

DECODE



IO3

Guidelines for educational institutions in the process of integrating ICT in education

Authors:

Magdalena Balica

Mihai Iacob

Ligia Sarivan



Erasmus+



Contents

Introduction	3
1. A Quality Framework for integrating ICT in the teaching-learning process.....	4
2. The digital competence among the interlocked 8 key competences for LLL	7
2.1 Knowledge <i>about</i> versus knowledge <i>for</i>	8
2.2 Integrated learning	10
3. The digital competence: meaningful teaching and learning	11
3.1 Documentation.....	11
3.2 Interaction	13
3.3 Presentation.....	14
3.4. Data bases.....	15
3.5 The virtual tours	16
3.6 In a nutshell: tips for the teacher.....	17
4. The digital competence: a goal and a tool in teaching and learning	18
5. Tools for the integration of ICT in schools	20
Conclusions.....	23



Introduction

The purpose of this Guide is to support school leaders to discover how the integration of ICT has been approached during the past decade in different European contexts and, hopefully, offer inspiration in regard to adapting practices to their own context. It has been produced within the [DECODE project](#), in conjunction to a series of National Reports regarding the integration of ICT in the teaching-learning process, as well as a Transnational Report which summarises the findings of the National Reports. You can find all intellectual outputs of the project on their [dedicated page](#).

The Guide goes one step further from the reports it is based upon and tries to inspire the reader with a more practical perspective on how the integration of ICT in education can be approached. Providing suggestions for such diverse educational systems as one can encounter throughout Europe comes with obvious limitations. Our intention is to provide reflection points, anchored in current developments, but it will be up to the readers to contextualise the information to their local environment.

The topics we have touched upon are quality assurance (Chapter 1), the way competences are conceptualized (Chapter 2), how they can be attained (Chapters 3 and 4) and the tools which can be employed to support the integration of ICT (Chapter 5). In the end we've included some thoughts on how the future is shaping up and what challenges we could expect.



1. A Quality Framework for integrating ICT in the teaching-learning process

What are the factors influencing a successful integration of ICT in education? What benchmarks can a school leader use? The [IO3 Transnational Report](#) (pg. 21-24) has outlined the approaches to quality assurance throughout partner countries (EN, ES, FI, IT, RO). As expected, there was a lot of variation among the different contexts.

In order to support the reflection of school leaders in this regard, we have tried to select a series of commonly occurring criteria. We have not attached any numerical values to the indicators which describe these criteria, as we thought it would be futile, given the variety of contexts covered by the target group of this guide. The criteria and indicators suggested have focused mostly on externally observable aspects, as they are more readily measurable.

Criteria and indicators for assessing school level integration of ICT

Criteria	Specific indicators
Availability of resources	Pupil to hardware (e.g. computers, video-projectors, smart-boards, tablets) ratio.
	Number of software licences for administrative and educational use
	Average time a pupil can use school hardware for curricular/extracurricular activities.
	Existence of provisions for integration of pupil owned devices (BYOD) in curricular and extracurricular activities.
	Number of subscriptions to online educational services.
	Ratio between the dedicated budget for ICT acquisition and the needed budget for ICT acquisition.
	Ratio between the dedicated budget for ICT maintenance and



	the needed budget for ICT maintenance.
Openness towards the community	Number of partnerships established with local stakeholders (NGOs, informal groups, cultural-educational institutions) with a focus on the use of ICT.
	Number of activities organised with local stakeholders (NGOs, informal groups, cultural-educational institutions) with a focus on the use of ICT.
	Number of events organised by members of the community using the infrastructure/resources of the school.
	Number of events in which school staff and children volunteered in the community.
School development strategy	Existence of an ICT integration strategy, covering all the activities of the school.
	Existence of a monitoring mechanism, for overseeing the implementation of the school ICT integration strategy.
	Inclusion of ICT in the school development strategy in a way that relates to the educational priorities of the school.
	Existence of procedures and tools for monitoring the use of ICT in the classroom level.
	Existence of a data collection mechanism regarding the needs of school level stakeholders.
Recognition for the use of ICT	Number of projects related to the use of ICT for educational purposes in which pupils and/or teachers were involved.
	Number of documents (e.g. certificates, diplomas) awarded by third parties in recognition of the use of ICT by the school and/or teaching staff.
Continuous professional development (CPT)	Number of trainings available for the continuous professional development of teachers in the school.



	Number teachers attending accredited CPT courses (e.g. ECDL ¹).
	Ratio between the existing budget for teacher training and the budget needed to cover teacher training.
	Number of peer meetings for discussing ICT use for education.
	Existence of communities of practice at school/local level.
	Number of partnerships with other stakeholders to offer methodological support to teachers for ICT.
	Existence of schemes to offer incentives for the integration of ICT in the teaching process.
Integration of ICT throughout the teaching process	Existence of mechanism to promote the development of digital competence.
	Attaining a satisfactory awareness level concerning the costs, benefits and limits of the use of ICT in the teaching process.
	Existence of instruments to promote sharing of experiences (e.g. school magazine, meetings, online groups etc).
Promoting safety and security in the use of ICT	Number of educational resources related to safety and security in the use ICT available to the school staff.
	Existence of a mechanism to gather feedback from pupils after going through activities related to safety and security in the use of ICT.

Taking into account these indicators (or similar ones) does not guarantee results, but it will allow school leaders to make informed decisions, it will give all stakeholders a clear image of what is being done and it will make school governance more transparent.

In order to transform ICT tools into educational tools more consideration should be given to pedagogical aspects. We will try to cover this side of ICT integration in the next chapter.

¹ <http://ecd.org/>



2. The digital competence among the interlocked 8 key competences for LLL

In December 2006, the European Parliament and the Council of the European Union adopted a Recommendation on Key Competences for Lifelong Learning. At that point in time, the digital competence was already among the recommended eight dynamic sets of learning results² to be aimed at for effective lifelong learning.

Understood as complex acquisitions comprising knowledge, skills and attitudes, the 8 key competences are regarded as a “response to globalisation and the shift to knowledge-based economies”, and, consequently as a foundation for successful integration in an increasingly demanding society in which “people are Europe’s main asset”³.

In May 2018, the Council adopted a new version of the *Key Competences for Lifelong Learning*⁴. The revision of the prior document is motivated by the changing world that requires even more complex competences than 12 years ago. A society that is increasingly mobile and digital reshapes lifestyles and labour force and at the same time opens new perspectives for education and training: the learning environments can develop towards more flexible approaches and allow non-formal experiences to fluidly become incorporated in mainstream schools. The new technologies make all of the above possible. Yet, filling the gap from the “technically possible” to the “likely real-life experience” depends, to a large extent, on the actual response of the education systems.

Among the main challenges the education and training systems face nowadays, the European document mentions: *more jobs being subject to automation, technologies playing a bigger role in all areas of work and life, and entrepreneurial, social and civic competences becoming more relevant in order to ensure resilience*

² The 2006 set includes: communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression

³ Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning (2006/962/EC), p.1

⁴ The 2018 set of key competences includes: literacy; multilingual; mathematical competence and competence in science, technology and engineering; digital; personal, social and learning to learn; citizenship; entrepreneurship; cultural awareness and expression.



and ability to adapt to change⁵. These increased requirements for better quality and complexity jobs and relationships are in stark contrast with current results in the PISA and PIAAC studies that indicate a *constant high share of teenagers and adults with insufficient basic skills*. In 2015, one in five pupils had serious difficulties in developing sufficient reading, mathematic or science skills. In some countries up to one third of adults are proficient at only the lowest levels in literacy and numeracy. 44% of the Union population have low or no (19%) digital skills⁶.

2.1 Knowledge *about* versus knowledge *for*

Compare and contrast!

Sawyer, 10, grade 4, does not quite fit in school. He does not quite fit with his peers either. He is a lonely, not very talkative boy. He is learning today about the prepositional phrase. It is abstract, strange, apparently of no use. It does not help Sawyer with his communication skills. Later on, Sawyer gets involved in an informal project at a marine hospital, where he can help saving dolphins. Sawyer lights up! He learns meaningfully. He learns meaningful things. He starts communicating with adults and peers. He has a purpose for communication and for learning. (summary from *Dolphin Tale*, 2011, movie based on true events).

How useful is the lesson on the prepositional phrase for your adult life?

The focus on competence-based education represents an opportunity for every school to revisit their effective curricula, mainly teaching-learning-assessing practices that still centre *subject matters* instead of the real *subjects* of education. In many places (and situations) teachers continue to teach the “school disciplines” instead of teaching students according to the latter’s needs and interests. For quite some time, there has been this debate on how much of the curriculum is to be allotted to ICT/ computer science/ various other IT-related subject matters in order to tune the education system to the “digitized world”. If such curricular revision initiative appears to be an effort of adaptation it remains nevertheless a reiteration of a quantitative approach to knowledge in an old school pattern: teachers possess and give knowledge, students assimilate it in order to reproduce it for the exam. Subject-related (narrow) skills are shaped in order to make sure the school disciplines are thoroughly transmitted. The teachers are always in the hurry to “cover” the subject matter before the end of the term (irrespective of the various students’ levels!). This traditional approach to learning brings no highlight to un-cover, dis-cover (maybe re-cover!) topics, problems, cases etc., since knowledge is already shaped within the covers of the book, in a linear, chapter to chapter progression. It is interesting to note that both in terms of learning (as revealed by mind and brain studies) and digital approach to knowledge, this apparently disciplined school perspective is of little use. It is even less successful when applied to “Homo

⁵ Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p.2

⁶ Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p.3



Zappiens” who grew up in the digital age⁷, since s/he is familiar to multi-tasking, interconnected flows of information, cooperation and interaction with peers. The App Generation⁸ cannot understand the need or the effort to memorize chunks of information since they can instantly reach the required item. In extra, an encyclopaedic index in a Diderot & d’Alembert perspective is highly unlikely in a world with such high rate of information multiplication.

The competence-based approach comes to the rescue in this situation! It replaces the *knowledge about* with a more sophisticated *knowledge for* perspective, where acquisition mixes three components (knowledge, skills, attitudes) in a dynamic, functional (purpose-oriented) ensemble.

According to the May 2018 Recommendation, *the digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.*⁹

In terms of essential knowledge, skills and attitudes, *individuals should understand how digital technologies can support communication, creativity and innovation, and be aware of their opportunities, limitations, effects and risks. They should understand the general principles, mechanisms and logic underlying evolving digital technologies and know the basic function and use of different devices, software, and networks. Individuals should take a critical approach to the validity, reliability and impact of information and data made available by digital means and be aware of the legal and ethical principles involved in engaging with digital technologies.*

Individuals should be able to use digital technologies to support their active citizenship and social inclusion, collaboration with others, and creativity towards personal, social or commercial goals. Skills include the ability to use, access, filter, evaluate, create, program and share digital content. Individuals should be able to manage and protect information, content, data, and digital identities, as well as recognise and effectively engage with software, devices, artificial intelligence or robots.

*Engagement with digital technologies and content requires a reflective and critical, yet curious, open-minded and forward-looking attitude to their evolution. It also requires an ethical, safe and responsible approach to the use of these tools.*¹⁰

The digital competence is not the result of a *per se* intensive study, a number of periods/ week for a number of weeks per term/school year. It actually becomes an opportunity for:

⁷ Wim Veen and Ben Vrakking highlight in their now classic *Homo Zappiens. Growing Up in the Digital Age* the contrasting approach to knowledge of the millennials (homo zappiens) and their teachers (homo sappiens).

⁸ In 2013, the author of the multiple intelligences theory attempted to put in a digital perspective three generations (kids - young adults - middle-aged to seniors) of new technology users. (Gardner, H., Davis, K.: *The App Generation. How Today’s Youth Navigate Identity, Intimacy and Imagination in a Digital World*).

⁹ Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p. 20

¹⁰ Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p. 20



- a more meaningful school, i.e. better learning (since it involves “goals” that are worth striving for in the real world from a personal perspective)
- a friendlier school, i.e. more motivation for learning (since creativity, curiosity, open-mindedness are explicit key attitudes)
- use of acquisition in informal/ non-formal contexts, i.e. learning and school open towards broader experiences that help integration and inclusion.

2.2 Integrated learning

The opportunities listed above become manifest if schools seriously take into account the recommended integrated approach to the key competences: *[They] are all considered equally important; each of them contributes to a successful life in society. Competences can be applied in many different contexts and in a variety of combinations. They overlap and interlock; aspects essential to one domain will support competence in another.*¹¹

In very simple (yet not simplistic) terms, the digital competence is more than the mere focus of a school subject matter (ICT, Computer Science, Coding etc.). It permeates the fabric of school learning, by becoming a valuable tool for cognitive exploration and school participation. In actual terms, formal/non-formal acquisition in the digital competence sustains and expands learning in another competence. Let us look at just some examples:

- The development of good literacy and multilingual competence involves digital channels – otherwise, communication in context cannot take place! Basically, no current good learning in Language arts can avoid digital channels. Who can communicate outside the digital world?
- The training in math, science, technology and engineering makes use of virtual labs and digital simulations in order to enhance experiential learning and prepare the students for the actual problem solving.
- The scaffolding of personal, social and learning to learn competence should make use of social networks. Identity and interaction in our day and age – like communication – are difficult to sustain in the absence of social media.

¹¹ Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p.14



3. The digital competence: meaningful teaching and learning

The components of the digital competence, whether they are learned in formal classes (ICT, Computer Science or other IT-related school subject) or in nonformal or informal contexts can become valuable tools to plan and organize better teaching and enhance effective learning in – virtually! – all school subjects. At the same time, the digital acquisition being used in the varied contexts of varied knowledge domains is consolidated and gets to be more and more easily transferred in new situations. Therefore, the interlocking effect of the key competences generates more effective and accessible learning: *aspects essential to one domain will support competence in another.*¹²

Below are a series of examples that take elements of the digital competence – as stipulated in the description of the European Recommendation – and use them in various school subjects. Learning is facilitated, motivation is increased.

3.1 Documentation

According to Merriam-Webster, documentation is *the act or an instance of furnishing or authenticating with documents*. It also means *the provision of footnotes, appendices, or addenda referring to or containing documentary evidence*. In an educational perspective, the act of “documenting” will be a shift from listening to the teacher’s lecture towards exploring a variety of sources for a variety of topics in a variety of school subjects and learning how to “document” your search and results, i.e. to substantiate your findings with evidence.

A very important component of learning to learn, and a valuable source of knowledge and discovery learning in all subject matters, documentation is well supported by the digital competence. It helps students to look for sources and specific info. Support is needed with novices for filtering, selecting relevant information and processing it according to a learning goal.

¹² Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning, p.14



Students take pleasure in searching on digital channels (they explore texts, images, diagrams etc.) in nonformal contexts. They might not do it in a very structured way and they might need support from a mentor/facilitator/ teacher to transform the respective experience into memorable learning.

What exactly could students document in school? Almost every project could have an exploration/documentation stage!

- Case studies in History
- Reports in Science
- Biographies of famous people in language arts
- Project work from Civics to Technology etc.

The image below shows middle school students in a village school in the early stages of a science project about water preservation. The teacher chose a short animation from YouTube as an entry point to the documentation process. It is the students' first science project and they are introduced to the stages of the inquiry method, documentation included.





3.2 Interaction

Kids, youth use social networks extensively and they love it. From an educational perspective, far from being a mere distraction from serious study, social networks can become a good foundation for collaborative learning with all its benefits! Again, like with documentation above, interaction on social media can apply to any subject matter for a variety of learning topics. The profit is two-fold: the digital competence sustains the interaction and collaborative learning; new contexts of putting the digital competence at work expand, differentiate, consolidate and multiply the transfer opportunities of the competence for later use.



A.M., a Romanian teacher teaching Romanian as a mother tongue to middle school students set up a Facebook page to support her students' interest in reading (see images above and on the right for various posts). The page (Cititul este important – Reading is important) has brought a lot of advantages for her teaching¹³:

- *students have become increasingly involved in reading and promoting reading experiences on the page;*
- *the students' reading community is authentic and meaningful: as a recognition of their reading abilities, the students designed a questionnaire for the whole school that inquires about the reading interests!*
- *the reading assignments require text reading and re-reading and offer the opportunity to refer to various sources, including online ones!*
- *before being posted the assignments are approached in small personalized steps;*



¹³ Mancas, E. A., *Facebook for the Language Class* in ICT for Language Learning Conference Proceedings, 7th edition, 2012. <https://www.facebook.com/Cititul-este-important-167790990011236/>



- *the posts show the students involvement in their own learning. The page helps them understand that reading is not a mandatory school activity but it is fun and a genuine learning adventure that can be promoted online. Just count the likes!*



Other valuable learning experiences that are facilitated by networking, which is in turn sustained by the digital competence, are the many eTwinning projects that address a huge range of topics, school subjects and develop partnerships without frontiers thanks to the digital interface.

3.3 Presentation

Whether students present their results orally or in a written form, ICT is paramount! Digital channels are great to help with a good (even impressive!) presentation of good work.

A digitally supported presentation sustains the promotion of results and by thus brings about more responsibility on behalf of the learner/ presenter in neatly organizing ideas, expressing them in verbal (written/ oral) or non-verbal forms.





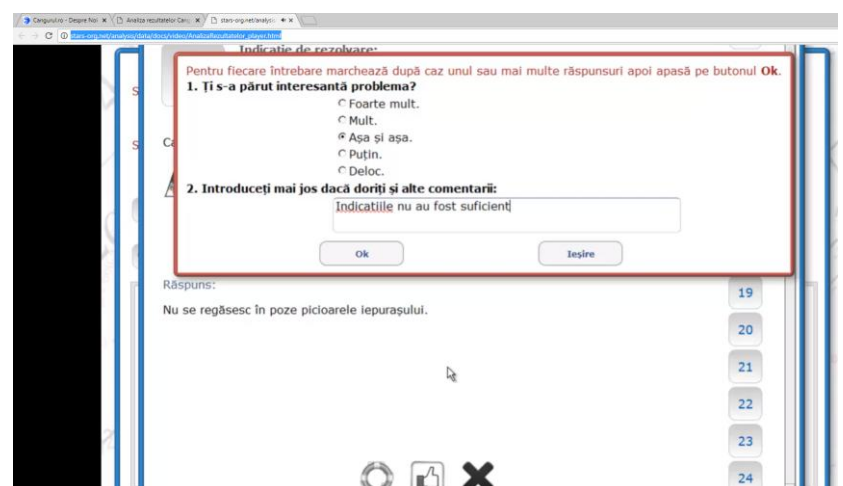
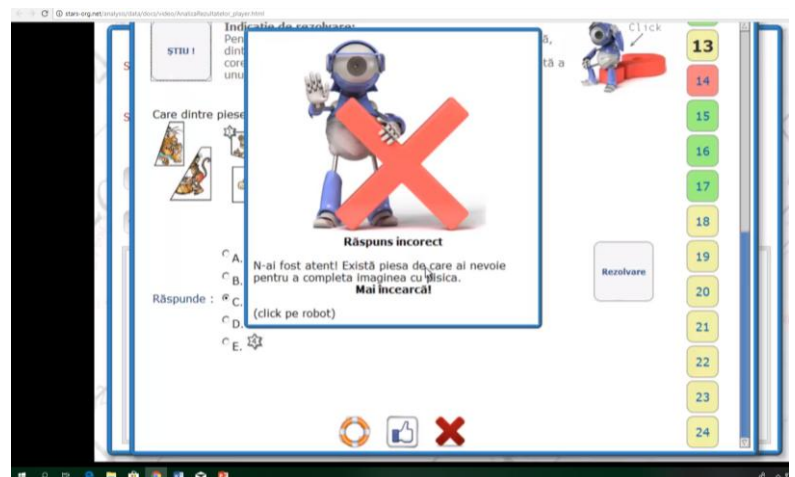
3.4. Data bases

Operating with data bases seems complicated and specialized and probably more appropriate for Math classes at high levels. But with digital support, primary school kids can effectively work with a data base and obtain learning profit.

The IDEA Association has designed and implemented the STAR system that supports the participants in the various educational contests the association manage in Romania, to find out: their results in the contest, compare these with other students', analyse their misrepresentations, obtain support to improve. The participants need to log in the system and filter information in a progressive way.

The system is uploaded with the results at all the tests in 3 weeks time after the contest took place. Further on, students can use STARS to work on the items for as many times they wish.

To sustain the operating with the data base the IDEA developed a friendly tutorial that show how to click on the various icons¹⁴.



¹⁴ http://stars-org.net/analysis/data/docs/video/AnalizaRezultatelor_player.html



3.5 Virtual tours

One of the most spectacular educational uses of new technologies is the virtual tour of an otherwise difficult to access aspect of reality. Commonly perceived as purely in the sphere of games and entertainment, virtual reality can support students to better understand a variety of topics. Whether it is about exploring science, technology, geography, history, literature or arts, the virtual tours are free and comfy (you are never tired when you visit from your chair!) and with many profitable learning experiences:

- Visit Versailles, the Holocaust memorial Museum etc.
- Come and see what is there in a black hole!
- Let us have a look in the human eye!
- 360° great hammerhead shark encounters!

Two impressive examples from YouTube:

- Angel Falls – biggest waterfall (360° interactive video)¹⁵ (see image to the right).
- The galactic centre¹⁶ (see image below).



¹⁵ https://www.youtube.com/watch?v=L_tqK4egelA

¹⁶ https://www.youtube.com/watch?time_continue=1&v=YKzmeABbkU



3.6 In a nutshell: tips for the teacher.

Irrespective of the subject matter, the new technologies can support sound teaching and learning:

1. Search and download materials for students – Classes become more adapted to the students' particular needs.
2. Invent home assignments that require digital channels – The students become more interested in doing those!
3. Communicate with students by means of WhatsApp – It's fast and popular!
4. Post on the various class blogs – it could promote memorable learning (and teachings!).
5. Encourage students to design neat presentations – This is important for later in life! It also helps them review and essentialize the material = Better learning!
6. Extensively use YouTube for entry points (An engaging entry point supports kids with effortless acquisition of new concepts) or to upload project results – it's free and fun + learning has more purpose if promoted!
7. Never use Apps just because! Put them to work meaningfully.
8. Whatever works for you and your students is best practice. Keep on using it. Don't forget to share online. It supports us all.



4. The digital competence: a goal and a tool in teaching and learning

Students and teachers like films, don't they?! Nowadays film making and film watching are quite at hand if we consider the potential of the new technologies. In order to really transform this technological potential in educational reality it takes some planning, some IT skills on behalf of the teacher. And a dose of good will to transfer in the class something fun and meaningful in a different perspective than the textbook. The students will probably need no further motivational/ inspirational push...

Here is an example presented in the IO3 Transnational Report¹⁷

Bradford Film Literacy Project¹⁸:

Bradford was the world's first UNESCO City of Film. In an effort to create a meaningful legacy from this status, a film literacy project was created which aimed to have a positive effect on learning amongst primary age children in the city. The idea behind the project was that film could act as a useful gateway into wider literacy learning (reading and writing) as young people are a generation who have grown up surrounded by the moving image. Therefore, by using a variety of short and long-form films, students could learn how image, sound etc. are used to build meaning and fashion a narrative. Students themselves were also encouraged to develop a short film, using hand held devices (tablets, mobile phones etc.) to capture and edit content. To guide this work tasks were set around literacy points; for example, including a scene in the film which demonstrated the use of an adverb. Hence, the project transcended the traditional use of (pre-recorded) video in the classroom. Instead it harnessed the potential of modern devices to become interactive parts of the learning experience, with learning driven by the young people. Alongside some in-school support, experts delivered CPD for teachers around the basics of film literacy, editing content etc. Not only did this mean that the teachers who took part in the training were confident to deliver the film literacy content independently, but they were also encouraged to act as ambassadors within their own schools, helping to upskill colleagues. For those schools that took part in the project, the results have exceeded expectations, with on average students' writing and reading literacy scores in tests improving by around four points.

SBO Project

In another partner country, Romania, a small community of young innovative Language teachers who share experiences online and come from very diverse teaching backgrounds (disadvantaged school, multicultural

¹⁷ http://decode-net.eu/wp-content/uploads/2018/07/IO3_Transnational-Report.pdf.

¹⁸ <http://bradfordfilmliteracy.com/>



school, rural, urban!) started the SBO project (SBO stands for “School Box Office”, an acronym developed after the more famous HBO!). It addresses project work for 5 grade English as a foreign language in two target groups (a class in a small rural disadvantaged community and an average class in an average neighbourhood in a large city)¹⁹. Students, who according to the Romanian national curriculum, start developing their A2 level English in grade 5, work monthly on a film-based project. They develop their oral comprehension with the support of cinematic images, they talk about the topic, characters and film message, they read simple connected texts and images and write short messages. Most importantly, they develop a meaningful product in connection to every film project that stimulates their curiosity and imagination; and they present their final result! The conclusion at the end of the school year is very promising for both target groups: a lovely atmosphere, students’ engagement, good quality projects and improved English!

The digital component is embedded in the Language curriculum as a tool for communication. The students’ tasks involved the curricular highlights. The film experience nevertheless is a methodological option that has stimulated learning and made English “alive” even among the students who do not have a lot of exposure to the foreign language (in a disadvantaged rural community it is quite unlikely for the households to have HBO and for the students to be able to go to the Mall!).

The digital competence was very much at work for the participant teachers! They shared plans and materials online, they interacted within their community of practice, they received encouragement and new ideas. They promoted the results among their colleagues and a dedicated section on a good practices DVD is to be published before the end of the year 2018.

As compared to the Bradford project, the film in the SBO project is the learning context not the goal. Whereas in the City of Film, Bradford, the priorities are reversed. Nevertheless, in both cases an integrated approach - that uses the digital competence - generates quality learning.

¹⁹ A presentation of this partnership: https://conference.pixel-online.net/ICT4LL/acceptedabstracts_scheda.php?id_abs=3427



5. Tools for the integration of ICT in schools

Planning tools

In order for ICT to become an effective educational tool, there needs to be a shared vision regarding its role amongst school level stakeholders. Making sure that everyone is on the same page when it comes to expectations, potential limits and benefits of the use of ICT is paramount to creating an educational community.

When trying to make sense of ICT context as an educational professional, it often seems impossible to keep up the pace of change. This is why schools need to shield their staff and beneficiaries both from trivial changes and from what turn up to be mere fads.

This vision should be built upon information gather within the local context. ICT comes with the advantage of facilitating the collection and processing of data. Small-scale surveys can be employed in order to identify the needs both of the teaching staff and of the learners.

The degree to which findings should be formalized into a document acquiesced by all the staff depends on their purpose, the requirements of the larger educational system in which the school functions and the school culture. More centralised education systems will already be familiar with standardised strategic planning tools (e.g. Institutional Development Plan in Romanian schools), while decentralised systems, such as the English school system, rely on more localised approaches.

Map of resources

Each type of resource needed to successfully integrate ICT in education, be they financial, technical or informational, comes with its own caveats. A general awareness of the ICT context needs to be developed at school level and this can take the shape of a map of resources, which can be shared – either in part or as a whole – with school level stakeholders.

Maps can be varied in their scope, theme (e.g. didactic resources, networks of experts, stakeholders, software) or information contained. They should be able to answer questions such as: what is the availability of



a specific resource? what are the costs associated with accessing a specific resource? what is the relevance of the specific resources for the needs of the school? The complexity of resource maps can range from basic lists (e.g. names of community stakeholders), to multi-layered analysis of several factors.

Training opportunities

Continuous professional development of the teaching staff is the key to having an updated set of skills and being able to deliver quality educational services. An exercise in mapping the local training offer and making it available to teaching staff is highly recommended. Depending on the what training opportunities can be accessed and the available expertise among school staff, one can consider organizing in-house trainings.

Communities of practice

Sharing of experiences among teachers is a great way to promote peer learning, which is rich in high quality local information. School should foster communities of practices regarding the use of ICT for teaching and learning.

Ideally, schools should create spaces for sharing practices in ICT use in the classroom, which would also allow results to be made visible and celebrate. Consider organising common learning events and making the results persistent, by either displaying them or by integrating them in the educational process.

Involving students in the design of learning

The fact that we consider digital natives as the reference group and non-natives as an ever-diminishing one, summarises the current view in the educational systems throughout the world. Crediting students, which are digital natives, with expertise is an effective mechanism of opening teaching practices to a wealth of insights and skills.

Students are the best source of information on their own needs, which should be tapped into regularly. They are also competent users of ICT devices and are able to support the teaching process with their skills and their feedback. The fact that students acquire ICT skills in non-formal and informal contexts means that they might not be supported by a critical apparatus and it will be the task of the teacher to create critical thinking skills.

Local partnerships

Schools are living organisms, within the community they serve. School management needs to put into practice the concept of an open school, as otherwise they risk alienating local stakeholders, with tangible negative consequences. Schools have to assume the role of connecting people and this is best done through local



partnerships. Parents, the wider local community, companies and public services, all have an important role to play when it comes to shaping the use of ICT in a meaningful way.

Schools should aim to provide services for the community, outside their core mission of educating pupils. Empowering pupils to take the role of teachers for adults in the community, would be one way of providing such services. ICT is especially susceptible to be used in such educational settings²⁰.

Sharing with the global society

ICT has expanded the world beyond anything which was possible just two decades ago. Nowadays schools are connected to the world stage by simply tapping the screen of a smart phone. The challenge now is to think big and embrace the global society brought on by new technologies. Pupils can be in direct contact with their peers from different cultures and different continents, rather than just learning about them from a textbook.

ICT has enabled every school to engagement in a meaningful with global issues of any nature – the environment, migration, cultural identity and so on. The message that school leaders need to promote is that teaching should be rooted in issues that go beyond our immediate environment in order to be prepared for future challenges.

²⁰ <http://www.geengee.eu/geengee/>



Conclusions

Globalisation and modernisation are creating an increasingly diverse and interconnected world. To make sense of and function well in this world, individuals need to master changing technologies and to make sense of large amounts of available information. They also face collective challenges as societies – such as balancing economic growth with environmental sustainability, and prosperity with social equity. In these contexts, the competencies that individuals need to meet their goals have become more complex, requiring more than the mastery of certain narrowly defined skills. (DESECO²¹, 2005).

The first task of any school leader is to recognize the areas where ICT might be useful or not and to promote critical use amongst school staff. Teachers' attitudes and beliefs regarding ICT can only be change if they see how they work in their real context.

Not all devices and software have the same educational potential and schools need to adopt a critical approach to the adoption of ICT. There are inherent risks in the use of ICT and they should be highlighted in planning documents and procedures to tackle them. For example, schools can embed in their practices a policy of delayed adoption of software, so that bugs associated with new releases are not passed on to the teachers.

While there is an overall reduction in operating costs due to the use of new technologies, ICT solutions are not that as cheap as some may claim. Constant investments are needed and, even in developed economies, it is easy to notice gaps in the availability of hardware between schools from more affluent or less affluent communities.

Updated hardware and software are not enough to ensure quality teaching. Simply making better ICT resources, be they apps or devices, will not result in better teaching. The mediating role of continuous teacher training in this regard cannot be overstated.

Good practice examples are limited in transferability and great effort needs to be put in to make relevant to the context of transfer. National Reports created within the DECODE project offer many sources of inspiration, but we are aware of the challenges facing school leaders when trying to expand the daily educational routines.

²¹ <https://www.oecd.org/pisa/35070367.pdf>



Looking towards the future, there are several issues for which schools need to prepare themselves:

- **Creating and maintaining an online identity** is critical for all current and future citizens. It will be up to each educational system to take up the challenge of fostering the relevant skills.
- As technology becomes ubiquitous, **security** becomes an ever-increasing concern. We still transfer the way we think about physical objects to digital objects, which can be detrimental when it comes to protecting digital assets.
- The **ethics of a digital society** are only beginning to shape up. Ensuring equal and unrestricted access to all citizens is just the first step for creating an ethical framework.
- ICT is not only about risks, but also about opportunities. Promoting **active social involvement** is one of the greatest promises ICT has made. It is up to schools to make it come true.

We hope that the reflection points we have shared through this guide will contribute to the debate among educational professionals.

These are exciting times to be a teacher!