JRC Technical Notes

The Future of Learning: European Teachers' Visions

Report on a foresight consultation at the 2010 eTwinning Conference, Seville, 5-7 February 2010

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JRC59775 - 2010

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JRC 59775

Luxembourg: Publications Office of the European Union

ACKNOWLEDGEMENTS

This report could not have been written without the expertise and efforts of the teachers who participated in the workshop sessions. We would like to thank them for their invaluable insights and their willingness to contribute to our research.

We would also like to express our gratitude to Anne Gilleran on behalf of the whole eTwinning network, for her readiness to collaborate with our research team and facilitate a mutually beneficial knowledge exchange between researchers and teachers, and to Brian Holmes for his valuable feedback and suggestions.

We are, as always, most indebted to Patricia Farrer who edited and proofread successive versions of this report to prepare it for publication.

However, as ever, the views and conclusions expressed in the report, together with any errors or omissions, are the responsibility of the authors.

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PREFACE

The Europe 2020 strategy acknowledges that a fundamental transformation of education and training is needed to address the new skills and competences required if Europe is to remain competitive, overcome the current economic crisis and grasp new opportunities. However, to determine how education and training policy can adequately prepare learners for life in the future society, there is a need to envisage what competences will be relevant and how these will be acquired in 2020-2030.

To contribute to this vision-building process on ways of addressing emerging competence needs, JRC-IPTS, in collaboration with DG Education and Culture, launched a foresight study on "The Future of Learning: New Ways to Learn New Skills for Future Jobs", in 2009 (http://is.jrc.ec.europa.eu/pages/EAP/ForCiel.html). This study continues and extends work done in 2006-2008 on "Future Learning Spaces" (Punie et al., 2006, Punie & Ala-Mutka, 2007, Miller et al., 2008). It is made up of different modules which will be completed during 2010 and 2011. The modules will include a series of stakeholder consultations, involving different target groups ranging from policy makers, and scientists to educators and learners.

The overall objective of the research is to contribute to the development of imaginative visions and scenarios of the future of learning in order to support priority setting for education, training and skilling policies, by consulting a range and variety of different experts. Though teachers are major stakeholders in the field of education and training, they are rarely consulted when the future of learning is at stake. Recognising their expertise and valuable insight into learning and teaching trends, IPTS conducted a foresight exercise with a focus group of teachers from all over Europe at the occasion of the eTwinning Conference in Seville, in February, 2010. This report presents the outcomes of the consultation sessions, and describes the views of the participating teachers on the future of learning and teaching.

EXECUTIVE SUMMARY

It is widely acknowledged by policymakers and researchers that a fundamental transformation of education and training (E&T) throughout Europe is needed, not only to maintain existing levels of education and training in the population, but also to develop the new skills and competences required if Europe is to remain competitive and grasp new opportunities. The IPTS foresight study "The Future of Learning: New Ways to Learn New Skills for Future Jobs",[1] aims to better understand these changes. This research project involves more than 300 stakeholders from a variety of backgrounds in developing and validating visions and imaginative scenarios on the future of learning in 2020-2030.

Though teachers are major stakeholders in the learning field, they are rarely consulted in foresight research into the future of education and training. To change this, IPTS took the opportunity to develop and discuss visions of the future of learning with teachers during the yearly eTwinning conference, which in 2010 was held on 5-7 February, in Seville. The results of these consultations contribute to an IPTS-led vision building process on the future of learning. This report presents the outcomes of the consultation sessions, and describes the views of the participating teachers on the future of learning and teaching.

In interpreting the results of these consultations, it must be acknowledged that the participating teachers were not a representative sample of all European teachers, as they belong to a specific group already involved in European wide ICT-based networking and innovative learning activities and projects through eTwinning.[2] However, this research does not aim to gather empirical evidence of teachers' opinions on ICT in Europe, but seeks expert advice for developing visions of the school of the future. The bias of the sample is therefore a strength rather than a limitation. As it turned out, the teachers consulted in this exercise were extremely knowledgeable, reflective and critical of current developments in educational policy and practice. These observations confirm that the teachers consulted can, in fact, be considered experts in the future of school education in Europe.

Teachers' perspectives for changes in learning over the next 10 to 20 years

Participating teachers highlighted the following major areas of change to learning at school over the next 10 to 20 years:

Learning objectives will focus on competences rather than knowledge. Teachers confirmed the importance of emphasising the EU Key Competences in future educational objectives, and highlighted the fact that analytical and critical skills, problem solving, collaboration, negotiation, innovation and self-management will become important basic skills for the future. Developing one's personality and managing one's identity were identified as new important key competences, together with awareness of the environmental challenges and understanding and managing one's place in a changing world and society. Languages, mathematics and ICT were considered crucial for developing one's competences over the course of a lifetime.

Learning will be more tailored to the needs of individuals. Encouraging individual learners to develop their own talents and interests is important for keeping them motivated and improving their educational attainment and performance. Therefore, educational approaches should be tailored to their individual needs, learning styles and preferences, thus facilitating

[1] Cf. www.futureoflearning.eu.
[2] For more information about eTwinning, see: http://www.etwinning.net/

personal progress. In order to support personal competence development, educational practices, learning objectives and assessment procedures should be revised and should not be too strictly standardised. Various ways and sources of learning should be provided and supported so that people can create their personal learning journeys, taking responsibility for their own learning goals and the ways they achieve them.

Learning will be more active and connected to real life. Members of the younger generation should learn to grow up as part of society and be aware of what takes place around them, thereby becoming responsible and independent global citizens. Learning will become more active and constructive, with an emphasis on learning by doing, and on locational and authentic learning. Learning will take place in social interaction with other learners, teachers and third parties. It will be connected to real life, nature, work, and life in the local and global community.

Technologies will be an integral part of learning and life. Technologies are shaping, changing and enabling new ways of accessing, understanding and creating knowledge, and will be a natural part of learners' lives in the future. Therefore, it is crucial that all learners, obtain the necessary skills to find, process and manage information and to confidently, efficiently and critically use technologies to achieve their objectives. As technologies keep changing, teachers need to continuously update their skills in order to support learners in safe and critical usage of the currently most relevant technologies.

Teachers will become lifelong learners themselves. It is essential that in the future teacher training is understood as a lifelong learning task, and is supported as part of teachers' daily work. Teachers need to continuously update their knowledge of students' learning needs and develop their teaching methods through networking, observing and peer learning from other teachers. Teachers' learning can be effectively supported through local and online communities, where practices are shared and developed together, such as eTwinning.

Challenges for the future of education and training in Europe

The main messages coming from all the conference sessions about the future of learning, including the final plenary discussion, highlight the following overall challenges for the future of education and training in Europe:

Education needs to change to respond to the needs of the economy and society. Learning objectives need to change to take into account future competence needs. It is already recognised that learning is changing and a lot of valuable learning takes place outside school, which must also be recognised in the formal education system. In order to change education, assessment practices also need to change everywhere in education and training systems.

ICT are creating and impacting change in learning, but more knowledge is needed. Technologies provide new means for learning, by increasing access to various forms of information and establishing new connections between people. It is important that everybody learns to safely and responsibly use technologies in their lives and at work. However, more knowledge and support is needed for effective pedagogical strategies for the use of ICT in schools.

Teachers need to be encouraged to be part of implementing the change. It is crucial to enable all teachers to be confident with technologies as part of their work in the future. Currently, teachers' daily working environments do not necessarily encourage innovating and trying new learning approaches. eTwinning is an example of an effective Community of Practice which enhances teachers' professional development and promotes educational innovation.

Organizational change is required to allow and encourage innovation in education. Leaders need to have a holistic view which takes into account aspects such as skills, attitudes, regulations, IT resources, time resources, links between schools, parents and community, and social support for change. New models can be mainstreamed through networks that enable practices to be shared and adapted efficiently in local circumstances.

Policies should be better linked with developing practices. Policies should be developed taking into account the viewpoints of different actors, including practitioners. Networking on a European level is important for accelerating change. For example, eTwinning participants can take part in developing the future of eTwinning through community spaces, and thereby contribute to the development of educational policies and strategies in Europe.

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1. INTRODUCTION

It is widely acknowledged by policymakers and researchers that a fundamental transformation of education and training (E&T) throughout Europe is needed, not only to maintain existing levels of education and training in the population, but also to develop the new skills and competences required if Europe is to address the current challenges of competitiveness, environment and ageing population, as well as to grasp new opportunities. Technologies, especially ICT, have a particular role to play in realising these changes. It is difficult to imagine a future learning environment without some sort of ICT, at the forefront or in the background.

To determine how education and training policy can adequately prepare learners for life in the future society, there is a need to envisage what competences will be needed and how they will be acquired in 2020-2030. The JRC IPTS foresight study "The Future of Learning: New Ways to Learn New Skills for Future Jobs", aims to better understand these changes. This research project involves more than 300 stakeholders from a variety of backgrounds in developing and validating visions and imaginative scenarios on the future of learning in 2020-2030.

Teachers are major stakeholders in the educational field but are rarely consulted for foresight research on future of learning. Since compulsory education will remain one of the key components of all people's lifelong learning journey and since teachers are key to making changes happen in schools, their visions are an important part of the overall picture. Acknowledging the importance of their opinions and views on the future of learning, future visions and scenarios of learning were developed and discussed with teachers in two workshop sessions and a plenary discussion during the eTwinning Conference[3] in Seville, 5-7 February 2010, which brought together more than 400 teachers from all over Europe.

This report presents the outcomes of the conference sessions that aimed to gather the views of the participating teachers on the future of learning and teaching as well as the final plenary discussion of the conference. The remaining part of this Chapter 1 introduces the methodology used for the foresight consultation sessions. Chapter 2 and Chapter 3 present the results of the first workshop session which dealt with the envisaged changes to learning by 2025, and the way these could take place for three different types of learning scenarios. Chapters 4 and 5 summarize the findings of the second workshop, which concentrated on discussing the future key competences and what they would mean for learning objectives and assessment of different learners. Chapter 6 summarises the topics raised in the plenary panel session on the last conference day. Finally, Chapter 7 gathers together overall messages and lessons learnt from the sessions observed and reported.

CONSULTATION APPROACH

The foresight methodology employed in this study is not used to predict the future, but rather to elaborate and understand different, plausible futures. Vision building is an important part of foresight as it enables the development of strategic visions, bringing together the viewpoints of various actors and stakeholders towards common goals. The aim of this particular foresight activity is to develop visions on the ways in which people will acquire, retain and update the necessary competences for successful and prosperous lives in a fast changing world, with a view to addressing, in particular, emerging competence needs and ways to increase individual employment opportunities.

[3] http://www.etwinning.net/en/pub/news/news/etwinning_conference_2010.htm

The foresight consultation sessions in the eTwinning Conference involved three focus groups: a group of some 20 teachers in a first workshop session of 90 minutes; another group of 15 teachers in a second 90 minute workshop session; and some 70-100 teachers in the plenary discussion. The plenary session did not deploy any specific methodology, but followed a typical structure with an opening presentation, invited panel experts for addressing specific questions, and a discussion moderated by the presenter on the topics relating to the future of learning in Europe. The focus groups in the two workshop sessions followed the structure as presented below. Further information of the methodology of each session is provided in the respective session description chapters.

First workshop: Changes to learning by 2025

The first workshop took place on Saturday morning, 6 February 2010 at 10h00 to 11h30 and was attended by approximately 20 participants. The workshop was divided in two parts:

- A: joint brainstorming session on changes in education,
- B: group work focusing on the learning strategies in (a) primary, (b) secondary education and (c) for teachers' professional development.

These sessions A and B are reported in the chapters 2 and 3 of this report, in the respective order.

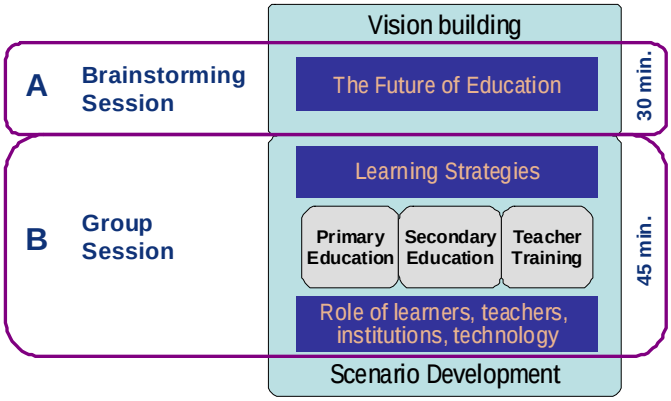


Figure 1: Content structure for IPTS workshop 1.

Second workshop: Future key competences and ways for achieving them

The second workshop took place on Saturday afternoon from 15h00 to 16h30, and was attended by approximately 15 participants. Some participants had attended the IPTS workshop 1 in the morning, others had not. The workshop was divided in two parts:

- A: brainstorming session on future key competences,
- B: group work on the learning objectives and assessment in (a) primary, (b) secondary education and (c) for teachers' professional development.

These sessions A and B are reported in the chapters 4 and 5 of this report, in the respective order.

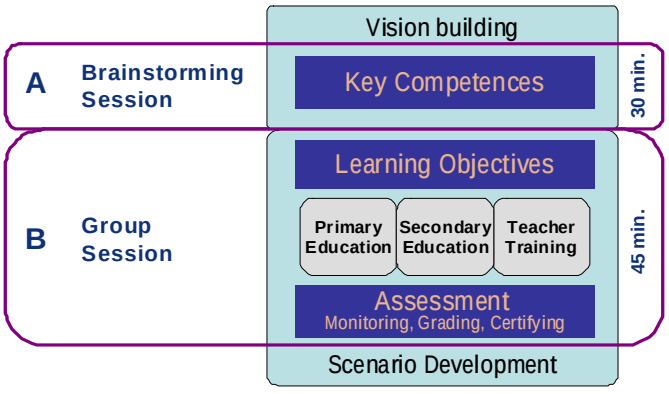


Figure 2: Content structure for IPTS workshop 2.

To facilitate the vision building process in the workshops, character descriptions relating to primary and secondary education and to teacher training were developed. It should be noted that these persona are completely fictional. The photos used for illustration purposes are published with the authorisation of the owners. The link between the photo and the persona description is established only for presentation purposes and is completely fictitious.

It must be acknowledged that, given that the consultations took place as part of the eTwinning Conference, the teachers who participated in all three sessions were by no means representative of the teacher population in Europe. On the contrary, given their high engagement in eTwinning they can be considered pioneer teachers, i.e. those who are driving innovation in school and believe in the need to modernise school education in view of future challenges. In particular, these teachers believe in the power of ICT for improving teaching and learning and, because of their positive ICT-mediated experiences in eTwinning, they share the technology-oriented perspective of the research team. However, since this research does not aim to gather empirical evidence of teacher opinion on ICT in Europe, but is seeking expert advice for developing visions of the school of the future, the bias of the sample is not a limitation, but a strength. As it turned out, their visions and opinions were very much in line with what experts and current research projects expect to happen in the next 10-20 years. Where teacher opinion deviated from research insights, it added a new and valuable perspective to looking at future developments.

2. VISIONS ON THE FUTURE OF SCHOOL EDUCATION

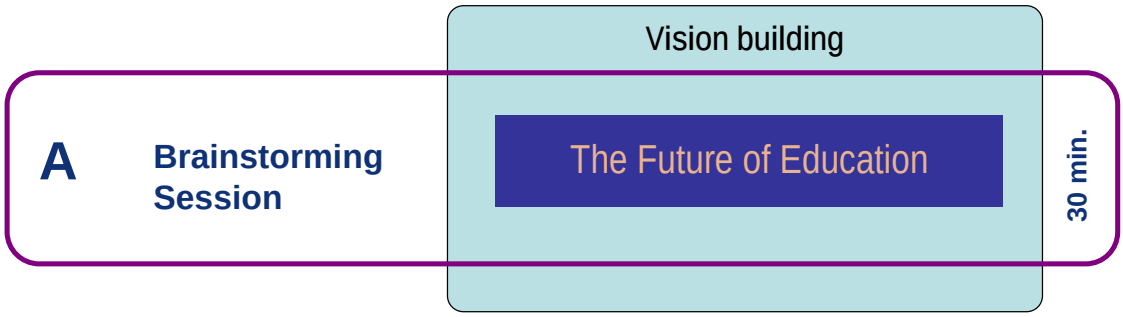
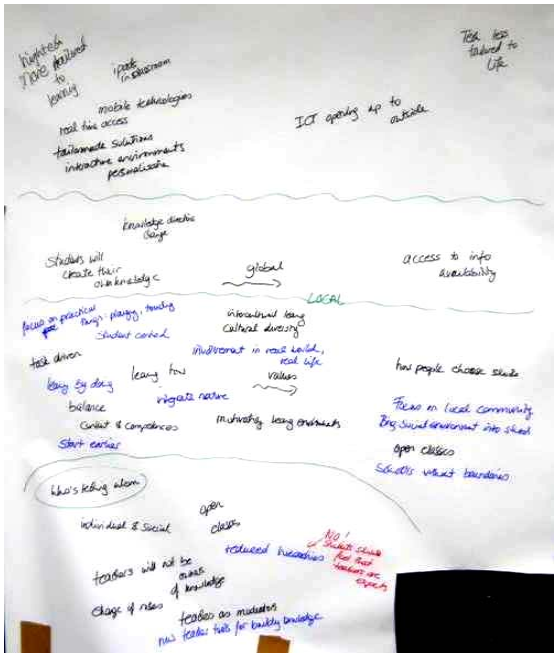


Figure 3: Structure of IPTS workshop 1, part A.

2.1 BRAINSTORMING METHODOLOGY

The workshop participants were given paper sheets, with three empty answering spaces and a trigger statement: "*The three most important changes to Education in 20 years' time will be*:……"

After people had thought about the statement and written down their answers, each participant in turn was asked to name one change. After the first round of answers, participants were asked to give any other changes they had thought of but not yet mentioned, in any order. Moderators wrote down the changes suggested by the participants on a common poster, which is illustrated in Poster 1.



Poster 1: Changes to education in 2025.

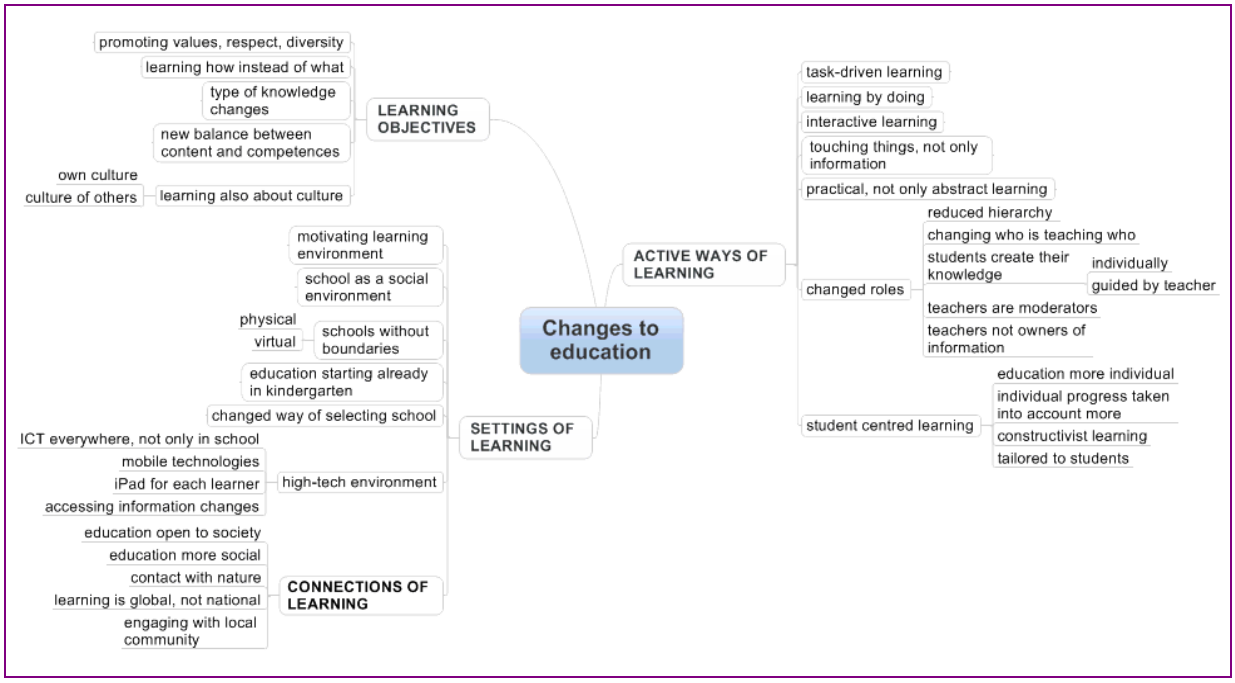
2.2 KEY ELEMENTS FOR THE FUTURE OF SCHOOL EDUCATION

The answers gathered can be grouped under three main clusters, each including several types of topics, as illustrated in Mind Map 1. The major types of changes expected are:

More active ways of learning. Learning will become more active, focusing on learning by doing, experiencing, touching. At the same time, it will become more social and collaborative with each learner constructing his/her knowledge in interaction with others in the context of practical applications and tasks. Student-centred learning approaches, where each learner's individual needs and progress are taken into account, will come to the fore. The traditional roles of teachers and students will change to support this development, and teachers will become moderators and guides for students' personalised and collaborative knowledge creation.

Revised learning objectives. More active and constructive ways of learning will arise from a shift in the balance between knowledge and skills, and the emergence of new competences. In a world that is characterised by information overload, "knowing how" will become more important than "knowing what". Furthermore, values, like respect, tolerance, responsibility and cultural awareness and diversity will become important learning objectives.

New learning settings and contexts. Changing learning objectives and ways for reaching them will be accompanied by the emergence of new learning settings and their connections to various contexts. Learning will be supported by flexible and dynamic virtual environments and by a range of tools and applications to facilitate individual and collaborative learning processes inside schools, outside school, and with connections to various contexts. Physical or virtual boundaries will become obsolete. From pre-school onwards, learning will take place in versatile environments that are smoothly integrated into life. Learning environments will be motivating, social and connected to nature and to the local community and global society. In particular, learning will become more holistic, embedded in the societal context and the local community. Parents will be respected as parties in the learning process.



Mind Map 1: Changes to education in 2025.

2.3 HIGHLIGHTS FROM THE DISCUSSION

The answers received from the participants and the joint discussion raised some interesting aspects that are not necessarily explicitly considered in the education policy context. The participants highlighted:

- **Nature.** Connecting learning with nature was considered as a motivating factor for learning, especially for children. It was pointed out that the new school for people aged 0-21 mentioned by Stephen Heppell[4] in his Conference keynote presentation should include, for example, a farm.

[4] http://www.heppell.net/

- **Touching and experiencing things.** Teachers suggested that there should be more focus on practical things than on information – children should play and touch things as well. Furthermore, a physics teacher suggested that children should not just learn to believe what others say, but to experiment and see for themselves how things work.
- **Involving the local community and parents.** Schools should open up, connect with parents and local communities, so that the learning of pupils would be supported in a holistic manner.
- **Role of ICT as a tool for personalisation.** When the answers and comments were related to ICT, they typically considered technologies as a tool for personalisation of learning, increasing access to information and tailoring learning to students' needs and preferences. ICT was seen as a tool for all learning, not as a subject.

Although several participants pointed out that the roles of teachers and students will be changing, opinions on the kind of changes diverged. Whereas some judge that in the future there will be reduced hierarchy between teachers and students, others underlined the importance of the teacher being in charge and respected as an authority. The conclusion of this discussion was that teachers will remain in charge of designing the learning process and guiding the learner through it. However, they will respond to a greater extent to the individual learning needs and preferences of learners and value their individual capacities and achievements. Furthermore, a more cooperative and collaborative learning and teaching style will prevail.

2.4 MAIN MESSAGES FROM THE SESSION

- As a result of the brainstorming exercise, the most important changes expected and hoped for the future of learning were seen to relate to:
    - More active and individualised ways of learning;
    - Revised learning objectives considering more competences and values than knowledge;
    - Highly technological learning settings that connect to and embed schools in society, which includes the local and global community, parents, and nature.
- This was the first exercise showing that the objectives of the educational policies and what the teachers consider important can be very similar. Later tasks and sessions confirmed the view. However, sometimes terminological differences can cause difficulties in communication between different actor groups.
- This session was also the first one to show that, in fact, with their day-to-day practical experience with what works and what does not work at school, teachers are in an excellent position to bring forward interesting and valuable viewpoints that entail additional benefits and include issues in the debate that are overlooked by policy makers.

3. LEARNING FROM DIFFERENT PERSPECTIVES IN 2025

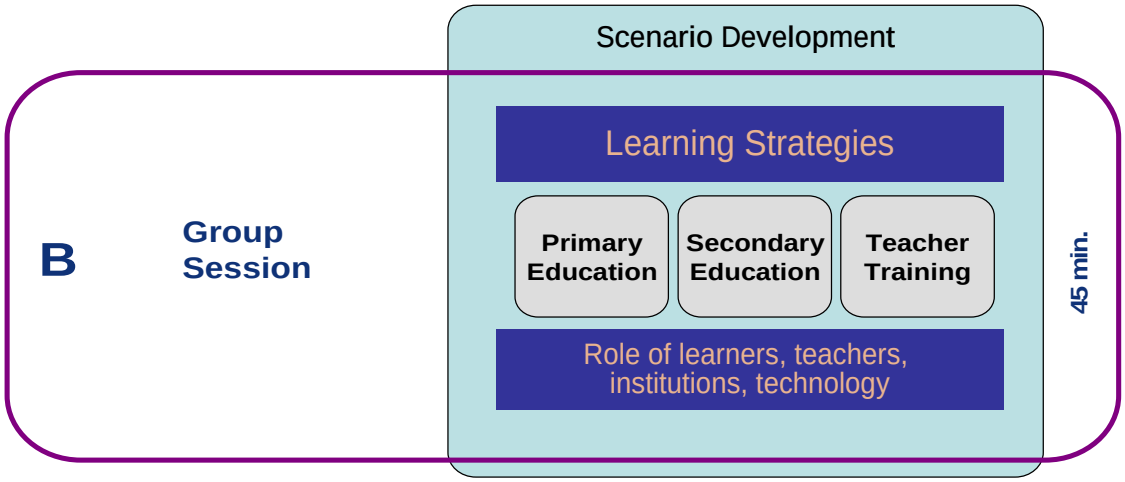


Figure 4: Structure of IPTS workshop 1, part B.

3.1 LEARNING SCENARIOS METHODOLOGY

The workshop participants divided themselves into six groups, according to three themes: Main changes to school education in 2025, as concerns (a) primary or (b) secondary education, or (c) teacher training. Each theme was discussed by two groups working in parallel and independently from one another. Each group task was illustrated using a persona, i.e. a (fictitious) archetypical representative of the particular target group with common problems and needs. The persona descriptions on which the team work was based are presented in Fig. 3.

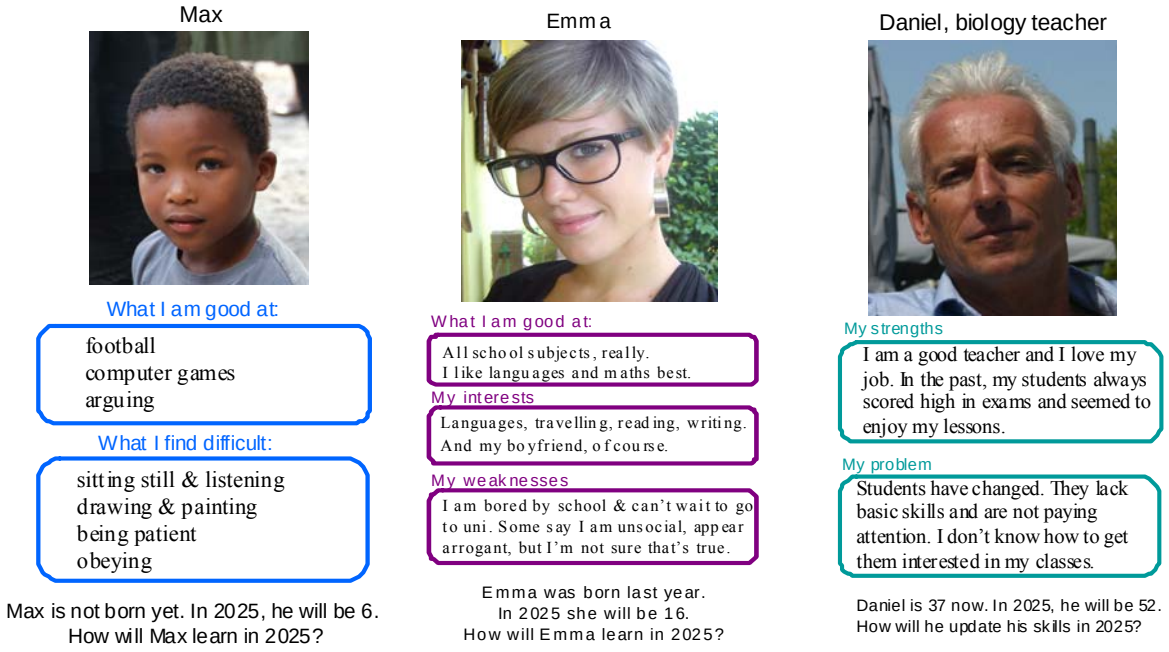


Figure 5: Persona Descriptions for primary (Max), secondary (Emma) education and teacher training (Daniel)

Group participants had individual sheets to work on and were asked to develop a joint poster describing the:

- learning needs,
- learning objectives,
- learning strategy,
- role of teachers/trainers,
- role of technology

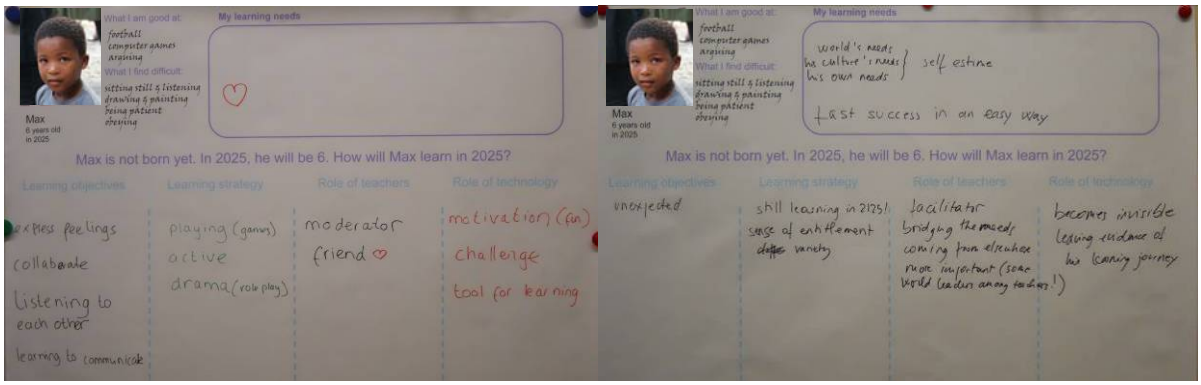
relevant for the persona they discussed. Afterwards, the groups presented their posters, followed by joint discussion.

Figure 6: Scenario work in groups on the future of school education

3.2 LEARNING SCENARIOS

For each persona, two posters were produced, the results of which are synthesized in the Mind Map 2. On the whole, while there were slight variations between the two teams working in parallel, no marked differences or contradictions emerged. Agreement on general tendencies was, overall, surprisingly high.

3.2.1 The future of primary school education: Max, 6 years



Poster 2: Primary school education in 2025, as illustrated by the persona 'Max'

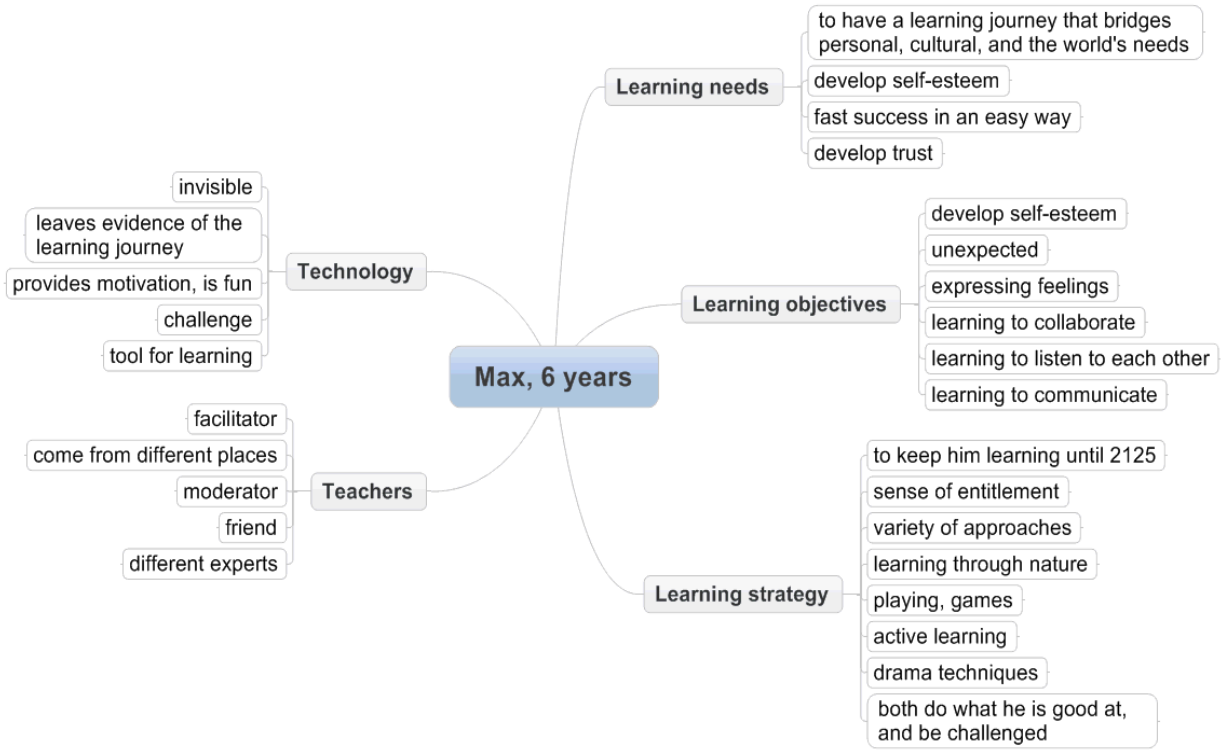
Max's persona represents a typical primary school child: a boy, who finds it difficult to come to terms with the traditional routine of school education, like sitting down, being still and listening; an active, maybe even hyper-active, boy who needs far more corporal movement than a typical school day offers nowadays and is attracted by media that currently are not used, and often even banned from classrooms, like computer games.

In 2025, it is very important that Max acquires and maintains an interest in learning over the course of his lifetime. Given the fact that life expectancy is increasing, his lifetime might well extend over a whole century, with all the accompanying societal changes and challenges. Therefore, as a child he should be offered opportunities to enjoy learning and experience it as being fun. Neither group considered learning strategies which would aim at increasing his capability to concentrate in class or on encouraging him to become more patient and obedient. On the contrary, both teams stress that Max should be encouraged to concentrate his efforts on learning the things he is good at, combined with challenging him with things he is not (yet) so good at, presented in a way that makes them relevant and interesting to him. It was

emphasized that experiencing learning as enjoyable will enhance Max's ability to become a lifelong learner.

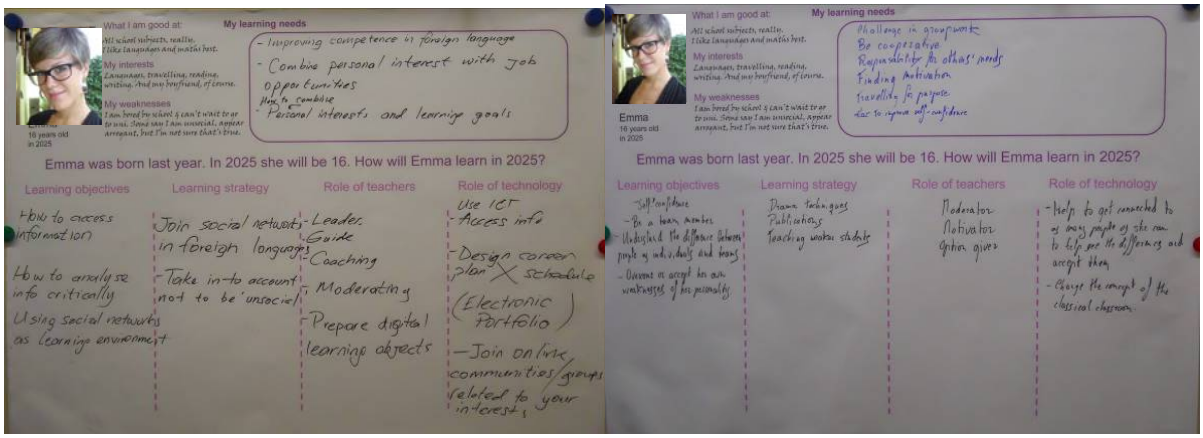
One of the particular issues raised concerning primary education was the fact that the emotional sphere of the learning process should not be overlooked. It was underlined that the most important pre-condition for the learning success for young children like Max was love, i.e. feeling protected and cared for. In particular, the cognitive focus of school education tends to overlook that sometimes all a child needs is a hug. More generally, school education at primary level should, according to teachers, incorporate more holistic, active and corporal experiences, involving all senses. Approaches involving drama techniques and visits to nature were mentioned as examples.

According to the teacher working teams, Max should have a learning journey where he learns things that are important for his personal development, and also things that are seen as important for the needs of the society and economy, on local and global level. Through a variety of active learning approaches, he develops self-esteem, expressing feelings and communicating as well as listening to and collaborating with others. Technology is present but invisible in Max's life and learning. It gathers the evidence of his learning journey and is a tool that can provide fun and challenge, as needed for learning. Max has many different teachers who are facilitators, moderators and friends for his learning journey. Some of these "teachers" are experts, politicians, scientists, football stars, etc, from all over the world. They contribute to Max's learning process by responding to different learning needs and objectives and supplying a variety of perspectives and world views.



Mind Map 2: Primary school education in 2025, as illustrated by the persona 'Max'

3.2.2 The future of secondary school education: Emma, 16 years old



Poster 3: Secondary school education in 2025, as illustrated by the persona 'Emma'

Emma's persona is representative of an average, good or even excellent student. However, in her adolescence she loses interest in school and is at risk of underperforming. Emma sees herself as an adult, a university student rather than a school student, and is dissatisfied with being treated as a child at school.

By 2025, according to the teachers present at the workshop, it should have become possible to make some university courses accessible for high school students. Those students who are advanced in a subject should be allowed and enabled to go beyond school curricula in study topics they are interested in at university level. For Emma it is suggested, for example, that she visits universities virtually to see what she could study, and enrols in some courses, online or even locally, if there is a university nearby.

By 2025, teachers expect that learning processes will have become more social and active at both secondary school and university levels. There will be more collaboration and integration of knowledge, which will make it possible for students to prepare university-level learning modules at high school.

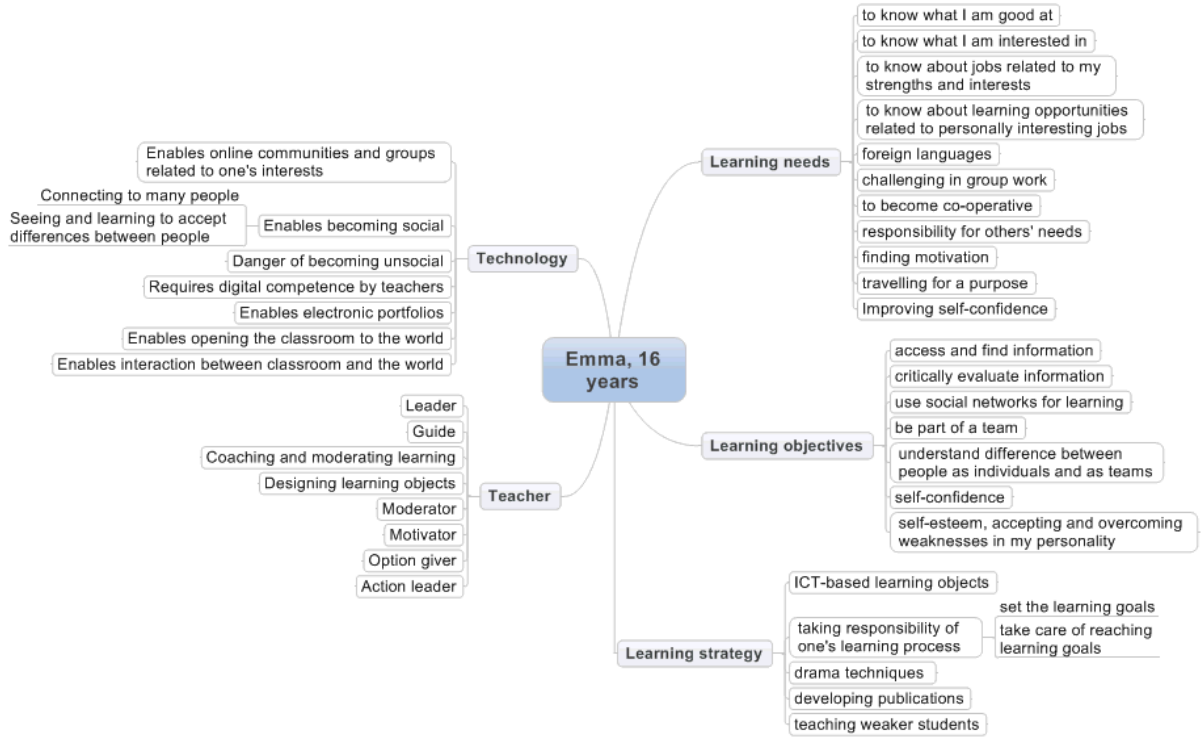
Again, teachers emphasize the holistic learning needs of Emma as a person, not just as a student. Therefore it is stressed that Emma's learning needs at the difficult age of 16 are very much concentrated on developing as a person, knowing who she is, what she is good at and understanding what she is interested in. She needs to find out about jobs that would relate to her interests and corresponding learning pathways. This would also help her to take responsibility for her own learning processes, setting her learning goals and doing what is necessary to reach them. She needs to be supported to develop her self-esteem, accept herself and understand differences between people. Through drama techniques and teaching weaker students, she could be encouraged to improve her collaboration and team skills.

For Emma, in 2025, technology will be an always-present enabler for many things. It is not yet known what form of technology she will use, but the workshop participants suspect that the glasses she is wearing could be the interface to her personal mobile ICT.

Given the ubiquity of technology, accessing, finding and critically evaluating information from the huge variety of possibilities will be one of Emma's crucial learning objectives. Through the way technologies are connecting classrooms with other actors in the world, she will have learned to also use personal social networks for her learning. The technologies allow her to connect with many people, and to find a wide variety of online communities and groups to choose from, which also helps her to see and learn to accept differences between

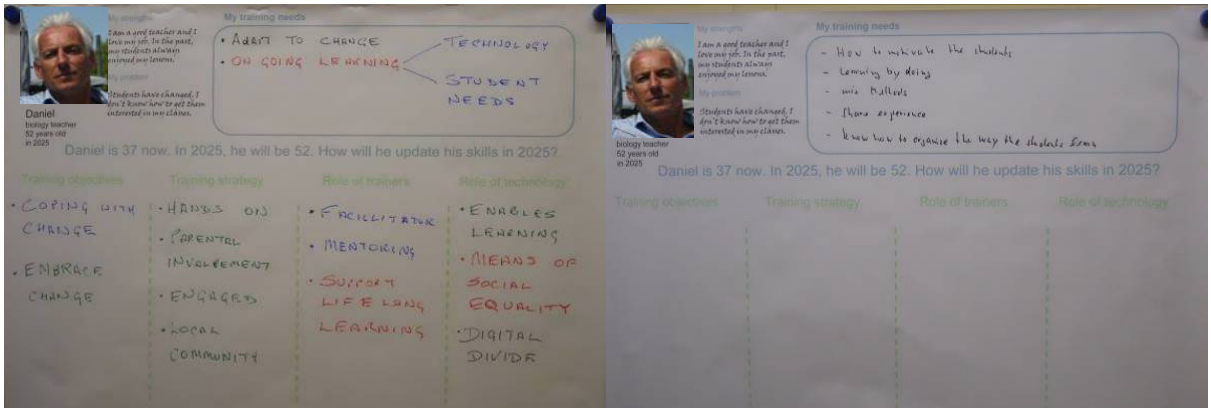
people. She will be learning to develop her social aspects both online and face-to-face in the classroom, as both are important in her life.

Teachers are important guides in Emma's learning journey, coaching and moderating her learning. They motivate, give options and lead her learning in directions that are most beneficial for her development. The highly integrated use of technologies in Emma's life requires that teachers have a high level of digital competence. They need to be able to design and prepare ICT-based learning objects and models, as technologies are the tool Emma is using now and will be using in her future jobs.



Mind Map 3: Secondary school education in 2025, as illustrated by the persona 'Emma'

3.2.3 The future of teacher training: Daniel (52), a teacher



Poster 4: Teacher training in 2025, as illustrated by the persona 'Daniel'

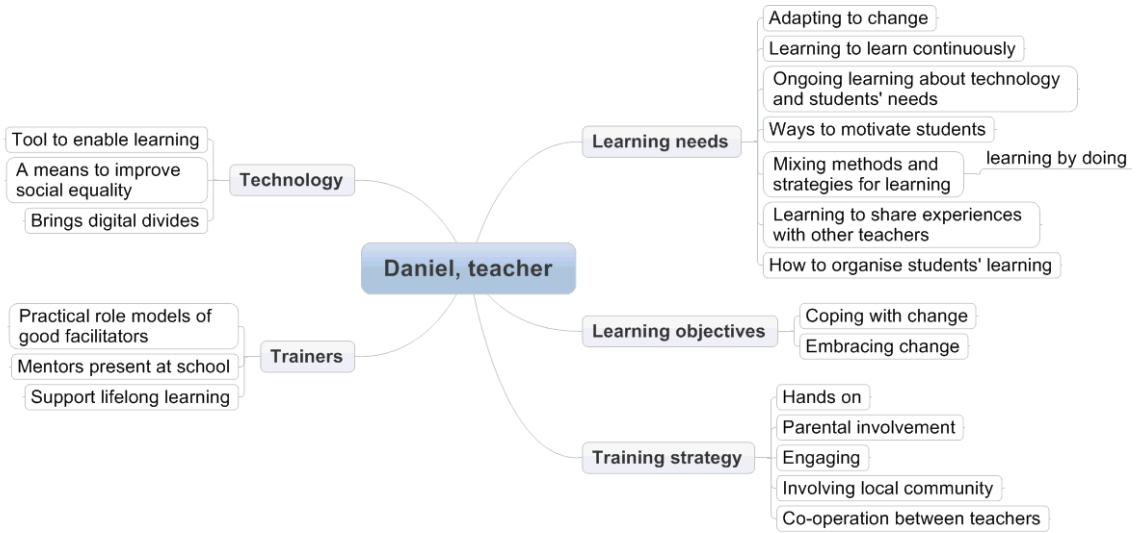
Daniel's persona is representative of teachers who have been following society's developments and have been adapting to changes since 2010, trying to stay on top of things. According to workshop participants, by 2025, skills updating will have become a continuous

task for Daniel and everyone else. Those teachers who might otherwise be left behind are supported by various training approaches. Teachers still play an important role in organizing and motivating students' learning, as learning cannot always be entertaining and requires hard work. Therefore, Daniel has been learning a variety of skills to motivate and engage his students in learning, by mixing methods and strategies as needed.

By 2025, schools will have opened up far more to society and Daniel will have learned to co-operate with parents and the local community. Professional development will take place very much through co-operation between teachers. In fact, this is also how Daniel has learned and practiced the skills he needs for teaching his students to be collaborative. Daniel shares and exchanges experiences with other teachers both within and outside school, as he has realised that watching, observing and copying examples from other teachers is a very efficient way to learn.

Teacher trainers are important role models for Daniel. They are good facilitators of learning, which is how they have motivated and encouraged Daniel to become a facilitator himself. Furthermore, Daniel has a mentor who is systematically in contact with him, challenging and stimulating him in his work at school. Daniel thinks that lifelong learning is essential and that it is the only way to adapt to changes, and keep updated with the needs of the students and technological and societal developments.

Daniel knows that technologies as such do not teach anything, but they can enable learning to take place. They also enable access to information and resources in new ways. There are specific ICT tools and systems that help Daniel to design and organise students' learning in 2025 with the various opportunities available. It has been crucial for him to acquire and continuously update the digital competence to benefit from the tools and technologies that help him to plan and organise his teaching tasks, and provide versatile learning approaches for his pupils.



Mind Map 4: Teacher training in 2025, as illustrated by the persona 'Daniel'

3.3 GENERAL TENDENCIES FOR SCHOOL EDUCATION IN 2025

Participants pointed out that all the viewpoints discussed during the session about desired changes are already important, not only in the future. It is difficult to think about the future without linking it to current needs or making assumptions based on the current situation. This was also demonstrated by the fact that none of the groups first mentioned reading and writing

as important learning objectives. However, when asked, everybody agreed that of course these are very important.

It was interesting that although the task settings addressed quite clearly primary and secondary school, the answers and discussion did not use these terms much. On the contrary, it was specifically pointed out that the boundaries between primary school, secondary school and university are changing. Maybe even this kind of terminology separation will no longer exist in 2025.

Participants agreed on the need for continuous professional development for teachers. Learning to cope with, embrace and adapt to change were seen as important learning needs and the lifelong learning for teachers was seen as the only solution. Some people suggested that teachers will realise this automatically and will learn and develop with the society, no longer having major problems in 2025. However, it was pointed out that this will not necessarily apply to all teachers; some may lag behind and need encouragement and support.

Workshop participants raised the question: Where will the trainers that teach teachers come from in 2025? First, it was suggested that the trainers should be other teachers, who can be good practical examples and mentors. Then, it was pointed out that experts from other areas such as industry would bring in other skills that would not necessarily be present in schools. They could also feedback learning needs from the schools' surroundings. As a conclusion, both aspects were considered important.

3.4 MAIN MESSAGES FROM THE SESSION

- Encouraging the talents and interests of each learner was seen as more important than focusing on improving weaknesses. Students that can perform well should be able to develop their talents better in the future.
- Learning can be improved by integrating experts from different environments with different expertise as teachers, including world leaders. Issues relating to learning to live as a responsible citizen with other people and in the society should be integrated among the learning objectives from early on.
- Technologies are expected to be highly integrated and present in the learners' lives and learning in the future, and therefore advanced skills and confidence will be required on the part of the teachers as well, to be able to apply them optimally in teaching.
- Teacher training should be a lifelong learning task and supported by school organisations. Teachers need to enhance their knowledge of students' learning needs and also develop their teaching methods through networking, observing and peer learning from other teachers.

4. KEY COMPETENCES IN 2025

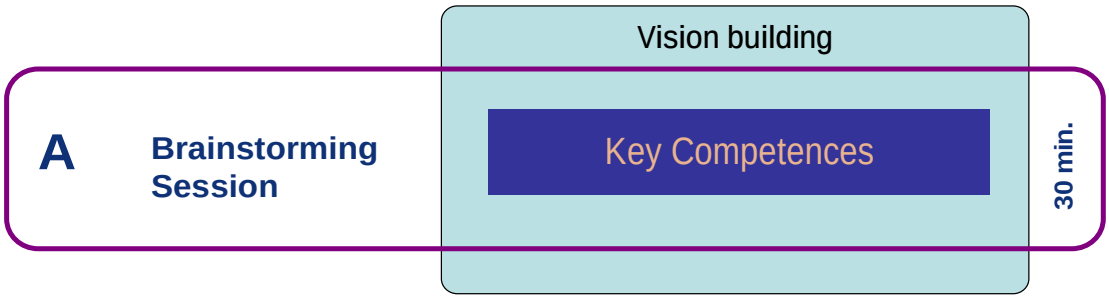
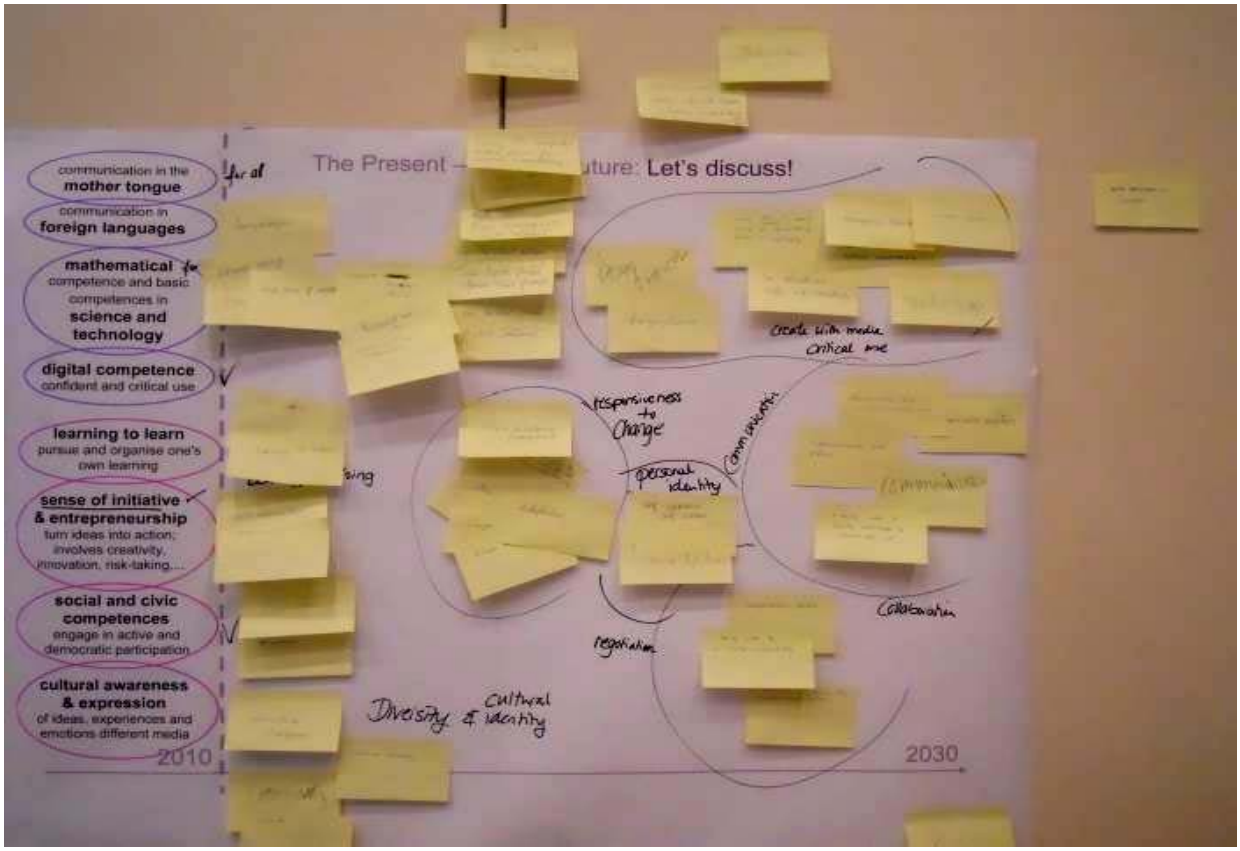


Figure 7: Structure of IPTS workshop 2, part A.

4.1 BRAINSTORMING METHODOLOGY



Poster 5: Key competences in 2025.

Workshop participants were asked to reflect on what they would consider the three most important key competences in the future, in 2025. Everyone was asked to write these three issues on separate post-its. Some participants asked for permission to write more than three, which was granted.

The post-its were collected and clustered on a common poster, following a topic oriented approach. For each topic that was mentioned, all post-its with related issues and aspects were first considered and posted, before a new issue was dealt with.

4.2 CURRENT AND FUTURE KEY COMPETENCES

After gathering all post-its, a previously concealed part of the poster was exposed, displaying the current set of key competences as defined by the European Parliament and the Council in 2006[5]. This European recommendation names eight Key Competences and several crosscutting skills as a reference framework, with a view to ensuring that initial education and training offers all young people the means to develop the key competences to a level that equips them for adult life, and which forms a basis for further learning and working life.

The discussion focused on a comparison of these currently recognised key competences with the future key competences as they were developed by participants in the brainstorming session, discussing, in particular, how key competences would/should change in the future to meet emerging skill needs. Figure 6 shows the current definition of key competences on the left and on the right related issues describing future competence needs as they were raised by participants in the brainstorming session.

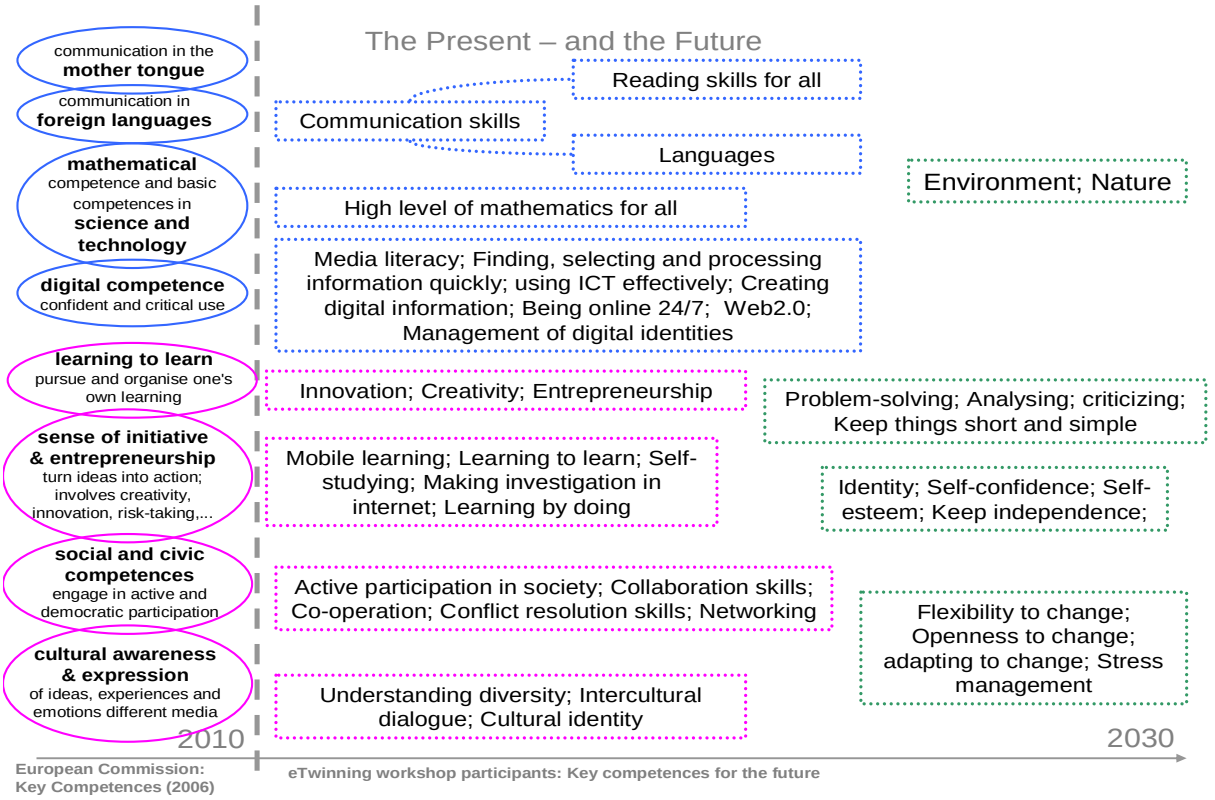


Figure 8: Key competences as defined now and as suggested by the audience for the future.

The similarity between the European Recommendation on Key Competences and the future competences emerging from the discussion was remarkable. Furthermore, the workshop participants discussed and suggested aspects that enrich the understanding of the aspects relating to the competences as they are defined now. For example, the description of Digital Competence was enriched by workshop participants, who suggested to consider also the emergence of new communication patterns, such as being constantly online and coming to terms with using different identities and communication tools in parallel.

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[5] European Parliament and the Council (2006). Recommendation of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning. Official Journal of the European Union, L394.

The workshop participants highlighted the increasing importance of transversal skills such as problem-solving, analytical thinking, critical skills and effective communication; attitudes such as flexibility, openness and self-management; personal skills such as self-confidence and independence, and societal awareness, as expressed in the need to respect nature and the environment. Many of these have been recognised also in the current Recommendation as important cross-cutting skills.

4.3 LESSONS LEARNT FROM THE DISCUSSION

Interestingly, all competences currently defined as key competences and as important cross-cutting skills in Europe were mentioned in the brainstorming session as being important for the future, thereby confirming their continuing importance and relevance. However, the discussion and the suggestions from the participants transcended and refined the current set of key competences, indicating how they could be modified to better meet future needs. The following issues were highlighted as being relevant in the future:

- Traditional basic competences, such as literacy and numeracy, but also digital competences, were considered to be important basic competences to be attained by all citizens. They were deemed important in order to avoid increasing divides and to enhance inclusion. Basic competence attainment should be guaranteed for all as a first priority and be the main building block for any further competence development.
- Communication skills, both in mother tongue and foreign languages are expected to become increasingly important in the future. However, participants emphasized that the focus of language acquisition should be on the ability to communicate effectively, rather than on grammatical correctness.
- Various skills relating to digital competence were considered to be crucial in the future, both for students of all ages and teachers. Among these, skills for critical, efficient and confident use of technologies, and for creating digital content were seen as particularly important.
- Transversal competences, such as learning to learn, innovativeness, creativity, reflection and collaboration skills were seen as becoming increasingly important. In particular, lifelong learning was expected to become the dominant form of knowledge acquisition, making it important for all citizens – and for teachers in particular – to be able to learn effectively in a continuous and self-directed fashion.
- Various social and civic skills were emphasised as becoming increasingly relevant in the future (together with digital competence), including, e.g. understanding cultural, social and individual differences and developing skills to collaborate and network effectively with people from different backgrounds and social spheres. These skills should be learned from early on.

Workshop participants furthermore suggested that the following crosscutting skills and competences will play an important role in the future. These have not been recognised in the current Recommendation, and should be considered as new elements when refining and developing the current set of key competences for lifelong learning to reflect future challenges:

- *Problem-solving, analysing and criticizing situations*, as well as the *ability to express oneself effectively by "keeping it short and simple"* were suggested as important future competences, relevant for all learners.
- *Responding to change* was considered as another new key competence. It was noted that this should not simply mean adapting to everything, but considering change, being

open to it, and negotiating and managing it so that one's identity is not lost with changes, but developed.

- *Identity* came up as a future key issue in various aspects, as an issue to be developed (self-confidence, self-esteem), a skill in digital environments (managing different identities), social and cultural aspect (cultural identity) and as an underlying skill for learning to learn (keeping independence).
- Experiencing and using *nature and the environment* in a responsible and holistic way was mentioned as a further key competence in the future.

4.4 MAIN MESSAGES FROM THE SESSION

- Participants spontaneously suggested key competences for the future that confirm the ongoing importance of the currently defined EU Key Competences. However, they raised many new crosscutting skills which can be exploited to further refine, scope and align current competence sets with future challenges.
- The discussions emphasised skills and competences relating to the following cross-cutting themes that relate to living and working with other people in a changing world:
    - *Establishing and developing oneself*: personal and cultural identity, self-esteem, skills and motivation to learn.
    - *Living and working with other people*: skills for communication, understanding diversity, collaborating with other people.
    - *Coping with change*: being critical and analytical, being open to change, adapting to change but at the same time managing it.
- Languages, mathematics and ICT were considered crucial tools for developing further competences. Therefore all citizens should be trained in these basic competences from early on in order to attain fluency in literacy, numeracy and digital tools, which enable them to become lifelong learners.

5. LEARNING OBJECTIVES AND ASSESSMENT IN 2025

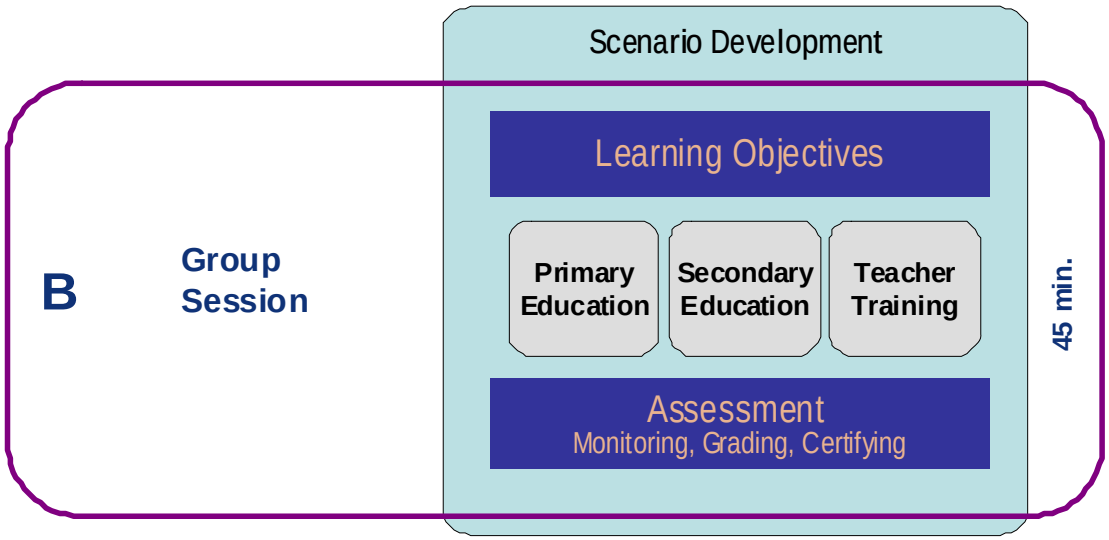


Figure 9: Structure of IPTS workshop 2, part B.

5.1 SCENARIO DEVELOPMENT METHODOLOGY

Five teams were formed, focusing on future learning objectives and assessment strategies at (a) primary school level (1 team); (b) secondary school level (2 teams) and for teacher training (2 teams). Again, each group task was illustrated using the personas of a six year old boy (Max), a sixteen year old girl (Emma) and a 52 year old biology teacher (Daniel). In each case the task was to identify (1) learning objectives in 2025 and (2) ways of assessing these in 2025.

Each team was asked to select the four most important competences together with corresponding assessment strategies for the assigned persona. Participants received individual paper sheets to write down their ideas and were encouraged to discuss these and note their findings on a poster. However, due to time constraints, the posters were compiled by the presenters on the basis of the group presentation.

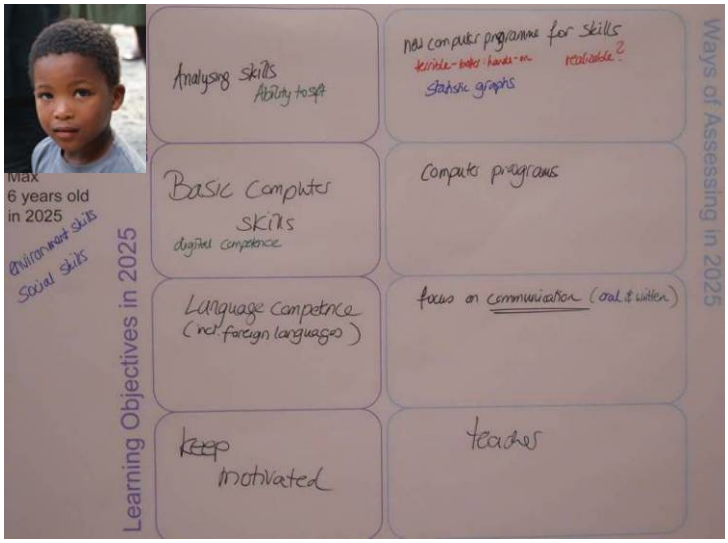
5.2 LEARNING OBJECTIVES AND ASSESSMENT STRATEGIES IN 2025

5.2.1 Max, 6 years old

For Max, it was considered important that he learns (not in order of importance):

- the basic computer skills of 2025;
- skills to find and analyse information, to find the truth from knowledge overload;
- native and foreign languages (assessing communication);
- how to stay motivated (assessed by teacher);
- social skills; and
- environmental skills.

It was suggested that, in particular, Max's digital skills could be assessed by developing suitable computer programmes. This raised disagreement and discussion, as it was pointed out that computer programmes may have mistakes, or not be able to assess everything correctly. If they do use them, students and teachers should be aware that there may be mistakes in the assessment and be prepared to point out and check unclear or suspicious situations.



Poster 6: Learning objectives and assessment in 2025 for Max.

5.2.2 Emma, 16 years old

Poster 7: Learning objectives and assessment in 2025 for Emma.

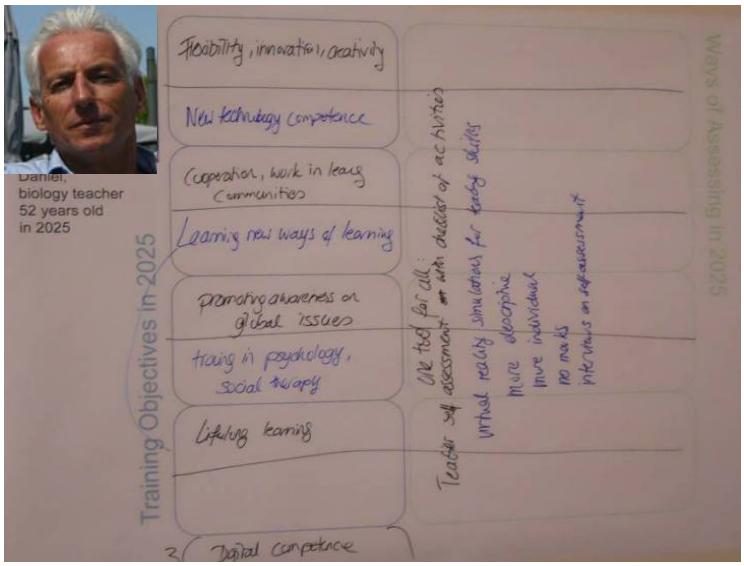
Emma also needs skills for communication in different languages and skills to use ICT efficiently for her purposes. In addition, it was seen as important for her to learn:

- to be social, negotiate, collaborate and know team working roles,
- analyse the world critically and convert information into knowledge,
- personal goal setting and learning-to-learn skills.

It was argued that young people do not necessarily know how to communicate well with other people, even though they can use communication technologies, chatting tools etc. It was suggested that both direct face-to-face communication and technologically-mediated interaction, focusing on social interaction aspects, should be used to improve their communication skills.

Regarding assessment strategies for Emma, it was considered crucial that, in 2025, these should cater for diversity in certification and learning needs. It is important to allow differentiation, and not insist that all learners are in the same group if some of them are able to learn faster. Therefore, assessment and learning objectives should not be too rigidly standardised but allow for flexibility and personalisation.

5.2.3 Daniel, a teacher



Poster 8: Teacher training objectives and assessment in 2025.

Digital competence and creating digital content were considered important for Daniel as well. Furthermore, he should learn:

- to be flexible, creative, innovative and prepared for change;
- to be autonomous and a lifelong learner;
- to collaborate and work in communities;
- profession-specific skills, such as psychology, new ways of learning, and promoting global issues.

It was emphasized that most of the learning objectives identified were applicable and relevant for any employee and worker in 2025, not only for teachers.

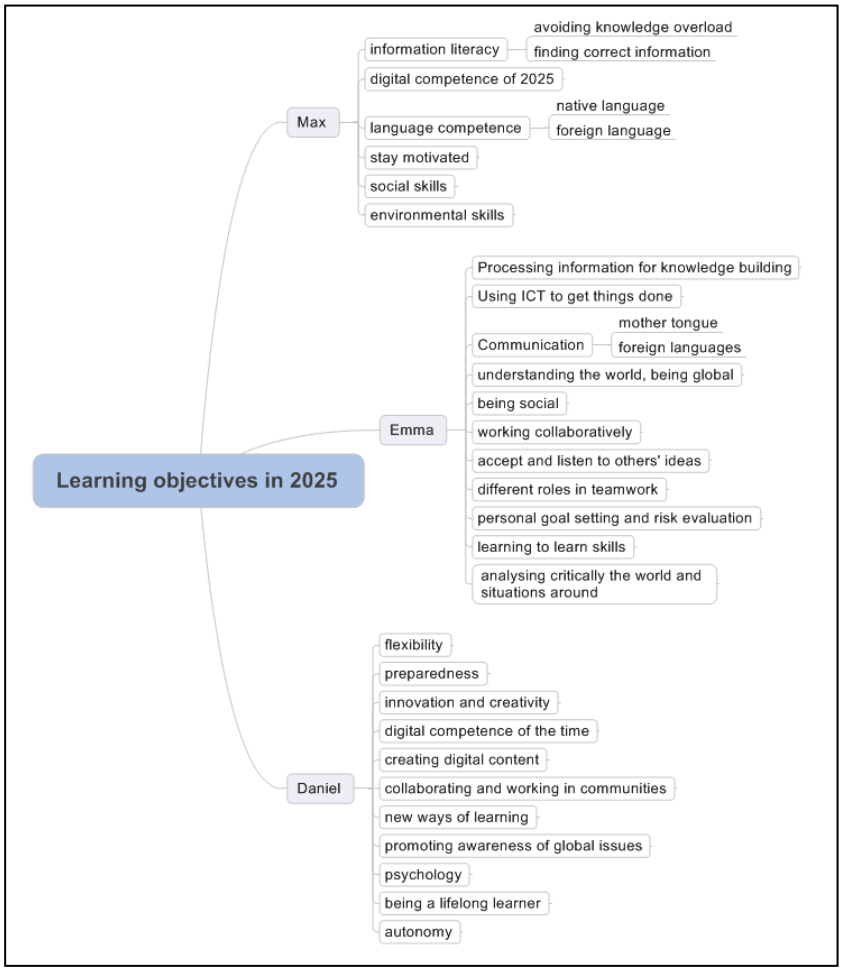
For assessing and supporting teachers' professional development, it was envisaged that schools in 2025 will have quality management systems which are based on teachers' self-assessments. Teachers will be provided with checklists for objectives and activities that they will self-assess for a yearly report. These could be complemented by interviews with the students and colleagues. Furthermore, specific teaching skills could be practiced and assessed with simulated situations in virtual reality.

5.3 SYNTHESIS OF THE DISCUSSION ON COMPETENCES AND THEIR ASSESSMENT

5.3.1 Learning objectives and competences in the future

Workshop participants pointed out that all the learning objectives and competences discussed during the session are already needed now, not only in 2025. Furthermore, it was stressed that children can already start to learn all the key competences, and that it is important to start learning them early. As seen above, learning objectives often addressed similar issues for all

learners. Mind map 5 summarizes the main learning needs for all three learner groups in 2025.



Mind map 5: Learning objectives and competences in 2025

Based on the results of the group work, the workshop participants considered the following competences as very important for 2025:

Digital competences. This includes the competence to efficiently, confidently and critically use the technologies of 2025 in an efficient and targeted way. Information skills, such as searching, sifting, organising, managing and evaluating information; judging the relevance and trustworthiness of sources and avoiding knowledge overload are considered a crucial part of future digital competences. Creating digital content was also considered important.

Communication. Both mother tongue fluency and competences in foreign languages are very important, but the emphasis will be on using them as a means for communication with other people, not on grammatical correctness per se.

Global citizenship. This is a versatile competence of understanding and being able to analyse the surrounding world, being social and part of the society, and assuming responsibility for taking care of the environment, also for future generations.

Learning to learn. Being motivated to pursue one's own learning progress and knowing how to process information, assigning meaning to it and converting it into knowledge, are important. People need to be able to set their own goals, strategies and evaluate risks. They need to live their lives as a continuous learning experience.

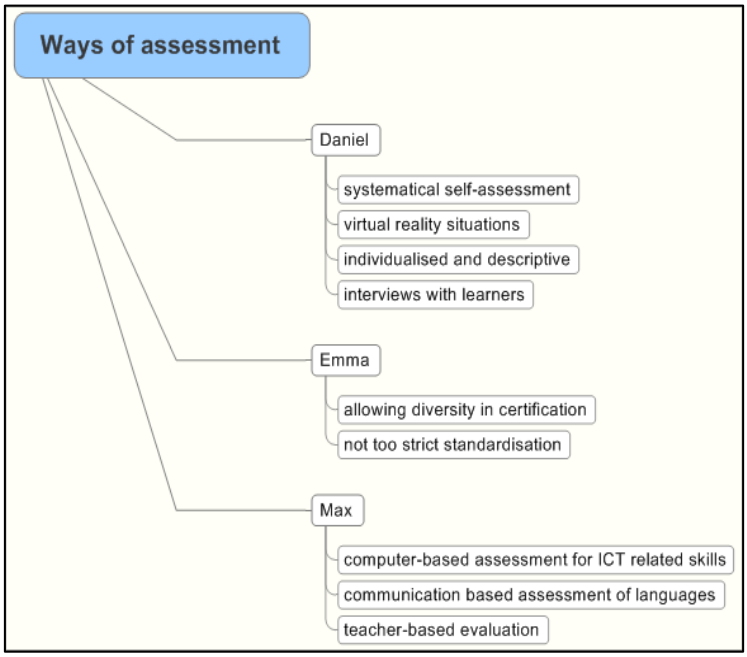
Working collaboratively. Collaboration was seen as a crucial skill that needs to be learned and practiced from early on in education, and remains an important form of working and interacting for all employees – including teachers. People need to learn to listen to others, negotiate and accept others' ideas, understand and work in different roles in teams, and participate in communities.

Continuous skills updating. All employees, and especially teachers, need to be committed to continuous updating of skills related to their work. They need to be prepared to do this in their initial training and supported during their working lives. This skill includes autonomy, lifelong learning, flexibility and preparedness for continuous change and development, innovation and creativity.

5.3.2 Assessment in the future

Assessment in 2025 was seen mainly as formative and personalised, i.e. as a tool which supports individual learning pathways and goals and helps individuals to more effectively reach (or adapt) their learning objectives. Personalisation is partly achieved through guided self-assessment practices, which are learned from early on. Qualitative formative assessment by trainers or with other parties involved in the learning and resulting working processes (customers, learners, colleagues) is an important tool to support adults' skills updating.

Competences and their assessment will focus on practical skills and abilities rather than abstract and theoretical knowledge. For example, the effective and efficient use of language for communication purposes will be more important than demonstrating grammatical perfection. Therefore assessment strategies for language acquisition will also concentrate on the former rather than the latter. ICT helps in practicing and assessing skills by creating virtual situations where competences can be applied in virtual reality situations and by providing software and tools that allow for personalised skills training and self-assessment. In general, assessment approaches need to be adapted to reflect the new ways of learning. Instead of assessing only factual knowledge they should aim to capture critical attitudes and skills, such as social and communication skills, analytical and critical thinking and problem solving.



Mind map 6: Ways of assessment in 2025.

5.4 MAIN MESSAGES FROM THE SESSION

- Digital competence was seen as a crucial learning objective (and a means for further learning) in the future. However, it was emphasised that the digital competence of 2025 may not coincide with what we are imagining now. It is very important to keep updating the understanding of the needs for digital fluency as the technologies and the ways society is using them are constantly changing and developing.
- Consideration of the environment and what is happening in the world was identified as an important learning objective at school. Pupils should learn to grow up as a part of society and to consider what takes place around them, thereby becoming responsible and independent global citizens.
- The discussion emphasised that current assessment approaches need to change in order to support new learning objectives. People need to learn self-assessment practices from early on, as these enable them to personalise their learning at school and to take responsibility for their own lifelong learning.

6. PLENARY DISCUSSION ON THE FUTURE OF LEARNING IN EUROPE

Figure 10: Audience at the final plenary discussion session

Yves Punie from IPTS opened the session with a presentation highlighting the changing trends in education and training in Europe and the rest of the world IPTS research on ICT for learning, creativity and innovation[6] has pointed to several changes taking place and the key role of ICT in creating both new challenges and new opportunities for learning.

The introductory presentation ended with two questions for the expert panel and the eTwinning conference participants: How are all these changes taking place? How can the desired changes in education be realised?

The expert panel consisted of three European experts:

- Marc Durando of European Schoolnet,
- Adam Pokorny of European Commission DG Education and Culture,
- Brian Holmes of European Commission DG EAC/Executive Agency.

Both the audience in the conference room and those following the discussion through web streaming could ask questions and make comments to the panel members. The discussion went back and forth around different topics relating to future of education and the important role of eTwinning in Europe. Instead of following the order of discussion, this section gives a structured account of the main messages raised during the session.

6.1 EDUCATION MUST CHANGE

Learning is already changing. It was argued that today, learning is starting to break out of the box. More and more learning is taking place outside organisations in social networks that are not part of the school system. Informal learning needs to be taken into account in education. Furthermore, the emphasis in learning is changing to active, collaborative, and learner-centred approaches. ICT and new ways of teaching are supporting constructivist learning approaches. As a result, the roles of the teacher and learner are already changing. However, the role of the teacher is not becoming any less essential. The teacher is needed as a guide who motivates and inspires students to learn. New teaching and learning strategies are developing though the interaction across different age groups, e.g. when exchanging knowledge about technologies and sharing stories about life and culture.

[6] See overview of the IPTS research on ICT for learning: http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html

Learning objectives need to change. It is important to consider what children are educated for. Currently the emphasis is on knowledge, facts and figures, whereas future learning objectives should, and will, change towards *knowing how*, instead of *knowing what*. It was argued that employers are asking for new skills and collaboration, whilst schools are assessing traditional subject-oriented knowledge. The importance of new skills has been recognised by industry: for example, the project started by Cisco, Intel and Microsoft (http://www.atc21s.org/) is assessing new skills for the 21st century. Learning about oneself and managing one's different identities is also important. This is also crucial for learning the safe and secure usage of ICT.

Assessment practices should change in education and training at all levels. It was noted that in higher education peer learning and collaborative learning and assessment are starting to be recognised and enforced. Students need to be trained in these practices at school in order to prepare them adequately for higher education and employment. However, it was argued that the current generation of teachers has not been trained in these skills, which makes it difficult for them to guide their learners towards employing self-assessment practices. Therefore, learning and assessment practices need to change not only in schools, but also in teacher training. Education policy cannot promote education based upon collaborative learning, with an emphasis on 'know how' rather than 'know why', focusing on the development of transversal skills, networked learning, etc., whilst maintaining assessment approaches that are based upon summative exams in physical locations that mainly test factual memory. Therefore, assessment approaches need to be adapted to reflect the new ways of learning.

6.2 ICT ARE CREATING AND IMPACTING CHANGE

Technologies provide access to knowledge and connections. It was pointed out that access to knowledge is not just accessing resources. ICT provides both access to information resources and access to networks (people), which is very important. ICT create new possibilities for meeting socially and for interacting with content in new ways. Although the face-to-face dimension remains important, through ICT people can have friends all over the world with similar interests and experiences, who they would not connect with otherwise.

Safe and responsible use of technologies is important. A member of the audience pointed out that although everything is more and more online, face-to-face contact is important and nothing can replace it. There needs to be a balance, which teachers should consider and also teach to students and parents. A trustworthy infrastructure and technologies to protect teachers and students must be ensured. New technologies for mobile, confident and secure usage need to be developed. However, also the reality outside schools should be taken into account. Restricting students from using their own technologies for education at school cannot be a solution, user security and responsibility need to be supported by providing skills for it.

Pedagogical use of ICT must be supported. Technologies for learning can be and have been used in a variety of ways. Before, the emphasis was on buying computers, without considering maintenance or teacher training. Now it is understood that these are important in order to make effective use of the possibilities of ICT for learning. In the discussion it was suggested that it is not necessarily a good idea to give a laptop to every child; it might prove more effective, from a learning point of view, to give one laptop to a group of children. Financial constraints have affected ICT investment in education and training and this was seen as problematic, illustrated by the fact that, in some countries, ICT advisors have been the first to lose their jobs in the context of crisis.

6.3 TEACHERS NEED SUPPORT

Professional development needs to be embedded into daily work. Teachers have a great need to learn to use ICT and to use ICT in innovative ways to effectively support learning processes. A recent OECD study[7] shows that much more professional development is happening among teachers than had been expected. However, traditional teacher training is not necessarily the most effective. When individual teachers go on an external training course and then come back to school, they are not necessarily able to implement and develop what they learned. A better form of professional training would be to base training courses at the school, in collaboration with networks, as a part of daily practice. Hence, eTwinning can be a means of effectively supporting teachers' professional development.

Developing teachers' e-confidence is crucial. In 20 years time, technology will be cheap, easy and invisible. Teachers are at the centre of the educational processes and need to be prepared to use technologies. Currently, teachers often do not trust the technology to work in their school and have not learned to use it. As a result, they are worried about planning to use it in class, or for meetings, etc. Although there have been massive investments in the equipment, there often has not been enough support for teachers.

Innovative teachers need support in their work environment. A member of the audience pointed out that innovative teachers are often in a difficult position in their working environment. Other teachers may not want to take on board innovations that challenge their beliefs, routine and professional expertise. Furthermore, discussing this with school leaders may be difficult in cases where, for example, the school director himself does not even know how to find the school web page. It was argued that changes need to be driven by good leadership. It is very important that the head teachers keep themselves informed and collaborate with teachers on new developments and possibilities, for example through networks such as the eTwinning network.

Creating incentives for innovation: Teachers who experiment with innovative teaching practices and lead the way for others to follow should receive some acknowledgement for their effort and engagement. This reward does not necessarily have to be monetary but can be linked to career advancement. Case studies in the eTwinning network are showing that teachers want and need both formal and informal recognition. The latter can be addressed through the community but the former needs a more official structure.

6.4 ORGANIZATIONAL CHANGE IS REQUIRED

Schools and systems have to enable innovation. The discussion emphasized several times that schools are not the only places where learning takes place –it takes place everywhere. It is a great challenge for educational systems to adjust to this reality. Critical challenges include developing assessment, curricula, and cross-curricula approaches for 21st century skills, such as learning to learn. To do this, innovation is needed in a variety of areas, not just at one point of the process. Schools can only become innovative, if innovation is a key element in the evolution and transformation of the education and training system. On the first day of the conference, Stephen Heppell showed in his keynote speech examples of how there can be innovation even in the ways schools are built.

There needs to be a holistic view on innovation and change. It was argued that the most important changes to education and training are happening at home, not at school. Children spend only 20% of their time in school, and the rest of it at home and in the community.

[7] http://www.oecd.org/edu/talis

Therefore, it is important to establish cooperation with parents. Innovation becomes systematic only if all the actors are involved, and there is a holistic approach to the whole system of education and the context in which learning takes place.

Change from mainstreaming to networking. There are fewer and fewer national policies for schools, as education systems are going towards more autonomy at regional and local levels. Schools are encouraged to develop their profiles more freely, not governed by laws, but collaborating in networks. Therefore, instead of mainstreaming good practice, good practices will be exchanged in networks. Experimentation and knowledge exchange will drive innovation. Teachers who are participating in eTwinning are, for example, already using technologies in different ways, without any new regulation being put in place, and are spreading their experiences through the eTwinning network, encouraging other teachers and schools to follow in their footsteps.

6.5 POLICIES SHOULD BETTER LINK WITH PRACTICE

Different levels of actors should be brought together. Making systems change is difficult, slow, and often frustrating for some of the actors. Future visions are often out of touch with the real world and for this reason it is important to involve teachers, policymakers, and all actors in transforming education and training to address the challenges of the 21st century. Developing new practices bottom-up often works better than dictating them top-down. It is important to find effective ways to convert successful experiments to mainstream practice. Although school education is under the exclusive authority of Member States, the Commission can help Member States by collecting good practices.

Networking at European level is important for accelerating change. It was pointed out that although eTwinning is a Community of Practice, it is not representative of a typical teacher community in Europe. Systems are moving slowly, and there is a big gap between national systems and European guidelines. It is important to address at European level the development of national education and training systems, and monitor and assist those who are lagging behind. It was pointed out that there are strategies available at the European level, that aim to help in accelerating change. For example, European peer learning activities[8] gather representatives of different countries to find and transfer good examples and practices.

Funding should be targeted to enable change effectively. Availability of funding is a big factor impacting investment in equipment and staff. To facilitate the necessary pedagogical transformation, investment in staff development and teacher training is needed. The poorer countries and regions especially need support from the European Union. It was pointed out that European Commission is preparing a new strategy for the priorities for the next 10 years, and education plays a bigger part than before. Furthermore, the new Lifelong Learning programme for 2014-2020 is under discussion at the moment. It is important to make proposals now and submit ideas on how to best invest the funds.

6.6 ETWINNING IS ALREADY MAKING A DIFFERENCE

eTwinning is an effective Community of Practice. Several comments during the session emphasised that eTwinning is a very good example of a Community of Practice, helping teachers to be equipped with tools and strategies to facilitate change and supporting their professional development. It enables developing and sharing new pedagogies, to identify what is working, and makes it possible for all the teachers to be part of the changes in the future..

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[8] http://ec.europa.eu/education/lifelong-learning-policy/doc32_en.htm

eTwinning could be linked and embedded more. When asked about challenges and problems in eTwinning, the audience had a few suggestions. The need for a more global approach was considered a challenge, as Europe is only a small part of the world. It was suggested that eTwinning could integrate other social networks, e.g. by establishing interconnections between eTwinning and Facebook etc. The new "eTwinning groups" platform will be an important change and development for eTwinning. It is crucial that participants experience eTwinning as giving value to their everyday work, and making this value more visible is important. It was suggested that eTwinning should be embedded in the curriculum, which would get teachers involved and engaged in it.

eTwinning can shape its own future. Initially, eTwinning started as a platform for projects between schools, but is has since developed into a social network for the teachers of Europe. eTwinning is now established and valued and should be developing its future and offering ideas on how to best support teachers and practices. An eTwinning group to discuss the future of eTwinning collectively was suggested. Initially, the conference Twinspace could be used to start the discussion.

eTwinning can impact policy and curriculum development. Some countries such as Spain, Poland and Estonia have taken eTwinning and embedded it into their policies for both general education and education with an ICT focus (or, as in the case of Spain, encouraged their autonomous communities to do so). In these cases, eTwinning has had a remarkable impact on teaching practices and other important aspects such as the continuing professional development of teachers.

eTwinning can drive innovation. To encourage innovation in education, organisational change is needed. eTwinning, as an effective Community of Practice, has shown it can facilitate organisational change and prepare the ground for innovation in learning and teaching. However, at the moment, we are faced with isolated islands of innovation. To make the actions of pioneer teachers in eTwinning and in other innovative pilots systematic and sustainable, teachers need to be further supported and empowered.

7. CONCLUSIONS ON LEARNING AND EDUCATION IN 2025

Figure 11: Illustration of the terms used in the plenary discussion (created with http://www.wordle.net/).

The workshop and discussion sessions gave interesting insights into the teachers' views on the future of learning and the development needs for school education, today and in the future. It must be noted that teachers participating in the IPTS workshops were not a representative sample of all European teachers, as they are the ones who are already participating in European wide ICT-based networking and who are interested in innovative learning activities and projects through eTwinning. However, the bias of the sample is not a limitation, but a strength. As it turned out, the teachers consulted in this exercise were extremely knowledgeable, reflective and critical of current developments in educational policy and practice. These observations confirm that the teachers consulted can, in fact, be considered experts in the future of school education in Europe. The aspects brought up and discussed during the observed consultation sessions point towards the following major areas of change in the future:

Re-considering key competences for 21st century. Several key competences were recognised by the European Parliament and Council in 2006,[9] and it is considered that all of these will still be relevant in 2025. However, not all of them are supported by current educational systems, and new skills and competences relevant in the 21st Century will emerge. Skills for analysing, being critical, solving problems, learning, collaborating, negotiating and innovating were seen as important basic skills. Developing and managing one's personality and identity is becoming a new key competence, as is considering environmental aspects and understanding one's place in the world and society. Most importantly, everybody needs to learn to be prepared to change and respond to it with lifelong personal and professional learning and training.

Ensuring up to date digital and information competence for all. One of the major changes raised in all the conference discussions was the way in which technologies are shaping, changing and enabling new ways of accessing, understanding, doing and creating things. It is crucial that all learners, teachers, workers and citizens have the necessary skills to confidently, efficiently and critically use technologies to achieve their objectives. Technologies are also important for finding, filtering, processing and managing information,

[9] Communication in the mother tongue; Communication in foreign languages; Mathematical competence and basic competences in science and technology; Digital competence; Social and civic competences; Sense of initiative and entrepreneurship; Cultural awareness and expression; Learning to learn.

which are crucial skills for everyone. As the tools and their uses continue to develop, it is important that teachers constantly update their technological skills and means for learning.

Supporting learner-centred, personalised lifelong learning. It was emphasised by the session participants that education and training learning strategies should be more tailored and personalised. Learning should be a journey that starts very early in life, keeps learners motivated throughout their childhood and adolescence and enables them to create and pursue their individual learning journeys in their adult lives. Therefore, learning approaches need to allow people to develop their talents according to their personal progress and educational practices should not be too strictly standardised. Various ways and sources of learning should be provided and supported so that people can create their personal learning journeys, take responsibility for their own learning goals and reach them.

Promoting active learning in the interface of life, school, work and the community. The school of the future is envisaged as having no physical or virtual boundaries. Actors at schools will collaborate within the school, with other schools, parents, and the local community, taking into account global aspects as well. Learning will take place in various active, student-centred and constructive ways, which promote learning by doing and experiencing through tasks and people will not only acquire information but also practical skills and competences. Learning will be motivating as it will be connected to nature and real life, and take place through social interaction with relevant actors and other learners.

Revising and developing teacher training and skills updating. Before the major changes described above can take place, teachers also need to become lifelong learners who update their own skills and practices in order to enable changes in education. They need to be supported to assimilate new ways of learning and teaching, assessing, facilitating and moderating during their initial education and in-service training, through their own experience and practice and through good role models. Teacher training should be embedded in their daily work and supported by continuous mentoring and networking, so that teachers can share and learn from each others' experiences. At the same time, initial teacher training has to change radically, so that all European teachers are equipped with a forward looking vision towards education. Otherwise the next generation of teachers will be further behind at the start of their careers. However, all this is possible only if educational systems and school working environments are supportive of these changes.

Organisational change in educational systems is required to make the new developments possible. The development of new forms of curricula, assessment approaches and networking is especially important. Experimentation is necessary to find practices that work, and it is crucial to find ways to share, make visible and learnable the results and good examples found. Both, top-down and bottom-up approaches are needed in order to make changes happen. Innovation should be enabled and encouraged by supportive funding and policies which facilitate the monitoring and dissemination of good practice. Assessment approaches need to be adapted to reflect the new ways of learning.

The eTwinning community can have an important role in contributing to future learning in Europe. As a unique platform gathering together more than 80,000 European teachers, it can, through networking and discussion, give concrete suggestions and ideas from key stakeholders in the educational field to educational policymakers. As illustrated by countries such as Spain, Poland and Estonia, eTwinning can have an impact on policy and curriculum development and foster the continuing professional development of teachers, thus contributing to preparing European schools for the future of learning.

ANNEX 1: KEY CHANGES TO EDUCATION BY 2025

Individual responses of workshop participants in the first brainstorming session (cf. chapter 2) continuing the sentence "*The three most important changes to Education in 20 years' time will be*:…". In total 17 contributions were collected, each containing at least three proposals, some containing four or five. Statements are displayed randomly.

- Technology: digitalised textbooks and use of ICT on daily basis
- Knowledge: More process and skills-oriented, less content-based
- Role: teacher → moderator
- Online learning, opportunities to study elsewhere
- Global, not national
- ICT in education
- The development of educational systems where students are encouraged to think for themselves
- The promotion of values like respect and tolerance of diversity and other people's thoughts
- All educational systems in Europe to bring elitist programmes to lower social classes at risk of exclusion;
- Must be globalised in diversity
- Open classes
- Learning by doing
- Real social learning
- How to select schools and who does it?
- Organise a better life inside the schools - during breaks, why can't we all be together (teachers and students)?
- Reduce the separation between parents and their children, they must start talking to each other again.
- Students will make their own knowledge
- Teachers as facilitators of learning
- Schools without boundaries
- Virtual learning space will be more important than school building / real space in formal education
- The distinction between roles in the learning process will be less defined. Who teaches who?
- The most important school "subject" will be information 'studies': how to access, select, handle, share, build a strategy with…
- Access to information -- teachers are no longer the owners
- Role of teachers -- provider of tools on how to process information + tools on how to build knowledge
- More stress on shared building of knowledge -- learning more cooperative among peers, less individual
- Consolidation of ICT as a means of education and learning both in schools and places
- As a consequence of the consolidation of ICT as a means of learning, the consolidation of learning communities (international, local…)
- Mobility of both students and teachers as part of learning at earlier stages
- There will be more use of ICT and internet in the future
- Students have to learn how they choose sources and how they can learn by themselves

- Students should focus on their own culture and also compare it to other cultures from other countries (intercultural)
- Individual and social at same time (interests, special needs, modular vs. team work, projects, collaborative)
- More informal learning (hobbies, arts, music, sport), all talents important
- Portfolio and process evaluation, skills and competences important.
- New balance between content and competences
- They way information is available and reaches us/students
- The position of the teacher -- a coach instead of an expert
- High-tech educational environments, where the challenge is that more talented students use the ICT and less talented students prefer actual social life
- Truly and completely student-centred
- Teacher's role is going to be more active, leadership
- Classrooms are going to be virtual.
- Individual, adapted to the individual's progress (tailor-made), home-based and connected to the web
- Interactive, pro-active, ask/answer-based, equality
- Experimental, inventive, practical, task-driven, learning by doing
- Teacher moderator
- More technologies at schools
- Learning how to learn more than what to learn
- e-learning
- More technology in school (many teacher do not know how to use all the new tools)
- Change of roles -- both the student's role and the teacher's, also the idea of what a class is will change
- Students will be educated in fewer subjects and go deeper into a few subjects earlier
- Each learner uses his own laptop in the classroom (a perfect iPad)
- The internet is available everywhere for a quite low price or for free
- The computer skills of all teachers have to increase.
- Individuality
- Motivation of the learners to learn, challenge to motivate the learners
- How to read, how the world of the pupils can be integrated into the school
- Globalization

ANNEX 2: FUTURE KEY COMPETENCES

Individual input by workshop participants in the second brainstorming session (cf. Chapter 4) responding to the following prompt: "What will be the most important skills, the key competences people will need in 15 to 20 years' time?" Answers were noted on post-its. In total 53 separate post-its were collected.

- For pre-school children: Access Internet
- For pre-school children: Take digital photos from their friends
- Digital Competence
- Using the computer/mobile phone for nearly everything
- Using ICT effectively
- For Pre-school children: Find ideas, Make investigation in internet
- Learning to learn
- Self-studying
- Responsibility for environment
- Environment care competence
- Nature awareness always
- High level of maths
- Languages (e.g. Chinese)
- Language literacy
- Languages
- Stress resistance / management
- Adaptation
- Adapt to change
- Change orientation
- Flexibility skills
- Teacher has to be open-minded and always be ready to adapt himself to the constantly changing world context.
- Analyse/criticise
- Being critical
- Assessing, evaluating, sifting information
- Media wise
- Information processing
- Managing knowledge
- Be selective with information
- Being able to select sources of relevant information and process it critically
- Communicative competence
- Being able to build knowledge and communicate it
- Communication
- Communicate with others
- Communication skills and conflict resolution skills
- Learning by doing
- Self-confidence, self-esteem
- KISS -- keep it short and simple
- Distantiation
- Teachers will have internet classes from home and will be online 24/7

- Mobile learning web3.0 -- single applications
- Active participant in society
- Being able to work cooperatively
- Cooperation skills
- Collaborative work between the different subjects' teachers
- Networking
- Collaboration
- Entrepreneurship
- Problem solving
- Intercultural dialogue
- Creativity
- Innovate
- Embrace diversity
- Very high level of self-confidence and self-esteem from a sense of rootedness in community
- First language super literacy for all
- Very high level of maths for all pupils.

European Commission

JRC 59775 – Joint Research Centre – Institute for Prospective Technological Studies

Title: The Future of Learning: European Teachers' Visions. Report on a foresight consultation at the 2010 eTwinning Conference, Sevilla, 5-7 February 2010

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Luxembourg: Publications Office of the European Union

2010

JRC Technical Notes

Abstract

Teachers are major stakeholders in the field or learning. However, they are rarely consulted when thinking about the future challenges and changes for education and training. To change this, IPTS took the opportunity to develop and discuss visions on the future of learning with teachers during the yearly eTwinning conference in February, 2010, in Seville. This report presents the outcomes of the consultation sessions, describing the views of the participating teachers on the future of learning and teaching.

The findings of this consultation process confirm the need to innovate and modernise school education to adequately prepare students for their future. Participating teachers foresaw that in 15 years' time learning objectives will focus on competences rather than knowledge; learning will be more tailored to the needs of individuals and will be more active and connected to real life. Technologies will be an integral part of learning, work and life and teachers themselves will have become lifelong learners.

During the conference sessions, the following challenges were recognised for the European education and training systems to consider and address in order to develop future school learning. Firstly, school education must change to better respond to the needs of the economy and society. Secondly, ICT is creating and impacting change in learning, but more knowledge must be developed about its effective implementation. Additionally, teachers must be encouraged and supported to be part of implementing the change. Organizational change is also required to allow and encourage innovation in educational systems. Finally, policies should be better linked with developing educational practices.

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