regulations also stipulate that the teachers working in comprehensive, professional and professional-oriented education, as well as in the interest education teachers are responsible for developing their own professional competence, devoting to it no less than 36 hours every three years, and planning it in cooperation with the administrator of the institution where they teach.

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Teachers who conduct their work as certified private practitioners need to plan the development of their professional competence personally.

In the beginning of the implementation of the Latvian education system informatisation programme, it was established that basic ICT skills would be developed and opportunities for using ICT in the teaching process would be demonstrated to teaching staff. Thus, ICT should be gradually integrated as one of the elements of the teaching process. The basic ICT user skills include:

- Internet use and information retrieval,
- E-mail use,
- Text processor use,
- Presentation software use.

Lifelong education preparatory programmes for teachers were supplemented with the requirements for the basic and advanced user levels for various specialised ICT software. However, an insufficient emphasis was laid on interactive collaborative tools and new teaching methods that can be used due to modern technologies.

Government Action Supporting ICT in Education:

Latvian National Development Plan for 2007–2013 (NDP) was created as a medium-term strategic planning document for the implementation of the development process as prescribed by the model of growth adopted in Latvia. The document also included new terms for the development of education in 2007–2013, which set new tasks and development goals for the education system for the forthcoming years. One of the goals was to provide every resident with the opportunity to obtain quality lifelong education according to their personal interests and capabilities as well as to the needs created by the development of Latvia's economy. The goal-oriented implementation of ICT in the education system is viewed in the terms of the document as one of the most relevant tools for the improvement of education.

Teachers and other education system employees (e.g. librarians) were trained in the use of computers; computer science schoolteachers were trained in teaching the topics included in the study programme for their subject. Teachers were also certified according to the requirements of the ICDL programme. The training was conducted in the regional computer centres established in 35 municipality capitals and cities of national status by specially prepared teachers (most often – the most competent computer science teachers in the region) according to the training programme. In total, the systematically implemented basic ICT courses covered 27 000 or 70% of all the schoolteachers in Latvia.

The Central Statistical Bureau data on the informatisation of comprehensive schools at the beginning of the 2013/2014 academic year are shown in Table 4.

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	2013/14
Schools equipped with computers	829
Schools equipped with computer rooms	794
Computer rooms in comprehensive schools	1189
Computers in comprehensive schools	41871
Computers used for teaching	25640
Students per computer used for teaching	8

Table 4: Latvian comprehensive schools informatisation.[18]

The Latvian Ministry of Education and Science has set the following priorities for year 2015, which will be the main criteria for the development of the education system: the quality and availability of education, cost efficiency. It is planned that the development of comprehensive and professional education content will be created on the basis of the competency approach as well as the professional standards (according to the European requirements) and professional education programmes will be created. In order to ensure the increase in quality of education, the Ministry of Education and Science has started and will continue the discussions over the development of new content for comprehensive education based on the competency approach. It is planned to ensure the approval of a competency-based comprehensive education standard project and its gradual implementation. The changes are planned to be made in the pre-school, primary and secondary school teaching content, as well as in the system used for quality control.

Currently, some schools have already implemented innovative education programmes according to the development needs of their municipalities. Inclusive education has also been successfully implemented: its primary task is to promote and expand the education opportunities for each student according to their skills, abilities, and needs.

Teacher Training and CPD

There are several projects that involved the development of modern digital teaching material and the establishment of lifelong education for teachers.

State Education Development Agency and the Centre for Curriculum Development and Examinations carried out the European Social Fund projects as follows:

[18] http://www.csb.gov.lv/sites/default/files/nr01_latvijas_statistikas_gadagramata_2013_statistical_yearbook_of_latvia_13_00_lv_en_0.pdf

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- ‘Science and Mathematics’
- ‘Teaching content development and lifetime education for Natural Sciences, Mathematics and Technology teachers’

The lifelong education courses designed to develop the ICT skills for teachers:

- Technology and creativity in interest education
- Multifunctional school server development in Moodle
- E-course development and implementation in the teaching process (the Moodle environment course)
- Interactive whiteboard tools use for preparing teaching materials
- Teaching the programming basics at schools.

Regional competence development centres were established, for example, the Zemgale Region Human Resource and Competences Development Centre[19], which also provide courses for professional growth to teachers.

There are also centres financed by municipalities, which provide lifelong education to teachers and the general public. Examples of such are Riga education and information methodical centre, the Ventspils Digital Centre, the Olaine Adult Education Centre etc. The goal of these centres is not only to promote the involvement of the municipal government, the public and businesspeople in the information-based society and E-Government, but also to maintain the activities for creating an information-based society and implementing e-government solutions on the local, regional, national and international levels, as well as to create, maintain and develop the ICT infrastructure and foster professional growth among people working in education.

Despite this, there is no national programme that would consistently aim towards the use of IT online collaboration tools for the teaching purposes. Likewise there is no programme to cover the teaching methodology on how to involve these on-line ICT tools in the teaching process. Such activities are partly maintained via projects by non-government organisations cooperating with the local branches of international IT companies, such as the Microsoft and Samsung.

Informal Competence Development:

There are active teacher communities in Latvia, such as the innovative teachers’ portal Skolotājs.lv, which has been offering for teachers online training programmes for 4 years. The programmes allow the teachers of any subject to improve their ICT skills and study the online ICT tools used in the modern teaching process. The number of teachers registered for the “Virtuālā Klase” (Virtual Classroom) programme has exceeded 1000, among which 185 have received certificates of professional development.

Latvian Computer Science Teacher Association established the project STARTIT (www.startit.lv) during which the first free programming learning programme for comprehensive schools in Latvia

[19] http://www.zrkac.lv/index.php?view=group&group=10&id=43

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was created. Its objective is to improve the skills of computer science teachers by teaching them the Java programming language with the objective to promote students' interest in the most popular industry of the future – the IT. Currently, the program is realized in 272 in comprehensive schools.

The 'Samsung Skola nākotnei' project is a free digital teacher training programme: its objective is to promote modern and creative teaching in Latvia's schools. It is intended that after graduating this programme the graduates has obtained all the necessary knowledge and skills as to start making changes at their schools and on the more general scale of education; by passing over their new knowledge to their students they help them get their dream jobs in the future.

eTwinning offers the 'ICT tools in the teaching process and eTwinning projects' online course to teachers. The course is created to help teachers obtain the routinely needed skills in the use of various ICT (Information and Communications Technology) tools online, ensuring a more efficient use of time for the teacher.

About 200,000 users have registered at the www.Uzdevumi.lv educational portal, which started its work in 2009. In cooperation with schoolteachers, high-quality tasks of various levels of difficulty as well as theoretical content are being developed at the portal.

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Lithuania

Overview of Education System:

The Ministry of Education and Science plays the major role in the educational system. For example, it defines the curriculum, which is used throughout the country. It also determines teacher's salaries, requirements for teachers' qualification, priorities for qualification development, and the assignment of educational staff.

Lithuania has twelve years of comprehensive education (Pre-primary Education, Primary Education and Upper secondary schools) and three cycles of higher education.

Pre-primary Education in Lithuania is intended for children aged 1 to 6 and is optional.

Primary school consists of Grades 1 to 4. Till the 2006-2007 school year informatics was taught only in Grades 9-10, but now it is taught at Grades 5-6, after which it is integrated into other subject areas.

The upper secondary school consists of Grades 11 and 12. In parallel with these there are Gymnasiums. From the year 2000, the system of "profiles" was introduced in the upper secondary schools all over Lithuania. This meant that any upper-grades student was free to choose one of four "profiles" for his or her studies: humanities, mathematics and science, technology, or art.

The Centre for Information Technologies in Education (CITE) under the Ministry of Education and Science (MoE) for a long time was the main organisation in charge of coordination of the formulation of national policy and the implementation of all governmental programmes and projects for ICT introduction into general education and vocational education and training. Now Education Development Centre (EDC), established in September 2009 is the main player in this area.

The number of the local educational bodies (at municipality level) has their own policy documents and programmes for ICT introduction into general education schools. In-service training centres in the counties play a significant role in promoting ICT literacy for teachers.

The main changes performed in Lithuanian education system in 2009-2010 deal with decentralisation of provision of computer hardware and software as well as learning resources for schools. At the moment all the money for hardware and software are planned in so-called 'pupil's basket' and they are paid directly by schools. No centralised tenders are specially organised by the central authorities.

Teacher in-service training is also performed by regional education centres only, and the central authorities under the MoE can only book these training services for teachers. The money for teachers' in-service training is also planned in the 'pupils' basket'. The responsibility for educational policy-making and administration is shared between MoE (central government), regional (county) government, municipal (local) government, and governing bodies of schools.

In the school year 2013-2014 in Lithuania were 51 000 educators. Within 10 years, their number has decreased by almost 18 000, that is ¼. In the last school year the number of teachers and school principals was about 34 400, including 633 pre-school teachers, 7 500 teachers of initial grades, 23 100 teachers of 5-12 grades of secondary schools and 3 100 school principals and their deputies. In secondary schools in positions of teachers and school principals usually work women. In 2013, they constituted 87% of teachers employed in schools. Number of schools in Lithuania decreased from 1309 in 2011/12 to 1208 in 2013/14. Such data is quoted by the Lithuanian Department of Statistics.

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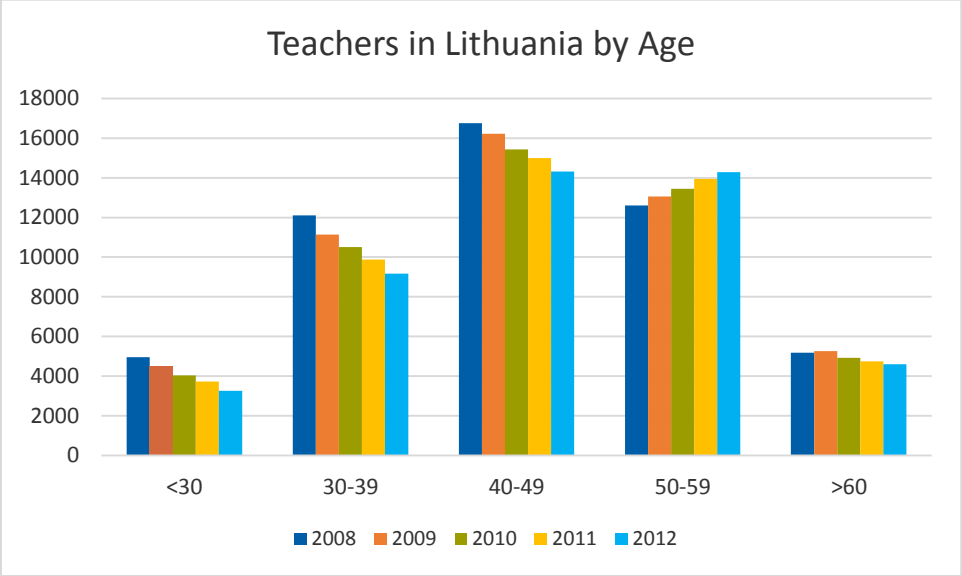

Figure 5: Teachers (primary, lower- and upper-secondary education) in Lithuania by age group, 2008 to 2012. Source: Eurostat

According to the Eurostat data (Figure 5) number of teachers under 49 is decreasing, and at the same time number of teachers, who reached the age 50- 59 is increasing or staying stable for those who are older than 60. The average age of teachers in these schools is 48 years. At the beginning of the school year 2013-2014, more than half – 53.2% teachers in secondary schools reached the age 45-60 years. Young teachers (under 30) constituted only 4.5%, while older than 60 years ones – 10.8%.

Teachers' Competence Requirements:

General requirements to become a teacher in Lithuania are established in the Regulations for Recognition of Educational Qualifications issued by Order V-774 of MoE on 2014 08 29. This order contains a list of general subjects and educational achievements or professional competencies needed to teach the subject.

Teachers' IT competencies are left without necessary attention. The Computer Literacy Standard for Teachers was issued by Ministerial Decree N. 1694 in December 21, 2001. The last Standard renewal was done by Ministerial Decree N. 555 in March 29, 2007. For tteachers who undergo standard ICT training according to the course curricula testing is not compulsory. By the end of the technological part of the courses, teachers may sit only an optional ECDL entrance test. By the end of the pedagogical part of the courses, they shall sit a special test of Educators Computer Literacy and develop a presentation about the use of ICT in their teaching practices. The presentation is also assessed.

Teachers of grades 9-12 shall undergo Teachers Computer Literacy training. There are separate tests for teachers' technological skills and pedagogical skills. The assessment of technological skills is similar to the ECDL assessment and it is not compulsory.

The assessment of pedagogical skills is in one part: the development of an e-portfolio about the using ICT in their own teaching practices.

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Government Action Supporting ICT in Education:

The newest Strategy and Programme for the Introduction of ICT into Lithuanian General and Vocational Education for 2008–2012 has been approved by the Minister of Education and Science in December 2007. The new strategy is still in development. The vision of this Strategy is to create qualitative new and flexible students' and teachers' learning environments which would provide them personalized (customized) learning possibilities in electronic space and stimulate creation and implementation of modern ICT based teaching and learning methods.

There are four objectives emphasized in this strategy:

- To create digital learning content and to develop modern teaching and learning services
- To form digital teaching and learning infrastructure, to improve schools provision with hardware and software, and increase access to ICT
- To educate schools communities competencies, to effectively apply ICT for education, to improve teaching and learning quality, and to develop digital teaching and learning culture
- To apply ICT in educational process organisation and schools management

Teacher Training and CPD:

The Lithuanian authorities consider the modernisation of teacher training and of teachers' continuing professional development to be one of their biggest challenges in education. Making improvements in this area is essential in order to enable teachers to help learners acquire not only the conventional transversal competences, but also, and in particular, the skills of critical thinking, research, problem solving and creative thinking. As of 2010, those wishing to study in the field of education and training and to benefit from state financing for this are required to take a test evaluating their motivation. In addition, participation in continuing professional development is a necessary condition for promotion. The action plan to implement the national programme for higher education, research and development for 2013-20 includes measures to update and improve the professional competences of teachers in higher education. The action plan for entrepreneurship for 2014-20 includes measures designed to develop the entrepreneurial competences of both students and teachers, including vocational teachers. The development of teacher training is mainly financed from European social fund. A national project 'Development and introduction of the system to improve the technological skills of teachers and lecturers working in vocational education and training' was launched with a budget of EUR 6 million. A further project, also financed by European social fund, aimed to promote in-service training and retraining of teachers and was allocated a budget of EUR 8.9 million. Other projects also include plans for the development of teaching and lecturing qualifications and for the use of ICT in teaching.
Fast changes in the ICT sector require constant qualification improvements, which is time-consuming. Low wages in the teaching field constrain teachers and professors and push them to the private sector.

The only large-scale ICT implementation in vocational education and training (VET) project was implemented by the Centre of Information Technologies of Education (CITE) in 2005-2008. Its main aims were:

- To implement scientific research on computer teaching aids and virtual learning environments (VLEs) suitable for Lithuanian VET
- To purchase 24 computer teaching aids for all VET areas.
- To localise a VLE suitable for delivering distance learning courses for VET teachers.
- To prepare 12 distance learning courses for VET teachers.

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- To train more than 2000 VET teachers to use purchased tools and techniques in their pedagogical practice.

Country-wide ICT teacher training is part of the national ICT in education strategies, as well as of the national 'E-school' programme.

The national programme focuses on the provision of adequate ICT training for grade 9-12 teachers of various subjects all across the country. Initially, "Computer Literacy Standard for Teachers" and "Computer Literacy Standard for School Librarians" (approved in October 2002) were elaborated.

Two forms of ICT-related training are financed from the budget of the national 'E-School' programme and widely applied:

- Training (workshops) in computer labs.
- Distance learning.

Initial ICT training, which is based on the Technological part of Requirements for Teachers Computer Literacy Programs, is mainly delivered in computer labs (in teachers' in-service training institutions and schools). Meanwhile, the training for ICT implementation into teaching practices, based on the Pedagogical part of Requirements for Teachers Computer Literacy Programs, is mainly delivered by distance.

Other forms of training, such as workshops for teachers of different subjects, seminars, conferences, etc., are organised almost permanently at various levels of the education system: national teachers in-service training institutions, regional teachers in-service training centres and at schools. Annually in autumn, national scale ICT in education conference is organized for teachers by CITE. More and more ICT related teachers training activities are moving from the national to regional and school community level.

Various teachers' associations and other professional organisations set up collaborative networks, provide informal training and support for enthusiast teachers as well (e.g., The Association of Lithuanian Teachers of Informatics: http://www.linma.org/ Lithuanian Computer Society: http://www.liks.lt/). However, the latter activities are not so common and not widespread.
An active policy for developing information society and promoting **digital literacy** has been pursued during the last decade in Lithuania and it includes:

- Strategies for Introducing ICT in the Lithuanian Education System (2001-2004, 2005-2007, 2008- 2012) cover both general education and vocational training in the field of ICT. The main objective of the third strategy for the period 2008-2012 was to create a digital content in education and to develop modern teaching and learning services. Within the framework of this project, the methodology of applying ICT in education was developed and about 3,000 teachers were trained.
- Educational portals
- AIKOS system
- Portal e-School (eMokykla).

In Lithuania, the Strategy for Assuring Lifelong Learning was approved in 2008. The purpose of this Strategy is to define both development directions and implementation measures of lifelong learning in the fields of vocational and adult education.

The policy of lifelong learning is supported by several national legal acts: The Law on Education (1991, new edition 2003), the Law on VET (1997, new edition 2007), the Law on Nonformal Education (1998), The Law on Higher Education (2000), The Law on Support for Employment (2006).

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The programme of Lithuanian Virtual University for 2007- 2012 was approved in 2007 for promotion of e-learning and the development of e-learning infrastructure. The Programme aims to further develop Lithuanian Distance Learning Network (LieDM) and to create information technology based and integrated e-learning space, providing lifelong learning possibilities. Currently LieDM unites 77 institutions: universities, colleges, adult education centres and VET institutions. The network provides 10 master level programmes and more than 1070 distance learning courses in various areas.

Informal Competence Development:

Some governmental and non-governmental educational organizations, teachers' associations and other Lithuanian professional organizations set up collaborative networks, provide informal training and support for enthusiast teachers as well, conduct the educational activities that help teachers to improve their ICT skills:

- Education Development Centre: http://www.upc.smm.lt/veikla/about.php
- Lithuanian Computer Society: www.liks.lt/en/
- The Association of Lithuanian Teachers of Informatics: http://www.linma.org/
- Intelligent Teachers Association (Išmanių mokytojų asociacija): http://www.ismanus.lt/

Education Development Centre is a state educational institution which provides educational support for students, teachers and for school. Education Development Centre proceeds on implementing and develops the activities of reorganised educational institutions and is responsible for the most important areas of educational support for Lithuanian educational community. EDC develops general education curriculum, teacher training programmes, and implements continuing adult education, evaluates textbooks and educational tools, carries out EU Structural Support projects, and successfully collaborates with teachers of all Subject Associations and the other social partners.

Lithuanian Computer Society (LIKS) is a voluntary and independently acting social association of computer and software users, specialists and amateurs in informatics and computer science. Officially LIKS was registered on January 29, 1990. Presently Lithuanian Computer Society has over 400 members. LIKS is the ECDL National Operator in Lithuania.

LIKS organizes national multi-event "Computer Days (Kompiuterininkų dienos)". It is a biennial meeting and conference of researchers and teachers of informatics, users and specialists of hardware and software, leaders and administrators of creating Information Society in Lithuania.

The Lithuanian Association of Informatics Teachers (LINMA) was established in 1999. The main aims of LINMA are to collect, evaluate, and share methodological know-how of ICT use at school.

Intelligent Teachers Association (Išmanių mokytojų asociacija) unites active educators who are interested in and use the most advanced technologies and share their knowledge with students, teachers and the community.

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There are a number of projects in educational field in Lithuania.

- **eTwinning: http://www.etwinning.lt/**
- **The exhibition "MOKYKLA" ("SCHOOL"): http://parodamokykla.weebly.com/en.html**
- **Use of iPad tablet devices in education**
- **Bebras (beaver): http://bebras.lt/**

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Summary of Country Analysis

The country analysis of the four EU member states participating in the study – Estonia, Germany, Latvia and Lithuania – revealed a heterogeneity in terms of both education systems and approaches to technology in education. The smallest country in the survey, Estonia, has only 541 schools, whereas the largest country, Germany, has 30,890. In addition, the federalised structure of Germany led to much greater internal variations in policy and approach than was the case in Estonia, Latvia, and Lithuania.

Nevertheless, there are some **characteristics of the educational systems** that are similar and have implications for the use of online collaborative tools in education. In particular, the age profile of the teachers is similar across the four countries. The largest age category of teachers is 40-49 years in Estonia, Latvia, and Lithuania, and 50-59 years in Germany. This demographic characteristics suggests that there may be a considerable portion of teachers who are not comfortable with, or common users, of social media. Although social media users are drawn from all age groups, there is evidence[20] that use is prevalent among younger age cohorts. This therefore poses a competence development challenge for many teachers.

All of the countries examined have taken steps to identify the relevant **competence requirements** for teachers, but there are difference in how formalised these steps have been. In Estonia, a formal framework of competence development in the area of ICT in education has been adopted. In Germany, however, there is a far more ad hoc approach to identifying competence requirements across the different federal states. In Latvia, there has been an explicit competence dimension to the broader process of introducing informatics and technology to education. Meanwhile, in Lithuania, ministerial standards for teachers have been introduced, but there is no compulsory formal assessment of these activities.

Government actions and initiatives to promote the use of ICT in education have been adopted in all four countries, but again there are significant differences in how they these have taken place. In Estonia, there is a relatively coherent picture of implementation, with linkages between policy and delivery of actions. In contrast, the situation in Germany is quite different, and the fragmented nature of the federal system means that some states have radically different approaches to how digital media education links to the curriculum. Latvia has a national development plan, of which reform of the education sector is a component. The goal is to implement ICT in the education sector, and a competence approach and professional standards will be embedded in the developing educational system. In Lithuania, there has been a government strategy in place for several years, but the actions from it are still in development.

Teacher training and continuous professional development (CPD) are core activities to developing teachers' competences. ICT skills are a formal part of teacher training in Estonia, and there is also a proscribed amount of teacher training that must be completed every five years by teachers. In

[20] Pg.11 "Media Use in the European Union", http://ec.europa.eu/public_opinion/archives/eb/eb78/eb78_media_en.pdf

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Germany, once again, there is variation between states, and a more informal approach is taken to CPD. In Latvia, a range of centres supports teacher training and CPD in the area of ICT in education, but there is no consistent national programme. Finally, in Lithuania, several different programmes are available, some of which are financed through the European Social Fund, and there is also a range of legal instruments that supports life-long learning.

There is a relatively well-developed ecosystem of **informal competence development** initiatives across all the countries. These initiatives are driven by a number of different structures, including not-for-profits, such as foundations or associations (for example, the Lithuanian Computer Society or the Latvian Association of Computer Science Teachers); events and activities sponsored by technology providers, such as Microsoft and Samsung initiatives in Estonia; and peer-to-peer resource-sharing networks. The specific activities are also varied in structure and approach, and include online portals, digital books, training materials, and other resources to support teachers.

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Survey Research

Overview

An online survey was the main tool used to carry out primary research into the needs requirement of teachers in the area of online collaborative tools. The target group for the survey was active teachers and educators. The survey aimed to gather demographic and personal data about the respondent and then to measure:

- Current professional engagement with online collaborative tools
- Confidence using these tools
- The potential of these tools
- Experience in learning about these tools

Analysis of the survey results in the conclusions of this chapter will help to inform (see O1A1: "Utilising Research Outputs" for more detail):

- The **breadth** of the programme
- The **depth** of the programme
- The **context** of the programme
- The **positioning** of the programme and the project outputs

Methodology

An online survey tool was used[21]. A set of questions (see O1A1, Appendix 2: Online Survey Questions) was agreed by the project team, and an English version of the survey was created. This was then localised by the relevant project partner to Estonian, German, Latvian, and Lithuanian.

The survey questions gathered data relating to:

- Personal information, including gender, teaching experience, subject area
- Current use of skills areas (defined above), on a scale of 1 to 4 from never used to used weekly.
- Self-evaluation of confidence in use of skills areas (defined above), on a scale of 1 to 4 from very confident to not at all
- Open text-options to identify additional online collaborate tools or their uses
- Formal and non-formal skills development in the area of online tools

The survey findings were then exported and country level-analysis was conducted in spreadsheets. The findings were then aggregated to compare countries, and to average between countries. Because of the differing size of samples from the four countries, the average between countries was generally calculated by using the mean percentage value for the four countries. For open-text

[21] www.surveymonkey.com

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responses, a content analysis and classification of similar responses was conducted to identify common responses (see below for example, “frequency of other tool use”).

Sampling

The research guidelines called for a minimum sample of 100 teachers per country. This number was estimated as being sufficient to allow meaningful comparison between the four countries. In the end the total number of respondents, varied considerably between countries. As the survey was online, there was a relatively low cost associated with communicating and disseminating the survey, and Estonia, Latvia, and Lithuania in particular were highly effective in distributing the link through the target population of teachers.

	Estonia	Germany	Latvia	Lithuania	Total
# Respondents	668	99	644	1408	2819

Table 1: Number of respondents by country

The survey went live in the four target countries on February 9th 2015 and stayed open until March 9th 2015. Responses were considered to be valid if all required demographic and personal data was provided. A high level of responses to the survey was received, and a high level of statistical confidence can therefore be associated with the results.

Demographic and Personal Data

A range of demographic and personal data was gathered from the respondents to better understand their profile and to validate the representativeness of the sample.

Gender

	Estonia	Germany	Latvia	Lithuania
Male	10.6%	38.2%	8.7%	10.5%
Female	89.4%	62.6%	91.3%	89.5%

Table 2: Respondents by gender

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A high ratio of female to male respondents was noted, reflecting the typical preponderance of women in teaching across Europe. Eurydice data [22] indicates that the percentage of women in the teaching profession in primary, lower secondary, and upper secondary education in 2009 was 83.2% in Estonia, 66.1% in Germany, 86.2% in Latvia, and 84.5% in Lithuania.

Age

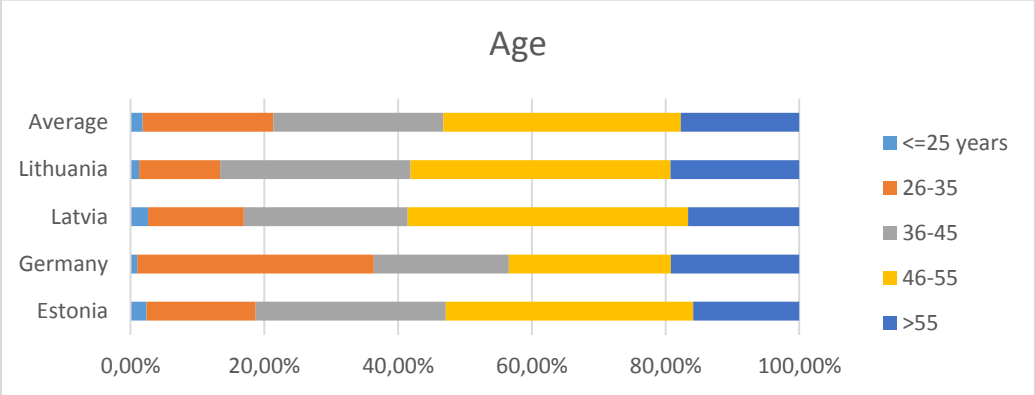

Figure 6: Respondents by age

The majority of survey respondents (60.9 %) were between the ages of 36 and 55; German respondents were on average younger. Data from Eurydice[23] indicates that more than half of German primary school teachers are over 50; in Estonia, Latvia, and Lithuania, the 40 to 49 age group was the most common. The same date indicates that in majority of European countries, secondary education teachers are older than those in primary education. This does suggest that the respondents to the survey may well be somewhat younger than the "average" teacher in the countries examined. This is not surprising – the use of an online survey may, in itself, have skewed responses toward individuals who use online tools to communicate (i.e. read and responded positively to the invitation email) and those who are comfortable engaging with online forms (i.e. the survey tool). This may have implications for our conclusions. If we assume that younger teachers may be more familiar, even in a casual way, with the use of online collaborative tools, then the actual competence gaps that exist in the teaching population may actually be more pronounced then the survey results might suggest.

[22] "Key Data on Education in Europe in 2012" Education, Audiovisual and Cultural Executive Agency 2012, page 122.
[23] Ibid. page 124.

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Teaching Experience

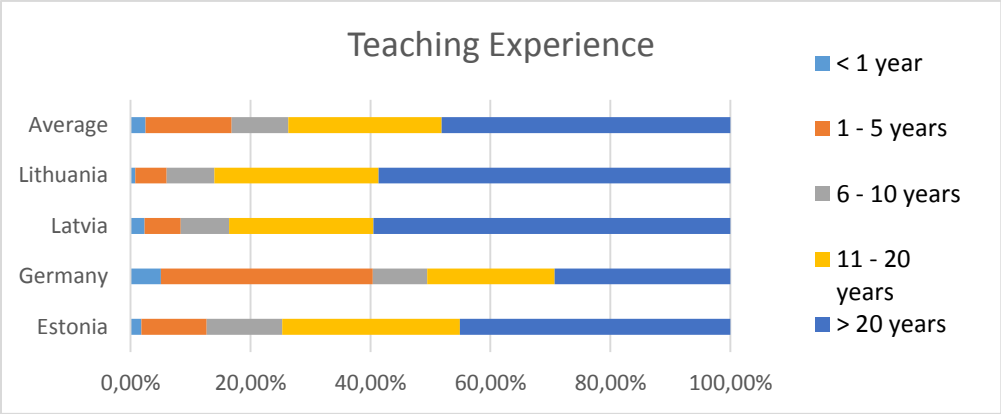

Figure 7: Teaching experience

Regarding experience, on average, almost half (48.1%) of respondents had been teaching for more than 20 years. Again, this is reflective of the age profile of the respondents. Regardless of the observation made above in relation to the slightly younger than average profile of respondents, the experience profile indicates that the sample contained and set of respondents that reflect a good – and representative – range of age and experience, representing both "digital natives" who have grown up with web-based technologies and "digital immigrants" who have been faced with these emergent technologies later in life

Class Taught

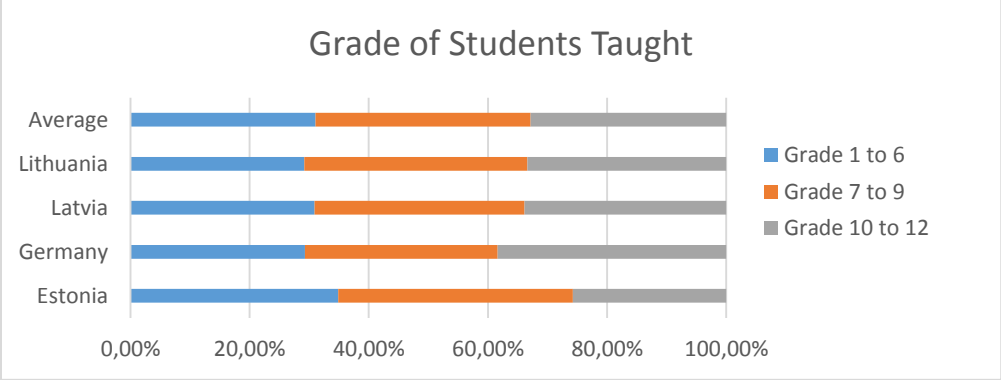

Figure 8: Grade of student taught

On average, 31.1% of respondents taught grades 1 to 6, 36.1% taught grades 7 to 9, and 32.8% taught grades 10 to 12. This relatively even distribution of teachers across primary education, lower secondary education, and upper secondary education indicates that the view of the respondents should be reflective of the concerns and circumstances of younger children and their teachers, as well as older children and their teachers.

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School Size

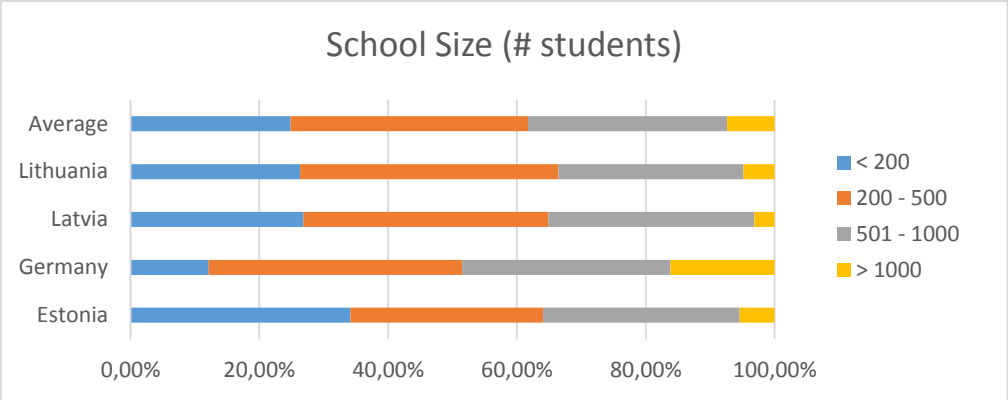

Figure 9: School size

On average, the most common (36.9%) size of school in which respondents taught had between 200 and 500 students. Noticeably fewer German respondents came from small (< 200 students) schools. Again, this is consistent with other data – for example, Eurydice data (2012)[24] indicates that school size in Germany tends to be larger than in Estonia, Latvia, and Lithuania. As with the other demographic measures, the sample does suggest that the respondents were drawn from a representative sample of schools.

Subject Area

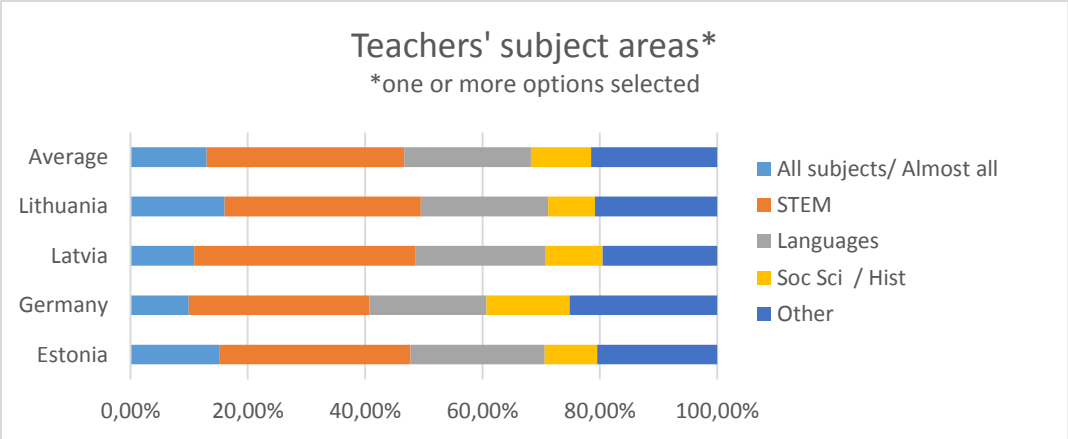

Figure 10: Teachers' subject areas

Respondents taught in a wide range of subject areas, although the most common category taught was science, technology, engineering and maths (33.66%). The variety of subject areas taught ensures that the responses should not be biased through, for example a predominance of teachers who are teaching technology.

[24] Ibid page 37.

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Online Collaborative Tool Data

The substantive element of the online survey focused on familiarity with only tools, as well as experiences of developing related skills and competences.

Frequency of Use

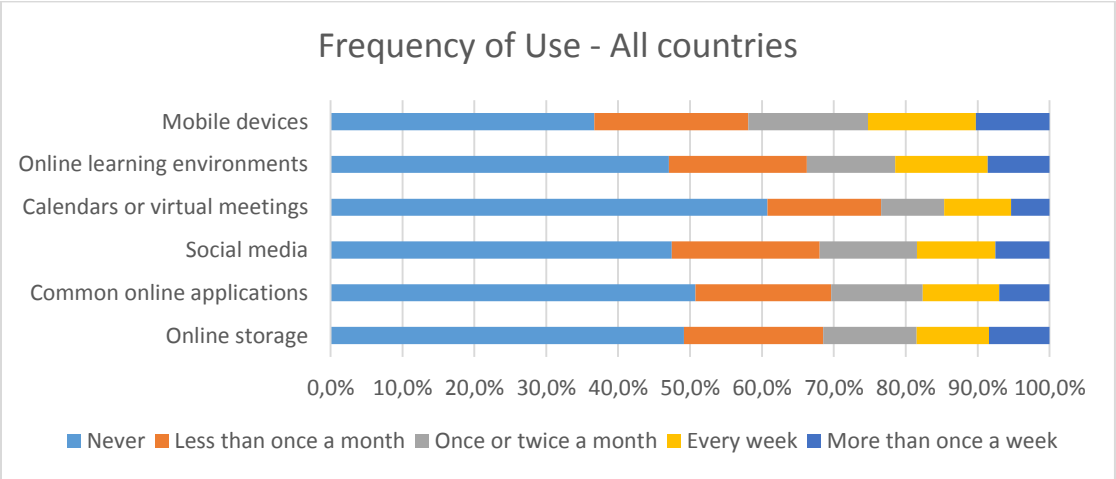

Figure 11: Frequency of use – all countries

Respondents indicated the frequency with which the used a range of online collaborative tools in their professional practice. The tools listed in the survey were those that were identified as a being frequently used online collaboration tools, as specified in the ECDL / ICDL Online Collaboration module[25].

These tools were only used infrequently or never by a large proportion of respondents. Even the most common used tools – mobile devices – were used never or less than once a month by almost 60% of teachers. Overall the picture is one of infrequent and sporadic use across the population of teachers. Given that these tools can facilitate learning and are often commonly used by teachers and students in a non-educational context, this indicates a lost opportunity – or great potential – among teachers.

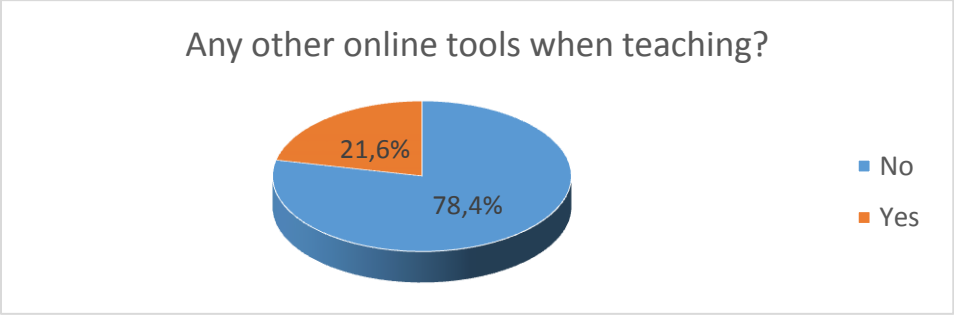

Figure 12: Other online tool used when teaching

[25] http://www.ecdl.org/programmes/index.jsp?p=2928&n=2948

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Respondents were also asked to list any other online tools, other than the ones specified in the survey, that they used in their teaching practice. More than three quarters of respondents did not identify any other online tool. Of those who did report using another online tool, there was little consensus. Apart from country-specific local resources, other tools identified included YouTube[26] (video sharing service - 7.4% of those using another tool), Google Drive[27] (online storage service - 5.3%), Padlet[28] (online bulletin board - 5.3%), Prezi[29] (online presentation application 3.6%), and Skype[30] (VoIP service - 2.5%). The absence of a strongly cited additional tool commonly used by respondents is a strong validation that the set of tool identified in the survey design and put to candidates reflected the typical tools used.

Confidence

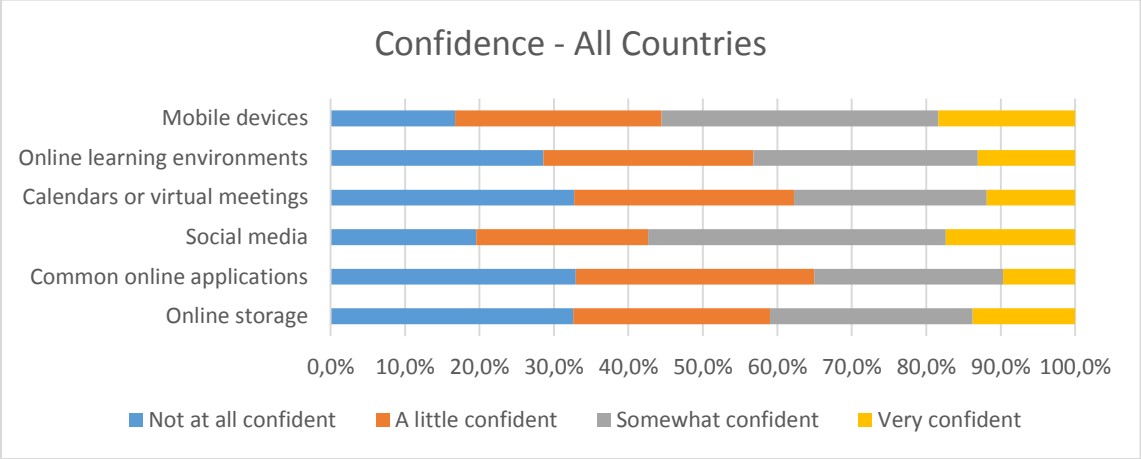

Figure 13: Confidence using online collaborative tools

Respondents indicated their confidence in using a range of online collaborative tools. Confidence varied between tools, but even for ubiquitous tools such as mobile devices and social media, on average more than 40% of respondents were not at all confident or only a little confident. This level of confidence indicates that there is a very substantial cohort of teachers who lack the confidence to use even common online tools in the classroom. The impact of this lack of confidence may be exacerbated if teachers feel that their students are potentially more proficient in the use of these tools than they are.

In order to investigate differences in confidence levels between different age cohorts, responses were analysed for those teachers who were 35 or younger and those who were over 35. Figures 14 and 15 clearly indicate a difference in confidence using online collaborative tools across the whole range of tools. This confirms the belief that younger teachers are more comfortable with these technologies. For example, social media was the tool that, on average, demonstrated the highest

[26] www.youtube.com
[27] www.drive.google.com
[28] padlet.com
[29] prezi.com
[30] www.skype.com

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levels of confidence. However, whereas approximately 28% of those 35 and under were not or only a little confident, this figure rose to approximately 46% for those over 35. What is particularly interesting, though, is the fact that, even among younger teachers, there are a considerable proportion who are not or only somewhat confident using these tools. For example, more than half of respondents under 35 were not or only a little confident with regard to the use of common online applications. Therefore, it would be wrong to assume that young teachers do not required competence development in this area – they do, but the need may be even more acute among older teachers.

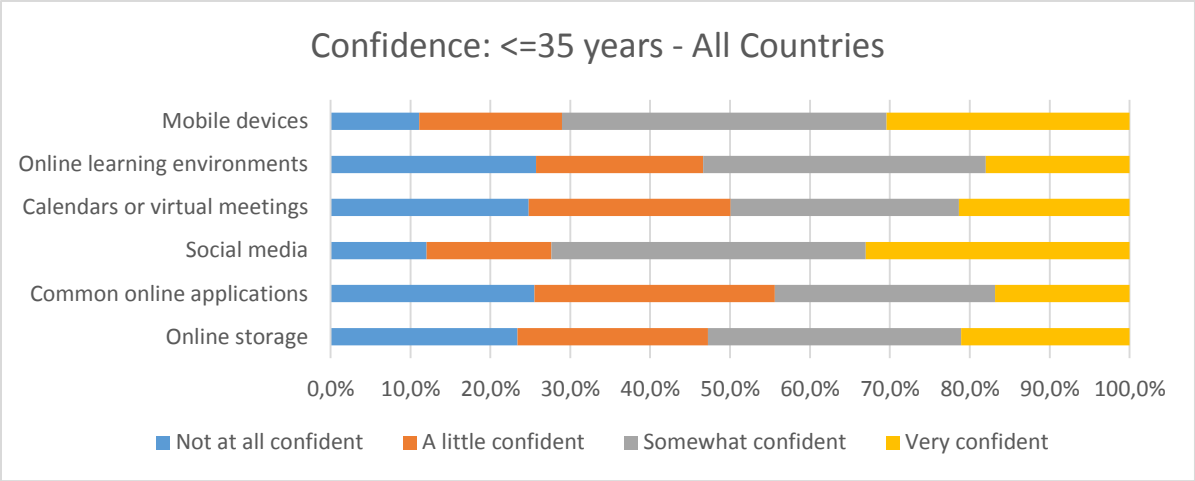

Figure 14: Confidence among younger teachers (35 or less)

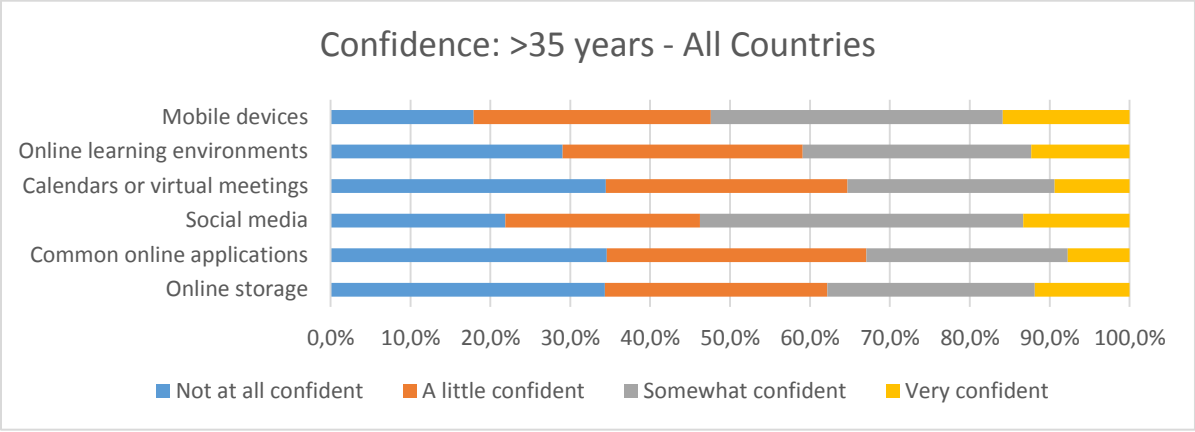

Figure 15: Confidence among older teachers (over 35)

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Perceived Importance

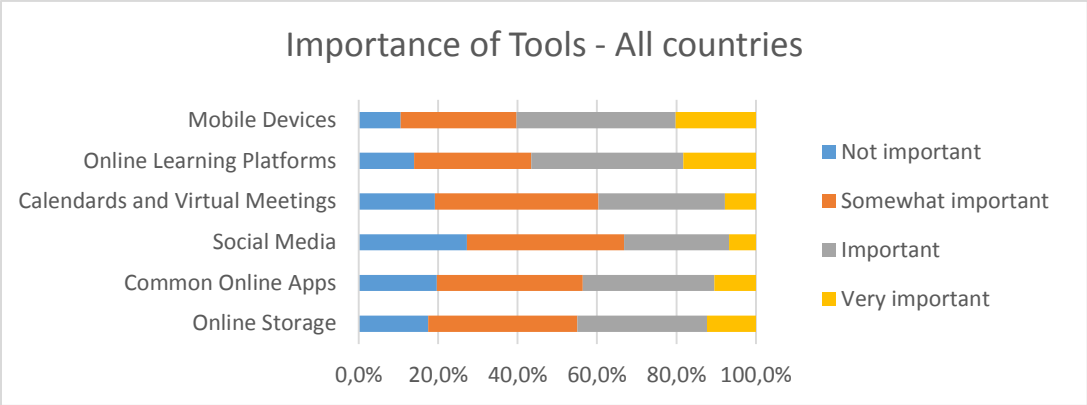

Figure 16: Importance of Tools

Respondents indicated the relative importance of online tools. Mobile devices, online learning platforms and online storage were ranked the highest when “important” and “very important” responses were aggregated. Surprisingly, on average more than 60% of respondents thought that social media was not important or only somewhat important. This indicates that there is considerable potential for teachers to develop their awareness, knowledge, and skills relating to how this commonly-used tool can be used in an effective and controlled way in an educational environment.

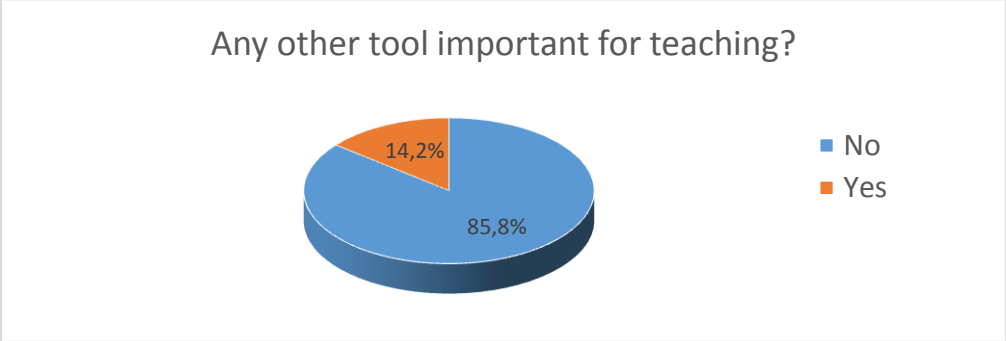

Figure 17: Other tools that could be important

More than 85% of respondents did not identify any other online tool that they thought was potentially important for their teaching practice. Of those who did report another online tool as being important, there was little consensus. Apart from country-specific local resources, other tools identified included Google Drive (6.8% of those citing another tool), Padlet (4.9%), and YouTube (4.2%). Once again, the absence of a strongly cited additional tool viewed as being important by respondents is a strong validation that the set of tool identified in the survey design and put to candidates reflected the typical tools used.

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ICT Training

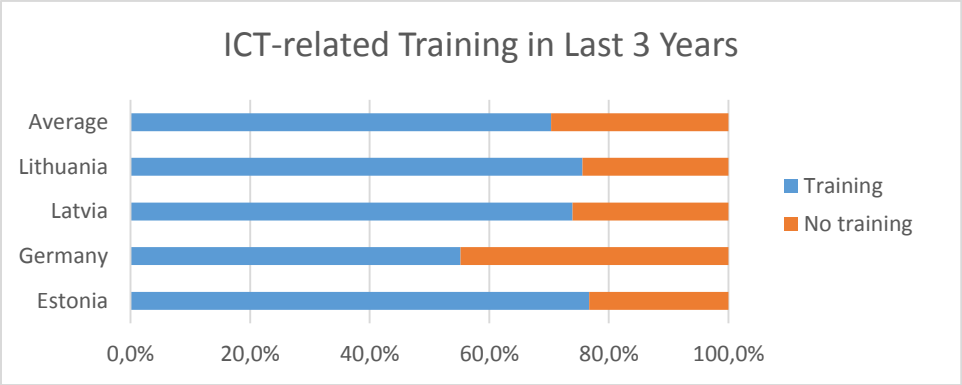

Figure 18: ICT-related Training in Last 3 years

More than half of the respondents in all countries received some form of ICT training in the last 3 years. In Estonia, Latvia, and Lithuania, more the 70% had received training. This indicted that across all the countries, initiatives to develop ICT-related skills among the teaching population have been implemented. This reiterates the findings of the desktop research in the four countries, which set out a range of activities in this area.

Formal Online Collaborative Tools Skills Development

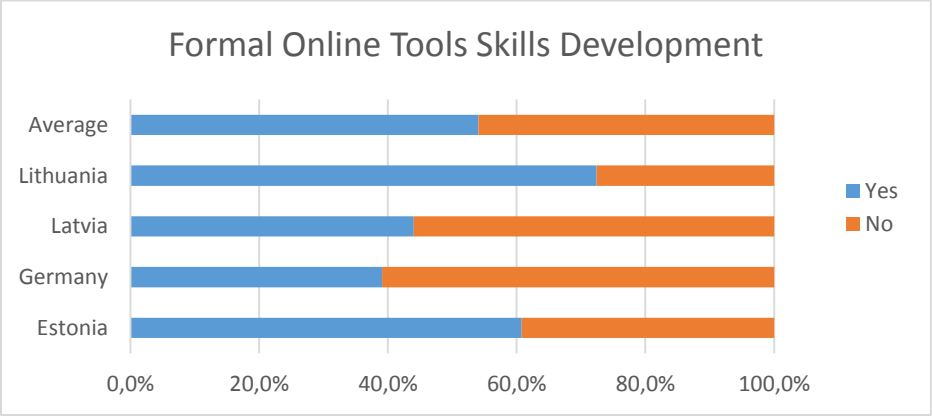

Figure 19: Formal Online Tools Skills Development - Proportion

Further investigation into the topic of training indicated that an average just over half of respondents had received some formal training in the area of online collaborative tools skills development. The highest proportion was in Lithuania, where 72.4% of respondents had received formal training, while the lowest proportion was in Germany, where only 39.1% of respondents had received formal training.

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The type of formal activities engaged in by respondents was also investigated.

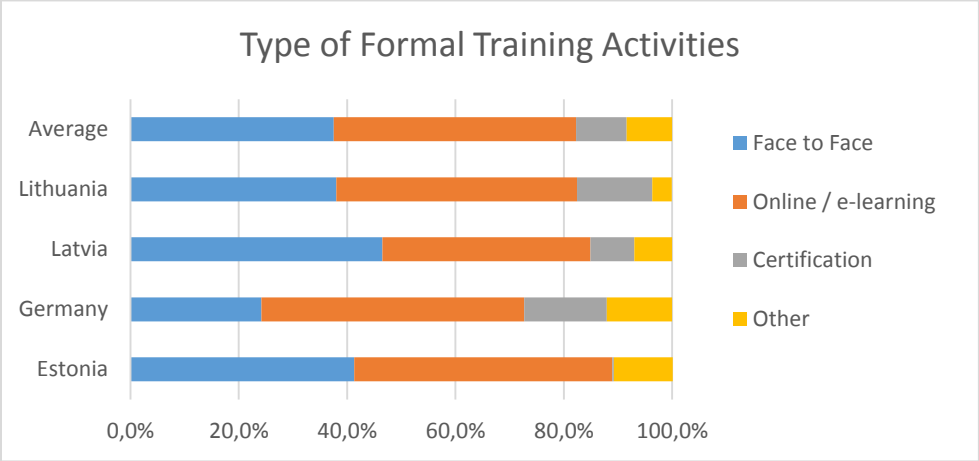

Figure 20: Type of Formal Training Activities

Of those respondents who had engaged in formal skill development, 38% had taken face-to-face training, 44% had engaged in e-learning, and 9% had engaged in a formal certification programme. Some national differences included a relatively low amount of face-to-face training in Germany (24.2%) and virtually no certification activity in Estonia (0.3%). Taken together, these results indicate that face-to-face and online training are relatively common competence development interventions among the target audience of teachers.

Informal Online Collaborative Tools Skills Development

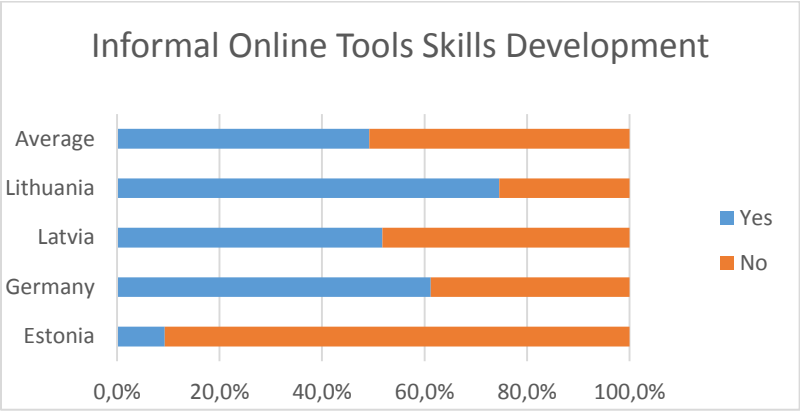

Figure 21: Informal Online Tools Skills Development – Proportion

On average across the four countries, approximately half of respondents (49.2%) indicated that they have engaged in informal skills development relating to online tools. This masked some considerable variations between countries – in Lithuania, 74.6% of respondents indicated that they had developed their online tools skills informally, while in Estonia, this figure was only 9.3%.

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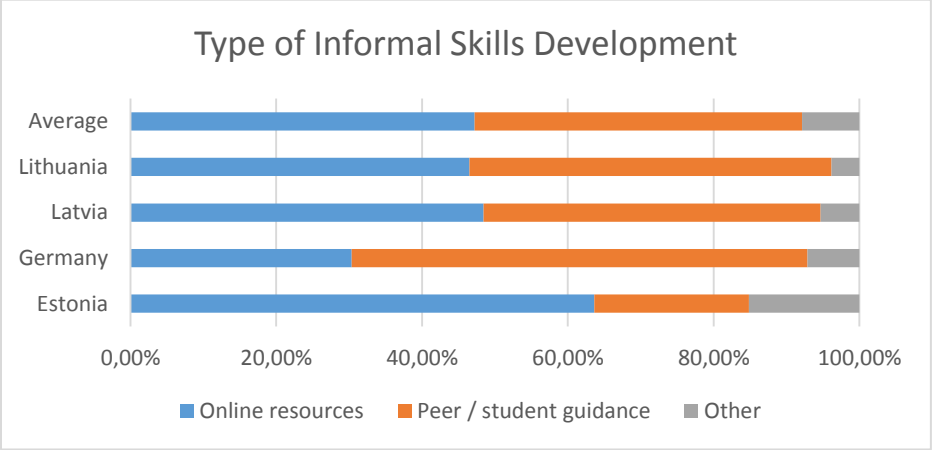

Figure 22: Type of Informal Skills Development

Of those respondents who had engaged in informal skill development, 47% had referenced online resources and 44% had engaged received guidance from others, indicating that both these informal approach to learning were used regularly by survey respondents.

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Summary of Survey Results

As set out in survey overview, the primary goal of the survey was to provide input into the programme to be developed for the Online4EDU project. Specifically, these inputs will relate to the breadth, depth, context, and positioning of the programme.

Regarding **breadth**: The respondents were representative of a varied mix of school sizes, grades and subjects taught. This diversity should be reflected in the construction of the programme. Similarly, the respondents were drawn from a range of age categories and experience levels – they were not just the so-called digital natives. The potential users of the programme will therefore be drawn from the whole spectrum of potential users, from newly qualified teachers to those nearing retirement. In terms of content, the programme should cover a range of online collaborative tools reflective of the tool set proposed in the survey, which were found to be the most used and most important online tools. Consideration should also be given to some other tools there were cited by some respondents (see "Perceived Importance" above). Other tools occasionally referenced, for example video sharing sites, online presentation tools, and virtual whiteboards, should be considered as potential additions to the programme. In addition, the generally low levels of confidence using a range of online tools suggests that the programme should be self-contained and not assume that participants have a good knowledge or skill-level associated with ICT in general. This may mean including some enabling concepts about the use of ICT.

Regarding **depth**: there is a significant number of respondents who do not or only rarely use common tools (approximately 50%) and who are not or only a little confident (approximately 70%) in using these tools (see "Confidence" and "Frequency of Use" above). This suggests that what is required is a programme that is focused on the needs of the majority of teachers who are at the start of the process of learning to integrate Online Collaborative tools into their teaching practice. This suggests that the programme should introduce and build on introductory topics in this area to support these participants.

Regarding **context** – training in the use of ICT in general is relatively common among respondents, and almost half had taken part in some form of training relating to the use of online collaborative tools (see "Formal Online Collaborative Tools Skills Development" above). However, a large proportion have not, and both confidence and use of these tools is relatively low. Informal skills development and different type of training (e.g. face-to-face and online) are cited by respondents, so it seems reasonable that the programme should adopt a blended approach and accommodate multiple learning methods where appropriate.

Regarding **positioning** – the programme should appeal to teachers from a range of disciplines and should be focused on addressing the needs to teachers who lack confidence and or who are infrequent users of these common tools. In addition, the content examples in the programme should be reflective of the differing needs of participants in terms of subject and student age. In addition, certification has not been engaged with by many respondents (see Figure 18). This option could be useful as a potential incentive for individuals to complete the programme.

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Qualitative Analysis

Overview

A structured interview (face-to-face or phone) was conducted to elucidate qualitative, in-depth responses from national stakeholders on this topic.

The target group for this interview were stakeholder in either teacher training specifically, or the quality of educational delivery more generally. Examples of appropriate stakeholder are trainers of teachers or educational policy makers. Interviews were conducted by country partners between February and April 2015.

Table 3 indicates the number of interview conducted, broken down by country and by the type of respondent. The respondents were loosely classified as:

- Academic / teacher training, who were engaged in delivering training to teachers or who were engaged more conceptually with considering the competences that teachers should have
- Public policy formation, who worked in government with a focus on devising and implementing policy.
- Other stakeholders, who were drawn from a range of organisations, such as teachers' associations or more broadly defined IT associations, concerned with promoting the effective use of technology in education.

	Estonia	Germany	Latvia	Lithuania	Total
Academic / Teacher Training	2	4	4	1	11
Public Policy	0	1	3	1	5
Other stakeholders (e.g. teachers' associations)	1	1	1	4	7
	3	6	8	6	23

Table 3: Interviews by country and by interviewee type

The spread of respondents indicate that, taking the four countries together, the different types of stakeholders were represented, with a slight bias towards those actively involved in teacher training.

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Four substantive topics were addressed in the interviews:

- The importance of promoting the use of technology among teachers
- The degree to which teachers are currently engaging in technology
- The type of initiative that can be successful and examples of these
- The relative importance of different online collaboration tools

Analysis was carried out by reviewing all responses relating to each question point, and distilling the range of views expressed to reflect either points of consensus or divergent opinions. Direct quotes are used as appropriate to illustrate different viewpoints and perspectives on the topics considered. The quotes are not directly attributed, but a full list of participants who agreed to be named as respondents is provided in Appendix 1: Interviewees by Country.

Importance of Embedding Technology in Education

In the interviews, respondents were asked:

"How important do you think it is to support teachers in embedding technology in education?"

There was unanimity that this was either a very important or important objective. The main reason was because of the potential provided by effectively using technology in education, which results in opportunities for an enhanced learning experience. Acquiring skills relating to the use of technology - and supporting teachers as they do so – is "*a basis for raising the quality of education and generating learners' interest*" (Latvian stakeholder 1). Doing so will also allow teachers to use IT as "*an aid to improve the learning process and facilitate work*" (Lithuanian stakeholder 3)

More specific reasons why support for teachers in this area is important is because of intergenerational differences around technology adoption that are emerging. Students in particular use tools such as social media outside the classroom; this ubiquitous medium is clearly a potential route to engage with young people, but there is a danger that teachers are just not savvy enough to do that – "*As teachers are not digital natives, but immigrants, it is of high importance to give them support. Otherwise the gap between the two generations will become deeper and deeper*" (Latvian stakeholder 3). If these technologies are not integrated in teaching, we will miss an opportunity to use tools that are relevant to students – "*the gap between the students' use of digital media in their spare time and what is going on in the school is still too great and needs to be closed*" (German stakeholder 3).

Some respondents looked beyond the immediate educational experience when citing the importance of supporting teachers. Failing to integrate the embedding of technology could have implications for individuals and society after school – "*the importance stems from the need of high digital skills of the students and school graduates for them to meet the demand on the work place*" (Estonian stakeholder 3).

The means in which the support for teachers is provided is also interesting – this cannot be solely be left to individual teachers. There needs to be a coordinate initiative to support teachers at a school or

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policy level. "*The school should be the strategic leader in initiating the engagement of the teachers with technology*" (Estonian stakeholder 1). These supports need also to be ongoing – what is required is "*not only an adequate ICT infrastructure in schools, but also a continuous support for professional development*" (Latvian stakeholder 5).

Degree of Current Engagement with Technology

In the interviews, respondents were asked:

"To what degree are teachers in your country currently engaging with technology?"

The respondents made a number of observations concerning engagement with technology. Firstly the technology was, in general, available to teachers, but that it was not being used to its full potential. Teachers "*have the computers necessary to use digital media, but technical equipment does not necessarily mean that digital media are used in the classroom*" (German stakeholder 3). When the technology is used, it may be in a relatively simplistic way that clearly does not exploit its potential – "*most of the teachers use IT on the lowest level – for presentations and videos*" (Lithuanian stakeholder 2) and "*in most cases, teachers effectively use presentations, but this is only a passive use. It is also wide use of video, but it does not improve learning effectiveness*" (Lithuanian stakeholder 6). The issue is more one of competence development then access to technology – "*the actual use of technology is rather low, specifically due to the lack of digital skills, time and resources, and the poor quality of digital resources*" (Latvian stakeholder 2).

Furthermore, the technologies were used to different degrees by different teachers. There were early adopters who embraced technology enthusiastically, but they were in a minority. As one respondent put it – "*approximately 20 % are pioneers, who test and seek new tools, methodologies and opportunities to improve the learning process, 80% use technology in a rather traditional way, making preparations for the lessons or using a technical device to display different learning materials during the lesson"* (Estonian stakeholder 2). There was also a demographic dimension to this, with a different between younger and older teachers, with younger teachers usually "*being very well versed in using new technologies and digital media*" (German stakeholder 3).

Also, there were differences in engagement based on the subject area, with an apparent, and not surprising, bias toward STEM subjects – "*Only the most active and enterprising teachers use IT in their lectures. The major part of them are technology and IT teachers, some teach math and physics*" (Lithuanian stakeholder 1). When available, the provision of equipment may also be influence by subject – "*For many natural science and mathematics teachers, interactive whiteboards are available at schools*" (Latvian stakeholder 7). Although use of technology may come easier to teachers in these subject areas, teachers in other subject areas – and more importantly their students – are clearly missing out by not fully engaging with technology.

Appropriate Initiatives

In the interviews, respondents were asked:

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"What sort of initiatives can help teachers to start engaging with technology?"

A wide variety of opinions was expressed by respondents on the topic of type of initiatives that would be appropriate to assist teachers as they begin to engage with technology. This, in itself, serves to illustrate that a single solution with a single focus is probably not going to work in all circumstances.

Characteristics of the appropriate initiatives can be loosely grouped into features that **support** an initiative and the **structure** of the initiative.

A range of **supports** are required for initiatives to be effective. Many of these will be driven by policy, either at national, regional, or school level. A commitment to resourcing initiatives adequately is crucial – many initiatives exist, "*but what is missing is time, time, time*" (German stakeholder 5). Teacher participation and buy-in needs to be incentivised. "*The support and motivation of school leaders*" (Estonian stakeholder 3) and "*the need to show the benefits of IT*" (Lithuanian stakeholder 6) are soft incentives. More concrete incentives could include either financially motivating teachers, or mandatory IT training or certification. Another resource-focused consideration is ensuring that accessibility to, for example, devices by students is addressed in initiatives – "*it is not a matter of course that each student, for example, owns a smart phone and is able to join a class WhatsApp group*" (German stakeholder 3).

Various characteristics relating to the **structure** of initiatives are also identified. Initiatives should allow for sharing experiences and for collaborative learning between teachers – "*mutual teachers' learning groups would be more effective (than training courses)*" (Latvian stakeholder 7). At the centre of the initiative must be content that can be used by teachers in their teaching practice – examples, templates, workshops, appropriate learning materials and good practices are all mentioned by several respondents as ways of achieving training that "*ends with a very concrete output*" (Estonian stakeholder 2). On top of this, there must be flexibility that will accommodate "*different structured learning processes*" (Latvian stakeholder 2).

Also relating to the theme of appropriate initiatives, respondents were asked:

"Are there any successful examples of such initiatives in your country?"

A wide range of responses to this was provided, mirroring many of the initiatives that have been set out in the Country-Level Analysis section.

The breadth of responses indicated that this is an area in which there has been much activity. Some of examples can be described as public policy initiatives. An example of this is Estonia's Tiger's Leap, a government-led initiative to heavily invest in development and expansion of computer and network infrastructure, with a particular emphasis on education (see pg. 6 above). Other initiatives were in conjunction with or sponsored by vendors, for example the Samsung Schools for the Future initiative in Latvia, a free digital teacher training programme (see pg. 21 above). Yet more initiatives were

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developed at a regional level, for example the LearnLine project[31] – an educational search engine - in North Rhine Westphalia.

Relative Importance of Different Tools

In the interviews, respondents were asked:

"What type of online collaborative tools are most important for teachers and why?"

Several respondents commented that whether or not a tool was important for a teacher will depend on the teacher and his or her requirements – "*teachers need to decide for themselves which application is useful for their individual situation*" (German stakeholder 3). Similarly, this flexibility could be reflected at a school level, in which schools are encouraged "*to develop their own ideas, rather than enforce a standardised tool for all*" (German stakeholder 4).

In terms of specific tools, Moodle is cited by several responses as an appropriate learning management system to support teachers and technology integration in the classroom. Other specific tools commonly referenced include online storage, online discussion fora, and social media. In terms of how tools were deployed, it is clear that tools will "*shift even more to cloud services*" (Estonian stakeholder 2).

[31] www.learnline/schulministerium.nrw.de

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Summary of Qualitative Analysis

The qualitative analysis of the 23 interviews carried out provide an opportunity to explore in greater depth some of the key issues informing this research.

The target audience of the project should utilize IT in their teaching. What is clear is that there is a consensus that more needs to be done to ensure greater engagement by teachers with technology in the classroom. Failure to do this means that the opportunity will be missed to provide richer and more meaningful educational experiences for school children.

Current engagement with technology by teachers is sporadic. There are a proportion of teachers who do engage with technology, but they form the minority. The majority must be encouraged to engage with and utilise technology, irrespective of the subject area that they work in or their current level of engagement with technology inside or outside education.

An effective programme, such as Online4EDU, should have certain characteristics. The programme should be flexible to accommodate different deployment methods. It should be supported and promoted actively by schools and at a higher level, and participation by teachers should ideally be incentivized. Care should also be taken to ensure that the appropriate technology is available to all involved, teachers and students, to facilitate the ongoing application of the programme's objectives.

A relevant programme, such as Online4EDU, should cover certain topic areas. It must be flexible enough to apply to teachers from different disciplines, and it should facilitate collaborative learning between teachers. It should also cover the common tools that will be used by teachers for online collaboration, while also empowering teachers to make judgements about the potential of other tools.

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Implications of Results for Programme

This concluding section draws together the results from the desktop research, survey, and qualitative analysis to make recommendations for the programme that will form the core of the Online4EDU project.

Context

- The programme is needed. Despite a range of initiatives in the general area of ICT in all countries, there is a gap in skills and confidence relating to the use of online collaborative tools[32]. Within the cohort of teachers, some subject areas and some profiles of teachers (e.g. older teachers[33]) in particular need support in this area.
- Opportunity to engage in creative and novel ways with students – and to improve learning outcomes for them – is lost if teachers do not engage with technology. Developing skills associated with technology is "*a basis for raising the quality of education and generating learners' interest*"[34]

Content

- The tool set initially identified was broadly validated by the research, with some additional tools that are relevant for teachers identified[35].
- Content must be driven by examples that appeal to a broad range of teachers – not just STEM: "*Only the most active and enterprising teachers use IT in their lectures. The major part of them are technology and IT teachers*"[36].
- Focus should be on building up from introductory skills to support the majority of teachers who lack confidence and experience in using these tools: "*80% use technology in a rather traditional way, making preparations for the lessons or using a technical device to display different learning materials*"[37].

Delivery

- The programme should be aimed at the substantial cohort of teachers who are not engaging with technology.[38]

[32] See page 37, "Confidence".
[33] See page 38, figures 14 and 15.
[34] Latvian stakeholder 1.
[35] See page 38 perceived importance.
[36] Lithuanian stakeholder 1.
[37] Estonian stakeholder 2.
[38] See page 36, "Frequency of use".

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- Thought should be given to how to incentive participation, for example through the "*support and motivation of school leaders*"[39].
- Programme content should be delivered in a flexible, blended way that reflects the typical learning activities (formal and informal) carried out by teachers[40].

[39] Estonian stakeholder 3
[40] See page 39, 40 "Formal and informal online collaborative tools skills development".

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Appendix 1: Interviewees by Country

Estonia

Estonian stakeholder 1: Academic respondent (anonymous)

Estonian stakeholder 2: Birgy Lorenz, Project Manager / Board Member, Tallinn University, Institute of Informatics, Digital Safety Lab/Network of Estonian Teachers of Informatics.

Estonian stakeholder 3: Egle Kampus / Inga Kõue / Elo Allemann, Leader of the training Department / Leader of resource development / Project Manager, Information Technology Foundation for Education (HITSA)

Germany

German stakeholder 1: Prof. Dr. Stefan Aufenanger, Professor of Education and Media-Pedagogy, University of Mainz

German stakeholder 2: Paul Eschbach, Head of Division; Development, Planning and Coordination of Further Education and Qualification in Schools, Media Counselling, Learning Materials; Ministry for School and Further Education, North Rhine-Westphalia

German stakeholder 3: Sandra Bischoff, Head of media competency and media economics, Hessische Landesanstalt für privaten Rundfunk und neue Medien

German stakeholder 4: Dr. Michael Kaden, Consultant, Ministry for Education, Youth and Sports

German stakeholder 5: Lisa Rosa, State Institute for Teacher Education and School Development in Hamburg

German stakeholder 6: Michael Retzlaff, Head of Media Education, Institute for School and Media, Berlin-Brandenburg

Latvia

Latvian stakeholder 1: Representative of government agency (anonymous).

Latvian stakeholder 2: Dr. Rudolfs Kalvans, Senior expert, Ministry of Education and Science

Latvian stakeholder 3: Signe Neimane, Director, Education and Information Services of Riga City

Latvian stakeholder 4: Viesturs Vēzis, Senior Administration Raporteur, VISC / National Centre for Education

Latvian stakeholder 5: Zane Matesovica, Deputy Head Program Director, Ventspils City Education Board

Latvian stakeholder 6: Edite Sarva, Teacher educator, Mission Possible, eTwinning

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Latvian stakeholder 7: Mārtiņš Kālis, Director, Foundation "Mission Possible"

Latvian stakeholder 8: Oskars Lūsis, Chairman of the Board, Latvian Association of Informatics Teachers

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Lithuania

Lithuanian stakeholder 1: Skaidra Vaicekauskienė, Board Member, Director, Lithuanian Computer Society (LIKS) Education Section, ITMC Accredited Teachers Training Centre

Lithuanian stakeholder 2: Aidas Žandaris, Viceprezident, LinMA, Lithuanian Association of Informatics Teachers (LInMA)

Lithuanian stakeholder 3: Algimantas Merkys, Coordinator of Educational Projects, Association „Langas į Ateitį“ (LIA)

Lithuanian stakeholder 4: Aušra Kumetaitienė, Information Society Policy Department, Head of the Information Society Development Division, The Ministry of Transport and Communications of the Republic of Lithuania

Lithuanian stakeholder 5: Loreta Križinauskienė, National Coordinator, Director, National Digital Coalition, Association „Langas į Ateitį“

Lithuanian stakeholder 6: Giedrius Vaidelis, Director, Education Development Centre

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