

Community of Practice

ICT IN SCHOOL DOCUMENTATION - 2014

Executive Summary

The ICTWays Community of Practice is organized in Special Interest Groups (SIGs) so that teachers can discuss specific issues. The groups are mainly organized per scientific area (like Mathematics, Biology, etc.) and per language (Portuguese, Lithuanian, etc.). But there are also general purpose groups (News, Events, etc.) and specific topics (ICT for special needs, Games for learning, etc.).

The SIGs activity is mainly taking place online through research collection and asynchronous social networking (blogs, forums, etc.) but there is some face-to-face activity during the network meetings, conferences, ICT training and local workshops.

This document compiles the activity report for each of the active groups, providing best practice information and state of the art resources for use and exploitation in each of the areas addressed by the groups. The SIG participants generated the reports based on their own dynamics which explains that, in some cases, the same report addresses different orthogonal areas (like a certain level of education in a certain topic). For completeness and organization purposes, it was then decided to replicate those reports in the corresponding sections.

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General

1 News

Carlos Vaz de Carvalho

1.1 Background

This chapter is dedicated to the most up-to-date information regarding the use of ICT in Science classrooms. It includes information about funding programmes, national and European initiatives and other relevant links that can make a difference on the preparation of teachers for this process. It also includes some data from worldwide organizations and initiatives when that was deemed relevant for the teachers. The SIG is used to provide dynamically this information for all the registered teachers.

1.2 Reference Info

This sub-chapter compiles some of the most relevant information published in the SIG in the more recent months.

1.2.1 Quick guide: Monitoring and evaluation of ICT in education initiatives (<http://www.infodev.org/articles/quick-guide-monitoring-and-evaluation-ict-education-initiatives>)

This site, created by infoDev, provides some useful resources related to the monitoring and evaluation of ICT in education initiatives to assist those interested in the topic. The site includes:

- infoDev publications and activities
- UNESCO publications and activities
- Some studies related to the impact of ICT use in education
- Some additional monitoring and evaluation resources

1.2.2 European Schoolnet Observatory (<http://www.eun.org/observatory/>)

The European Schoolnet Observatory is primarily designed to provide evidence about the use of technology to improve teaching and learning for decision makers in Ministries of Education, practitioners in schools and other ICT in education professionals at national, regional or local level across Europe. The Observatory highlights evidence in the area of innovation in education, especially:

- statistics evidence (e.g. Survey of Schools: ICT in Education)
- evidence from practice (and policy)
- evidence from research (e.g. literature review)
- Findings from surveys of end users in schools.

1.2.3 ICT in Education Toolkit (<http://www.ictinedtoolkit.org/usere/login.php>)

The ICT-in-Education Toolkit provides education policy makers, planners and practitioners with a systematic process to formulate, plan and evaluate education development programs enhanced by Information and Communication Technologies (ICTs). The Toolkit contains six toolboxes - a total of 19 tools - that provide interactive instruments and step-by-step guidelines which assist users:

- Map the National, Technological, and Educational Situation
- Formulate and Assess ICT-Enhanced programs
- Plan for Physical and Human Requirements
- Plan for ICT-Enhanced Content
- Generate Program Costs
- Create a Master Plan
- Monitor Implementation, Effectiveness, and Impact

The Toolkit contains also a Reference Handbook that summarizes worldwide knowledge, research, and experience on the effective use of ICTs for Education.

1.3 Success Stories

In this sub-chapter we present resources concerning best practice and success stories in the integration of ICT in education.

1.3.1 ICT in Primary Education

(<http://iite.unesco.org/pics/publications/en/files/3214707.pdf>)

This book explores the origins, settings and initiatives of effective integration of innovative technologies in primary school and presents the best practices of ICT incorporation in primary schools across the globe. The analytical study was elaborated by a team of experts representing various regions of the world (Chile, Hong Kong, Hungary, Slovak Republic, South Africa, Russia, UAE and UK). The book contains a

research literature review, a brief overview of nine sample primary schools, an international review of ICTs in primary strategies, as well as the international collection of inspiring projects and initiatives. The publication is designed for teachers, educators, headmasters, school policy decision-makers, parents and everybody who cares about modern education for primary stage children.

1.3.2 Survey of schools: ICT in Education (<http://ec.europa.eu/digital-agenda/en/survey-schools-ict-education>)

This study collected and benchmarked information from 31 European countries (EU27, HR, ICE, NO and TR) on the access, use, competence and attitudes of students and teachers regarding ICT in schools. ICT provision and use in European schools is improving but several obstacles remain. First, teachers still believe that insufficient ICT equipment is the biggest obstacle to ICT use in many countries. Second, whilst teachers are using ICT for preparing classes, ICT use in the classroom for learning is infrequent. Teacher training in ICT is rarely compulsory and most teachers devote spare time to private study. Third, students and teachers have the highest use of ICT and ICT learning-based activities when schools combine policies on ICT integration in teaching and learning. However, most schools don't have such an overarching policy.

1.3.3 Opening up Education initiative (<http://www.openeducationeuropa.eu/en/initiative>)

The main goal of this initiative is to stimulate ways of learning and teaching through ICT and digital content, mainly through the development and availability of OER. Amongst its actions, the most important one is to change the role of digital technologies at school. All the actions within the initiative are put in place with the hope that they help attain the ultimate objective, namely to boost competitiveness and growth at the European level.

Opening up Education calls for EU-level cooperation to push reforms towards the adoption of open learning environments as drivers to enhance digital skills both for pupils and teachers, and in education in general. Another major concern of the European Commission, stated in this initiative and in alignment with the Open

Education Europa portal, is to be able to support the deployment and availability of digital technology and content.

1.4 Final Remarks

The dynamics of such an active area as ICT in Education generate a lot of initiatives, projects and studies. The information generated by all these processes can hardly be resumed in a few pages. Therefore the information here contained should naturally be followed by the information that is continuously updated on the ICTWays community.

2 Events

Carlos Vaz de Carvalho

2.1 Background

The use of ICT in Science classrooms is a topic of research and practice. Therefore it is not a surprise that there are many events (conferences, workshops, training actions, etc.) focused on the topic. In this chapter, information on these events is provided for teachers, researchers and other stakeholders.

2.2 Reference Info

In this sub-chapter we present information relating to conferences that will be organized in the following months.

2.2.1 INTED2015, the 9th International Technology, Education and Development Conference (<http://iated.org/inted/>)

INTED2015, the 9th International Technology, Education and Development Conference will be held in Madrid (Spain), on the 2nd, 3rd and 4th of March, 2015. The conference provides an opportunity to present projects and experiences and it is a platform to discuss the latest developments in the field of teaching and learning methodologies, educational projects and innovations and new technologies applied to Education and Research. Two ISBN publications will be produced with all the accepted abstracts and papers. All accepted contributions will be included in the IATED Digital Library to form part of their database of innovative projects in Education and Technology.

2.2.2 ICT Conference for Schools - Southampton 2015 (<http://www.ictconference.info/>)

ICT Conference 2015 is for all the stakeholders involved with the strategy, planning and delivery of ICT in schools (senior management, heads of ICT, classroom teachers, etc) . This will be held at King Edward VI School and the all day conference will be free of charge for schools. The broad focus of the conference will be the practical use of mobile technology in schools and will have a range of presentations and workshops covering policy, practice and technologies.

2.2.3 EduTech 2015 (<http://www.edutech.net.au/>)

EduTECH® is the Southern Hemisphere's largest education congress and ed tech expo. In 2015, EduTECH will attract over 8,000 attendees and will host 8 congresses, 8 post-congress masterclasses, 250 exhibits, extra streams, seminars, TeachMeets and breakouts for expo visitors.

2.2.4 CSEDU 2015 (<http://www.csedu.org/>)

CSEDU 2015, the International Conference on Computer Supported Education, aims at becoming a yearly meeting place for presenting and discussing new educational environments, best practices and case studies on innovative technology-based learning strategies, institutional policies on computer supported education including open and distance education, using computers. In particular, the Web is currently a preferred medium for distance learning and the learning practice in this context is usually referred to as e-learning. CSEDU 2015 is expected to give an overview of the state of the art as well as upcoming trends, and to promote discussion about the pedagogical potential of new learning and educational technologies in the academic and corporate world.

2.3 Success Stories

In this sub-chapter we will address exemplary case of teacher training on the use of ICT in Science classrooms.

2.3.1 UNESCO ICT Competency Framework for Teachers (<http://www.unesco.org/new/en/unesco/themes/icts/teacher-education/unesco-ict-competency-framework-for-teachers/>)

The UNESCO ICT Competency Framework for Teachers (ICT-CFT) is intended to inform educational policy makers, teacher-educators, providers of professional learning and working teachers on the role of ICT in educational reform, as well as to assist Member States in developing national ICT competency standards for teachers with an ICT in Education Master Plan approach.

2.3.2 Commonwealth of Learning (<http://ccti.colfinder.org/>)

The Commonwealth of Learning, mostly in partnership with other organisations and institutions, has developed teacher training materials as open educational resources.

The materials aim to improve teachers' experience of teaching in the classroom with ICT and increase school managers' involvement in ICT implementation in the school. Institutions that wish to deploy the materials can use it as is, adapt it for their own context and make their own decisions about how these materials course should be used, which technologies to use and what learning management and/or collaboration tools to deploy.

2.3.3 European Schoolnet (<http://www.eun.org/teaching/teacher-training>)

European Schoolnet offers distant opportunities such as webinars and online training to reach out to a larger number of teachers. In December 2013 they launched the European Schoolnet Academy - Europe's first online course platform for teachers. Primary or secondary school teachers can benefit from the online professional development courses that are available in the European Schoolnet Academy (www.europeanschoolnetacademy.eu) to learn about innovation in the school and classroom, and enhance teaching practice. The two pilot courses that started in March 2014 cover two key areas of expertise of European Schoolnet: Future Classroom Scenarios and STEM education.

2.4 Final Remarks

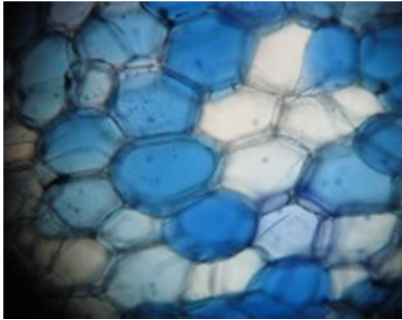
The use of ICT in education (including Science classes) is a thriving research and practice field with plenty of experiences and opportunities. It is not surprising therefore that this is a domain where a lot of events are available. We expect that this trend will continue in the next few years with more and more initiatives taking place with this focus.

Sciences

3 Biology

Andrea Bianchi

3.1 Background



Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy (*Based on definition from: "Aquarena Wetlands Project glossary of terms". Texas State University at San Marcos*)

There are a lot of interesting website and fascinating resources about how to teach biology with the information and communication technologies but often there isn't a place that collect them and that make them available for teachers: this community aims to cover this gap.

The SIG "Biology" it's a group for people who work with ICT in a biology classroom, particularly for teachers who need to teach using new methodologies.

3.2 Reference Info

This SIG is interested into sharing experiences in the field Biology. So the group has interesting for instance in finding out resources, experiences, best practices, devices, instruments, useful for this aim.

The SIG is available at the following link:

<http://ictways.eu/community/groups/profile/48/biology>

The group activities are available at the following link:

<http://ictways.eu/community/groups/activity/48>

3.3 Success Stories

From the webs showed before it can be seen that there is a strong community working in the development of tools for students and teachers in the field of geography and

other subjects. One of the most important is redeiras, (edu.xunta.es/redeiras) because it puts, in one portal, the most important tools, apps, literature, problems and so and so, needed for primary and secondary schools in Galicia (Spain). Some of the interesting topics discussed or to be discussed in the SIG:

3.3.1 A-level biology for android

Take a look at this app (free for Android) and let me know your opinion. It has been a really great overview of the A Level Biology course for many students all over the world:

<https://play.google.com/store/apps/details?id=com.learnersbox.a.level.biology&hl=en>

3.3.2 Membrane potential simulator

If someone needs to explain the concept of the membrane potential in a simple way, on this link you can find the membrane potential simulator developed by the University of Arizona. This simulator takes for granted that the user knows the Nernst and the Goldman equations but in my opinion it could be used also by high-school teachers to explain how ion concentrations and ion channels opening determine the membrane voltage. I suggest to select the "Goldman 37°C" modality with the gray label on the right. You are able to change the ion concentration with the cursors on the left and see on the right how the voltage changes. You can change both the []in and []out to show how the voltage is correlated to ion concentrations. Then you can change the permeability (if you don't need to explain what ion permeability is, just say that an ion channel is opening) and see again what happens to the voltage. This could be a way to make visible one of the most interesting topic of biology, that is at the same time one of the most difficult to understand for students.

<http://www.nernstgoldman.physiology.arizona.edu/>

3.3.3 Science education

An interesting report of the EC which analyse the state of renewal of Science Education in Europe: [http://ec.europa.eu/research/science-](http://ec.europa.eu/research/science-society/document_library/pdf_06/report-rocard-on-science-education_en.pdf)

[society/document_library/pdf_06/report-rocard-on-science-education_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/report-rocard-on-science-education_en.pdf)

3.4 Final Remarks

The SIG is characterized by people interested in the field of teaching biology. The community started its activity in July 2014 and it has actually 8 members, mainly biology teachers.

The SIG needs people really involved in the group subjects as, for instance, teachers, specialists, university professors, consultants and so on.

Nowadays teachers and students have information more than enough to study and to do lectures, the only important thing is that they need to filter contents in order to be not overcharged of information.

4 Chemistry

Manuel Pérez Cota

4.1 Background

Chemistry says Wikipedia is a branch of physical science that studies the composition, structure, properties and change of matter. Chemistry is chiefly concerned with atoms and molecules and their interactions and transformations, for example, the properties of the chemical bonds formed between atoms to create chemical compounds. As such, chemistry studies the involvement of electrons and various forms of energy in photochemical reactions, oxidation-reduction reactions, changes in phases of matter, and separation of mixtures. Preparation and properties of complex substances, such as alloys, polymers, biological molecules, and pharmaceutical agents are considered in specialized fields of chemistry.

4.2 Reference Info

<http://edu.xunta.es/redeiras>: This is the principal web in Galicia for education contents, provided by Xunta de Galicia (Galician Government), in this case is valid for Chemistry, Geography and some other fields. It provides focused information in all fields within the education programs in primary and secondary schools.

<http://www.feique.org>: This is a portal from Chemical Industry in which they provide resources for education, among many other things.

<http://recursostic.educacion.es>: It is another portal that provided resources for many subjects, newton for chemistry is very well known.

<http://www.eduquim.com>: It is a portal dedicated for chemistry developments in education, very simple to use.

<http://www.portaleso.com>: In it students and teachers can get information about subjects of chemistry in secondary schools.

<http://www.oei.es>: Portal of the latin american states to develop chemistry, geography and other subjects from their point of view.

4.3 Success Stories

From the webs showed before it can be seen that there is a strong community working in the development of tools for students and teachers in the fields of chemistry and other subjects.

For me one of the most important one is redeiras, (edu.xunta.es/redeiras) because it manages to put, in one portal, the most important tools, apps, literature, problems and so and so, needed in primary and secondary schools in Galicia (Spain).

4.4 Final Remarks

The most important remark, from my point of view, is that, nowadays, teachers and students have information more than enough to study and to prepare lectures, the only important thing is that they need to filter contents in order not to be overloaded by information.

5 Geography

Manuel Pérez Cota

5.1 Background

Geography (from Greek γεωγραφία, *geographia*, lit. "earth description") also from Wikipedia, is a field of science dedicated to the study of the lands, the features, the inhabitants, and the phenomena of the Earth. The study of this field is not only compulsory, but essential, because it makes students to understand the world they live. The use of ICT in this field are supported for many old and new ICT tools, that can permit not only to know the world, countries, rivers, mountains, etc. but too see them as if they were living over there. It can be considered that the use of ICT technologies, nowadays is an essential tool to discover the world.

5.2 Reference Info

<http://edu.xunta.es/redeiras>: This is the principal web in Galicia for education contents, provided by Xunta de Galicia (Galician Government), in this case is valid for Chemistry, Geography and some other fields. It provides focused information in all fields within the education programs in primary and secondary schools.

<http://maps.google.es>: This is an obligatory portal to be used, because students and teachers can discover all the world, almost any place can be seen using it. With the whole version it can be seen very small spaces (people can be seen). Then the knowledge that can be acquired can be the spearhead for a student to try to know the world is surrounding him or her.

<http://recursostic.educacion.es>: This is other portal that can provide resources for many subjects.

<http://www.portaleso.com>: In it students and teachers can get information about subjects like geography in secondary schools.

<http://www.oei.es>: Portal of the latin american states to develop geography and other subjects from their point of view.

5.3 Success Stories

From the webs showed before it can be seen that there is a strong community working in the development of tools for students and teachers in the field of geography and other subjects.

For me one of the most important one is redeiras, (edu.xunta.es/redeiras) because it conquere to put, in one portal, the most important tools, apps, literature, problems and so and so, needed in primary and secondary schools in Galicia (Spain).

5.4 Final Remarks

The most important remark, from my point of view, is the fact that, nowadays, teachers and students have information more than enough to study and to do lectures, the only important thing is that they need to filter contents in order to be not overcharged of information.

6 Math and Natural Sciences

Mikas Balkevicius, Renata Kondrataviciene

6.1 Background

The application of Information and communication technology in Primary education in Lithuania is one of the Lithuanian groups in the Community of Practice (www.ictways.eu). It consist from 7 sub—groups entitled in following: Primary schools' teachers' articles about ICT application educational process, Project work, Challenges and difficulties in application of ICT in primary education, Innovative methods of applying of ICT in Primary education, Virtual learning environments, Digital learning tools, Personal websites of teachers for using of ICT.

Teachers of Primary education shared valuable experience on using ICT in Primary education. The main subjects sufficiently covered: Natural sciences, Math. This is the reason they are explicated here.

6.2 Reference Info

Teachers of Primary education mentioned the following digital tools for fruitful teaching in the primary schools in terms of math and Natural sciences:

- Learning tool for teaching Math - Sebran's ABC: www.wartoft.se;
- Learning tool for teaching Math - Pasakyk, kiek laiko?: mkp.emokykla.lt;
- Learning tool for teaching Math - Figūros: mkp.emokykla.lt;
- Learning tool for teaching Math - Paveikslėlių aritmetika: mkp.emokykla.lt;
- Learning tool for teaching Math - Atogrąžų matematika: vma.emokykla.lt;
- Learning tool for teaching Math - Keturi veiksmi: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Sveikas maistas”: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Išmanieji robotai”: ismaniejirobotai.lt;
- Learning tool for teaching of Natural sciences - “Tvenkinio tyrinėtojas”: mkp.emokykla.lt;

- Learning tool for teaching of Natural sciences - Žemė, augalai, gyvūnai: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences - Pasaulio pažinimas: mkp.emokykla.lt.

6.3 Success Stories

6.3.1 Mathematics

Digital tools for teaching of Math were used extensively by most of Vilnius Primary schools teachers. The most common programmes used: “Sebran's ABC”, “Pasakyk, kiek laiko”, “Figuros”, “Paveikslėlių aritmetika”, “Atogražų matematika”, “Keturi veiksmai”.

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Pasakyk, kiek laiko”** this is a tool to learn about the time phenomena and equipment. There are two aspects of this tool – educational and evaluation. Pupils acknowledge the structure and measuring of time by observing of virtual clock. They are able to manipulate, edit time virtually. Also this tool promotes pupils understanding as time a treasure and prompts to value it. Digital format, availability to manipulation, and interactive testing makes this tool valuable for teaching about time in Math lessons.

Digital tool **“Figuros”** helps to acknowledge different shapes of geometrical figures: pupils are able to modify, construct different figures from the different elements. This tool enables constructive thinking in Math education empowering them to develop good visual and geometrical figures senses.

Digital tool **“Paveikslėlių aritmetika”** helps to understand the relation between the different counts and math operations. Pupils are encouraged to do some math operations by manipulations with different math procedures and test themselves. This tool enables pupils digital and Math competences at general.

Digital tool **“Atogrąžų matematika”** is used to promote pupils abilities to count different objects. It enables pupils learning trough counting different exotic animals and plants. This tool motivates pupils learning because they find interesting exotic environments and way of interacting with it.

Digital tool **“Keturi veiksmi”** is a digital tool for implementing the four major math functions addition, subtraction, division, multiplication. This tool enables interactive environment using different objects to complete different tasks using those four functions. Students have higher motivation working with this tool because of higher interactivity comparing to conventional methods of teaching.

6.3.2 Environment science subject **“Nature and Human”**

Digital tools for teaching of **“Natural and Human”** where used extensively by most of Vilnius Primary schools teachers. The most common programmes used **“Sveikas maistas”**, **“Išmanieji robotai”**, **“Tvenkinio tyrinėtojas”**, **“Žemė, augalai, gyvūnai”**, **“Pasaulio pažinimas”**

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Sveikas maistas”** introduces pupils with main foodstuffs production in our daily life. Pupils are able to observe structure and qualities of foodstuffs production virtually. Also they are able to reflect on negative aspects of unhealthy food. Pupils can test their knowledge doing virtual tests and tasks related too food safety at home. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Išmanieji robotai”** introduces pupils with nature. Robot is leading towards virtual excursions through diferent and the most famous landscapes of the world. Pupils acknowledges different geographical areas, basic climate, animals and cultures around the world. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Tvenkinio tyrinėtojas”** enables to acknowledge all species of the ponds, their ecological environment, their interrelations. Digital tools helps to show connection between environment change and species population. Pupils are able to manipulate with ponds environmental change observing the on-going change of the species in that interactive pond. Colourful and interactive environment of the support pupils attention and motivation in learning about environmental issues of the ponds.

Digital tool **“Žemė, augalai, gyvūnai”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Pasaulio pažinimas”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation

6.4 Final Remarks

Teachers of primary education used those digital tools in addition to the mainstream pedagogic strategies. So those digital tools are more complimentary to the main pedagogic strategies to improve knowledge and understanding about learning object.

7 Physics

Physics is one of the areas where use of ICT in education has a strong place and there is a strong potential for its exploitation. ICT is widely used for different kinds of demonstrations and tests. There are numerous free programs and teaching materials available for teachers of physics. More and more schools and teachers are using such materials as a standard part of their teaching process.

7.1 Reference Info

7.1.1 Cleaning Water Activity - <http://ictways.eu/community/file/download/2782>

NASA published an interesting document with a lesson which challenges students to create and test their own water filtering system.

Build Your Own Solar System - <http://solarsystem.nasa.gov/educ/byoss.cfm>

Creating a scale model of the solar system with your students is a great way for them to experience the vastness of the solar system and the relative sizes and locations of the planets and other solar system objects.

7.1.2 Physics for Children with Dyslexia - <http://ismart-project.com>

Nowadays the trend is to integrate children with special needs to regular classes. Children with dyslexia symptoms are considered the children with special needs. The teachers need special support to find the best way to teach dyslexic children. ICT tools provide new challenging possibilities to improve teaching and learning skills in this area. Integration of material and virtual world is the best way to allow dyslexic children to learn much faster and better. Physics is the area where this approach can be used the best.

Currently there is an iSMART project which develops applications for smart ICT based tools (such as smart phones, tablets and smart boards) for all levels of formal, non-formal and informal learning exercises. ICT is a key tool to help dyslexic learners in the classroom in both learning and teaching experiences as well as accessing or recording written information.

7.1.3 Memory, Thermodynamics, and Time - <http://physicscentral.com/explore/action/memory-and-time.cfm>

What is time? While answers abound for this question, many physicists and philosophers continue to work on it tirelessly. Our common experience leads us to think of time as flowing forward, but the equations that describe our physical universe do not require that time move forward. The educational article provides support to teachers to explain the phenomenon of time.

7.1.4 Resources for Teaching Physics - <http://www.csun.edu/~vceed002/physics/>

Another interesting portal with many interesting links to organisations, links, demonstrations or publications about teaching physics.

7.2 Success Stories

Physics Central (<http://physicscentral.com/>) is the activity and portal by the American Physical Society. It provides wide range of articles, studies, demonstrations, simulations, experiments and other tools which are very useful for teaching physics with use of ICT. This site is widely used by physics subject teachers.

7.3 Final Remarks

Physics is the area where ICT is widely used. The biggest potential lies in demonstrations as well as serious games used in teaching physics.

8 Humanities and Social Sciences

Carlos Vaz de Carvalho

8.1 Background

Although Humanities and Social Sciences were not initially included in the set of domains addressed by the ICTWays network but it was decided to address the use of ICT in this area for completeness and increased network scope. Therefore this SIG covers the use of ICT in disciplines like economics, human geography, political science, demography and sociology, anthropology, archaeology, history, communication and information sciences, law, linguistics and other related disciplines.

Currently, ICT tools are used extensively for research in these areas, mainly for statistical data analysis. The use of ICT tools for education in these domains is not so frequent therefore the relevance of this chapter which is organized by first presenting some reference information in terms of available software and applications and then some best practice related to the use of those applications.

8.2 Reference Info

In this sub-chapter different tools used to support education of social sciences and related domains are presented. In the respective web sites further descriptions and examples of use are available.

8.2.1 Timemesh (<http://timemesh.eu/>)

TIMEMESH is an online game about Europe. It is a collaborative and social graphical adventure game about the main historic events of our past. TIMEMESH is free, oriented towards 11-15 years-old but anyone can play it (it is available in English, Spanish, Portuguese, Slovenian and Estonian). TIMEMESH covers the following scenarios:

- Second World War: Help the Allies recover an Enigma Machine and a codebook to decrypt the Axis military messages. Go to occupied Paris, to the German Headquarters, the Warsaw ghetto and Bletchley Park, in England.

- Maritime Discoveries: Be part of the European maritime expansion in the XV and XVI centuries. Navigate with the Portuguese and Spanish Kings, find new lands in the Ocean.
- Industrial Revolution: Did you know that children were the major labour force in the Industrial Revolution? Be part of the struggle to allow children to study and to play. Convince the English Parliament to limit labour to adults.

8.2.2 Learning Portuguese (<http://learningportuguese.eu/curso/curso.html>)

This online course aims to enhance the employability of European citizens and competitiveness of companies by means of acquisition of language and cultural competences in Portuguese, with particular attention to the Brazilian variant. It is useful for companies staff interested in learning Portuguese for better performance in their work, when already working with Portuguese speaking countries, or just for professional promotion, being aware of the increasing importance of Portuguese for international business. It can also be used by adults willing to improve their language skills for personal or professional improvement.

This course is an example of a growing category of applications dedicated to language learning.

8.2.3 Betwixt Folly and Fate

(http://www.history.org/history/teaching/dayinthelife/interact_role.cfm)

Betwixt Folly and Fate is an immersive 3-D role playing game that places players in 1774 Williamsburg as one of four characters:

- Chloe, an enslaved house servant
- Henry, a free black carpenter
- Mary, a midwife's assistant
- George, a young gentleman

In each role, players face the challenges of daily life in early America while learning about the social classes and customs of the time. For example, Henry, a free black carpenter, must find enough work as a journeyman to pay his mother's rent. As Henry

seeks carpentry work and other tasks that come his way, the player learns about facets of ordinary eighteenth-century life as well as the opportunities and constraints facing a free black tradesman in 1774.

8.3 Success Stories

In this sub-chapter we present two studies related to the use of ICT in Humanities and Social Sciences education. We also present a European association dedicated to research and education of Digital Humanities.

8.3.1 A Survey on ICT Usage and the Perceptions of Social Studies Teachers in Turkey (http://www.ifets.info/journals/11_3/4.pdf)

A research study done by Turkish researchers Yasemin Gulbahar and Ismail Guven from Baskent University and Ankara University analysing the use of ICT tools in primary schools in the social studies subject area. Authors try to identify the various variables that affect the success of the use of those tools.

8.3.2 ICT in History Education (<http://dl.acm.org/citation.cfm?id=1057201>)

A review of the use of ICT tools in History education by Peter Hillis and Bob Munro. The review is a bit dated (2005) but provides a basis for the study of more recent developments.

8.3.3 European Association for Digital Humanities – EADH (<http://eadh.org/>)

EADH brings together and represents the Digital Humanities in Europe across the entire spectrum of disciplines that research, develop, and apply digital humanities methods and technology. These include art history, cultural studies, history, image processing, language and literature studies, manuscripts studies, and musicology, amongst others. The EADH also supports the formation of DH interest groups in Europe that are defined by region, language, methodological focus or other criteria. Although this is mostly a research and academic association it has relevant initiatives in the use of digital technologies for humanities education.

8.4 Final Remarks

The umbrella denomination of Humanities and Social Sciences incorporates a large number of scientific areas. However the use of ICT in the education of these areas is

quite unbalanced. A few areas like History, Geography and Economy have a large (high-quality and interactive) range of educational tools for different levels of students. Others, like Anthropology, barely have educational tools support. The use of a Community of Practice like ICTways where teachers can share their expertise and use of these tools can be a way to balance IST use throughout all the scientific areas.

Other topics

9 Special Topics

Elisabetta Giannossi, Francesca Savy

9.1 Background

Today's technology offers students all kinds of new and highly effective tools that they can use to learn - the Internet, where they can search for almost any information, search tools to distinguish what is true and relevant, analysis tools to help make sense of the information, tools for the creation and presentation of its findings with a variety of media, tools to network and collaborate with people from all over the world. The SIG "*Special Topics*" it's a group for people who work with new technologies in a school. In this group we can share experiences, difficulties, best practices, the best app for education.

9.2 Reference Info

This SIG is interested people that use the devices during lessons in own class. In this group you can find experiences but also products made with the use of the tablet.

In the "Group files" were included lessons conducted with LIM. These lessons have been created in collaboration with the students using the method of the flipped classroom. The activities are available at the following link

<http://ictways.eu/community/groups/profile/2431/special-topics>

9.3 Success Stories

Some of the interesting topics discussed or to be discussed in the SIG:

- APP's in the Classroom

The subsections of the group, such as "APP's in the Classrooms" I detected a large amount of information on the APPS that you can use in everyday teaching. From this comes the ability to understand the added value of digital in their specific professional context and then to know to effectively integrate and use.

Another interesting section of this group is the section devoted to programming. Even in Italy is to be introduced in the school curriculum hour of programming and I think it is of major importance as programming develops logical and rational thinking of our pupils.

9.4 Final Remarks

The SIG has actually 16 members. In this group teachers share apps specific for math and science that can also be used with primary school students. But there is also research and cataloging of the resources, textbooks, videos, podcast, music, games and the creation of didactic narratives. Teachers and students can establish new creative relationships.

10 ICT for Special Needs

Lucía Polo Alvarez

10.1 Background

The importance of the ICT in teaching is growing every year, but this importance is becoming crucial in the case of pupils with Special Needs (not only physical needs). The technology is not only the tool, it also supports new methodologies to teach, and very useful, for this people to learn. In some cases, the differences between the use or no use of ICT is more than 60% of success rates in the end.

But technology, hard and soft, changes day by day, and it is difficult to be always updated and to be able to pick out the best products. So this SIG is the place to share, to point out these best practices, best apps, best methodologies and also the relevance of the use of these products in the classroom. It is important also to know if some of them could be used with other disabilities.

10.2 Reference Info

A specialized training course in ICTs in Education for people with Special needs, within the framework of the IITE project Information and Communication Technologies in Education for People with Special Needs. The course is intended to provide the specialists involved in education of people with special educational needs (SEN), with an overview of main ways, methods, and principles of information and communication technology (ICT) usage in their professional activities.

<http://iite.unesco.org/pics/publications/en/files/3214644.pdf>

A report with the Top 100 Education Innovatives, in the field of Sciences.

http://www.fundaciontelefonica.com/arte_cultura/publicaciones-listado/pagina-item-publicaciones/?itempubli=263

A web where it could be found many publications about resources, methodologies, memories about Education for people with special needs.

<http://www.fundaciononce.es/es/pagina/publicaciones-1>

The web of the Standing Conference on Teacher Education North and South, and the special chapter about using Ict to support pupils with special Educational Needs (useful docs and links)

<http://scotens.org/sen/ict/>

10.3 Final Remarks

It is important involve not only teacher, also researchers and institutions (social or not) which work in this area). The SIG will be success if the people are really involved.

11 Games for Learning

Lucía Polo Álvarez, Anna Bertolini

11.1 Background

Videogames and apps are current in school's life, trying to teach through this methodology could provide better results, not only to learn but also to understand. Games create a need to know, to ask, to examine, to assimilate and to master special skills and content areas. Some experts argue that games are, first and foremost, learning systems, and that this accounts for the sense of engagement and entertainment players experience. But it is necessary to use only those which could be useful in the classroom.

11.2 Reference Info

Using games, students can understand how functional they are in the identification of their own inclination. In the classroom our starting point was this specific image, but then we went further: here there are the links to the material found ON the Internet and produced by ourselves.

<https://pixelearning.wordpress.com/2012/08/14/why-are-games-good-for-learning/> In a 3rd year middle school Class, we approached the study of the Central nervous system together with the "orientation project" (which is the choice of the secondary school) starting From the picture (link) showing the position in the Brain of various playing areas. We highlighted the different Brain areas, as displayed by the link, and compared them with the ones identified by Howard Gardner as the Places of multiple intelligences. We related the Brain areas activated during the execution of some games to the ones involved during the execution of certain activities: It became clear then how specific kinds of games develop into work activities. Playful activity is thus a preamble of future work activity.

11.3 Success Stories

First of all, we used the interactive whiteboard to show images and the computer lab to search for information; then students, through the use of specific software

(S.OR.PRENDO), discovered their own aptitudes. It is important to point out that our school was chosen by the Ministry of Education (MIUR) to test this new above mentioned software for Parma area.

<http://sorprendo.it/>

Gardners maintains that the different development degree of areas in which multiple intelligences are located affects kids aptitude, thus children should consider this aspect when choosing their future schools.

They need to start from their natural predisposition in order to consider possible future careers.

http://www.uciim.sicilia.it/intell_multiple.htm

<http://www.ipermind.com/tipi-di-intelligenza/>

<http://www.giovanaspantigati.it/en/la-teoria-delle-intelligenze-multiple.html>

<http://gabryventu49.blogspot.it/2014/01/linsegnamento-con-modalita-sinistra-e.html>

<http://www.edutopia.org/blogs/beat/game-based-learning>

11.4 Final Remarks

Collaboration between Science and Social Studies/Humanities teachers allowed students to a greater understanding of this topic and of themselves. it increased the value of students aptitudes even in those activities which are usually underestimated at school: linguistic and mathematic skills are generally considered the most important in the educational environment. we started from games to reach future jobs. All the team teachers chose this kind of approach to value digital skills in all the subjects, as stated by European Council

12 Technology

Carlos Vaz de Carvalho

12.1 Background

ICT and technology education in primary (basic), secondary and vocational education (middle levels) have quite different levels of implementation in the different European countries. Therefore to ensure the general interest, this edition of the SIG report on ICT use for Technology education focus on a transversal topic, Learning to Code/Program. This issue is currently being addressed at different age levels all over Europe and the World (the UK is leading in this aspect with mandatory programming education for all primary and secondary students). Coding (that is, creating software applications) is seen as a way to teach applied math and sciences but most of all it is a way to teach iterative approaches to solving problems and testing out ideas. In other words, it supports the development of a new way of thinking.

12.2 Reference Info

In this sub-chapter we present different tools that support the learning how to code:

12.2.1 Scratch (<https://scratch.mit.edu/>)

Scratch is a free, downloadable application that lets users combine graphics, photos, music, and sound to create simple interactive animations, games, and slide shows. Users create scripts by dragging and dropping graphical blocks that snap together like puzzle pieces. They can then post their creations on the Scratch site, where others can view and download them. This MIT effort is named after scratching, the technique hip-hop DJs use to create music by combining turntable manipulation with prerecorded clips and synthesizers. Teachers and parents have lots of information on how to use Scratch with their kids.

12.2.2 Hopscotch (<http://www.gethopscotch.com/>)

Hopscotch HD is a drag and drop programming app for kids to write their own programs. Kids need to be independent readers in order to follow the instructions and commands and "write" their code, but there is no objectionable content in the app.

Kids are empowered to create programs that control characters and can add text to their programs. Kids can view programs created by other kids in or upload their own programs to the community.

12.2.3 Hackety Hack (<http://www.hackety.com/>)

Hackety Hack teaches the absolute basics of programming from the ground up, using the Ruby programming language, used for all kinds of programs, including desktop applications and websites. Hackety Hack uses the Shoes toolkit to make it easy and fun to build graphical interfaces. Several lessons and example programs are provided, showing how to make all kinds of things!

12.3 Success Stories

In this sub-chapter we present the most relevant worldwide initiatives related to learning to code and to program.

12.3.1 Code Academy (<http://www.codecademy.com/>)

Codecademy is an online interactive gamified platform that offers free coding classes in seven different programming languages including Python, PHP, jQuery, JavaScript, and Ruby, as well as markup languages HTML and CSS. As of January 2014, the site had over 24 million users who had completed over 100 million exercises. Codecademy also provides documentation that supports teachers to teach their students how to code. As part of the Computer Science Education Week held in December 2013, Codecademy launched their first iOS app called "Hour of Code". The app focuses on the basics of programming, including the same content from the website, and it's aimed for people who want to learn programming in a fun way and on the go.

12.3.2 CODE (<http://code.org/>)

Launched in 2013, Code.org® is a non-profit dedicated to expanding participation in computer science by making it available in more schools, and increasing participation by women and underrepresented students of colour. CODE vision is that every student in every school should have the opportunity to learn computer science so computer science and computer programming should be part of the core curriculum in education, alongside other science, technology, engineering, and mathematics (STEM) courses, such as biology, physics, chemistry and algebra.

12.3.3 Khan Academy (<https://www.khanacademy.org/hourofcode>)

Khan Academy provides resources for teachers and parents to work with kids to learn how to code. This can be a multi-hour, self-paced curriculum in JavaScript and lessons in HTML / CSS as well as SQL (language for databases) for students to learn various forms of programming. It includes the following content:

- Videos and “talk-throughs”, to teach programming concepts.
- Coding challenges, which give the student a chance to practice the concept and allow to automatically grade them and award points.
- A final project, a way for students to use what they’ve learned in a more creative, free-form way.

12.3.4 Year of Code (<http://yearofcode.org/>)

Year of Code was an independent, non-profit campaign to encourage people across UK to get coding for the first time in 2014. Through code people could discover the power of computer science, get involved with technology, change the way they think about, and get the most out of, the world around them.

12.4 Final Remarks

Learning to code and to program has become one of the most important topics in ICT and Technology learning. Coding is seen as a way to improve the way students think and learn by providing them with better problem solving skills, improved reasoning and logic thinking and the capacity to implement small projects.

13 How to use a tablet in the classroom

Andrea Bianchi

13.1 Background



Today's technology offers students all kinds of new and highly effective tools that they can use to learn from Internet, with which search for almost any information, search tools to distinguish what is true and relevant analysis tools to help make sense of the information, tools for the creation and presentation of its findings with a variety of media, the mass media to network and collaborate with people from all over the world.

The SIG “How to use a tablet in the school” is a group for people who work with new technologies in school, particularly for teachers who teach scientific subjects. Its official description is declaimed as following: “Experiences, difficulties, best practices and advices about how to use a tablet during a lesson or in a lab”.

This SIG is interested in people that use the devices during lessons in own class. In this group you can find experiences but also products made with the use of the tablet.

The tablet was used in a variety of subjects, and there is no indication that the tablet is more suitable for any subject in particular. Most of the teachers used the tablet mainly for browsing and searching the Internet to collect learning material, or with a variety of applications in order to prepare presentations for lessons. This type of practice suggests that the tablets provide a set of tools and functions that can be exploited across all subjects. But tablet is lot more than that! So join us and tell us your experience with it!

13.2 Reference Info

This SIG is interested into sharing experiences in the field of the using Tablet in the classroom. So the group has interest, for instance, in finding out resources, experiences, best practices, devices, instruments, useful for this aim.

The SIG is available at the following link:

<http://ictways.eu/community/groups/profile/2436/how-to-use-a-tablet-in-the-classroom>

The group activities are available at the following link:

<http://ictways.eu/community/groups/activity/2436>

13.3 Success Stories

Some of the interesting topics discussed or to be discussed in the SIG:

- **Padlet**

Have you ever tried Padlet in your classroom? Reading this article it seems interesting and useful: <http://www.avatargeneration.com/2014/01/padlet-in-the-classroom/>

Here other examples: <http://it.padlet.com/gallery> Take a look at it! Please comment if you consider useful this advisory for your lessons.

- **Quest to learn**

Let's see this website: www.q2l.org. A different way to learn and teach

- **iPads for teaching**

A useful site with many interesting links and advice to create interesting things in classroom through the use of the iPad . <http://www.ipads4teaching.net/ipads-in-the-classroom.html>

13.4 Final Remarks

Information and communication technologies drives the new economy and human capital is its fuel. In fact, the ICT revolution makes knowledge a competitive resource.

The SIG is characterized by people interested in the field of ICT in the classroom, helping in this way students to become the new workers of tomorrow . The community started its activity in July 2014 and it has actually 16 members, mainly involved between schools which use a tablet in their classroom.

The SIG needs people really involved in the group subjects as, for instance, teachers, specialists, university professors, consultants and so on.

14 APP's in the Classrooms

Alexandra Baldaque

14.1 Background

App development is already considered one of the main digital industries, due to the amount of revenue generated by hundreds of millions of consumers around the world. The Apps, short for "applications", came up with Smartphones to make life easier for users in almost all aspects of life, work, school or play. The generalization of these programs was facilitated by being cheap or even free products.

There are very desirable and popular niche markets, such as the games, the customization tools, photography, social networks, aggregators of information, etc. Of course, the school, teaching and learning were not left out of this revolution in the world of digital technologies.

The SIG "App's in the classroom" is a group for people who want to share experiences about practices of introducing App's in the classroom and discuss those inherent problems associated like: How to manage so much information? How to experience and evaluate so many news? Is it worth it? Does the novelty justify the change? There will be an effective benefit? What costs will this benefit?

14.2 Reference Info

This SIG is interested into sharing experiences about how to manage a classroom with teachers and students provided with different ICT tools, devices, apps, etc., and discuss about their benefits, difficulties, awareness, costs, etc.

The SIG is available at the following link:

<http://ictways.eu/community/groups/profile/3194/apps-in-the-classrooms>

The group activities are available at the following link:

<http://ictways.eu/community/groups/activity/3194>

14.3 Success Stories

From the webs showed before it can be seen that there is some relevant discussions and activities that are worth to mention.

One of the relevant discussions on this group is related with Programming and Programming interesting courses, app's and teaching methodologies of this subject, Programming with games, etc.

Another relevant discussion is to elect the 3 best app's introduced by teachers in the classroom, in order to share those experiences with the students, why they use those app's, benefits, etc.

14.4 Final Remarks

The SIG is characterized by people interested in sharing experiences and good practices involving App's in the classroom. The community started its activity in September 2014 and it has actually 11 members of different teachers and students from Portugal and other countries.

The SIG needs people really involved in the group subjects as, for instance, teachers, specialists, programmers, university professors, consultants and so on.

Nowadays teachers and students have app's more than enough to use on their study and to do lectures, the only important thing is that they need to use more the available technology they have in order to be more motivated in the classrooms.

Education Levels

15 Primary Education

Mikas Balkevicius, Renata Kondrataviciene

15.1 Background

The application of Information and communication technology in Primary education in Lithuania is one of the Lithuanian groups in the Community of Practice (www.ictways.eu). It consist from 7 sub—groups entitled in following: Primary schools' teachers' articles about ICT application educational process, Project work, Challenges and difficulties in application of ICT in primary education, Innovative methods of applying of ICT in Primary education, Virtual learning environments, Digital learning tools, Personal websites of teachers for using of ICT.

Teachers of Primary education shared valuable experience on using ICT in Primary education. The main subjects sufficiently covered: Natural sciences, Math. This is the reason they are explicated here.

15.2 Reference Info

Teachers of Primary education mentioned the following digital tools for fruitful teaching in the primary schools in terms of math and Natural sciences:

- Learning tool for teaching Math - Sebran's ABC: www.wartoft.se;
- Learning tool for teaching Math - Pasakyk, kiek laiko?: mkp.emokykla.lt;
- Learning tool for teaching Math - Figūros: mkp.emokykla.lt;
- Learning tool for teaching Math - Paveikslėlių aritmetika: mkp.emokykla.lt;
- Learning tool for teaching Math - Atogrąžų matematika: vma.emokykla.lt;
- Learning tool for teaching Math - Keturi veiksmi: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Sveikas maistas”: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Išmanieji robotai”: ismaniejirobotai.lt;
- Learning tool for teaching of Natural sciences - “Tvenkinio tyrinėtojas”: mkp.emokykla.lt;

- Learning tool for teaching of Natural sciences - Žemė, augalai, gyvūnai: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences - Pasaulio pažinimas: mkp.emokykla.lt.

15.3 Success Stories

15.3.1 Mathematics

Digital tools for teaching of Math were used extensively by most of Vilnius Primary schools teachers. The most common programmes used: “Sebran's ABC”, “Pasakyk, kiek laiko”, “Figuros”, “Paveikslėlių aritmetika”, “Atogražų matematika”, “Keturi veiksmai”.

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Pasakyk, kiek laiko”** this is a tool to learn about the time phenomena and equipment. There are two aspects of this tool – educational and evaluation. Pupils acknowledge the structure and measuring of time by observing of virtual clock. They are able to manipulate, edit time virtually. Also this tool promotes pupils understanding as time a treasure and prompts to value it. Digital format, availability to manipulation, and interactive testing makes this tool valuable for teaching about time in Math lessons.

Digital tool **“Figuros”** helps to acknowledge different shapes of geometrical figures: pupils are able to modify, construct different figures from the different elements. This tool enables constructive thinking in Math education empowering them to develop good visual and geometrical figures senses.

Digital tool **“Paveikslėlių aritmetika”** helps to understand the relation between the different counts and math operations. Pupils are encouraged to do some math operations by manipulations with different math procedures and test themselves. This tool enables pupils digital and Math competences at general.

Digital tool **“Atogrąžų matematika”** is used to promote pupils abilities to count different objects. It enables pupils learning trough counting different exotic animals and plants. This tool motivates pupils learning because they find interesting exotic environments and way of interacting with it.

Digital tool **“Keturi veiksmi”** is a digital tool for implementing the four major math functions addition, subtraction, division, multiplication. This tool enables interactive environment using different objects to complete different tasks using those four functions. Students have higher motivation working with this tool because of higher interactivity comparing to conventional methods of teaching.

15.3.2 Environment science subject **“Nature and Human”**

Digital tools for teaching of **“Natural and Human”** where used extensively by most of Vilnius Primary schools teachers. The most common programmes used **“Sveikas maistas”**, **“Išmanieji robotai”**, **“Tvenkinio tyrinėtojas”**, **“Žemė, augalai, gyvūnai”**, **“Pasaulio pažinimas”**

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Sveikas maistas”** introduces pupils with main foodstuffs production in our daily life. Pupils are able to observe structure and qualities of foodstuffs production virtually. Also they are able to reflect on negative aspects of unhealthy food. Pupils can test their knowledge doing virtual tests and tasks related too food safety at home. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Išmanieji robotai”** introduces pupils with nature. Robot is leading towards virtual excursions through diferent and the most famous landscapes of the world. Pupils acknowledges different geographical areas, basic climate, animals and cultures around the world. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Tvenkinio tyrinėtojas”** enables to acknowledge all species of the ponds, their ecological environment, their interrelations. Digital tools helps to show connection between environment change and species population. Pupils are able to manipulate with ponds environmental change observing the on-going change of the species in that interactive pond. Colourful and interactive environment of the support pupils attention and motivation in learning about environmental issues of the ponds.

Digital tool **“Žemė, augalai, gyvūnai”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Pasaulio pažinimas”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation

15.4 Final Remarks

Teachers of primary education used those digital tools in addition to the mainstream pedagogic strategies. So those digital tools are more complimentary to the main pedagogic strategies to improve knowledge and understanding about learning object.

16 Secondary Education

Seher Yıldız

16.1 Background

Secondary schools are the last step before entering a University. So it's a very important step for all the students, teachers and the families as well. They start to study the first steps of all subjects (literature, maths, physics, chemistry, biology, history, geography, art and IT) on the 9th grade and students go on studying the second steps of the same subjects on the 10th grade. Then they choose the subjects to focus on the ones which they will study at their favorite university/faculty. If a student wants to study at medical faculties, s/he chooses the sciences, physics, chemistry, biology and less maths ; If s/he wants to study engineering s/he chooses more maths and less physics and biology. On the 11th and the 12th grades.

So ICT is a necessary means to be used for such a heavy programme to catch and the save the time, to reach more information affectively from existing resources.

16.2 Reference Info

By using ICT, students can find more software programmes, more information in the forms of audio visual and in three dimension to learn better and affectively. They can do more examinations/tests to be able to study and test themselves to see if they have understood.

<http://www.osym2015.com/node/709>

<http://www.ossmat.com/index.php/konu-anlatm/biyoloji-dersi-konulari.html>

16.3 Success Stories

I have met two teachers both teaching biology, one is good at using IT at her courses, she doesn't have to write and draw for teaching, she just open the smart board, download her subject on the board and finishes her course affectively and with no large efforts. And her students also follow the system. The other still uses old classical methods writing on the board, drawing the charts on the board and so on. She spends

much time and effort to finish her course and also her students have to do the same using lots of pepper sheets feeling board and tired at the end

16.4 Final Remarks

Using ICT makes every point of subject more practical to get, to learn, to collect and also saves time and energy.

17 Vocational education and training

Andrea Bianchi, Elisabetta Giannossi, Francesca Savy

17.1 Background



Secondary education is composed of general secondary schools, and vocational and technical secondary schools.

The SIG “Vocational education and training” is a group for people who work with ICT in Vocational secondary schools, particularly for teachers who need to teach using new methodologies with the support of ICT. There are some interesting articles in this group about teaching

methods and resources for working in a vocational school. The Group gives a lot of good tips to get the best out of every student and encourage everyone to express his/her skills.

The official description of the group is declaimed as following: “Are you teaching or working with ICT in an vocational training center? Are you experimenting a new didactic approach in your classroom? Wonderful, this could be your best community group. Describe your experience, tell us your difficulties, share your discovery or your self-discovery”.

The logo of this SIG is a hand because we want to symbolize the main characteristic of vocational schools: students need to use creative hands for studying and working.

17.2 Reference Info

This SIG is interested into sharing experiences in the teaching/learning. So the group is interesting for instance in finding out resources, experiences, best practices, devices, instruments, useful for this aim. There are several important informations about the role of tablet in the school at the following link:

<http://sylviamoessinger.wordpress.com/2012/05/13/tablets-a-must-have-in-education/>

Also interesting is the file reported in “Tips to teach pupils in a vocational center”

<http://ictways.eu/community/file/view/2896/tips-to-teach-pupils-in-a-vocational-center>

The SIG is available at the following link:

<http://ictways.eu/community/groups/profile/2767/vocational-education-and-training>

The group activities are available at the following link:

<http://ictways.eu/community/groups/activity/2767>

17.3 Success Stories

Some of the interesting topics discussed or to be discussed in the SIG:

- The role of tablets in the school
- Chromecast: Chromecast has the advantage of permitting a wireless connection for teachers, so they can move themselves freely in the classroom and they can also let the students have access to the projection.
- Use of the e-portfolio in the classroom: I know a lot of schools usually do a paper portfolio, but unfortunately I know also that these portfolios remain in a folder so they are not useful for students in order to find a job or to update their competences and knowledge list. Instead take a look at this e-portfolio <https://www.behance.net/RitaPita> from a friend of mine who works in the graphic sector.
- Use of the TEDs in the classroom: Have you ever tried to teach English using TEDs in the classroom? There are a lot of interesting videos concerning all the materias. <http://www.ted.com/> Some videos have also subtitles in several languages.

An interesting article is “How to teach vocational education: A theory of vocational pedagogy.” (<http://ictways.eu/community/file/download/2896>). This article, even if it is turned to teaching in vocational schools, illustrates methods, viewpoints also applicable to other types of schools, especially in primary school, where the approach is fundamental to knowledge through direct experience. The children should always know how and why to actually implement the knowledge learned. The text presents a

broad spectrum of learning and teaching methods, all important to engage and motivate all students.

17.4 Final Remarks

Information and communication technologies drives the new economy and human capital is its fuel.

The SIG is characterized by people interested in the field of ICT in the classroom for creating employing knowledge workers and continuous learning. The community started its activity in July 2014 and it has actually 27 members, mainly involved in the field of initial vocational training. The SIG needs people really involved in the group subjects as, for instance, teachers, specialists, university professors, consultants and so on.

National

18 Turkey

Seher Yıldız

18.1 Background

Turkey is a developing country not only on the points of industry and agriculture but also on Education as well. The population is increasing rapidly and the system in education should be more practical and effective on science classes. And ICT makes the teachers communicate with their peers. The government and the ministry of education support the dissemination of using ICT both at schools and at homes. Using internet and social sharing sites (facebook, tweeter, instagram ..) is getting common in every subject to share ideas and news.

18.2 Reference Info

By using ICT, a student or a teacher from a very eastern town could share any new event or experience to another student or teacher in Turkey. Once I received a message from a teacher from Hatay (a very far city in the north-east) asking me how she could join an EU Erasmus+ Project. I sent her the mailing address and we still contact each other about our experiences on projects. Regarding English teachers we have many blogs to share our ideas and find answers to our questions: 'Comenius for teachers of Turkey', 'ICT WAYS FOR SCIENCE CLASSROOMS ', etc.

18.3 Success Stories

Here is a very specific example: a teacher has written on the blog to ask about the ideas and experiences. And also the other teachers share their ideas.

'Arkadaşlar bir proje hazırlamaya çalışıyorum ve çok hakim değilim kültürel projelerin geçme olasılığı sanırım daha yüksek eğitimle alakalı olmak zorundami projemiz yardımcı olursanız sevinirim. Öğretmenler günümüz kutlu olsun

[BeğenBeğen](#) · [Paylaş](#)



Serkan Yeşilbağ mustafa hocam ne tur bir proje bu,hangi okul,proje konusu ne bu bilgileri vermezseniz tam olarak yardımcı olamayix

Formun Altı

18.4 Final Remarks

It is very useful and practical to use ICT in many subjects not only in the limits of Turkey but also all around the world. It makes the life easier to find the answers for any questions. It's getting wider to use ICT but it should be used even more.

19 Portugal

Alexandra Baldaque

19.1 Background

In the Portuguese education system, in accordance with 6th Article Of the Teaching Career Statute, as regards the right to training and information to pursue the educational function, assures to the teacher the access to continuous regular training actions aimed to update, enhance and further develop the knowledge and professional skills, supporting their self-training, according to the respective individual training plans. This right may also target goals of professional conversion and as well as of mobility and career progression. There is a lot of interest in knowing how to access interesting training actions, as well as, to know about best practices happening in every school.

The SIG “Portuguese Teachers Group” is a group for people who want to share experiences about practices of introducing ICT in the classroom, particularly for teachers who need to teach using new methodologies.

19.2 Reference Info

This SIG is interested into sharing experiences between Portuguese teachers in secondary and vocational schools. So the group has interesting for instance in finding out resources, experiences, best practices, devices, instruments, useful for this aim.

The SIG is available at the following link:

<http://ictways.eu/community/groups/profile/3188/portuguese-teachers-group>

The sub-group of SB Design is available at the following link:

<http://ictways.eu/community/groups/profile/3189/sb-design-multimedia>

19.3 Success Stories

From the webs showed before it can be seen that there is a strong story from the Soares Basto school and its best practice. The “Soares Basto Design” (SBD) best

practice was conducted in the Design, Communication and Audiovisuals course but extended to other practical subjects of the multimedia course, where this is appropriate. It involves students from several classes of the Vocational Technical Multimedia Course: 10th, 11th and 12th grades. The project arose from the need to disclose school activities for various subjects.

The SBD team was born in September 2008, an initiative of two teachers from Soares Basto school, after they feel the need of changing something in their classes in the area of design, image and multimedia. The question was how to change the pedagogical methods in order to increase students' motivation in the classroom. Teachers know that many enterprises in the region asked many times to the school if they would like to help them to disclose and promote some of their activities, events, projects and contests. In this way, these two teachers thought: why not help these companies and simultaneously put the students working for them in the classes? It could be a perfect symbiosis.

In this context, it was created an experience in one class formed by students of the Vocational Technical Multimedia Course and it was a great success, so that it was replicated to several other classes, following the first one, all these years and the idea remains until today. Their activities, mainly in the context of teaching and learning in the classroom, use practical and creative strategies and methodologies with central development in the Design, Communication and Audiovisuals course but extended to other subjects, where this is appropriate.

The work developed is innovative because it represents the action, within the school, of an enterprise that provides multimedia services not only for the school, but also for the surrounding community (institutions, libraries, associations, etc.). The strategy developed has sustainability for the future, because since it was created, it has increased more and more requests and has always given an effective and efficient answer.

19.4 Final Remarks

The SIG is characterized by people interested in sharing experiences and good practices involving ICT in the classroom. The community started its activity in July 2014 and it has actually 18 members of different teachers from North Region of Portugal.

The SIG needs more teachers to share different good practices in different subjects from every level of teaching like vocational teachers, secondary teachers, university professors, elementary teachers and some students also.

Nowadays teachers and students have information more than enough that happen everyday in their classrooms to share and to teach, the only important thing is that they need to exchange experiences of methodologies and strategies in order to be known.

20 Spain

Manuel Pérez Cota

20.1 Background

Education system in Spain: Nowadays in Spain there are 17 different educational systems, they depend on the community (Galicia, Basque Country, Catalonia, Andalucia, and so on). Nevertheless they depend of some central rules from the Central Government in Madrid. Then there are no one rule but 17. There is attached with this document a pdf file that explains these situations (educación_guia_en_español).

20.2 Reference Info

<http://edu.xunta.es/>: Explains all the Galician Educational System, it can be used some ICT resources from here.

<http://recursostic.educacion.es>: Here teachers can obtain a lot of ICT resources.

http://es.wikipedia.org/wiki/Educación_en_España: Explains, clearly, the pre-university educational system in Spain.

<http://www.mecd.gob.es>: This is the portal of the Ministry of Education in Spain, from here the other communities portals can be linked.

20.3 Final Remarks

The most important remark is that in Spain there are a big variety of scenarios in education, it should be separated in order to understand they all.

21 Czech Republic

In the Czech Republic the use of ICT is very much supported by the Czech government. It is part of the framework educational plan. The implementation of ICT in education is also financially supported by Structural Funds as well as local funds. The aim of the government is also to promote use of mobile devices in the classrooms and to enhance the gamification process.

21.1 Reference Info

21.1.1 Tabuized tablets into schools - <http://www.ceskaskola.cz/2014/06/ondrej-neumajer-tabuizovane-tablety-do.html>

In early April 2014, the Ministry of Education published a call for proposals in the Operational Programme Education for Competitiveness for further education of teachers, through which it is possible to buy 20 pieces of mobile devices for the schools involved. This action started a strong media discussion on the meaningfulness of introducing tablets into schools. Most of the polemical articles were often misleading, often written without understanding the subject. It is therefore necessary to pursue this issue in the long term and to provide sufficient arguments to explain the topic.

21.1.2 Myths about ICT in education - <http://ictways.eu/community/bookmarks/view/2774/myty-a-mylnosti-o-ict-ve-vzdelavani>

The article deals with general popular misconceptions that are associated with the use of ICT in teaching and learning.

21.1.3 Current Innovation Report http://ismart-project.com/images/ismart/downloads/iSmart_Research_on_Current_Innovation_Report-English.pdf

The Research on Current Innovation Report summarises the findings from inventorying the current situation on what software and hardware is available for helping pupils with dyslexia and other learning disabilities, and innovative projects aiming to introduce new tools to help such challenges. The iSmart partners have researched what is currently in use across the globe especially in the Czech Republic, Sweden,

Turkey, Germany, Greece, Italy, Malta. This report is also available in Czech, Swedish, Turkish, German, Greek and Italian.

Welcome to Earth - methodical manual for teachers -
<http://ictways.eu/community/file/view/2783/vitejte-na-zemi-metodicky-manual-pro-pedagogy>

Guide to interactive educational product that provides relevant and current information on the status and development of the basic components of the environment.

21.2 Success Stories

One of the success stories in the Czech Republic is the ongoing activity by Cenía – non profit organisation established by the Ministry of environment. The project called Welcome to Earth (<http://vitejtenazemi.cenia.cz/cenia/>) provides online teaching materials as well as educational materials related to environmental topics. This site is very popular and has a strong impact on educational process in the Czech Republic.

21.3 Final Remarks

In the Czech Republic the use of ICT in education is on a high level thanks to support on the governmental side as well as interest of school directors and school teachers and parents.

22 Slovakia

In Slovakia, there is a national strategy covering training measures and research projects in the use of ICT in schools. Guidelines have been produced by the government concerning ICT learning objectives at both primary and secondary education level. In primary and secondary schools ICT is taught as a general tool for other subjects/or as a tool for specific tasks in other subjects and as a separate subject, and in secondary schools ICT is also included within technology as a subject. Students and teachers at primary and secondary level are expected to use ICT in class in all subjects.

22.1 Reference Info

22.1.1 Institute of Information and Prognoses of Education (www.uips.sk)

The task of informatization in regional education (kindergartens, primary and secondary schools) is mainly performed by this Institute, an organization established by the Ministry. A department within this institution, called 'Developing informatization of the regional school', provides:

- internet connections in schools;
- Wi-Fi in schools;
- antivirus software for schools;
- asset management for schools with ICT projects;
- organisation of training techniques and control services for schools with ICT projects;
- implementation of projects supporting the adoption and use of information technology.

This institution operates as a service centre for the co-ordination of ICT for schools in Slovakia.

22.1.2 Study on the influence of the educational reform in Slovakia on technology use in pre-college economic education, by Jaromír Novák (<https://www.mruni.eu/upload/iblock/a08/ST-13-3-2-04.pdf>)

In the research, the author analyzed the changes in the use of modern educational technologies in pre-college economic education in Slovakia over the past five years, since the Slovak educational reform started in 2008. The main objective of the research was to find out how the situation has changed during this period and to define the main reasons for the changes, i.e., to determine to what extent the changes were related to the reform and to what extent they were affected by other factors.

22.1.3 Using ICT in Informatics Education and Selected Subjects in Primary Education in Slovakia (<http://www.issep2014.org/wp-content/uploads/2014/02/23.pdf>)

A research oriented to the use of ICT in selected school subjects and the frequency of using selected kinds of didactical technologies and educational software.

22.2 Success Stories

22.2.1 GeoGebra as a motivational tool for teaching according new curriculum in Slovakia

A study by Ján Gunčaga shows that, using GeoGebra, it is possible to motivate students in their learning process, in which student can be more a partner of teacher and the teacher's role is more to be a moderator in the teaching and learning process. Therefore students' work becomes more active during the lessons and they are not anymore simply passive receivers of information.

22.2.2 iBeaver - Informatics contest for children

iBeaver is an international contest for students of lower and upper secondary stages that seeks to promote the interest in ICT and Informatics in children. This contest responds to the Slovakia objective to include programming as a key component of Informatics education and a productive instrument for developing complex digital literacy.

22.3 Final Remarks

In Slovakia the use of ICT in education is on a high level being heavily supported by the government. But there is an identical interest from school directors, school teachers and parents.

23 Italy

Marisa Orsi

23.1 Background

This group was born among the teachers of the school "Cecrope Barilli". It is an institute comprising vertically three schools of different order (a Nursery school, three Primary schools and a Secondary School). It is located in Montechiarugolo, a small town in the province of Parma, in northern Italy.

The group's objective is to share and to show the best practices (in the use of ICTs) among school's teachers and, more importantly, to introduce such practices to teachers of other Italian and European schools.

The group, in fact, is an open group... for teachers who want to exchange and share experiences and best practices in the use of ICT at school.

23.2 Reference Info

The group's activities relate to the experiences and good practices in the use of ICTs that teachers in the school put in place in their daily work. For further information you can go to the website of the Comprehensive School "Cecrope Barilli" : <http://www.icmontechiarugolo.it/> Here you can find news and information about the school, relating to teaching, to projects, to activities...

23.3 Success Stories

The group was founded about two months ago, so it still has not carried out works of particular interest. In these first two months the teachers have come close to the site "ICTWays" and they have begun to know it, observing the activities produced by the other groups. Recently, the activities have been intensified and have been reported links to sites particularly useful in teaching.

23.4 Final Remarks

The group expresses a point of view favorable and positive; it is in the process of continuous expansion.

24 Lithuania

Mikas Balkevicius, Renata Kondrataviciene

24.1 Background

The application of Information and communication technology in Primary education in Lithuania is one of the Lithuanian groups in the Community of Practice (www.ictways.eu). It consist from 7 sub—groups entitled in following: Primary schools' teachers' articles about ICT application educational process, Project work, Challenges and difficulties in application of ICT in primary education, Innovative methods of applying of ICT in Primary education, Virtual learning environments, Digital learning tools, Personal websites of teachers for using of ICT.

Teachers of Primary education shared valuable experience on using ICT in Primary education. The main subjects sufficiently covered: Natural sciences, Math. This is the reason they are explicated here.

24.2 Reference Info

Teachers of Primary education mentioned the following digital tools for fruitful teaching in the primary schools in terms of math and Natural sciences:

- Learning tool for teaching Math - Sebran's ABC: www.wartoft.se;
- Learning tool for teaching Math - Pasakyk, kiek laiko?: mkp.emokykla.lt;
- Learning tool for teaching Math - Figūros: mkp.emokykla.lt;
- Learning tool for teaching Math - Paveikslėlių aritmetika: mkp.emokykla.lt;
- Learning tool for teaching Math - Atogrąžų matematika: vma.emokykla.lt;
- Learning tool for teaching Math - Keturi veiksmi: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Sveikas maistas”: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences – “Išmanieji robotai”: ismaniejirobotai.lt;
- Learning tool for teaching of Natural sciences - “Tvenkinio tyrinėtojas”: mkp.emokykla.lt;

- Learning tool for teaching of Natural sciences - Žemė, augalai, gyvūnai: mkp.emokykla.lt;
- Learning tool for teaching of Natural sciences - Pasaulio pažinimas: mkp.emokykla.lt.

24.3 Success Stories

24.3.1 Mathematics

Digital tools for teaching of Math were used extensively by most of Vilnius Primary schools teachers. The most common programmes used: “Sebran's ABC”, “Pasakyk, kiek laiko”, “Figuros”, “Paveikslėlių aritmetika”, “Atogražų matematika”, “Keturi veiksmai”.

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Pasakyk, kiek laiko”** this is a tool to learn about the time phenomena and equipment. There are two aspects of this tool – educational and evaluation. Pupils acknowledge the structure and measuring of time by observing of virtual clock. They are able to manipulate, edit time virtually. Also this tool promotes pupils understanding as time a treasure and prompts to value it. Digital format, availability to manipulation, and interactive testing makes this tool valuable for teaching about time in Math lessons.

Digital tool **“Figuros”** helps to acknowledge different shapes of geometrical figures: pupils are able to modify, construct different figures from the different elements. This tool enables constructive thinking in Math education empowering them to develop good visual and geometrical figures senses.

Digital tool **“Paveikslėlių aritmetika”** helps to understand the relation between the different counts and math operations. Pupils are encouraged to do some math operations by manipulations with different math procedures and test themselves. This tool enables pupils digital and Math competences at general.

Digital tool **“Atogrąžų matematika”** is used to promote pupils abilities to count different objects. It enables pupils learning trough counting different exotic animals and plants. This tool motivates pupils learning because they find interesting exotic environments and way of interacting with it.

Digital tool **“Keturi veiksmi”** is a digital tool for implementing the four major math functions addition, subtraction, division, multiplication. This tool enables interactive environment using different objects to complete different tasks using those four functions. Students have higher motivation working with this tool because of higher interactivity comparing to conventional methods of teaching.

24.3.2 Environment science subject **“Nature and Human”**

Digital tools for teaching of **“Natural and Human”** where used extensively by most of Vilnius Primary schools teachers. The most common programmes used **“Sveikas maistas”**, **“Išmanieji robotai”**, **“Tvenkinio tyrinėtojas”**, **“Žemė, augalai, gyvūnai”**, **“Pasaulio pažinimas”**

Most of teachers emphasize the following qualities of those digital tools: interactive, constructive, contextual, involving, promotes information and digital literacy, educates attentiveness, logical thinking.

Digital tool **“Sveikas maistas”** introduces pupils with main foodstuffs production in our daily life. Pupils are able to observe structure and qualities of foodstuffs production virtually. Also they are able to reflect on negative aspects of unhealthy food. Pupils can test their knowledge doing virtual tests and tasks related too food safety at home. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Išmanieji robotai”** introduces pupils with nature. Robot is leading towards virtual excursions through diferent and the most famous landscapes of the world. Pupils acknowledges different geographical areas, basic climate, animals and cultures around the world. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Tvenkinio tyrinėtojas”** enables to acknowledge all species of the ponds, their ecological environment, their interrelations. Digital tools helps to show connection between environment change and species population. Pupils are able to manipulate with ponds environmental change observing the on-going change of the species in that interactive pond. Colourful and interactive environment of the support pupils attention and motivation in learning about environmental issues of the ponds.

Digital tool **“Žemė, augalai, gyvūnai”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation.

Digital tool **“Pasaulio pažinimas”** about wild animals, plants and Earth. High level of interactivity and virtualization supported that is the main factor of learning motivation

24.4 Final Remarks

Teachers of primary education used those digital tools in addition to the mainstream pedagogic strategies. So those digital tools are more complimentary to the main pedagogic strategies to improve knowledge and understanding about learning object.