



**RECOMMENDATIONS
AND GUIDELINES FOR
REGIONAL POLICY MAKERS**

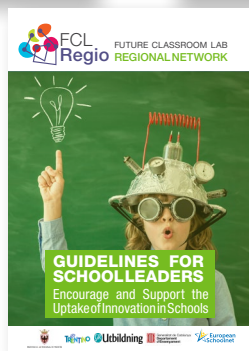
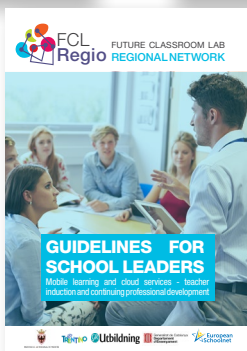
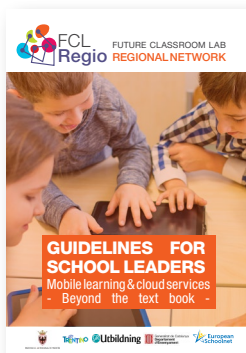
Mobile learning and cloud services – Encourage
and Support the Uptake of Innovation in Schools



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1. Executive Summary

The Future Classroom Lab Regional Network (FCL Regio) brings together local and regional authorities to explore opportunities and challenges related to the innovative and meaningful integration of ICT schools, focusing particularly on mobile learning and cloud computing.

In its third year, the FCL Regio project has focused on identifying policies carried out at regional level to encourage the uptake and the systematic embedding of innovative teaching and learning practices at the level of schools. The following key questions were the focus of interest and the focus point of the work developed during this year:

- **What does it take to encourage the initial uptake of innovation in schools?**
- **How can we further support innovation so it can become sustainable and long lasting?**
- **How can one best support whole school use of ICT?**

The research has looked into the elements that are of paramount importance in creating the best environment that will foster innovation. The analysis has considered not only classrooms and teachers as main factors to this end, but also schools and students, communities and parents, institutions and policy makers, economies and companies.

During a face-to-face consultation with all project partners and associate partners in April 2018, FCL Regio has identified some key elements of innovation. On the basis of this first consensus on what makes education innovative, the project then carried out desk research and further online consultations, leading to the formulation of a number of recommendations for policy makers that are summarised below.

RECOMMENDATIONS

RECOMMENDATION 1: Develop a well-articulated innovation agenda encouraging the involvement of a wide-range of stakeholders for the progressive take up of innovation.



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of schools.

RECOMMENDATION 2: Promote the creation of formal and non-formal networks of schools and teachers and encourage participation.

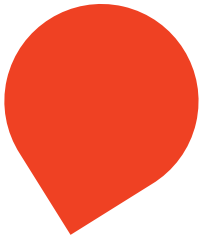
RECOMMENDATION 3: Encourage peer to peer learning and sharing the results of the innovation happening in schools.

RECOMMENDATION 4: Ensure e-safety and ethical use of ICT in schools by providing technical solutions as well as by empowering and supporting headmasters and teachers.

RECOMMENDATION 5: Encourage learning anywhere anytime including by using ICT to facilitate access to learning in both formal and non-formal educational settings.

RECOMMENDATION 6: Promote the proactive engagement of students, encouraging the shift from consumers of technology to creators and to contributors.

RECOMMENDATION 7: Establish a strategy and action plan for the development of learning and teaching spaces with a holistic school community involvement.

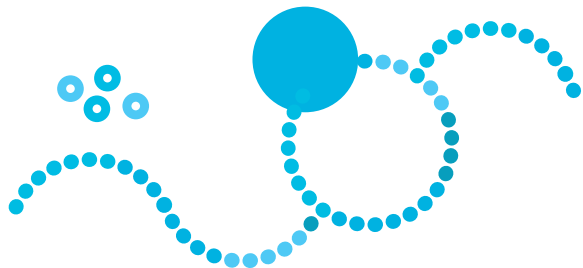


2. The Future Classroom Lab Regional Network project

The Future Classroom Lab Regional Network project (FCL Regio), funded by the Erasmus+ programme and coordinated by the Autonomous Province of Trento and European Schoolnet, is providing new opportunities for regional educational authorities to explore common challenges related to the integration and mainstreaming of ICT in schools. This project includes local authorities from three regions in Europe (Catalonia, Gothenburg and Trento) that are at the forefront of making innovative use of ICT. The project supports ICT integration in teaching and learning, and aims to:

- Strengthen cooperation between decision makers developing and implementing ICT strategies for schools working at national and regional levels based on an exchange of practices and joint projects related to the use of mobile devices and the development of cloud services;
- Showcase innovative classroom practice in regions and produce strategic guidelines for those attempting to mainstream ICT in schools, particularly related to pedagogical scenarios involving mobile devices and K-12 learning cloud services;
- Provide practical guidelines, recommendations, resources and other support materials for head teachers and school leaders developing strategies for whole school use of mobile devices and cloud services.

In the first year of the project, FCL Regio partners focused on how regions are responding to developing, accessing and using digital educational resources. For this purpose, they published a report designed to inform and provide advice to decision makers developing regional and national ICT strategies. In the second year of the project, the consortium focused on continuing professional development and induction programmes for teachers in the use of technology for educational purposes. During this third year of activity, the consortium decided to investigate how regions can better encourage and support the uptake of innovation in all schools. A number of reports, studies, projects and pilots, summarised below, have provided the context for discussions within the project, and have also contributed to formulating and revising the recommendations being made in this document.

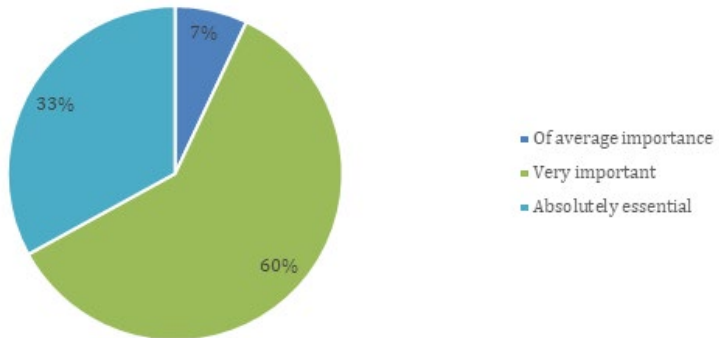


3. Regional perspectives, priorities and challenges

During the third year of the project, European Schoolnet together with the consortium's partners, developed an online questionnaire and conducted interviews with regional decision makers regarding the issues of both piloting and then mainstreaming innovative pedagogical practices in schools. The main challenges and enablers of adopting new pedagogies, integrating ICT for learning and designing flexible learning spaces, were some of the main topics investigated through the survey and the interviews. Eighteen regional representatives from 13 different regions and 10 different countries responded to the survey and expressed their perspectives and practices related to the topic.

The survey highlighted that innovative learning and teaching are connected with the use of ICT. This is why regional educational strategies are increasingly focused on: ICT as a mean to bridge the gap between schools and society; student-centred learning via the use of a wide range of technologies; and on open educational resources and digital education.

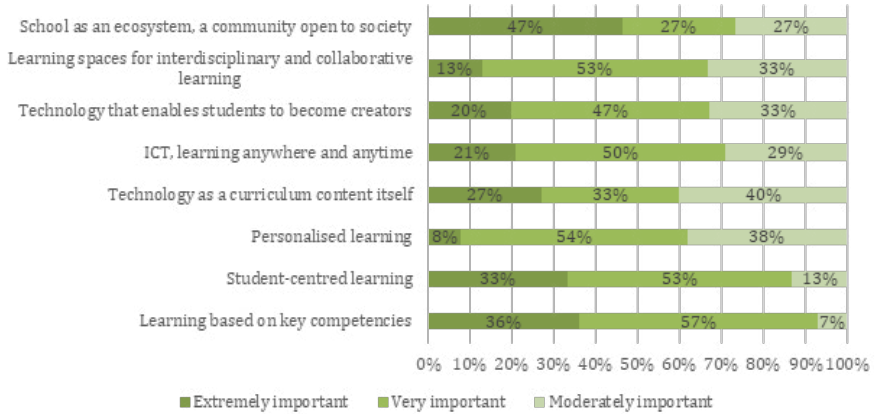
How important is the connection between the innovative learning and teaching and the use of ICT?



Understanding schools as an ecosystem and a community open to society is the most important element for regions (47% of respondents rated it as extremely important). Regions also tend to believe that learning based on key competencies is quite a crucial element in their educational strategies (36%) and they see student-centred learning as extremely (33%) or very important (53%) elements. The importance of individual learning using Information and Communication Technology (ICT) and learning spaces for interdisciplinary and collaborative learning, are also considered important elements for the regional participants. Personalised learning is considered an important or extremely important element by the majority of the participants (62%), but there is also

a significant percentage of respondents that find it of moderate importance in their regions (38%). The respondents tend to underline the importance of using technology that enables students to become creators (67%), but a number of respondents also mark this element as moderately important (33%).

How important are the following elements in your region?

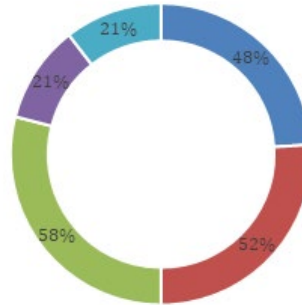


Regarding the adoption of new pedagogies, regions tend to believe that the type of final assessment and the fact that it does not focus on assessing student competences is one of the main challenges currently faced by regions (58%). The lack of vision by policy makers about innovation in education and the traditional approach to didactics and teacher training, is also considered as a significant challenge (52%). Teachers lack of competence and confidence when using ICT is also considered as a paramount challenge encountered in the regions (48%). Participants also mention the lack of training (21%) and the lack of leadership skills by school leaders (21%) as relevant factors. As a way to support the adoption of new pedagogies in schools, regions suggest that a greater focus should be placed on: the creation of informal, professional networks that encourage new teaching and learning approaches; training of teachers on new pedagogies and recognition and certifications systems for trainees.



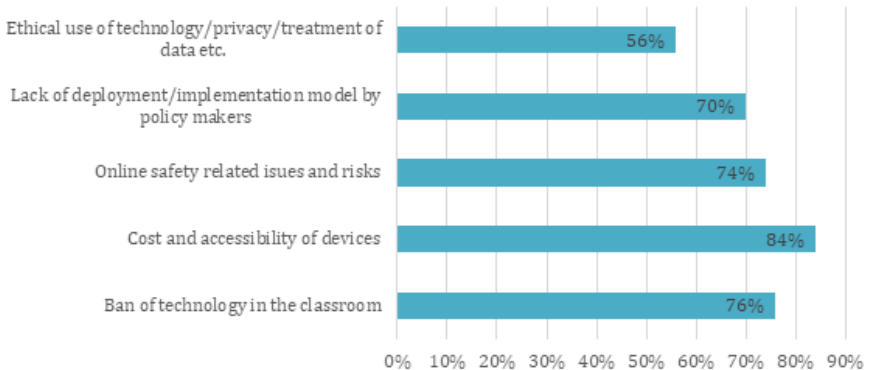
What are the main challenges the schools in your region encounter when trying to adopt new pedagogies?

- Lack of competence and confidence by the teachers
- Lack of vision by policy makers
- The type of final assessment
- Lack of training
- Lack of leadership skills by school leaders



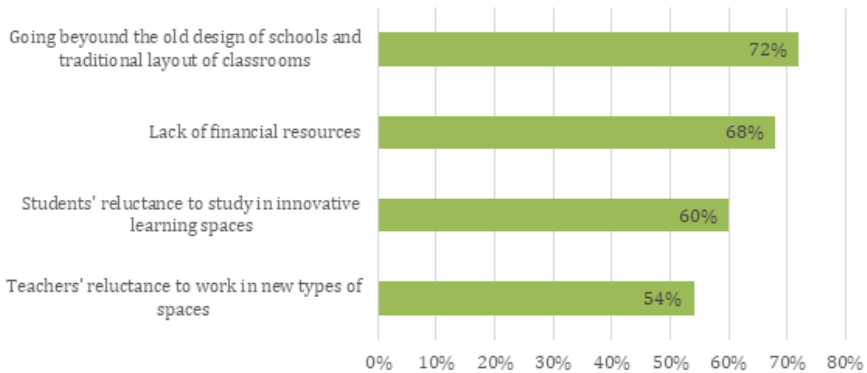
When asked about which are the main challenges regions encounter when trying to use technology in the classroom, cost and accessibility of devices appears as the most important factor (84%). For 76% of the participants, the ban on using some technologies in the classroom (e.g. smartphones) constitutes an additional challenge created by national educational policies. The lack of deployment/implementation models by policy makers (70%) and the online safety related issues and risks (74%) seem to be also of high importance for the regions. The ethical use of technology concerning the privacy and the treatment of data is identified as a challenge when using technology in the classroom by almost half of the respondents (56%). Lack of openness toward improvement and innovation, teachers’ attitudes and lack of appropriate training were also identified as challenges. To facilitate the use of technology in classrooms, participants believe that training and financial support is essential.

What are the main challenges the schools in your region encounter when trying to use technology in the classroom?



Concerning the design of innovative learning spaces and the main challenges related to this, the participants were mainly concerned about the attitude and the effort needed to go beyond the traditional school and classroom setting (72%). A majority of respondents also consider the lack of financial resources to be a significant challenge (68%), as well as the students' reluctance to study in innovative learning spaces (60%). Almost one out of two respondents recognize teachers' reluctance to work in innovative spaces is a challenge (54%). Respondents have also underlined the difficulty of persuading various stakeholders to be open in considering more innovative school designs and classroom layouts. In order to ensure that regions will be able to support the design of innovative schools and flexible learning spaces, participants think that contracting architects must develop initially a strategy based on actual analysis of stakeholder needs. This analysis would properly reflect the new demands and expectations that different stakeholders (teachers, students, parents, community organizations) have linked to learning in and out of school, including the role increasingly played by ICT.

What are the main challenges the schools in your region encounter when trying to design innovative learning spaces?



Regions have developed various initiatives regarding these topics. In Catalonia, [mSchools EduHack](#) is a large-scale co-creative process for school teachers that connects, inspires and allows the educational community to develop innovative classroom experiences for all levels and subjects, integrating the use of digital technology. OBSERVA_ACTION, a program developed by the Department of Education of Castilla Y León, has highlighted the benefits of job shadowing other teachers in neighbouring schools as an effective form of training for all teachers, and particularly for newly qualified teachers. The “Digital Animators Community” in Trentino in Italy, encourages teachers to collaborate, share and learn together by organizing training sessions for their colleagues and developing sustainable methodological

and technological solutions to help spread innovation within the school. In the Öckerö islands in the Gothenburg region in Sweden, the training programme SIKTA addresses both teachers and school leaders. The training consists of how to use different digital tools, depending on the current level of the teachers, and in addition the ways we can reflect when incorporating different digital tools in teaching. In Galicia there are several programmes for students within the Edudixital 2020 strategy that aim to develop high ICT competences among students, mainly relating STEM topics.

These include: STEM challenges, where 6 prizes of 2.000€ each are awarded in three areas (robotics, coding and 3D printing) at 2 levels; after-school clubs (30 schools participating, 70 new schools joining this year); and STEM weeks (both in Galician and English) for students ranging from 5th to 8th grade.



4. Define innovation to embrace it

Before investigating policies and ways to mainstream and support innovation in schools, we think it essential to first agree on a general definition of innovation in education, and to define what are exactly the key elements that are reflected in innovative pedagogical practice, including teaching and learning that make use of new technologies in the classroom.

According to the consortium:

“Innovation in education is a sustainable improvement process that positively affects the ecosystem, the content and the results of learning.”

Innovation is usually defined as a dynamic process that: requires effective communication, a climate of trust, provides rewards for those involved, and where the stakeholders have high levels of energy and the relevant skills to implement new methods. Educational innovation is seen as part of innovation in economies and societies and could help enhance equity in the access to and use of education.

Technology-supported innovation is a key component of the FCL Regio’s activities. According to Kozma (2003)¹,

“ICT-supported innovation in education is defined as pedagogical solutions and means supporting a shift from traditional paradigms towards emerging pedagogical approaches based on our current understanding of learning, such as fostering learner-centred and constructivist processes, and the acquisition of lifelong learning skills.”

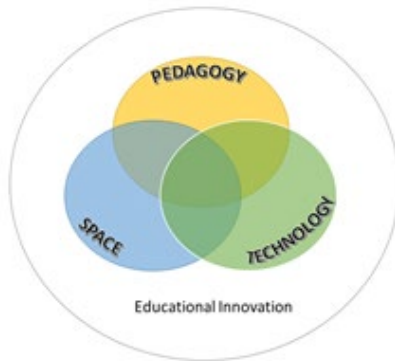
Innovation is not a single achievement, but a process of positive improvement. It is achieved not with the adoption of a research breakthrough by an institute or an organisation, but when excellence is widely communicated, disseminated and implemented. Innovation in education must be inclusive, structural and long lasting; each student should benefit from it.



1 Kozma, R. B. (2003), Technology, Innovation, and Educational Change. A global perspective: A report of the Second Information Technology in Education Study Module 2, ISTE publisher.

The innovation process happens at different levels: national, regional, local, municipal, organisational, and even individual; and involves a variety of actors, who are not necessarily well connected or networked. Regions and Local Authorities can play an important role to guarantee innovation policies are actually translated into practice at the school level.

The main elements of school innovation have been summarised and organised by the project partners in three different categories: new pedagogies, teaching and learning approaches; technology in the classroom as enabler; innovative schools and learning environments.



4.1. New pedagogies, teaching and learning approaches

Among the project consortium there is a good deal of consensus around what are the most important elements of an innovative pedagogy; for example, project partners agree that it should include:

- **Learning based on key competencies.** The focus in Education is no longer only on the acquisition of knowledge, but more and more on the development of skills and competencies that are crucial for the success of the individual in a fast changing reality.
- **Student-centred learning.** Innovative teaching methods tend to shift the focus of instruction from the teacher to the student; they aim to develop learner autonomy and independence by giving to students the ownership of their learning path. Student-centred learning, focuses on skills and practices that enable lifelong learning and independent problem solving. Student-centred learning theory and practice are also based on constructivist learning theory that emphasizes the learner's critical role in constructing meaning from new information and prior experience.



- **Personalised learning.** The process of tailoring teaching and learning to the particular requirement of students is also increasingly viewed as an important part of innovative pedagogy. It generally encompasses instructional methods that recognize individual differences in learners' abilities, interests and how they prefer to learn (learning styles) and involves the teacher working more with individuals and small groups of students rather than for the whole class for long periods.

4.2. Technology in the classroom as enabler

Technology is not a necessary element per se in innovation in education, as several innovative practices that span from embodied learning to unplugged computing activities do not rely on any technological support. Digital technology however is an opportunity, often untapped, that we can now leverage to modernise education, and it deserves therefore a special attention alongside the following trends.

Discussions on this topic involving regional decision makers in the project have highlighted the following issues:

- **Learning with and about technology.** Technology has transformed both the economy and society, as the digital revolution has altered conceptions of time and space. This new context should be reflected in the education sector as well. Teachers and students should be able not only to wield digital tools with ease but also with effectiveness, as these digital tools can facilitate and enable powerful learning experiences that aid students at developing skills and extracting meaning out of complexity.
- **Information and communication technology, learning anywhere, anytime.** Mobile technology and cloud services allow students to access knowledge and learning 24/7 regardless of their location. Technology in this case can help bridge formal and non-formal education activities and develop closer synergies between the school, local communities and the broader society. Equally importantly, Technology offers multiple representations of knowledge according to different learning styles and can address special needs that students may have (e.g. impaired students, as well as students with high abilities).
- **Technology that enables students to become creators.** Educational robotics, 3D design and printing, tinkering, applications and videogames development, are only some of the activities students can engage in using currently available and often affordable technologies. These tools have two

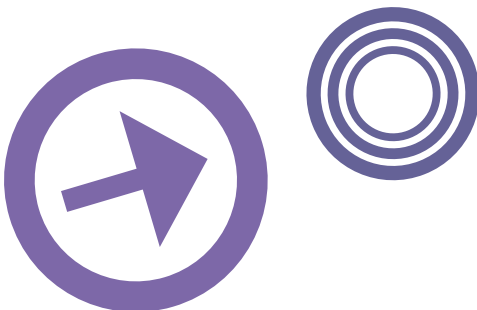
major benefits: they place technology in the hands of students and empower them to move from being consumers to being producers of technology.

4.3. Innovative schools and learning environments

Changes in the approaches and in the tools used for teaching and learning, should be reflected in the design and organisation of learning spaces as well as of the learning processes in educational ecosystems.

Discussions on this topic involving regional decision makers in the project have highlighted the following issues:

- **Learning spaces for interdisciplinary and collaborative learning.** To encourage interdisciplinary learning, all spaces in the school (common areas, classrooms as well as the teachers' rooms), should provide to both students and teachers the best conditions possible, to collaborate and exchange. Furthermore, schools have been designed to bring students together and their strongest asset is the opportunity to offer them collaborative learning activities.
- **School as an ecosystem.** If we believe that a school is an ecosystem, then we realize we must care about every aspect of the school. Schools are considered ecosystems because of the interactions between non-living (physical location, curriculum, culture etc.) and living elements (teachers, school leaders, students etc.). All these elements should be considered in order to balance the ecosystem of the school and an increasing number of recent studies highlight the quality of the learning space as an important element that can make a real difference in the learning process.



5. Challenges and enablers

What are the challenges and roadblocks that prevent innovation from happening? What are instead the enablers and opportunities that can be leveraged? What elements do we have to take into account to create the best environment for allowing effective innovation to thrive?

5.1. New pedagogies challenges and enablers

New pedagogies, such as participatory learning, personalised learning and problem based learning, support learners in mastering twenty-first century skills and competencies for a complex and changing future. Yet a key question remains: *do educators and relevant key stakeholders have the courage and the skills required to disrupt conventional wisdom and encourage learners to improvise and pursue innovation?*

Discussions on this question involving regional decision makers in the project have highlighted the following issues:

- **Teachers' lack of competence and confidence.** Despite the fact that various governments' have funded professional development programmes to improve teacher competences and to strengthen educational practice, many teachers still feel insecure and unprepared to deliver 21st century learning and to use educational technologies effectively.
- **Short-sighted views of innovation.** Teacher education programmes, either for beginning or in-service teachers, frequently do not provide adequate training regarding the pedagogical use of ICT and often lack a strategic or long term vision for how technology can improve teaching and learning and the teaching profession more generally.
- **Final assessment not focused on competencies.** A competency-based system is inextricably linked with the quality of the assessment methods employed and with the methods used to monitor student's progress and monitor and evaluate the achieved competences. New pedagogies go hand in hand with new approaches to assessment.
- **Peer learning and mentoring.** Sharing of teaching practices can encourage and empower teachers to risk changing their teaching methods and also develops teachers' capacities to participate successfully in learning communities, both during their initial teacher education and throughout their teaching careers.

- **Co-creation of educational content.** Open educational resources (OER) offer opportunities for incremental but sustainable change in education via engaging educators in new participatory processes that aim at content creation and sharing of inspiration.

5.2. Technology in schools: challenges and enablers

New technologies have gradually been introduced in classrooms as a powerful tool for transforming learning, bringing together both benefits and risks. But, a key question remains: *how ready are educators and policy makers to successfully implement ICT in educational settings?*

Discussions on this topic involving regional decision makers in the project have highlighted the following issues:

- **Lack of a deployment / implementation model.**

Learning and teaching enabled by technology require a robust and flexible technical infrastructure capable of supporting new types of engagement, ensuring ubiquitous connectivity and seamless accessibility to the necessary equipment. The key element though is first understanding the pedagogical goals and desired outcomes.

- **Ban of technology and electronic devices in the classroom.** Some countries have adopted a policy of banning laptops, tablets, and cell phones in learning environments, as these technologies are seen as a nuisance in teaching practice, disrupting the learning process. These policies are unlikely to change unless more is done to demonstrate the possibilities offered by these mobile technologies when they are managed and used effectively.



- **E-Safety in schools.** The integration of ICT in education can expose minors to online risks, like cyberbullying, predators lurking online, or accidental downloading of malware, to name a few. Maximising the potential of the digital revolution in education requires the implementation of methods for educating students, teachers and parents about online safety.
- **Ethical use of technology.** The availability of technology in classrooms brings new and challenging ethical issues to the forefront, including not only issues related to privacy but also issues related to the treatment of personal data in a broader sense. Establishing a norm of proper use of technology and incorporating cyber ethics into this culture, is seen as essential in order to avoid cybercrimes being committed in school environments.
- **Technology has been already used for school management and monitoring purposes.** According to some FCL Regio partners, ICT has been introduced in many schools as a management instrument with the purpose of monitoring student attendance, handling effectively administrative functions of the school, and keeping track of learners performance. This represents an opportunity for educators to expand the use of such technology also for learning, enhancing communication, creativity and collaboration competences of students.
- **Cost and accessibility of devices.** Managing technology costs and the accessibility of the devices within a school is a demanding task for school leaders and principals. Implementing Bring Your Own Device (BYOD) approaches can be a catalyst in improving the efficacy and sustainability of technology enhanced learning.

5.3. Innovative schools and learning environments: challenges and enablers

Introducing innovation in teaching and learning includes all aspects of education, including pedagogical approaches, technology and the actual design of the spaces where teaching and learning takes place. However, it is only fairly recently that serious consideration has been given to the question: How can schools move away from traditional designs and settings, and encourage innovation to thrive?

Discussions on this question involving regional decision makers in the project have highlighted the following issues:

- **Old design of schools and old layout of classrooms.** Recent studies show that flexibility and versatility in today's classroom designs can facilitate more active 21st century learning. Configuring classes in different ways to

better engage learners and meet learning objectives is considered a growing priority in educational discussions around the globe.

- **Students are sometimes reluctant to hand over their “personal life”.** Bring Your Own Device (BYOD) initiatives at schools provide the possibility to reduce costs related to device procurement, maintenance and updating. However, BYOD approaches sometimes are not fully understood or regulated (technical infrastructure, data protection, device management etc.) affecting not only students’, but also parents’ and teachers’ reluctance to bring and use their own devices at school.
- **Learning anywhere is an actual possibility today.** There is quite a challenge in the fact that many schools are still trying to address a curriculum that is subject based and that requires moving students around from one classroom to another every 40 minutes or so. New technologies enable individuals to decide the time, the place, the path and the pace at which they will learn and manage their own learning.





6. Recommendations

The major focus in the third year of the project was on how regions can ensure that innovation is achieved in a sustainable way and is long lasting. The work in FCL Regio has highlighted that, whereas progress has been made towards introducing innovative learning opportunities, there is a broad agreement that on-going support by policy makers is still needed to ensure that high quality learning opportunities that engage students throughout their school careers, are offered. More effort is also required to develop strategies which will ensure that there will be a whole school approach to embedding innovative use of ICT in line with the growing digital demands of our society.

This has led the FCL Regio to propose key recommendations for policy makers related to how they can promote innovative teaching approaches with the use of mobile devices and cloud computing. These recommendations aim at supporting innovation to flourish at schools. They stem from the definition of innovation in education given at the beginning of this document, and take into consideration its main elements as well as the particular opportunities and challenges associated with innovative implementation of ICT use in schools.

RECOMMENDATION 1: DEVELOP A WELL-ARTICULATED INNOVATION AGENDA ENCOURAGING THE INVOLVEMENT OF A WIDE-RANGE OF STAKEHOLDERS FOR THE PROGRESSIVE TAKE UP OF INNOVATION

Policy makers should develop a well-articulated innovation agenda which has both long-term vision and achievable short term goals for the progressive take up of innovation. The agenda should be designed in agreement with school leaders and teachers, research institutions, and private sector stakeholders. It should also foresee how to assess and document evidence of change.

Successful uptake of innovation in education requires a holistic and whole system approach to teaching and learning whereby a common vision, strategies and agenda are defined and agreed by all stakeholders. It also requires all dimensions in the learning and teaching processes to be addressed (content, resources, curricula, learning and teaching strategies, assessment, learning outcomes etc.) Successful uptake is context-dependent, which is why policy makers should consider a very broad parameters to improve access, quality and efficiency of education.

The capacity for scaling up innovations has to exist at multiple levels in the education infrastructure (micro, meso and macro) and regular exchange of knowledge and experience between policy makers on all issues linked to innovation in education is essential when attempting to drive change. The establishment of a broader culture

of innovation that challenges our assumptions about how we do things is also considered important, so that practice and skills can be shared and adjusted to local contexts and needs, and so that the development of networks and hubs of innovation can emerge to help disseminate and diffuse good practice.

Regional innovation strategies involve initial regional dialogue on innovation, analysis of regional innovation needs and capacities, selection of priorities, implementation of the strategy and establishment and use of a monitoring and evaluation system for the strategy. Creating a Digital Education Action Plan, which emphasizes making better use of digital technology, as well as promoting digital competence development in education for both teachers and learners will improve education as a result of better data analysis and foresight and provide an implementation roadmap for policy makers.

The Goteborg region (GR) leads the network Assessment for Learning <http://bedomningforlarande.se> which now consists of more than 20,000 teachers. Assessment for Learning (BFL) is an approach to learning and knowledge that deals with the quality and efficiency of teaching. This approach helps students develop their learning by finding out where they are in relation to the goals that have been set and related knowledge requirements. For the teacher, the formative approach means making the student's knowledge visible during the course of the work, giving targeted feedback at the right time, while providing the teacher with feedback on his/her teaching and adapting it to the students. Through this network, pedagogues at GR offers a holistic model (broader than only digitization) for building collegial structures at school based on Helen Timperley's² and Vivian Robinson's research³, on how to plan and organize your school for the National IT Strategy and for implementing the revised curriculum. GR also offer schools shorter training sessions in the form of workshops that are suitable for study days or as a startup.

RECOMMENDATION 2: PROMOTE THE CREATION OF FORMAL AND NON-FORMAL NETWORKS OF SCHOOLS AND TEACHERS AND ENCOURAGE PARTICIPATION

Policy makers should encourage all teachers and every school to take part in formal or informal professional development networks and communities of practice. Funding should be made available to help promote and animate these

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- 2 Timperley, H. (2008). "Teacher professional learning and development". In *The Educational Practices Series – 18*. Ed. Jere Brophy. International Academy of Education & International Bureau of Education: Brussels.
 - 3 Viviane, R. (2017). "Reduce Change to Increase Improvement". In the Corwin Impact Leadership Series. Ed. Peter M. DeWitt. SAGE Publications Inc: United States

networks along with tested models for successfully mainstreaming innovative practices.

It has been stressed by all the Regions involved in the consultation that networks of schools, school leaders and teachers can undertake an innovation process together by creating peer-to-peer learning communities, and by helping to build confidence and resilience among them. Informal or non-formal networks and communities, therefore, should be encouraged, recognised and, if possible, formally endorsed by the public authorities as they can contribute substantially to an innovation process and are often consistent with and supportive of official policies.

The regional hubs model, piloted and evaluated by [the Living Schools Lab project](#), coordinated by European Schoolnet, aimed at developing a mentoring and collaboration relationship between schools at a national and regional level. In this project more advanced schools acted as Regional Hubs to share good practices and provide opportunities for closer mentoring and collaboration between schools that were making fairly limited use of ICT. The evaluation of this model suggests that regional hubs may particularly help associated schools to mainstream innovative practices aimed at developing whole school adoption of ICT.

[Escola Nova 21](#) in Catalonia, Spain, represents a very interesting example of a collaborative learning approach. Escola Nova 21, launched in January 2016, is an alliance of schools and other public and civil society institutions for an advanced education system. It responds to UNESCO's call for the participation of all sectors in an inclusive process to improve education. During its inception, the program signed an agreement of collaboration with the Government of Catalonia's Department of Education in order to ensure that they bolster the efforts of public education administrations. In the city of Barcelona, Escola Nova 21's approach is articulated through Networks for Change ("Xarxes per al Canvi"), an initiative led by the Barcelona Education Consortium (a government entity that combines the efforts of the Barcelona City Council and the Government of Catalonia). Their challenge is to be able to help all schools in Barcelona to be involved in projects of sustainable improvement as a result of cooperative work among professionals. The ultimate goal is that all children, regardless of their background, in all schools, should be able to enjoy empowering and relevant learning experiences that allow them to develop their competences for life. As part of its activities, this initiative, has also created a [network of key competences](#), the CB Network, made up of a team of teachers who focus on developing competencies in their schools, create support tools to guide reflection processes and curriculum management, and share self-assessment processes. More than 8,000 teachers have been involved over the last 16 years. Today, 450 schools and 5,000 teachers are active agents in the Catalan schools.

In the Göteborg region, in Sweden, collaboration among the members is highly promoted. The main idea of the region is to create formal networks between the

teachers and increase informal collaboration. Such an example is the [network for digital school development](#), which covers areas such as procurement and developing common strategies for the use of digital tools in teaching.

The Autonomous Province of Trento promotes school networks in order to facilitate the meaningful integration of ICT in the Trentino education system, and provides the necessary support and specific funding for actions promoted by school networks. The provincial school digital plan (approved in November 2017) is based on this idea and that is why a specific action has been launched. The action “#27 Le reti” (the nets) of the plan, offers initiatives in order to assist networks of schools in the realisation and in the management of European funded projects.

International and European networks of teachers and schools can provide opportunities to teaching staff and students to exchange and support each other internationally. An example of such a community, operating both online and face to face, is eTwinning. Funded by the European Commission (Erasmus+ programme), [eTwinning](#), is the community for schools in Europe and offers a platform for staff members of schools from the European countries involved (teachers, head teachers, librarians, etc.), to communicate, collaborate, develop projects, share and exchange innovative educational ideas and practices with educators from other regions, cities and countries. This network, initially established in 2005 and currently involving around 596.100 teachers and 195.300 schools, provides an exceptional opportunity for learning and developing together in the school setting. It is promoted both at national and regional level to reach the educational community.

RECOMMENDATION 3: ENCOURAGE PEER TO PEER LEARNING AND SHARING THE RESULTS OF THE INNOVATION HAPPENING IN SCHOOLS

Regional and local authorities should enrich teachers' continuous professional development by providing job shadowing, study visits and mentoring opportunities in order to help promote and mainstream innovative educational practices.

As described more extensively in the project second year guidelines for policy makers on teacher induction and continuing professional development, mentoring, job shadowing and more extensively, peer to peer learning, can be an important catalyst in encouraging teachers to explore and adopt innovative teaching practices⁴. Schools should be able to pair new teachers with experienced mentors who are able to show them in practice how innovative pedagogical techniques, methodologies and



4 Recommendations and Guidelines for Regional Policy Makers, mobile learning & cloud services – teacher induction and continuing professional development, Year 2, 2018, FCL Regio, [available online](#).

resources can be integrated into the classroom. This will allow the mentored teachers to enrich their practice and gain in confidence and grow professionally, and ultimately offer students the best possible path to learning. Mentors should be active observers of the new teachers' performance, giving constant feedback and encouraging reflection on their performance.

Peer to peer training is closely linked to mentoring but the emphasis is more on collaboration with a group of colleagues who have different competences and levels of experience. Teachers work with their colleagues by setting agreed goals, building together lesson plans, and implementing agreed methodologies and actions in their respective classrooms. Time is also frequently allocated so that teachers can observe each other's lessons, reflect on the practice of colleagues and draw conclusions together. A peer-to-peer learning strategy aims at developing a teacher community where teachers share their pedagogical successes and failures and are encouraged to improve their practice via a process of trial and error.

It is important that public authorities encourage and support collaboration among their educators to further strengthen connectedness. In many cases, regions are already directly engaging in supporting peer to peer learning approaches, including Trentino and Castilla Y León, especially with the aim of promoting innovative teaching and learning approaches and the integration of technology in the classroom.

In Trento, Italy, the provincial school digital plan (approved in November 2017) foresees the nomination of one or more Digital Animators for each school. The Digital Animator is a teacher with good interpersonal skills and a solid competence on teaching in digital learning environments. Each Digital Animator organises and runs specific training courses, and assists with the integration of ICT in teaching and learning in their school. This can involve, for instance, organizing guidance, mentoring activities and training courses for colleagues, encouraging laboratory initiatives, including peer-to-peer activities, and identifying sustainable methodological and technological solutions within the school.

The OBSERVA_ACCION⁵ innovative project In Castilla y Leon in Spain focuses on job shadowing, peer observation and school collaboration and shares the results of the innovation happening in schools. Teachers participate in three different ways:

1. One 2 One. A teacher observes the methodology used by an expert teacher who has been selected by local teacher training centres and later on has to apply what learnt in their own teaching regarding ICT and new methodologies.



5 OBSERVA_ACCION Innovation project, Castilla Y Leon regional authority, http://www.educa.jcyl.es/profesorado/es/formacion-profesorado/actualidad-formacion-profesorado/proyecto-innovacion-observa_accion-curso-2017-2018

2. Team 2 Teach. A Group of 4-6 teachers observe and are observed learning together and applying what they have learnt in their job shadowing experience regarding ICT and new methodologies.
3. School 4 School. Two schools work together based on peer to peer observation, also across different grades. Head teachers meet to learn about organisational aspects and ICT coordinators reflect on the best way to integrate technology in lessons and in schools. Teachers job shadow each other to discover the best way to implement ICT in different subjects, and in the school as a whole. Schools can work among schools in Castilla León, or with schools in Galicia (as this region has joined the project) or in other countries.

Nova Escola Galega is a programme that started in Galicia, Spain, in 1983 with the aim of promoting the educational innovation and to boost the use of Galician language at both linguistic and curricular level. Since then, the program has carried out different activities and initiatives to promote this among Galician educators at all educational levels in order to develop a public and democratic educational system. In addition, Galicia also participates in the program *Observa_accion*, which has among their participants four schools from Caramuxo, the non-formal community of schools in Galicia. This observation programme has been valued by teachers as extremely useful to foster cooperation, promote peer-to-peer learning and self-assessment and contribute to the identification and implementation of innovation within classroom settings.

In Öckerö, Sweden, in every school and pre-school there is a teacher responsible for the development of ICT. They meet four times a year together with the development department in the municipality to exchange experiences and inform their colleagues about innovations in their respective schools. The networks are led by a representative of the development department who is responsible for implementing a common ICT-strategy for all schools and pre-schools. This common ICT strategy can thus be influenced by innovations from the classrooms, and serve as a tool for implementing the strategy in all schools.

The [Scientix](#) platform collects and promotes best practices in science teaching and learning in Europe, and organises training and workshops for STEM (Science, Technology, Engineering and Math) teachers. Together with SYSTEMIC and the STEM Alliance, it offers the “Opening Minds to STEM Careers” Massive Open Online Course (MOOC), which aims at informing, training and empowering primary and secondary teachers in successfully introducing and attracting young people to choose STEM careers from an early age, as well as to learn about private and public initiatives in STEM education.

RECOMMENDATION 4: ENSURE E-SAFETY AND ETHICAL USE OF ICT IN SCHOOLS BY PROVIDING TECHNICAL SOLUTIONS AS WELL AS BY EMPOWERING AND SUPPORTING HEADMASTERS AND TEACHERS

Regional authorities should help ensure e-safety in schools by providing not only technical solutions, but also by offering professional development opportunities to decision makers and school staff on privacy, data processing, intellectual property and related issues. They should support schools and help them provide clearer e-safety guidance.

The increasing use of Internet and ICT offers new ways for educators to engage students and inspire them to communicate and learn. However, it comes with increasing concerns about their online safety, which potentially could inhibit or even derail the mainstreaming of innovative pedagogical use of ICT. Providing a safe environment requires an in-depth understanding of related issues and risks. Strategies for dealing with online risks need to be developed and implemented in order to ensure that the Internet is a place where equal opportunities are provided for everyone to access knowledge, as well as opportunities to communicate, to develop skills and to improve job prospects and employability.

These risks vary from accessing inappropriate and harmful material or websites while in school, to accidentally downloading malware or being victims of cyberbullying or grooming. An individuals' chances to encounter online risk increases as digital technologies become widespread. Policies will certainly exist already to protect students, but it is important to recognise that things change and policies need to be reviewed regularly.

The Autonomous Province of Trento has set up an inter-service coordination group to support schools in the ethical and responsible use of ICT. In addition, every year it funds training courses for the responsible use of ICT in schools; the aim is to enable all users to exploit the potential of digital technologies in an ethical, critical, mindful and safe way in order to avoid cyberbullying and other inappropriate uses of internet and related technologies.

Likewise, Castilla y León has developed an e-safety plan for schools. This plan includes specific training for students and teachers, innovative projects on ICT and a competition involving videos made by students at a regional level. This initiative ends with a final congress in June each year to share all the work done throughout the year on e-safety. In Galicia, Spain, a collection of videos with guidelines on digital identity and safety have been made available on the website <https://eventos-edu.xunta.gal/identidade-dixital>. The target audience is teachers and families, and the main objective is for them to have a more detailed knowledge of the digital world in an educational context.

The [eSafety Label \(eSL\)](#), developed by European Schoolnet, is a Europe-wide accreditation and support service for schools that has been available since 2012. It aims to provide a secure, enriching environment with safe access to online technology as part of the teaching and learning experience. The eSafety Label initiative invites teachers, heads of schools and ICT administrators to evaluate and reflect on their school's online safety infrastructure, policy and practices, to take action for improvement considering national and international standards and to share best practices among peers.

RECOMMENDATION 5: ENCOURAGE LEARNING ANYWHERE ANYTIME BY USING ICT TO FACILITATE ACCESS TO LEARNING IN BOTH FORMAL AND NON-FORMAL EDUCATIONAL SETTINGS.

Policy makers should facilitate access to formal learning enhanced by the innovative use of ICT as well as design new ways to support non-formal learning opportunities that increasingly exist out-of-school and in the community.

Technology offers the opportunity to make information and education accessible to everyone. When used effectively, technology supports learning and reduces educational barriers while providing multiple means of representation, expression and engagement, serving the different learning styles or the special educational needs of students and allowing teachers to engage and motivate all students regardless of their abilities.

Mobile devices and cloud services increasingly make it possible to learn anywhere and anytime both within and beyond the school. Effective technology integration and use, however, requires teachers to be properly trained and to have confidence in how to access online tools and manage digital teaching materials. Policy makers also should not only support teachers and help them exploit ICT within the school but should also aim to encourage organised educational activities outside the established formal system and help schools to better leverage and link to community-led learning opportunities.

In this context, the Catalan Government has been offering [edu365.cat](#) since 2001. Edu365.cat is a students' portal with thousands of hours of interaction covering all ages and educational stages that is available on a self-access basis out of school hours as well as being widely used in schools. The portal is now undergoing a deep process of change and its future structure will be competence-based. It will also showcase resources and projects based upon innovative approaches such as coding, 360 images, geolocalisation, augmented reality and creative web tools.

The Trentino provincial school digital plan includes the provision of Wi-Fi to all schools and the project “Trentino Wi-Fi” provides free Wi-Fi connectivity services in many outdoor areas and public spaces of Trentino territory (e.g. lakes, beaches, mountain shelters). The use is completely free, 24 hours a day and 7 days a week, and once registered, anyone can access and navigate wherever they find the Trentino Wi-Fi signal.

In Castilla y León, teacher training focuses on the integration of ICT in schools with related methodological approaches, like flipped classroom, innovative projects that use mobile devices (FORMAPPS project), use of blogs, cloud data storage and web 2.0 tools that enable students to access education from any device wherever they are. The online courses also provide the opportunity for teachers to learn anywhere and anytime as well.

Digital content delivery is opening new possibilities in education via the increasing number of MOOCs (massive open online courses) that can be accessed worldwide, for instance, or online degree programs. Students access course materials or class lectures on mobile phones, tablets or on laptops and computers and can participate anytime in the learning. The [European Schoolnet Academy](#) and the [Teacher Academy](#) of School Education Gateway offer high-quality free courses for primary and secondary teachers as well as other educational professionals, encourage the creation of learning communities, and have removed many of the challenging time and distance barriers that inhibited when and where students could study.

RECOMMENDATION 6: PROMOTE THE PROACTIVE ENGAGEMENT OF STUDENTS, ENCOURAGING THE SHIFT FROM CONSUMERS OF TECHNOLOGY TO CREATORS AND TO CONTRIBUTORS

Policy makers should promote the active and creative use of technology in schools. Innovative use of ICT will involve students organising and managing their learning activities creating their own learning paths, being ‘hands-on’ and inventive in using technologies - not being just consumers of digital content, tools and services.

Initiatives that inspire the new generation to get creative with coding, programming and digital technology can highly contribute to the shift from the technology consumption to technology creation and digital creativity.

In Catalonia, many schools are involved in [Code Week](#), a multi-date and multi-location event during which schools participate and share their experiences in coding/programming aiming at developing digital literacy in an engaging way. In addition, the Government of Catalonia has issued STEMCAT, a Government Plan which aims to integrate and reinforce scientific and technological culture in society and help

students improve their critical view in a world where science and technology have a very relevant role.

A programme to improve and promote the use of robotics in education is also active in the same region. [Impulsem la robótica](#) provides students with the opportunity to improve their skills in the field of robotics, mainly through the use of the Arduino platform. Students work with an open and active perspective and share their outcomes within an open network.

The maker culture is growing gradually in most municipalities in the Göteborg region, in Sweden, from obligatory elements for all students and pre-school students, to maker spaces that students and teachers are able to visit or book as a study visit. The new Swedish curriculum emphasizes digitization as a means to encourage entrepreneurship, creativity and experimenting with modern tools such as robotics, microcontrollers, electronics etc. For example in the municipality Hårryda there is [Tellus](#), a science centre for schools, which offers further training in the use of digital tools for teachers. Tellus, also has programmes for student visits, where they can experiment and learn how to be creators with digital materials and tools.

In Castilla y León, Spain, there are many innovative educational projects focused on the creation of innovative educational content related to Robotics, 3D designing and Virtual Reality. For these projects collaboration with different companies such as LEGO, Samsung or Microsoft has been developed. The region aims at continuing relevant projects like these and also initiating projects on the Internet of Things.

In Trentino in Italy, various initiatives have been developed concerning this topic. Created in 2015, the “STAARR” network for robotics links sixteen Trentino schools, the Rovereto Civic Museum Foundation, the Department of Science and Information Engineering of the University of Trento and the Bruno Kessler Foundation. The network develops activities, common initiatives and events related to the diffusion of “educational robotics, information technology and new technologies”. The [CreativityLab](#) (Degaspero Secondary School in Borgo Valsugana - Trento) is an interdisciplinary laboratory in which science, technology, engineering and mathematics merge with Humanities subjects to enhance students’ ideas and talents, making them at the same time more aware about the priorities and in-demand skills in the workplace through collaboration with companies. Created in 2014, it hosts activities ranging from modelling and printing in 3D, to design, robotics in general and home robotics (smart home technologies), the development of new apps and video editing. The laboratory is located in an equipped hall of the De Gasperi Institute, in Borgo Valsugana. Here, teachers and students come together to design and model in 3D, build robots, develop web software and applications for mobile devices, work on hardware platforms such as Arduino and collaborate on the creation of prototypes for automated management of industrial systems.

The [WebValley](#) is the Fondazione Bruno Kessler-FBK summer school for dissemination of interdisciplinary research for students (ages 17-18). Organized by FBK, a leading research institute in Trento, WebValley started in 2001 as a regional initiative for high school students from Trentino Alto-Adige SüdTirol, and it is now open to national and international students. The school aims to introduce students to interdisciplinary research by combining an identified scientific challenge (a real problem) with new technologies, like open source tools, FBK research products and the creativity of participants. Students have the opportunity to test themselves, within a group, to acquire and apply skills (HTML, PHP, database, GIS) and methods to multidisciplinary research (analysis and visualization of data, design systems, interaction with experts from non-specialist).

Equally important, the Information Technology Management Centre at the Tambosi Institute of Trento (Upper Secondary School) is an IT-based educational programme aimed at helping students (starting from school year 11) to develop skills in the field of new technologies and programming languages. Every year there are about 60 students, who start the programme in the upper third. The strong point of the programme is the interaction with companies in Trentino that work in the IT field and that involve the students of the Institute in elaborating their IT programmes: every year the students receive some commissions from local companies and realize IT solutions, experimenting with advanced techniques already used in the world of work.

RECOMMENDATION 7: ESTABLISH A STRATEGY AND ACTION PLAN FOR THE DEVELOPMENT OF LEARNING AND TEACHING SPACES WITH A HOLISTIC SCHOOL COMMUNITY INVOLVEMENT

Policy makers should share a vision and set an action plan for the development of learning and teaching spaces so that everyone has the opportunity to explore what can be done with existing resources or by adopting a DIY approach. They should also assure that all key stakeholders views are considered, so that the learning environments reflects the pedagogical needs of the users.

Demographic, economic and technological changes have altered the perceptions of what constitutes effective teaching and learning. The reconsideration of school learning spaces is a response to that. In a number of countries, teams of experts from education, architecture practices, schools, business and academia are being invited to join forces and design new solutions to the challenges of delivering 21st century learning to students.

The need for developing flexible “learning environments” is also becoming increasingly significant, as schools become centres of lifelong learning and increasingly work with community organisations and providers of non-formal learning. A new range

of questions have been raised regarding the type of environments that will most effectively support different pedagogical approaches and there is a growing demand to design innovative learning spaces that engage students and can be easily reconfigured for different purposes.

In this context, there is a growing need for school leaders to audit how physical spaces in a school are currently utilised and then to develop an action plan for how those spaces can be adapted to support new pedagogical approaches. Experts, but also teachers, students and other school community members should be involved in the planning and re-design of these learning environments. They should also share or create guidelines and recommendations to assure quality, capitalizing on other experiences and best practices. To this end, broader ongoing connections with partnerships extending beyond the boundaries of traditional learning environments are required.

In Castilla y Leon, 24 schools called BITS schools (Bilingual, Inclusive, Technological and Safe Schools) have been selected that are considered the role models or prototypes for future schools that will join this Group. The intention is that these schools will integrate a number of the design ideas incorporated in the European Schoolnet [Future Classroom Lab](#) and will do their best to adapt their learning spaces to meet the requirements of 21st century teachers and learners. In Italy, as part of the provincial school digital plan, the actions “#9 Ambienti per la scuola digitale” and “#11 Piano laboratori” have been activated and have provided schools with flexible and modular environments in order to support pedagogical innovation through the construction of creative atelier and digital environments.

In Galicia, the need for teacher’s reflection is underlined in the “Aula nova” initiative which offers a flexible space that can be used by groups of teachers that want to work together, discuss and learn from each other. A calendar for booking the space and the resources is available on its website and teachers can select the date and time that best suits their needs. Furthermore, a new FCL-type space was open last July. It is located at CAFI, a teacher training centre, and aims at familiarising teachers with optimum use of space, ICT integration and new methodologies. It is also intended as a role model for schools, following a programme that was implemented this year to award resources to 10 schools, in order to allow them to open their own makerspaces.

One important thing that is sometimes forgotten is also that a new school environment requires training for the teachers and also students that will use the new space. Lack of adaptability and attempting to teach in an “old school way” within a “new school environment”, is likely to lead to challenges or failure. That’s why the school leader in Göteborg region has an important role in making sure that appropriate methods of teaching are in place in the new innovative school environment.

In general, at a global level, there is a growing interest in projects concerned with the development and use of learning spaces. The New Media Consortium (NMC), (2017) identifies redesigning learning spaces as a mid-term trend that will drive the adoption of technology in K-12 Education for the next 3-5 years. The adoption of innovative teaching methods is also encouraged and facilitated by the relevant learning environment, so the three main elements of educational innovation previously discussed in this document (pedagogy, technology and space) are again seen as being interconnected and affecting each other. In this context, it is important that school leaders should develop both a short term and also a longer term vision and strategy for how they will progressively support educational innovation.



7. Conclusions

Over the last three years (2016-2018), the FCL Regio project has managed to find new ways to actively engage regional decision makers in sharing both their existing best practices and on-going challenges related to opening up their systems to educational innovation. During FCL Regio meetings and exchanges, it has become clear that many regions are already encouraging innovation to flourish in school settings, both by establishing networks for collaboration and peer exchange and by helping schools to develop ICT strategies that support different pedagogical approaches and the demands of the 21st century teaching and learning.

Much still needs to be done, however, for innovative pedagogical practice to be mainstreamed. The main lesson learnt through the FCL Regio project about innovating in education is that regional authorities are crucial for the implementation of the educational change and they should therefore have an active role in its design at national and international level if we want them to be effective innovators.

In this context, it is essential that regional policy makers: develop their own, well-articulated innovation agenda; involve a wide-range of local stakeholders who can support the progressive take up of innovation; promote the creation of and encourage participation in formal and non-formal networks of schools and teachers; and put in place frameworks that enable educators to learn from each other and share their innovative practices. The successful integration of ICT in teaching and learning, also requires: related training and professional development opportunities for teachers; constant updating of e-safety measures to ensure the wellbeing of students; a shift from technology consumption to technology creation both for teachers and students; and the creation of flexible learning and teaching spaces that are designed by all the key stakeholders.

Embedding innovation in schools of course remains a slow process. It is difficult to know to what extent this is a consequence of a dearth of channels and networks that collect, circulate and discuss innovative pedagogical approaches but the consortium hopes that FCL Regio has gone some way towards filling this gap by providing information and recommendations that will resonate with regions across Europe who did not have the opportunity to be actively involved in the project.



PROVINCIA AUTONOMA DI TRENTO



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