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Technology-rich innovation *in schools*

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

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A phased process for innovation

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About this resource

Educational change is extremely challenging in any setting, and when the change involves technology Ð as most changes do in this day and age Ð the complications increase. This booklet was designed to support educational leaders in the exciting yet daunting task of initiating and maintaining technology-rich innovation in schools.

This booklet is part of a series produced by a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS). Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work.

The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders. This booklet harvests insights that are particularly relevant to educational leaders, and makes them available for use in other initiatives to achieve lasting and meaningful changes involving the use of modern technologies.

Tip: Key activities are summarized in the roadmap, which can be accessed here and from any page.

Other languages and formats
Portions of this resource are available in the following languages:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- This brochure in English as pdf

Contents

- Key highlights in Estonian
- Key highlights in Spanish
- Key highlights in German
- Key highlights in Serbian
- Short animated video of this brochure

Testimonials
What headmasters say about this resource

"A sharp coherent publication, very aesthetic with its good use of text, studies.contexts, images and graphics, easily read online, good balance of theory and digital case studies ... It would make a good summer course."

- Tom Roche, Ireland

"As a digital disciple I found the handbook a well laid out document with a very defined framework. From the very start it outlined the change from traditional to digital pedagogies. This key element of change is well illustrated."

- Robbie O'Leary, Ireland

"You can see what ODS actually means now in practice and not just theory."

- Daithi O'Murchu, Ireland

"I think that the document is an excellent production which is grounded in theory, sets out a framework for involvement with ODS."

- Fin Martin, Ireland

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References and related reading

Online reading
Websites related to technology-rich innovation in schools

Print and download
Journals, books and other reading available for offline access

Inspiring initiatives
What have others already done? What are they sharing?

Online reading
Websites related to initiating and sustaining technology-rich innovation in schools

International links

- http://ods.ea.gr
  - ODS Summer Academy 2015
- http://portal.opendiscoveryspace.eu/training-academies
  - ODS Teacher Training Academy
- http://tpack.org
  - Technological Pedagogical Content Knowledge (TPACK) is a framework that identifies the knowledge teachers need to teach effectively with technology.The TPACK framework extends ShulmanÕs idea of Pedagogical Content Knowledge.
- http://www.eschoolnews.com/2015/01/13/questions-innovation-303/
  - Think your school is innovative with tech? Answer these 6 questions and prepare to reassess
- http://www.digitalpromise.org/blog/entry/a-teacher-driven-approach-to-21st-century-learning-in-meridian
  - Innovation Starts in the Classroom: a series of case studies produced by Digital Promise examining the work of members in our League of Innovative Schools.

Country-specific links

Estonia

- https://www.ekool.eu
  - E-school for the schools in Estonia, which shows grades, information and homework for students and parents.

- http://koolielu.ee/
  - Educational portal for the schools of Estonia, which includes learning material, information for schools etc.
- http://www.haridusportaal.ee/
  - Portal, which gives information for schools.
- https://www.hm.ee/et
  - Portal of the Estonian Ministry of Education and Research.
- http://miksike.ee
  - Miksike in Estonia offers different online collaborative learning events, contests (quizzes, Pranglimine, contests built on intercive exercises etc.) and also educational content.

Greece

- http://photodentro.edu.gr/lor/
  - Photodentro.

Latvia

- http://www.e-klase.lv
  - Leading website in education. The website gives an opportunity for parents to see their children success in school. Website keeps updated class journal, grades, homework and other recorded remarks done by teacher.
- https://www.mykoob.lv
  - The site keeps class journal, grades and homework. The aim of the website is to inform parents of their children success in school.
- http://www.uzdevumi.lv
  - Website with wide range digital tasks online.
- http://macibas.e-skola.lv
  - E-classes and Mykoob setting Óstudy cloudÓ.
- http://visc.gov.lv/vispizglitiba/saturs/digit_maclidz.shtml#lv_pam
  - Ministry of Education and Science offers website with online training exercises for educational purposes.
- http://miksike.lv
  - Miksike in Latvia offers different online collaborative learning events. It also offers contests like quizzes, Pranglimine, contests built on intercive exercises etc. and also educational content.

Print and download
Journals, books and other relevant reading available offline

- Sandholtz, J. H. (1997). *Teaching with technology: Creating student-centered classrooms*. Teachers College Press, Teachers College, Columbia University, 1234 Amsterdam Ave., New York, NY 10027.
- Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational technology research and development, 53*(4), 25-39.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.
- Vannatta, R. A., & Nancy, F. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education, 36*(3), 253-271.
- McKenney, S. (2013). Designing and researching technology enhanced learning for the zone of proximal implementation. *Research in Learning Technology* Supplement 2013, 21: 17374.

Inspiring initiatives
Schools, projects and other real world examples of technology-rich innovation in schools

- http://gettingsmart.com/2014/11/100-schools-worth-visiting/
  - School visits are a great ways to learn and they are key to developing an innovatio mindest. This page lists 100 schools worth visiting. These are schools that create powerful learning experiences, often using innovative technology blends.
- http://www.policulturaexpo.it/world/pcem/
  - Politecnico di Milano organizes PoliCulturaExpoMilano2015, a digital storytelling competition for schools aimed at creating an engaging learning experience, based on modern technological techniques and methods, connected to the Universal Explosition in Milano 2015.

References

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Roadmap

The roadmap is a planning tool for schools in various stages of eMaturity

Stimulation
Awakening interest and identifying promising pathways

Trials
Seeking early lessons

Incubation
Steady, supportive development

Scenarios
From pilots to stable change

Acceleration
Becoming self-generative

Phase	Key ideas	Initial	Enabled	E-confident	E-mature
	Impact on teaching and learning of rapid growth of knowledge and information from a technological perspective	General understanding of how technology can improve teaching and learning	Understanding methodologies of how ICT can be integrated into the curriculum	Understand how ICT can improve learning of the curriculum	Design methodologies for integration of technologies in learning
Stimulation	Knowledge of global and local needs and challenges in terms of ICT use and familiarity	An initial map of the basic existing needs of the school is built addressing all the basic needs in terms of equipment, professional development, and its uptake in the institution learning environments.	Schools with already existing ICT infrastructure start designing the necessary professional development and implementation opportunities in the framework of the curricula.	ICT confident school will map the existing opportunities in the school community to engage in exchange projects and enhance learning experiences such as the use of real research in classroom.	Opportunities offered by OER and MOOCs are mapped and a vision for their integration in learning environment built. The school can rehearse innovative student centred models.

Trials	Scan the horizon to search for best practice examples	The map built in the first step is now populated with existing best practice examples in order to design the whole implementation process	Best practice examples are integrated in this phase and teacher will engage in actual implementation exercises	Exploration of research opportunities and engagement of students in real research projects is foreseen for this phase	Innovative experiences, based in existing best practice examples, or new creative opportunities are created in this phase involving students in cutting edge educational research experiences.
	Find innovative examples and partners	Partnership with other institutions that already started their change path towards a more ICT based development is advised at this stage	Interschool collaboration where teachers can implement already successfully tested examples in classroom should be implemented	School can participate for instance in real research campaigns with support of various institutions that promote such possibilities	Schools can design their own experiments and engage students in development of their own projects promoting entrepreneurship skills and ICT innovation.
	Involvement of the community	The school and local community play a major role in ensuring the feasibility of the roadmap designed in the first place. They are the facilitators and key players at stage.	School community is a perfect stage to exchange good examples between peers in the same subject area or for interchange and collaboration between different grade levels and subject areas	The local community can play a very important part in this phase, in particular when stakeholders can support the vision of the school for the uptake of innovative methods and solutions.	School and local communities can be drivers of change in this phase and could/should support the whole vision.
	Receptivity to new ideas	Schools should be opened to the use of ICT innovation for upgrading the teaching/learning process.	Schools should be aware of new ideas and new trends emerging in the field of ICT based education	New forms of learning environments are emerging and the ICT e-confident school should take advantage of cutting edge best practice examples in the field of education	e-mature schools are in a perfect position to pilot new ideas and to create change in the field of education.
	Finding effective communication channels	The whole school community have to be involved in the changes foreseen and continuously informed about the developments taking place	Communication from top-dow and vice-versa should take place at all stages when redesigning the use of existing facilities and roles played by the different stakeholders	e-confident schools can innovate faster and new solutions will pop-up in diverse areas. A proper communication channels has to be designed to ensure maximal uptake of good outcomes	e-mature schools can use modern channels to ensure instant communication between all teams fostering the innovative path in the school
Trials	School proficiency level related to	Teachers have general computer	Some experiences in using ICT tools	ICT confident school uses actively new	Teachers/school has extensive

	field trial	literacy but they do not use it in everyday classroom activities. No systematic teacher training and curriculum/eLearning development program and action plan. Limited access to electronic learning resources. ÒDrill & PracticeÓ learning/teaching method prevails in the classroom. Community (parents etc.) is not informed/involved in educational activities.	in the classroom. Teamwork and some active learning elements are used in the classroom. Growing confidence among teachers how to use new learning methods. Teachers are starting to share learning ideas with each other and inform parents.	pupil centered learning methodologies. Schools development program and action plan is followed. School participates in online learning events and is taking lead/coordination in more simple events. School is working actively to set up good relations with parents and community around the school	experiences in using new learning methodologies and ICT and they have participated in collaborative online learning events and research projects. Teachers have experiences and understanding about cultures (cultural differences) in countries involved with projects.
	The level of complexity of field trials	Designing elearning development plan and teacher training programme. Using simple electronic presentation and content in the classroom.	Participating in intra-school, intra-region learning events and contests (quizzes etc.). Making learning flexible in the classroom though using interactive / electronic content and programs	Filed trials, which engage pupils and teachers into more simple learning events internationally and more systematic collaborative project in own region / country. Starting to organize/coordinate learning events on their own.	Taking part in different online collaborative learning events, also the ones, which last months and involve synchronous communication and series of activities (like storytelling projects etc.) and often also travels.
	Organisational Òto-do listÓ	Preparing elearning development plan and teacher training programme in the school. Searching for contacts, teacher training opportunities. Upgrading school's ICT infrastructure. Involving/informing community (parents) into development plans of the school.	Starting to implement development plan, selecting filed trials, which require collaboration between classes and learning situations. Actively participating in teacher training events, networking events, information days.	Participating in different online learning events and trials. Coordinating events on regional level and simple events also multiculturally.	Maintaining and developing learning contacts in all levels. Coordinating learning events and participating in them. Functioning like a regional innovation centre and sharing experiences.
Incubation	Sustainability	Focus on short term	Focus on medium term	Focus on long term	Focus on organic community to auto-administer
	Active	Provide classical assessment method and limited feedback	Improve classical assessment methods and improve feedback	Provide a ground for self-assessment	Use digital resources for students to interact as peer and provide feedback

	Support	Get support from workshop organization	Get support from author of the resources	Get support from a community	Provides support to a community
	Localization	Use downloaded resources directly	Minor localization to downloaded resources	Major localization to downloaded resources	Contribute back to the community with a guide and support for successful localization
	Versatility	Use downloaded resources directly	Minor changes to downloaded resources	Major changes to downloaded resources	Contribute with own resources
Scenarios					
Acceleration	Dissemination and diffusion	Headmasters organize some basic presentations and workshops about ODS. They appoint an e-Learning ODS team.	The e-Learning ODS team develops e-Learning vision with the help of the headmaster.	E-learning vision is integraded into the school curriculum.	E-learning is implemented in classrooms. Both eachers and students use it.
	Motivation	Headmasters find funds for a couple of teachers who will be sent to some basic e-Learning trainings, seminars or academies.	The trained teachers train the interested groups of teachers in school.	All of the teachers are trained to use e-Learning systems.	The teachers implement e-Learning in their classrooms, prepare demonstration lessons and get points for professional development.

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About the authors

This booklet was produced as part of a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS).

Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work. The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders.

Project coordination
Open discovery space is co-coordinated by Intrasoft

Related resources
Related resources are available on the ODS website

Previous versions
Previous versions of this booklet are available upon request

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The authors of this booklet have been working on various tasks within the ODS project. Their affiliations represent many of the 51 partners in the consortium.

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What is technology-rich innovation?

Considerations for educational leaders who are initiating and maintaining change in the 21st century

Key ideas
How do we look at change in education today? What is considered excellent technology use?

School-based innovation
How do learning technologies yesterday and today differ? How are these altering school-based innovation?

The knowledge economy
In modern society witnessing a revolution? Are traditional educational methods disappearing? Should they?

Themes and trends
What European initiatives are currently promoting teacher competence in ICT use?

Key ideas about change in education today

Learners central
All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill

Education - schooling
Education, as both process and outcome, is now seen as very different from schooling in structure and intent

Knowledge creation
Knowledge creation is the ultimate goal in technology-rich innovation

Rapid changes
The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history

New priorities
Education is now shaped by critical factors that include: openness, adaptability, accessibility, innovation and learner-centric

technology literacy
⌄
knowledge deepening
⌄
knowledge creation

Three levels of excellence in teaching according to the UNESCO ICT Framework

School-based innovation: Learning technologies yesterday and today

All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill. Educational methods and techniques have, however, historically developed in response not only to learnersÕ needs, but also to the needs of wider social, political and economic structures. TodayÕs advanced technologies environment is in many ways an issue as old as education itself. It is the link between what individuals need to know, do and learn at a time of profound change.

At their most basic, learning technologies focus on the tools, methods, techniques and operational modalities that envelop the learning and didactic process. Over the past few decades, a complete revolution has occurred regarding not only our approach to the understanding of educational theories, but also our ability to use new and innovative methods to design and deliver learning. This process has promoted a significant re-evaluation of the role and purpose of education and the most appropriate delivery methodologies to ensure optimum learner engagement. Education, as both process and outcome, is now seen as very different from schooling in structure and intent. This point was originally articulated by Ivan Illich in the 1970s (*De-schooling Society*). Today, learning technologies permit the acquisition of knowledge, skills and attitudes in many new and innovative ways.

> The fundamental intellectual activities of discovery and learning are being transformed by the rapid evolution of ICT. Although many technologies have transformed the course of human history, the pace and impact of digital information technology is unprecedented.
>
> *- J. Duderstadt, 2013*

In all teaching contexts, learning technologies are important. The emergence of standardized methods of instruction took on a radically new dimension during the Industrial Revolution. This marked growing synchronization of teaching methodologies with requirements for improved work performance and productivity. The knowledge explosion and information revolution of our own era is still deeply marked by the experiences, structures and expectations of the industrialization process. Knowledge acquisition is central to the ODS endeavour as well as its underlying model of innovation and reform. Knowledge creation is the core of a set of skills, values and attitudes that, in their structure and imparting to others, are the essence of culture.

The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history. The mode of production and the distribution of knowledge have changed so radically that it is considered legitimate to speak of a new era. This is described as the information society. In this new paradigm, we see more production, distribution and use of knowledge than before.

The knowledge economy

The scale of growth in the knowledge economy is tied to complexity, change and technology. Increasingly, schools today are more complex. Talcott Parsons talked about social differentiation - as institutions grow in size and complexity the functions they have to perform become specialized and distinct subsystems. With the growth of these subsystems new distinct problems of coordination, hierarchy and social control emerge. While the pace and rate of change have been universally acknowledged, the scope and impact in recent times have been transformative. Technology has increased human mastery of nature - and altered human social relationships. In this profoundly different world, traditional education and learning patterns are challenged. New skills are required. New methods of acquiring skills are also required. Traditional schools often struggle to meet the new needs of learners. *Modern society is witnessing a revolution where traditional educational methods are not so much superseded by technology but altered and transformed in new and unexpected ways.*

Themes and trends

Whatever the technologies or methods, human learning remains driven by motivation, skill acquisition, improved understanding and tangible benefit. Educational institutions must respond to the paradigm shifts affecting society and relationships in the 21st century. Advanced technologies enable open learning to be a powerful tool in advancing learner competence. These technologies create new forms of delivery, assessment and research. At first unfamiliar, these can develop extraordinarily rich paths to improved learning, skill and knowledge. The key characteristics for the success of such technologies can be viewed through the evaluative framework outline by McManus and Lyne in their 1992 book on open learning in changing professions. They stress the importance of learning technologies to embody the following characteristics: accessible; available throughout a lifespan; responsive to individual life circumstances; able to cope with learner diversity; affordable; demonstrably effective.

Across Europe, many initiatives promote teacher competence and information and communications technology (ICT) usage. A few examples include: *Key Competences for Lifelong Learning* (2007); *Strategic Framework for Education and Training 2020* (2013); and the *Digital Agenda for Europe* (2010). The Key Competences document defines digital competence for all citizens, and identifies relevant knowledge, skills and attitudes to live and work in the 21st century. Inclusion of Digital Literacy as one of eight key competences indicates the importance attributed to ICT skills at European level. Combining ICT skills with emerging views in pedagogy, curriculum and school organization, the Standards reinforce professional development of teachers who use ICT skills and resources to improve their teaching, collaborate with colleagues and ultimately become innovation leaders themselves. As shown above, the UNESCO ICT Framework has three different levels of excellence in teaching:

technology literacy; knowledge deepening; knowledge creation.

The Open Discovery Space (ODS) approach is designed to recognize the profile of registered teachers and use it as an additional element to decide most appropriate learning objects. Instructional environments in some classrooms (including activities around preparation for paper-based state examinations) may not easily lend themselves to the development of and usage of e-learning environments. The local contextualization of innovations is therefore a critical concern that affects the uptake and use of new ideas. Various initiatives across Europe support tailoring and customization to specific settings.

For example, the Irish NCTE handbook - Planning and Implementing e-Learning in Your School: A Handbook for Principals and ICT Co-ordinating Teachers - recognises the important role of school leaders in promoting ICT in teaching and learning at school level. It provides a definition of e-learning, and outlines how schools can develop under five headings: leadership and planning, ICT in the curriculum, professional development, e-learning culture and ICT infrastructure. The handbook includes an e-Learning Roadmap which helps schools to plot their development reflected on a four-point rating scale of e-maturity: Initial; e-Enabled; e-Confident; e-Mature. The Irish roadmap facilitates planning and goal setting and targets at an individual school level.

Research has also consistently demonstrated that computer-based interventions and open education resources tend to be more effective when combined with constructivist approaches to teaching, rather than with more traditional approaches. Having identified trends and issues, the innovation model is challenging. However much has been achieved already. The obstacles and opportunities have been identified.

ICT in schools requires both leadership and vision. This helps it to move beyond a simply perceived technical skill to recognition of its critical role in shaping competence and learning innovation at a time of profound transformative and globalized change. The ODS model offers one clear, yet flexible vision for technology-rich innovation that can be tailored to meet the needs of specific learners, in particular schools, in varied contexts across Europe.

Technology-rich innovation in schools

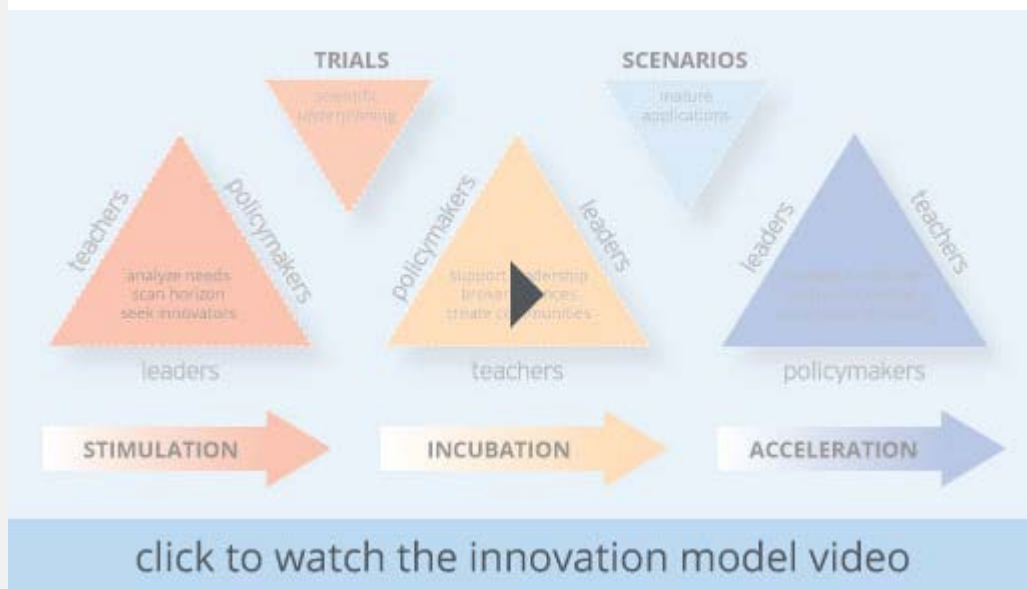powered by OPEN DISCOVERY SPACE

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Modelling innovation and reform

click to watch the innovation model video

Key ideas and origins
What are core considerations embodied in the ODS innovation model?

Innovation and reform
What is innovation? What is reform?

Innovation model
What does a visual representation of the innovation model look like?

Innovation and technology
What technolocy changes constitute innovation? What forces are at play?

Key ideas embodied in the model

Multiple forces
Top-down, bottom-up and side-side interactions shape the activities in this model of innovation.

Field work
Three main phases are strategically informed by field work and reflection on actual experiences.

Three key phases
Stimulating, incubating and accelerating are three main phases throughout the process, each with its own focus and concerns.

People are key
Individual and team development is central to the model, which also recognizes different and changing roles played by teachers, educational leaders and policymakers.

Context
Some factors in innovation settings can be manipulated, others are fixed Ð both powerfully affect the uptake and use of new ideas, at micro, meso and macro levels.

Model origins
The main objective of Open Discovery Space (ODS) is to mainstream eLearning in schools and national policies of the EU member states. ODS supports Action 68 of the Digital Agenda for Europe through an innovation, as it offers: A web-based resource giving teachers access to teaching and learning materials.

The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools. The model was originally conceived to *prescribe* ODS project activities. After the project was launched, the model has been updated to reflect the lessons learned based on real world experiences.

The model presented in this chapter *describes* how each element has been undertaken in the ODS project. The combination of authentic examples and clear guidelines make the ODS model presented here a clear and accessible resource for educational leaders.

Click here to visit the ODS YouTube channel, which offers much more background and examples from the ODS initiative.

What is innovation? What is reform?
Innovation is characterized as a bottom-up/grassroots approach, based on internal processes; whereas *reform* is characterized as a top-down approach, either system-wide or anchored within several different institutions, based on external processes. The
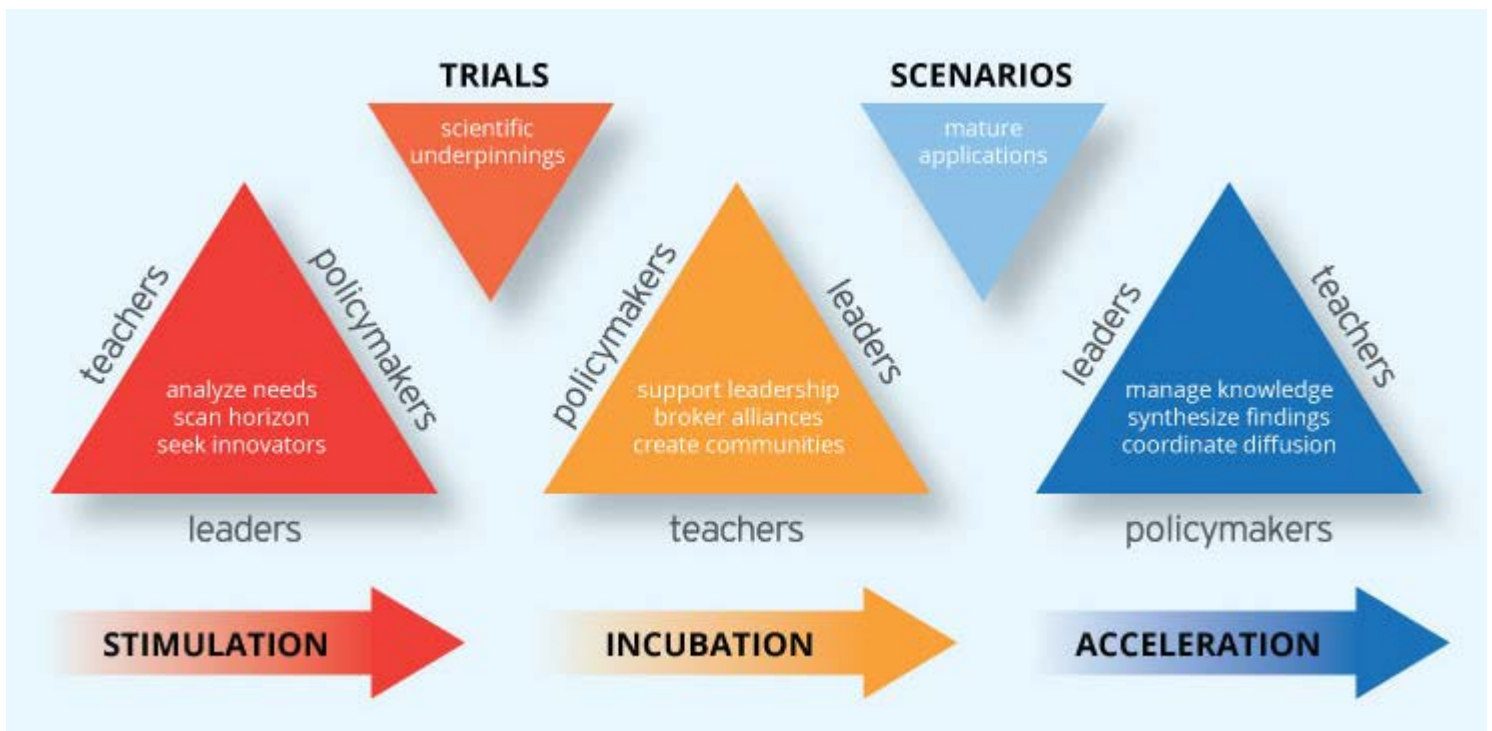
ODS model incorporates aspects of both innovation and reform.

Three characteristics of ODS illustrate aspects of *innovation* that are present in the underlying approach. First, there is a strong emphasis on stimulating broad involvement embracing all stakeholders at all levels: local/regional, national and European. Second, there is a hands-on approach to working with actors of change to ensure successful transformation Ð empowering teachers, school managers, and learners. Third, the approach explicitly supports excellence (centres of expertise and clusters), encourages dissemination of success stories (virtual eLearning communities and information portals), as well as promotes enhanced cooperation and experimentation. Across ODS (and thus, embedded in its model) is the central appreciation for human capacity and the need to share that across all dimensions of work, from the ground up.

At the same time, the formal, externally-based facets of change are crucial to success, particularly for within-country initiation. Classic elements of *reform*, these include the top-down pressures and incentives that pose powerful levers for change, such as: new assessment policies, new funding mechanisms, and revised curricular frameworks. Because sustainable change requires sound alignment between policy and practice, the connection with external agents (e.g. policymakers) remains an integral part of the ongoing process.

The ODS model of innovation and reform
An experience-based approach to technology-rich innovation in European schools

5 key components in the ODS model of innovation and reform
The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools.

Stimulation
This phase features the awakening of interest and the identification of promising pathways to technology- rich innovation. Needs analysis helps understand stakeholder concerns. Inspiration is sought by scanning the horizon. And innovators that can lead the work (from program champions to team coaches) are identified.

Trials
Field trials are undertaken early in the process to (1) engage key stakeholders; as well as (2) to learn important lessons that can inform the rest of the project. Like mini-innovations themselves, field trials participation often prompt creative developments, and are especially helpful for studying localized adaptations.

Incubation
Incubation refers to the steady, supportive development of new learning, techniques or methods so that sustained development can occur. During this phase, innovation capacity is cultivated so that the change can become self-generative.

Scenarios
Whereas field trials fostered the development and testing of new ideas, scenarios portray the transition from small pilots to stable ways of working under regular teaching and learning circumstances. Scenarios are informed by the experiences to date, and lay the foundation for the final phase of acceleration.

Acceleration

Once technology-rich innovation is up and running in representative settings, attention is turned to issues of sustained maintenance so that they can continue. This includes exploiting the knowledge available within the change setting and establishing routines for continuous quality assessment.

How do innovation and reform relate to changing technologies?

About changing technologies in schools

Technology-rich innovation is a term used often, in ODS and elsewhere. This is an umbrella term for teacher and school led change involving any kind of technology. But these days, most people think especially of electronic technologies (e.g. computers, mobile devices) as well as the use of specific applications for learners (e.g. simulations, communication tools) and/or teachers (e.g. electronic access to lessons plans or assessment rubrics). The rationale and goals of technology-rich innovation vary tremendously. The range includes: increasing equitable access to resources for remote schools; fostering EuropeÕs cultural pluralism; serving the educational needs of all students; and stimulating active learning.

Many people may be involved in technology-rich innovation, and of course each setting is unique. But across most innovations, attention is typically required for at least three core groups of actors: policymakers, teachers and educational leaders. *Policy makers* are those positioned to activate top-down interaction in some way. This includes (national, state or local) representatives of government, as well as representatives of teacher associations, funding bodies, curriculum agencies and assessment boards. Here, we use the term, *teachers*, broadly Ð to represent all educational practitioners who interact directly with pupils. In addition to regular classroom teachers, this includes classroom aids, therapists, remedial teachers, special subject teachers and counsellors. This group is positioned to initiate bottom-up interaction. *Educational leaders* are those able to lead side-side interaction. This group includes, but is not limited to: headmasters, superintendents, department heads and instructional coaches. Educational leaders play critical roles in implementing policy. They also support the work of teachers both directly (e.g. by ensuring that professional development opportunities are regularly available) and indirectly (e.g. by creating a healthy and stably organization).

What forces are at play during change?

Various *forces* come into play during change, and the inter-dependencies between actors are central to the different types of interaction: top-down; bottom-up; and side-side. It is well understood that sustaining change requires a balance of pressure and support. Key activities in earlier stages of *top-down* reform as well as *bottom-up* innovation therefore frequently require processes that seek or enable alignment of priorities and goals across the key stakeholder groups. By later stages, the driving forces have typically shifted hands. Whether initiated top down (e.g. by policy makers) or bottom-up (e.g. by teachers), the sustained maintenance of change is greatly dependent on the educational leadership present.

School-school interactions were major factors that contributed to the successful introduction of a new subject in Dutch secondary schools.

When schools saw how others handled the new curriculum they were both inspired to participate and reassured that doing so would be within their reach.
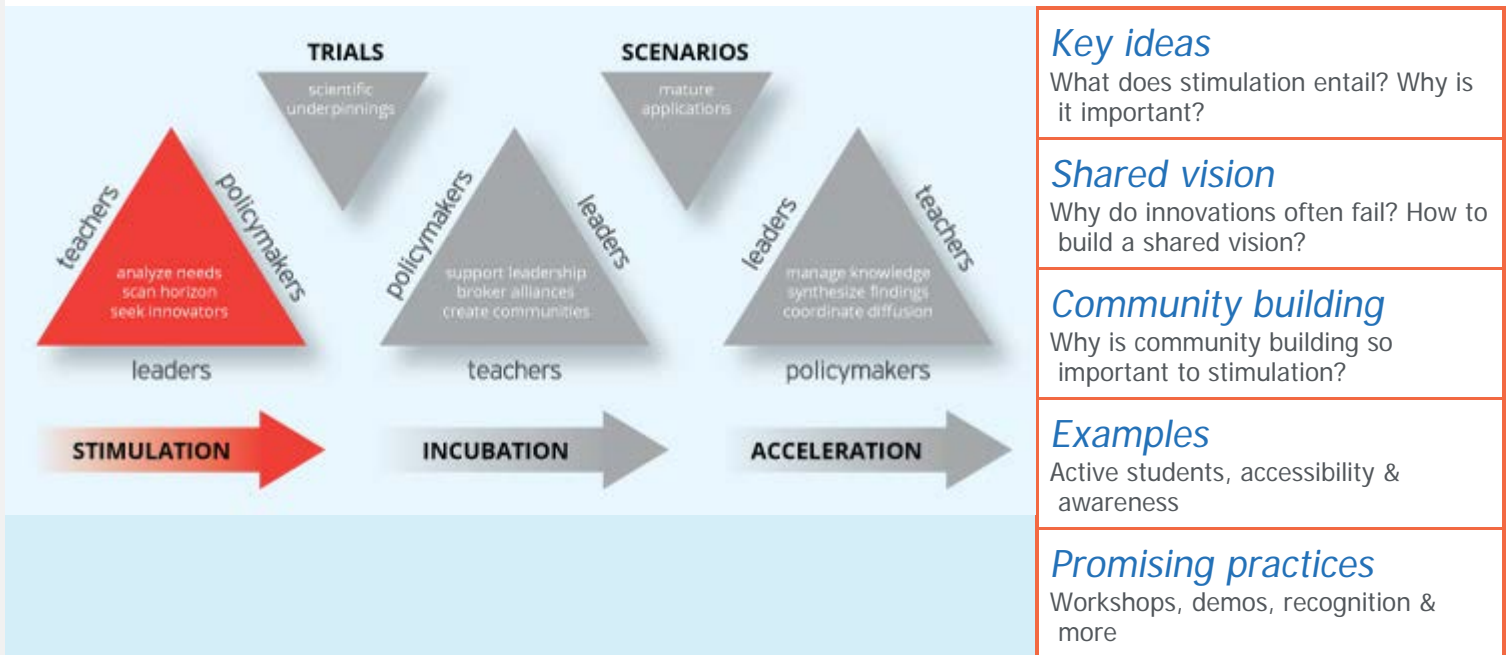

The importance of *side-side* interactions is comparatively less well documented as a force that helps initiate change, but is known to be especially important for developing change. Side-side interaction is therefore needed to enable schools to ascertain the degree to which a particular change is within their Ôzone of proximal implementationÕ (ZPI). McKenney (2013) refers to the ZPI as distance between what teachers and schools can implement independently and what they can implement through guidance or collaboration. The ODS model designs for the zone of proximal implementation by planning for implementation scaffolding (e.g. externally-led coaches, workshops or subsidies) to fade away in a timely fashion, while simultaneously developing the ownership and expertise among practitioners that will engender the desire and ability to locally sustain change.

Model of innovation and reform

Technology-rich innovation *in schools*

powered by **OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Stimulation

Key ideas
What does stimulation entail? Why is it important?

Shared vision
Why do innovations often fail? How to build a shared vision?

Community building
Why is community building so important to stimulation?

Examples
Active students, accessibility & awareness

Promising practices
Workshops, demos, recognition & more

Stimulating: the first key phase in the model

Knowledge of global and local needs and challenges in terms of ICT use and familiarity is a very important step towards the construction of a feasible innovative plan.

Scan the horizon to search for best practice examples and optimum resources to support actions that address identified needs.

Find innovative examples and partners that can bring new opportunities to the school and change the institutional vision by embracing relevant and engaging new methods and practices.

Involvement of the community helps to foster leadership, democratization of opportunities collaboration, network and team building.

Receptivity to new ideas is increased by mutual openness among all parties, to collaboratively define and embrace new proposed strategies.

Effective communication channels are essential for ensuring proper exchange of ideas and outcomes.

The stimulation phase is one of the most important in terms of creating the community that will support the trials, pilot the implementation of scenarios, validate and evaluate the usefulness and impact of innovative proposals. Thus, it is important in this phase to involve all participants in the different foreseen activities. A sense of ownership is a crucial motivating element and a step towards the sustainability of the successful changes.

An effective stimulation phase must encompass a careful analysis of local needs, review goals given existing possibilities, identify innovative key players and ideas, encourage teambuilding and brainstorming activities to seek out creative options that can be implemented in relation to the identified needs and the capabilities of the team addressing these needs and proposing innovation.

The importance of developing a shared vision
Innovations that fail to take sufficient time in the stimulation phase risk plowing ahead of the interests and abilities of those who will eventually carry the change in the long term.

The vision of a school towards innovative approaches for teaching and learning processes can only be achieved if solutions are designed in a collaborative environment where all stakeholders actively participate. Stimulating the adoption of innovative ways to solve contemporary (yet often unexplored) emerging needs in schools is a key to success. The stimulus to adopt new or different strategies should follow a planned direction:

- Involve all stakeholders from the start, and acknowledge that the forms of involvement will evolve along with the project.
- Remember to include headmasters, students, teachers, administrative staff, parents and education authorities and policy framers.
- From the very start, consider how to use the following approaches: strengths/weaknesses/opportunities/threats (swot) analysis, needs analysis, solution generation, solution refinement, design and development, attending to factors enabling solutions, and evaluating results and impact even of initial pilot activities.

Innovative schools embrace the challenge to explore unknown and poorly studied new fields. Education and opportunities to learn are changing swiftly and new ways must be adopted in order to ensure schools continue to be key innovative players when preparing new generations for the world of work.

Community building is at the heart of stimulation

The involvement of the school and local community is very important in the stimulation phase. Stakeholders, as mentioned already, have to be part of the innovation from the very start. Promotion of brainstorming sessions can be very useful in fostering support from the community and implementation of good ideas. Holding discussion evenings, forum, social events, and Ôvillage hallÕ debates are excellent methods to initiate discussion of options.

Innovative solutions and best practice examples can be easily found and assessed nowadays with the support of platforms such as ODS. Community support for their adoption is critical in order to overcome any possible existing barriers Ð which are usually more related to worries and attitudes than they are to technologies themselves. It is of utmost importance that all participant stakeholders have autonomy and the means to research which are the best options and adopt/adapt them to the local identified needs. Potential solutions ideally meet stakeholder needs and also promote student centered methodologies, use freely available content, serve cross curricular connections, have some form of quality assessment, and can be tailored in order to meet specific local needs.

The design phase for stimulating innovative ICT uptake has to take into account needs but also psychological concerns. Most people experience hesitation when dealing with the unfamiliar. The stimulating phase enables stakeholders to gain familiarity with elements of the innovation that could cause concerns, such as tools, pedagogies, or collaborations. By involving stakeholders, familiarity and exposure can lead to trust, ownership and engagement in the whole process.

School participation in projects such as ODS opens up new possibilities for the innovative solution seekers. Support and examples from communities are a key to future implementations. This model and the ODS internet portal offer such ideas.

Learner benefit is the primary added value

We must bear in mind that we are preparing students for future careers that are changing and reshaping the world of work at the speed of light. Career and skill requirements are something that we cannot possibly imagine at this stage. The task of school leadership is to prepare students in the best manner possible to allow them to embrace unanticipated challenges and opportunities in a transformed world. They have to be able to work in inclusive environment, to be tolerant, to have problem solving skills, to be critical thinkers, to be creative and to embrace innovation. They will enter a world of work where they are learning and interacting all the time and will need to be connected anywhere at any time.

Learners only benefit if schools are supported

While the world is changing rapidly, most schools are not. Despite thriving opportunities and extraordinary potential, schools struggle. Teachers lack time to develop ICT skills, schools are poorly equipped, teaching is often limited by rigid and dense curricula, and exams fail to measure use of innovative approaches or acquired competences. Successful innovation attends realistically to the challenges in everyday schools.

While we seek for innovative projects, most important of all, we seek for innovative minds

In any learning environment, we need to identify innovative teachers, those eager to tackle new challenges and not afraid of emerging struggles and opportunities. It is important to provide freedom of choice, tools to adapt and localize their experience and opportunity to freely share their developments and creations.

> If you always do what you always did, you will always get what you always got.
>
> *- Albert Einstein*

The profile of such innovators is not rigid - it depends on specific needs and challenges of the target audience. Each school has its own characteristics, each classroom has its own personality and each student will have their own special need. Innovative teachers also have different levels of expertise and projects must seek out for those innovators, eager to adopt a new vision, and take on the mission of adapting existing successes to their own professional development.

Innovative design solutions are a free enterprise and the measures of success are defined for each case. The education revolution is upon us: MOOCs, OER, OCW are the new trends in education. Schools and local communities are adapting to this reality and restructuring accordingly. Pilot innovative teachers are thus key players in this process. Innovative projects encompass interdisciplinary approaches, contextualized teaching, student centered methodologies and involvement of school and local communities. Global citizenship awareness and entrepreneurship are the critical skills and must be in the backbone of any innovative solutions adopted by houses of education.

School innovators explore new ideas with support of others, sharing results, incorporating and remodeling existing knowledge and adapting/localizing and adopting best practices in the field of education.

It is a challenge to try to time-stamp an effective road map for stimulating schools on taking the road of elearning, integration of student centered methodologies in classroom daily practices and the graceful use of ICT as a supporting tool for knowledge delivery, exploration and construction. Many barriers have to be overcome starting with the psychological. It is necessary to ensure each interested party has a sense of ownership of the process. An example of a careful possible design might be by introducing the idea and brainstorming with participants in short workshops where the vision is presented, discussed and improved.

What might stimulation activities look like?

Three examples from the ODS experience

Many initiatives are producing good results on adoption of school elearning and community building. For example, existing ODS experiences have shown that creating thematic communities around specific elearning tools and resources is a very strong motivation factor. The effort promotes community building at a national level but also promotes local practitioner involvement. Schools have become associated in groups under the same school board of directors. Many of the teachers belonging to the same group don't know each other and never collaborated before.

The support of the community has proven key to ensuring sustainability. The Galileo Teacher Training Program is a good example where experts in astronomy train teachers on use of real research in the classroom. Trained teachers, after mastering the use of specific tools and resources, can then train other teachers in a very efficient and sustainable cascade effect. This includes a worldwide help desk that supports teachers 24 hours a day.

Active students

In Portugal, the theme selected to exploit the Open Discovery Space concept was the fight against light pollution. Light pollution is the direct or indirect introduction of artificial light into the environment. Light pollution competes with starlight in the night sky, interferes with astronomical observatories, disrupts ecosystems and has adverse health effects.

In the stimulating phase, a vision-building workshop was promoted around the topic and at a later stage teachers participated in a training workshop. A community was created in the ODS online portal where all materials were shared.

As an outcome of this activity, the initial workshop ideas evolved into several scenarios that were created and implemented in various schools in the region. One of the teachers invited another school to

collaborate in the project. As a result, students from the new school participated in the experience by creating their own ICT-based material to address the topic. The teacher from the second school presented the work of her students to the ODS international contest promoted by the Portuguese national coordination. Her student won the first prize with a movie asking the mayor of the municipality to change the illumination of the streets to a more user-friendly setting

The image here shows the student who won first prize, proudly receiving his certificate from the mayor. The chain of events that lead to his achievement was initiated by the initial activities during the stimulation phase.

Touch the night sky: Astronomy for visually imparied students

Context

In the framework of ODS pilot efforts, and in partnership with other projects (A Touch of the Universe by Astronomical Observatory of the University of Valencia), the project is envisioning a significant contribution towards the adoption of an inclusive approach where blind students work with their non-visually impaired peers and educators. In collaborative settings, they engage in the exploration of content knowledge and use of e-learning tools that can help understand topics that seem, at first, unreachable by students with visual impairment. In the framework of this project, a school in Moimenta da Beira (Portugal), organizer of one of the largest telescope gatherings in the country, promoted a special observing session for blind attendees.

Resources

The project uses materials that can be found in school environments and enrich the experience by the use of freely available ICT tools and an apparatus specially designed for students with special needs. For the observing session, it was necessary to use a thermal printer that reproduced the images that were being acquired by a regular telescope in real time, processed by an image software and printed in a special swelling paper and thermal printer.

Tools

Telescopes, computers, image processing tools, thermal printers.

Scaffolds

Participants where supported by the promoters of the event and the activity was embedded in a regular environment where usual night sky observing sessions take place.

Process

The site was specially chosen for the beauty of its night sky, where light pollution is not yet causing too much damage. Over 50 telescopes from all over the country were gathered at the event. A Òspecial telescopeÓ, devoted for this special public was assembled, connected to a computer and printing the tactile images acquired. Participants with visual impairment were then assisted by educators in order to fully understand the ÒobservedÓ object and thus having the same full experience that all others were having on site.

Impact

Alongside their non-visually impaired colleagues, they could experience on site and on Òreal timeÓ the astronomical images collected by the telescopes there present. In terms of innovative ways of reaching audiences that usually donÕt attend these events this activity has proven to be a success gathering visually impaired and sighted students in a fully inclusive experience in terms of physical, social and knowledge acquisitions.

Lessons learned

The main goal was fully and successfully achieved - to showcase the possibility to involve blind students in purely observational and sight based experiences, otherwise inaccessible to blind or visually impaired audiences. Promoting an environment of collaboration and exchange of knowledge between educators and among the students themselves, sustaining peer-to-peer exploration and support, all students explored the tactile images observed (whether by sight or touch).

Dark Skies Rangers: Building communities and creating awareness

Context

Policy towards school administration in Portugal has been changing drastically over the last few years. Schools in the same region are now aggregated in big groups with the school main headquarters being located in one of the schools, usually the most central one in terms of geographical importance. Most groups have now schools ranging from primary to secondary level. Teachers have now to teach in the various establishments of the group and facilities are now shared by a larger number of users. This has brought new challenges to school boards and now demands new dynamics in terms of a common vision, well-orchestrated mission, design and activity implementation. Many of the educators of the same group, even within the same subject area, donÕt know each other. In order to support the team building and community building in this new groups, ODS-Portugal engaged in supporting teachers in the mission of promoting interschool projects. The theme of choice was the fight against light pollution.

Resources

The project proposal uses existing light pollution audit tools, available at the ODS portal, planetary software and online tutorials for its use. Communities were created at the portal with members from different parts of the country.

Tools

Online communities, digital tools and resources for the implementation of the different projects. Social media for publicity of achievements and sharing experiences and results.

Scaffolds

Face-to-face and online training material made available to the participants.

Process

Pilot teachers received training on the use of the specific tools and resources and support to implement the project in their school settings. Teachers on the field trained their lower secondary students (7th to 9th grade) who acted as mentors to younger students. Pilot teachers involved and supported primary school teachers as well as involved colleagues working in science subject areas. The main outcome was the learning process for the older students involved and the entrepreneurship skills developed in the younger kids who have developed their own project towards innovative solutions for better illumination in their streets with efficient energy and proposals for new settings.

Impact
Teachers involved in the process, namely pilot and those working with them, were very enthusiastic about the results and the impact on their students that participated in the project. The local community (mostly parents) was involved in the process and was very pleased with the achievement of their children.

Lessons learned
This experience in Portugal set the tone for the next school year approach for ODS as a powerful tool to engage communities in collaborative work and the next step for these communities is to engage all the schools in the same group in further collaborative projects, exploring other field s of expertise supported by ODS and the existing tools. In one of the schools, the target audience was students from a specific group in a primary school. Most of the students in the class come from a gipsy community and their attitude towards science was not very positive. In this particular case, students of the 8th grade of a school in the same group were their tutors and with the support of the pilot teacher they brought the project to the children's school. As a result of this project all students (4th grade) that are now going to the school hosting ODS project pre-registered to be members of the science club and are now exhibiting great excitement towards science issues.

Promising practices in the stimulation phase

Each context offers its own opportunities and hosts unique constraints. While adjustments are required for all settings, the four practices described below have been tailored for use in multiple settings with both pleasant and productive outcomes.

Vision-building workshops
Several such events must take place in order to involve as many people as possible. Some initial participants will then participate in a pilot trial. The vision-building workshops are brainstorming sessions involving all the important stakeholders in the creative process.

Training workshops
Following the initial teaser, participants are invited to create their own learning scenarios, using OER and ICT for a particular topic they are interested in and/or to use already existing ones, already tested in other schools/classrooms. These sessions will promote a sense of support and community building will take place.

On site demos and awareness campaigns
Activities that involve the whole school and local community are promoted, though of course time intervals between all actions vary according to the objectives and concrete implementation phase of each project. In demos, students and teachers gain first-hand experiences with innovative tools. Also, school and local community is welcomed to get involved in the innovation process taking place at school.

Establish a recognition system
Endorsing the work implemented and the achieved results is advisable. The whole path should be carefully designed and participants can then have a sense of the overall mission they are committing to and can evaluate their own progress.

Stimulation

Technology-rich innovation *in schools*
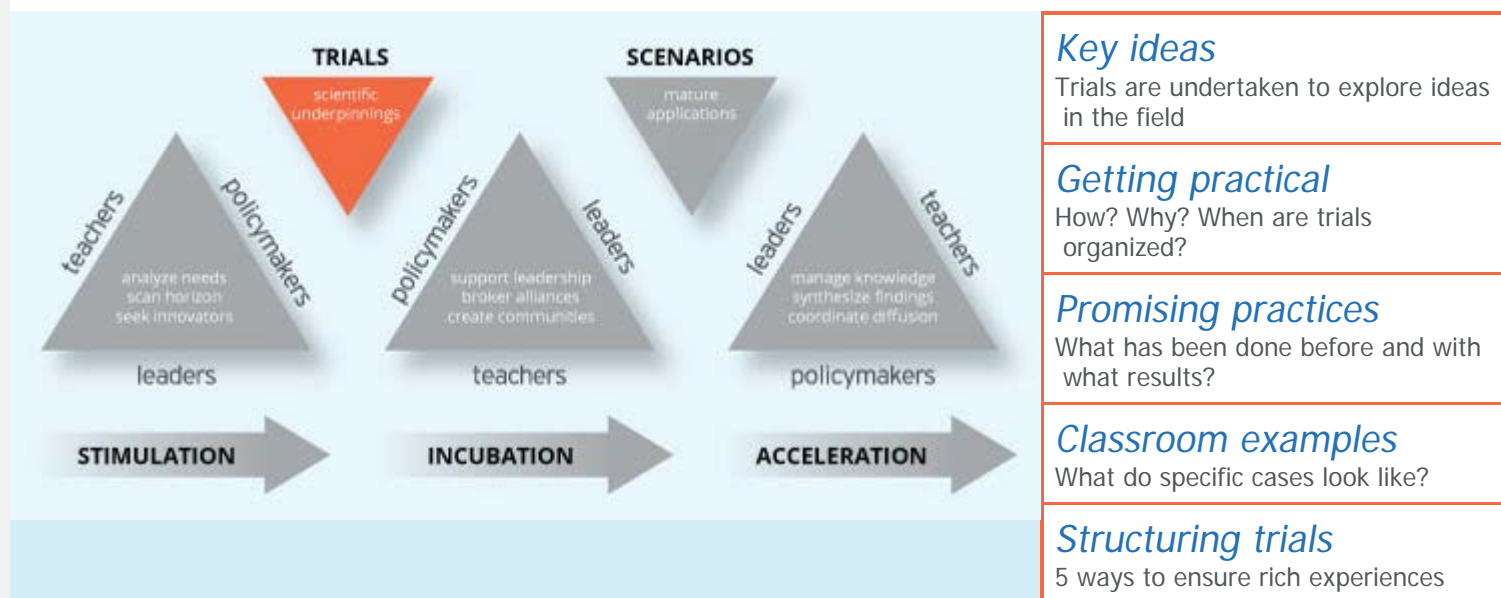
a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Trials

How are these new ideas related to our existing school plans? How can this be accomplished in our setting? Field trials give hands-on answers to questions posed by schools

Key ideas
Trials are undertaken to explore ideas in the field

Getting practical
How? Why? When are trials organized?

Promising practices
What has been done before and with what results?

Classroom examples
What do specific cases look like?

Structuring trials
5 ways to ensure rich experiences

Trials are undertaken early to exlore ideas in the field

Harness creativity
Field trials prompt innovators to creatively develop and try out new approaches to teaching, perspectives about learning, or resources.

Document events
Well-documented field trials have the power to share across time and settings, by recreating essential elements of the experiences and making them accessible to others.

Use science
Well-conceived trials are not only the products of inspiration or creative energy, but they are also underpinned by scientific research.

Popular or practical?
Trials do not have to include the use of popular, high-end materials or techniques Ð readily available tools are often easier for teachers to later integrate into their own environments.

Learning first, technology second
Educators care more about the benefits for their students than about the tools used Ð field trials offer a chance to experience new learning consequences first hand.

Trials are critical to piloting ideas, testing assumptions and exploring how users respond to initial changed and resources (human and material).

Field trials offer the opportunity for supporting and studying localized adaptation and commensurate results.

Field trials themselves can even be perceived as mini-innovations within a broader change agenda. As such, they provide interesting cases of creative adaptations and/or development of learning ecosystems.

The primary function of trials is to serve the development of the innovation and resources used to bring the change to life. The experiences of trials provide realistic inputs for subsequent development and the establishment of scenarios of use.

Trials not only help understand core change components. They also prompt linguistic and/or cultural considerations. Learning how to accommodate and respect the different views among geographical regions or cultural groups can also be part of the trial process.

Getting practical
What do trials entail? How are they organized? What are important features?

Trial events are organised to work out practical implementations of different educational scenarios in real learning situations. Often, trials are built around some learning event, which supports everyday learning in the classroom. As innovation champions speak about opening learning and widening borders of classrooms, collaborative learning events between different classrooms and regions and countries are encouraged.

Trials may be viewed as a set of experiments and observations undertaken to decide how and whether new learning methodologies and educational scenarios can be used regularly in everyday learning process at the school. During field trials schools get hands-on experience. Trials are excellent opportunities for adapting new learning solutions to school needs, especially when they feature commentary or feedback for the participating groups.

Field trials are performed in schools often during normal learning hours, but they still have an informal flavour in many cases. During field trials, teachers and pupils tend to be more free to experiment and try out different solutions. This enables the opportunity to see how new approaches or tools might better suit existing curricula. During field trials, schools may create opportunities to explain to parents and the local community how they are using new learning methodologies to help children get better education. During field trials, schools also gain valuable information for budgeting and investments.

Promising practices

This section offers sample field trial practices undertaken in ODS to facilitate elearning resources adoption in education. Each introduced participants to key concepts and uses of digital resources, while also engaging them in practical activities.

Summer schools

The first ODS Summer school took place in Crete. The Summer School activities were based on the exploitation and enrichment of two existing, open access repositories: Natural Europe and Discover the Cosmos. 81 European educators participated as trainees, attending 15 hours of lectures and demonstrations as well as 10 hours of hands-on workshops. Activities addressed three key-areas: inquiry-based science education; high energy physics and astronomy; and connections between formal and informal learning through museum visits. http://www.education.natural-europe.eu/natural_europe http://portal.discoverthecosmos.eu repositories

Webinars

Webinars are interactive conferences, online-workshops with a certain target group and goals. They give for schools new information, ideas and contacts. For example, ODS hosted a webinar entitled: How to build a strong Action Plan/European Development Plan for your school according to the Erasmus+ Framework. http://www.galileoteachers.org/live-ods-webinar/

Training academies

The ultimate goal of the ODS training academies is to nurture innovation leaders who will promote the uptake of eContent in schools. It delivers training programmes and online support specially targeted for a set of stakeholders key to the uptake of eContent. Four training activity themes are shown here. Each on addresses a different group of stakeholders.

Teacher training and ICT support academy

This programme assists teachers in acquiring and reinforcing the skills and knowledge they need to exploit the rich potential of eContent. They learn how to incorporate eLearning in their courses, to reuse and create eContent. It trains ICT support staff and administrators in schools to facilitate teachers and students working with eContent and to implement local eContent repositories, linking them to ODS.

Technology developer academy

This programme provides theoretical and practical training (e.g. in coding and interoperability) to developers in content use (packaging formats, access control, and licensing) and content discovery (metadata, vocabularies, protocols, and registries). Developers create learning resources and incorporate them in ODS immediately.

Content provider academy

This training offers guidelines and support to content providers to adopt learning technology specifications, standards, and tools in view of sharing their content with the eLearning community in general, and through ODS in particular.

eParents Academy

This is designed to inspire parents to become promoters in the uptake, sharing, and reuse of digital learning resources in schools. It also gives insight into eLearning and working with eContent that can support childrenÕs learning.

Contests & competitions

Different kind of contests can be organized online or face-to-face. Several kinds of competitions have shown to be motivating for schools and interesting for teachers and students. Here, two examples from the ODS project work are given

ODS contest: "Let's move teaching process to the limelight!"

The submission period lasted for two months. During this time, teachers from all over Europe were encouraged to create learning scenarios (reusable ideas, similar to lesson plans). This contest was exciting because it was open to teachers from all over Europe. Eligibility was based on three simple conditions, each of which contributed to the advancement of the ODS mission:

- the participating teacher had to be a registered ODS teacher
- the teacherÕs school that had to be a registered ODS school

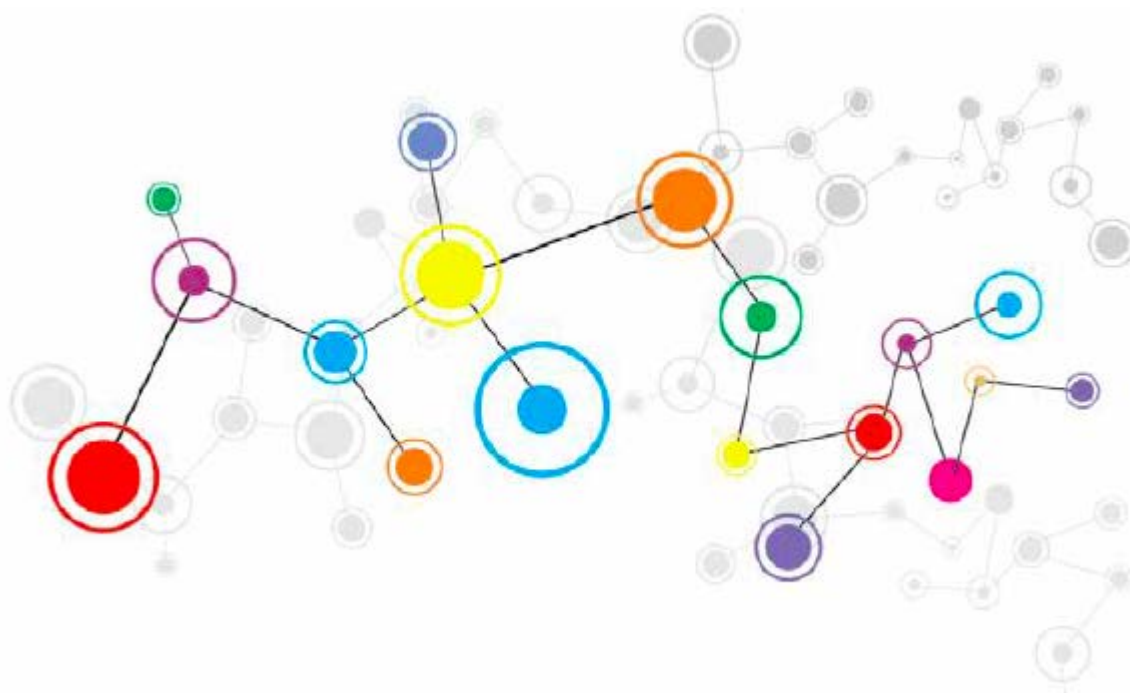- the learning scenario had to be created with ODS authoring tools

Multilingual international online contest

This competition featured and required automatic translation. The contest aimed to promote the use of automatic translation in regular schools. The contest was linked to the Organic.Lingua project, but was also connected with ODS. It Organic.Lingua project results. All together, 1846 participants from Estonia, Latvia and Crimea participated. Planning of the contest started months ahead. This included selecting student ages, identifying topics of interest to schools, and exploring tools and innovative solutions available to meet schools needs. It also featured discussions among teachers from different countries to select questions that should be included. Various schools and educational stakeholders were also involved. A few months later, the contest was ready to be translated and put online for all partners countries. After the contest was over, a finalizing phase took place. Teachers presented their experiences at a workshop in addition to their approaches to dissemination, promotion and feedback.

Informal teacher networking events

Informal mechanisms also foster teacher networking. For example, teachers can use eTwinning or participate in the Erasmus+ programme. Additional online collabrative learning events are being launched each day by various communities, universities, and development centres.
http://opendiscoveryspace.eu/eTwinning http://www.etwinning.net/

Masterclasses

The field trial can also take the form of a masterclass. This may, but does not necessarily, take place with support of local research facilities. Masterclasses are characterized by talks, given by a researcher or scientist, to teachers and students on specific topics. Following the presentation, debate usually takes place. Thereafter, the program follows with a hands-on session where students are introduced to a specific ICT hands-on tool with the purpose of exploring the subject in greater depth. The day may end with an event for the whole school and local community, for example, in the form of a science cafŽ.

This type of event can varied forms of impact. Here, three are mentioned in particular. First, it sparkles student interest for science. Second, it engages them in real research experiences via real, remote or virtual labs. And third, it promotes awareness among the overall community about the power of such approaches to influence the learning pathways of students.

Classroom examples
Masterclass example: The sky is my lab

Beginning

The day starts with a talk about modern trends in Astronomy. Researchers discuss recent discoveries and challenges. They are excited and detailed because they are speaking about their own fields of investigation. A hands-on session follows where students are introduced to specialized software. Stellarium, a powerful planetaria application, allows students to explore the night and day skies. This helps them to understand the most important phenomena related to celestial mechanics. This kind of

e-Confident

A more advanced session can take the work a step further, by engaging students in real research experiences. For example, students can participate in the regular campaigns for citizen science, promoted by robotic telescopes. In these events, citizens (including students) are invited to participate in observing the skies and following analysis of the results. Students

masterclass was viewed as very powerful to teach (in this case): moon phases, eclipses, seasons, and planetary motion.

can, for instance, begin to understand the life cycle of stars while observing different stages predicted for such phenomena.

Providing onlines tests for basic schools

Context
Online-tests are offered for teachers in Estonia by the Miksike Learning Environment. Miksike is a private institution in Estonia, which offers electronic learning content and services built on electronic content. Online-tests are part of the formal learning in Estonian schools, which are created to measure how well pupils have learned (skills and knowledge) relating to certain topics. Tests are done according to the curriculum and schools are using them as a part of their lessons. Grades are given according to the curriculum. Initial grading is done by Miksike's teacher assistant Ð an educational professional working on MiksikeÕs behalf who is supporting teachers in the classroom. A classroom teacher can change the grade, if she considers it necessary. In the 2013/2014 academic year much online testing took place: http://miksike.ee 445. There were many different online-tests and 76500 graded tests. In total, 428 teachers from 127 (nearly 1/3) Estonian schools benefited from this online testing service.

Resources
Miksike's teacher assistant coordinates the creation of questions and exercises in online tests. MiksikeÕs teacher assistant gets feedback from teachers communities and takes into consideration their wishes and suggestions. Questions are taken from electronic collections, which are also available freely though the ODS portal. When necessary, new questions are formulated and illustrations are obtained though images Miksike has the right to publish, open source libraries, commercial image services such as clipart.com.

Tools
Miksike's own e-learning platform is used for online tests, which was initially created in the Frames of Socrates/Minerva project. It is a platform for teachers and learners. In Estonia the addresses are: http://miksike.ee (for Estonian schools) and http://miksike.net (for Estonian Russian schools). The platform has different rights for different users (teachers have special rights and students have limited rights) to be able to work so that teachers see more information than students do.

Process
In the portal on the Minu Miksike (My Miksike) page there is an area called Online-tests. Taking a test is an easy process for the teacher and student. Teachers can easily connect tests with certain classes and make the tests public, the time they are needed. Pupils do not see the tests before the time assigned by the teacher. Results contains the list of tests taken, points for every test, and the grade (mark). If a test has been graded, users can view it once again; see mistakes and points earned for each question. Teachers can also see how successful his or her students were in tests, also teachers can see the student mistakes.

Impact
Miksike has offered online tests over 5 years and now, it can be considered more a mainstream service than an innovation. There are several factors, which keep schools using it. First, it saves teachers time. Now teacher evening hours can be spent confirming, not initially correcting, test results; this leavesmore time for organizing and planning creative things in the classroom. Second (and importance of this aspect is growing), online tests facilitate cooperation between schools, classes and teachers. Teachers like to discuss with their collegues how to measure learning and also compare results with other classes.

Lessons learned
Online testing services are suitable for eMature and eConfident schools as this requires good organizational skills on schools ICT personnel and teachers (enable whole class taking online tests same time etc.) and also some explanation needs to be done among parents and community as sometimes people outside of schools prefer to see classic paper tests when we speak about measuring pupils skills and knowledge. Teachers have to keep their eyes on security issues. It has sometimes happened that teachers forget their Ôteachers accountÕ password openly available and also primary grades are nowadays informed enough how to ÔbenefitÕ from this and cheating is possible.

Combining competition and learning
Context
V›istumiks is a set of learning activities offered for schools in Estonia by the Miksike Learning Environment. V›istumiks combines formal learning with elements of informal learning by using a contest/competition concept. Official grades are normally not given as a result of these events. V›istumiks helps learners to learn and repeat concepts, rules etc, which seem to be boring and difficult to remember. So this is just a small additional measure to help learners achieve learning goals set by the national curriculum. Learners learn in ways that they do not notice, because they are busy gaining as scores and points. V›istumiks is organized and coordinated by Miksike's teacher assistants Ð educational professionals working on MiksikeÕs behalf to support teachers in the classroom. V›istumiks is built up according to the teachers/schools needs and is community-centered. So, Miksike's teacher assistant`s task is to summarize and harmonize interests coming from schools. V›istumiks services started in the 2012/2013 study year and they continued 2013/2014. During 2013/2014, 20 V›istumiks learning events/contests were organized for the 1st - 9th grade students. 200-300 students normally participate in one V›istumiks event/contest.

Resources
Miksike's teacher assistant coordinates the creation of contests necessary for V›istumiks. Already existing exercises (over 8000 exercises) are used and if necessary, existing exercises are ÔclonedÕ and modified. Miksike's teacher assistant gets feedback from teacher communities and takes into consideration their wishes and suggestions. Contest exercises are often attended by schools teachers and they follow the national curriculum. Miksike's teacher assistant sets exercises up for the contest.

Tools
Miksike's own e-learning platforms subplatform is used for V›istumiks and it is available currently for schools in Estonia working in Estonian language http://miksike.ee and in Russian http://miksike.net. The platform has different rights for different users (teachers have teachers rights and students have usual rights) to be able to work so that teachers see more information than students do.

Process
In the portal on the Minu Miksike (My Miksike) page there is an area called āV›istumiksÒ. V›istumiks contains of 3 phases. First 2 phases are contests, which are built on interactive exercises. Contests are published for a certain time (1-3 weeks). Students are supposed to answer questions correctly, and as quickly as possible. Quicker responses earn more points. Incorrect answers of course deduct points. For one attempt, students are given a certain amount of time (normally 4 minutes, but this can vary according to organizers plans). After time is up, results are saved in a results table. Students can make unlimited attempts during the period contest is open. It is also allowed to participate after school hours. Result tables contain only the highest scores students have made. Result tables are visible to all contestants/learners. Results of these 2 phases are summarized. During the 3rd phase, students have to take a quiz, which is built on questions/themes of the interactive exercises. Results are summarized and winners announced, prizes distributed for individual students and also for teams/classes.

Impact
V›istumiks is a comparatively new service in Miksike (started 2012/2013 study year) but it is gaining popularity. Combining competition and learning is a powerful tool and additionally motivates learners to learn concepts, which are normally considered as ÔboringÕ ones. V›istumiks is suitable for eMature and eConfident schools and also to schools with less advanced eLearning practices. V›istumiks service is not explicitly aligned with the national curriculum.

Lessons learned
We need to find a good balance between learning and competition and keep in mind that the V›istumiks focus is on learning and not on figuring out who is the winner. Some pupils/teachers/schools get carried away so much by competition that the actualy learning is left in the background. Miksike strives to let much more contestants shine then just the ones gaining first places.

How to structure trials?
5 different ways to ensure both rich experiences for participants and collection of relevant insights to inform the innovation endeavor

Summer schools
Lectures and demonstrations and hands-on workshops combine to address three key-areas of substantive interest to teachers, while relevant outings and a pleasant atmosphere motivates participants.

Webinars
Like nteractive conferences, webinars are online workshops designed to speak to a certain target group and meat specific goals. They give for schools new information, ideas and contacts.

Training academies
These events nurture innovation leaders who will promote the uptake of change in schools. These deliver training programmes and online support specially target different sets of stakeholders.

Contests
Competitions have shown to be motivating for schools and interesting for teachers and students. An international dimension can also be stimulating.

Masterclasses
Specialist talks on specific topics are followed by active debate. This sets the stage for a hands-on session that engages participants directly with the issue at hand.
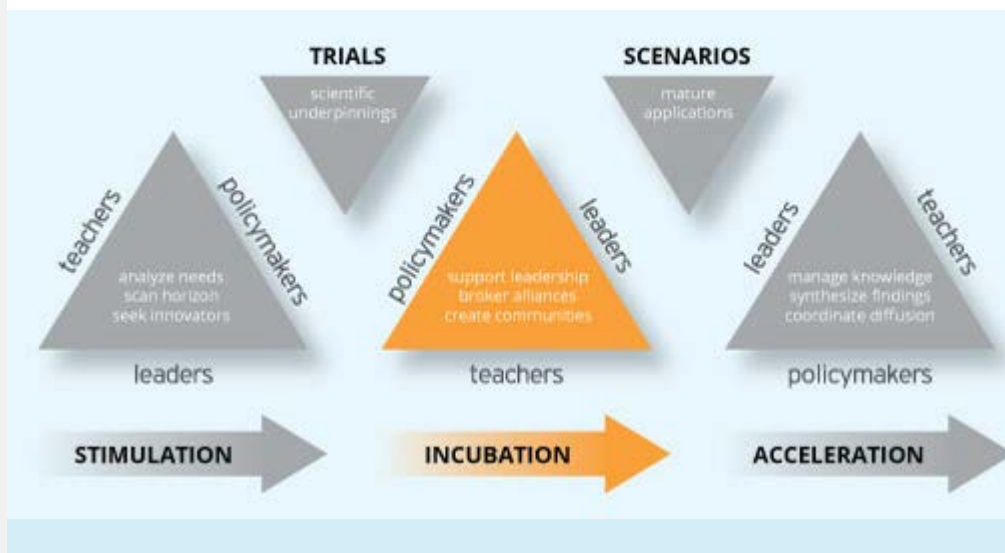
Technology-rich innovation *in schools*

powered by OPEN DISCOVERY SPACE

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Incubation

Key ideas
How to obtain steady, supportive change over time?

Requirements
What supports, interventions and innovative applications develop self-generative change?

Examples
Gadget supported learning? Creative learning processes?

Tips
Which incubation practices have proven useful before?

Incubation means a steady and supportive development of new learning, techniques or methodologies so that sustained and independent development occurs.

Sustainable innovation takes time
There are different aspects that have to be taking into account when changing teaching: take your time to reflect in the incubation phase.

Be creative and active!
Educational experiences that explicitly have an assessment-focused and creative activity are not only more engaging, but they influence and incubate further educational practices.

Innovation needs support
The ODS portal does not only provide resources, but also communities that will interact to support teachers willing to innovate.

Innovation starts locally
Preliminary workshops showed innovative teacher the advantages of change. Now it is the time to think how to start in your local environment.

Digital resources are versatile
Open Educational Resources can be adapted to your needs and (usually) run in computers at school or home.

Incubation requires a range of supports, interventions and innovative applications to develop self-sustaining self-generative change

After the phase of stimulating the teaching-learning process, and the different trials to explore Resource Based Learning (RBL), teachers need time to re-visit their own perspectives and experiment in their own classrooms: Incubation is that phase. RBL is a powerful and versatile pedagogical approach that needs time to be successfully applied in classrooms.

Innovative educational practices are more fruitful when Òfocused aroundÓ digital resources (e.g. slides, social networks, mobile devices, robots). It is important to take into account the importance of considering the total cost of operation (TCO) of the experiences. Digital gadgets are usually made up hardware (the ÒobjectÓ) and software (the programs executed on the hardware, including the operating system and other dependencies needed for it to operate). The use of open-source software could significantly reduce the cost of the system. First, obviously, in license expenditures, but also in hardware amortization (as usually open source software need less hardware resources to run and does not have fall into planned obsolescence practices).

Digital artefacts are key in Incubation phase, to support relationships and alliances between schools, help localization of the success experiences, and understanding how structures, hierarchies, system operational modes and learning cultures will adopt the change.

Examples
Gadget-Supported Learning
Handing useful gadgets (in general sense: hardware gadgets or digital Ðvirtual- ones) out to teachers and students to support well-designed educational practices can foster their adoption, use and spread over other colleagues, so facilitating the incubation of educational innovations and communities of practice. Gadgets must not come alone in the learning experience, but they should be accompanied by RBL approaches with the design of the experience that describes the real focus of learning (gadgets might be only a pretext to engage in).

An example of gadgetsÕ involvement is a workshop on Scratch programming carried out as a practice and reflection workshop for teachers. The first part of the workshop utilized a visual programming environment installed on desktop computers, and the second part used Lego Education WeDo robots to teach the same concepts. The second part resulted more engaging for teachers than the first one. Nevertheless, the first one is more cost efficient, just needing a computer and simulation software, and not specific gadgets. Later, teachers can see programs to finance the purchase of the robots. Then, check a large Scratch repository of resources that are promising as long as they are readily available in RBL portals. The social and pedagogical aspects of the portal ease sharing ideas on the key aspects for successful adoption in the classroom. But, the teacher has to reflect on the organizational change and learning cycles for implementation. Finally the teacher should contribute back to his/her community (and any other interested audience) thought the portal, resulting in new collaboration and networking.

Above: During the ODS incubation phase in Spain, Scratch proved to be a nice tool for programming simple programs for a computer or Lego robots. It is also suitable to a wide range of ages.

Creative Learning Practices
Educational experiences must foster to search, reflect upon, and create things that can be eventually delivered out of the educational environment, exchanged and assessed with/by others. The outcome of previous educational experiences can incubate future ones derived from the originals. New techniques like gamification are welcome.

An example of engagement by means of assessment-focused, creative activities is the Erathostenes experiment. First, it relied on a community of schools all over the world, each of them had to find a school to match up (this is, on the same longitude). Then, the Equinox day, students annotated their measurements in a shared document. In this experiment they had autonomy and freedom, but also guidance and supervision from their teachers. After the experiment took place, schools and school members have the chance to compare and assess othersÕ measurements, so fostering collaboration and incubating future practices.

It is important to highlight the importance of a web portal in the success of technology-rich incubation. It supports the leadership of change, easing connection of the participants, engagement, visibility and supporting broker relationships and alliances. Additionally, other digital artifacts (Facebook page, Twitter feeds, etc) can help highlight the good practices more properly.

RESOURCES	COMMUNITIES	SCHOOLS	TEACHERS	ODS ACADEMIES
EXPLORE OUR TO USE IN THE CLASSROOM AND PLAN YOUR LESSONS	SHARE EDUCATIONAL CONTENT THROUGH COMMUNITIES OR START YOUR OWN	NAVIGATE THROUGH THE SCHOOLS OF ODS NETWORK	BEING CONNECTED WITH OUR TEACHERS FROM ALL OVER THE EUROPE	FOLLOW THE ODS ACADEMIES TO IMPROVE YOUR PROFESSIONAL EDUCATION
813764 RESOURCES	627 COMMUNITIES	3170 SCHOOLS	8204 TEACHERS	163 ACTIVITIES

NEWS >

Innovative science...
Thursday, April 16, 2015
Conference on innovation and dissemination in math /...

ITK ja MAOL 15-18.4.2015
Tuesday, April 07, 2015
Interaktiivinen tekniikka koulutuksessa, ITK 25-...

Η Φυσική των Ολυμπιακών...
Tuesday, April 07, 2015
Η Ελληνογερμανική Αγωγή και το Γραφείο Σχολικών Συμβούλων...

COMMUNITY EVENTS >

Game Design - CS First
Tuesday, April 21, 2015
Activitatea 4 din club

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

ODS THEMATIC PORTALS

Science & Technology

World of Enterpreneuship

Geospatial Thinking

Above: ODS webportal http://www.opendiscoveryspace.eu

Incubation tips

Social platforms can incubate educational innovations that teachers and schools construct. But incubation requires support: a sense of community; connections to the environment; feasible and sustainable use of resources; and creativity.

Create your community of practice
ODS portal is community oriented, so it is the right place to find other teacher wish common interests and create your community to support you all and get visibility.

Listen to your environment
Experiences shown in workshops proved to be successful in their environment. Every country, every school and every group of student have their own dynamics, interest and experiences have to be updated accordingly before adoption.

Infrastructure and cost
When using digital resource user must set a proper digital environment and check sustainability. Not every hardware (computer, table, smartphone) is suitable for any resource. This could increase the cost (if affordable) of the experience.

Be creative
Open Educational (digital) resources can be improved over and over again. So do not shy to be creative and try new adaption of both the resources and practices.

Contribute back to your community
Your experiences (whether they were successful or not) are interesting to other members of

Tell me and I forget, teach me and I may remember, involve me and I learn.

-Benjamin Franklin

your community. Please, take your time to reflect on the key aspects of your experience and contribute back to your colleagues.
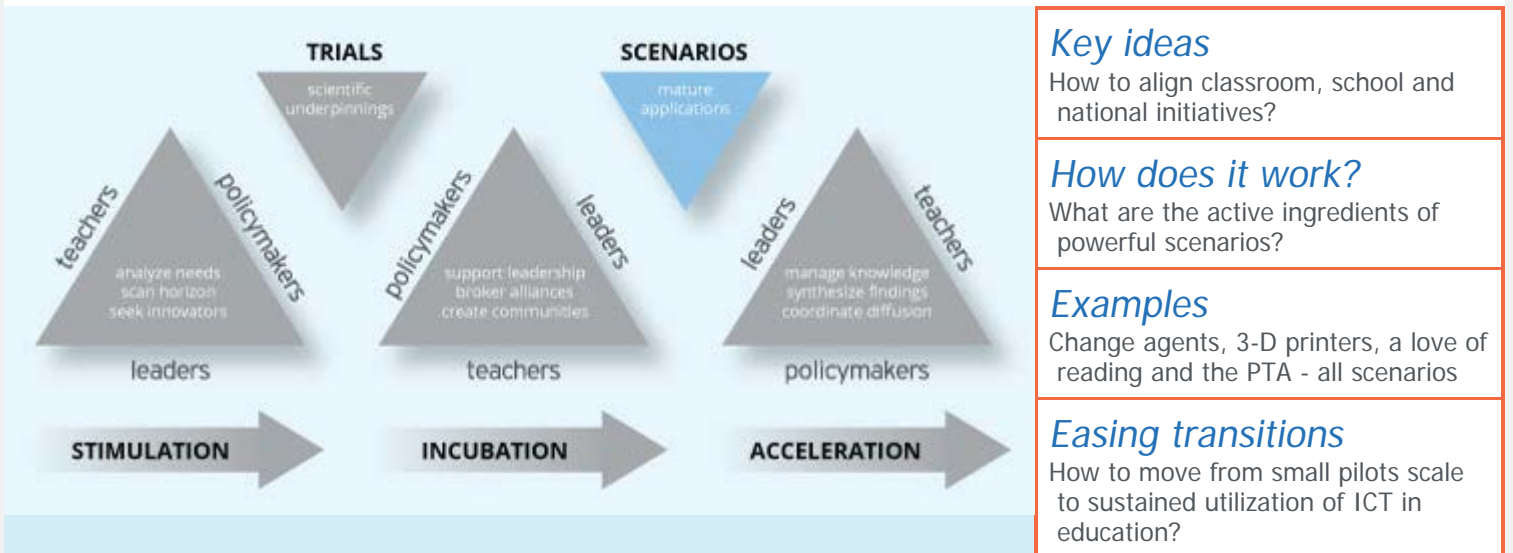
Technology-rich innovation in schools

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

roadmap | references | authors

Scenarios

Key ideas
How to align classroom, school and national initiatives?

How does it work?
What are the active ingredients of powerful scenarios?

Examples
Change agents, 3-D printers, a love of reading and the PTA - all scenarios

Easing transitions
How to move from small pilots scale to sustained utilization of ICT in education?

Scenarios exemplify, in scalable ways, how the intended outcomes can be achieved. Key elements for the scenarios are the contexts, the resources, the tools, the scaffolds, the impacts on school innovation and the lessons learned.

The triad: scenario in action, resource-based learning and school innovation
What is the interplay among them and how can research inform our efforts?
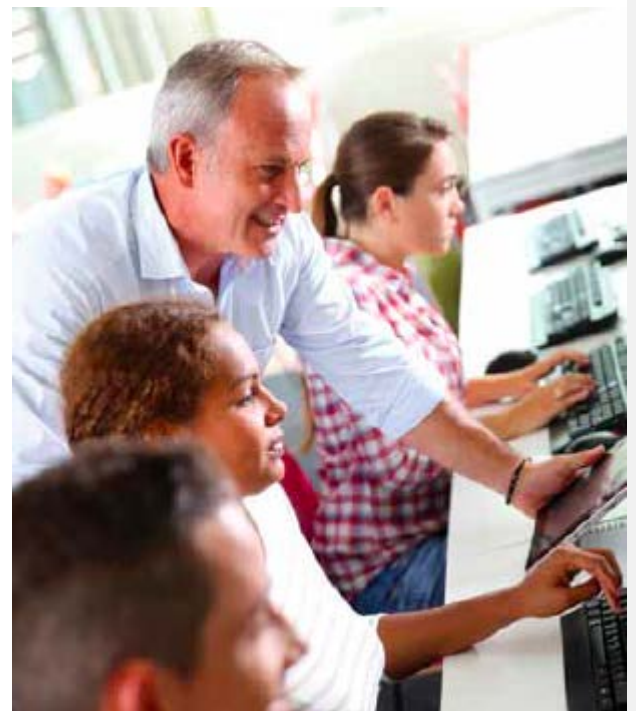
Classroom-wide scenario in action
The ÒCreating a model of Chirokitia Neolithic settlement using a 3D printerÓ scenario provides a roadmap from the creation of Communities of Practice to the exploitation of knowledge management techniques within participant teachers.

School-wide scenario in action
The scenario of a disadvantaged school becoming an innovation centre provides a roadmap from the invocation of the power to innovate to the acceleration of diffusion with national agencies.

National-wide scenario in action
A scenario in action related to the parentsÕ active involvement provides a roadmap from the support of the leadership of change to synthesis of evaluation and research.

How does it work?

What is it that will facilitate a large number of teachers, schools and learning communities to adopt resource-based learning in their everyday practices? What can we do about that?

Scenarios in action transition innovation work from the Incubation to the Acceleration phase. Scenarios are propelled by the change-agent teachers and supported by external agents (e.g. national coordinators). Both the people, and the innovation itself influence the ways in which scenarios unfold. In his classic work on diffusion, Rogers identified characteristics of innovations that determine their uptake and use. These characteristics are woven throughout an example of a change-agent scenario:

- Relative advantage: WhatÕs the added value?
- Compatibility: Will this change require other changes?
- Complexity: How detailed is the change?
- Trialability: Can I experiment with it before committing?
- Observability: Can I see it in action?

Real life examples
Change agent scenario

Mr. Alexandros Kofteros, Cyprus teacher in a disadvantaged school, managed to attract five other teachers from the same school to the ODS organisation and implementation process during scenarios in action. The participant teachers put a lot of hard work, while exemplifying many evidences of engagement and commitment. Finally, they decided to present their work to the national contest for the best ICT-infused scenario, organised by the Pedagogical Institute of Cyprus. During this process, the presentation skills of the participant teachers were greatly enhanced. The result was that two out of the five scenarios, presented by the participant teachers from the school of Mr. Kofteros, were rewarded in the final contest with prizes for innovation (Creating a model of Chirokitia Neolithic settlement using a 3D printer) and good practice (Learning about myself and others).

The hidden curriculum behind this scenario in action is related to how a disadvantaged school can become a school innovation center. Also, it exemplifies the importance of triggering the intrinsic motivation of the participant teachers in tandem with the courage and determination of the change-agent teacher. Another lesson learnt is related to the crucial role of the change agent teachers, provided that they have realised their roles, as well as, to how satisfying are reward systems and recognition for the hard working teachers (observability).

The change agent teacher of the disadvantaged school often quotes John Woods by saying: ÒThe player who makes the team great is more valuable than a great player. Losing yourself in the group, for the good of the group, thatÕs teamwork!Ó

Another enabler is the close relationship of the learning topics with topics of the curriculum: the participant teachers were challenged to use resources and tools in order to serve their learning goals, while gaining important ICT and presentation skills throughout this process (trialability). Taking into account their relationship with RBL and school innovation, scenarios in action might best be described using the structure of Hill & Hannafin (2001).

- Context, which includes a set of similar settings or learning situations in which the scenario in action can be applied successfully (like: combining formal with informal learning, enhance teacher motivation, foster self-regulating learning, use the affordances of learning analytics, provide community support mechanisms etc).
- Resources that are Òmedia, people, places or ideas that have the potential to support learningÓ
- Tools that Òaid individuals to engage and manipulate resources and ideasÓ
- Scaffolds through which Òindividuals are supported in identifying, interpreting, or otherwise using resourcesÓ
- Process description (data-->information--> knowledge-->meaning): how was this process established?
- Impact with regards to school innovation: how was school innovation fostered and/or sustained?
- Lessons learned (trialability): how can this scenario in action be generalized and transferred to other similar settings or learning situations? Which of the main actions included in the incubating phase trigger outcomes of the accelerating phase? And which outcomes are those?

Creating a model of Chirokitia Neolithic settlement using a 3D printer

Context

Based on an initiative to develop 3D printing, schools formed collaborations and worked in developing original content. Eventually, 3D models of the ancient Chirokitia settlement were created. Students from four different grades (aged 9-12 years) and educators that teach three different knowledge domains (history, technology and maths) participated. Participants engaged in a cross-disciplinary project with various forms of learning and multiple sources of information.

Resources

3D printing is an innovative teaching and learning practice. The ODS 3D printing @ Schools Community focuses on discussing and organising 3D printing actions, in order to address learning and teaching needs with poweful digital and physical representations while reusing existing infrastructure in a dynamic pedagogical context. Aim of this community is to raise teachers awareness on 3D printing, organise training events on design, use and deployment of design software and 3D printing infrastructures in schools and elsewhere, initiate cross discipline, augmented reality driven, projects between schools and other institutions using, mainly, 3D design and printing activities (relative advantage).

Tools

M obile devices, an easy-to-use 3D CAD tool for modelling 3D designs, history educational software and 3D printer.

Scaffolds

Students were supported by their educators (through dialogue and especially designed worksheets). The teachers were supported by the change-agent teacher (reduced complexity) and also they helped each other (reduced complexity, observability), since the project was a cross-disciplinary one.

Process description

An educational visit to the settlement in the context of the history course where data about the settlement were gathered (mobile learning, evidence-based learning); creation of a digital replication of the monument by modelling a 3D representation through a cross-disciplinary approach that combined mathematics (volume and area of 3D shapes, ratio and analogies) and technology education (3D modelling and 3D printing).

Impact

Regarding to school innovation, this scenario embraces project-based learning and mobile learning in conjunction with evidence-based learning (students are learning outdoors using mobile devices to collect evidences) while bridging informal with formal learning. Also, it embraces all kinds of collaboration (teacher-teacher, student-student and student-teacher). Finally, it has provided insights to the participant teachers about the affordances of mobile learning (Relative advantage). By the end of the project the participants had a holistic idea about life in the ancient Chirokitia Neolithic settlement.

Lessons learnt

RBL as a means of providing a) a protective environment to enable the collaboration and the exchange of knowledge between colleagues and b) an intriguing learning environment with lots of cognitive and social stimuli to enable peer learning between students. Also, unintended learning on behalf of the participant teachers in their effort to design an ICT-infused learning ÒecosystemÓ that would best serve the learning goals and the studentsÕ needs.

Read more

http://portal.opendiscoveryspace.eu/blog/alexandroskofteros/20130603-433
http://portal.opendiscoveryspace.eu/community/3d-printing-schools-community-270
https://tinkercad.com/

Love of reading: Learning about myself and others

Context

A common project between 4 schools (1 in Cyprus and 3 in Greece) based on the book ÒLit Book of the Great Psychological OppositesÓ (Oscar Brenifier). Schools came together through their participation in the ODS project. Even though material was developed (and shared) by the participating teachers, additional digital resources were used, saving time and effort for all involved in the project (relative advantage).

Resources

The idea was to change the attitudes of the students towards reading books - instill to them the love of reading- while they learn about themselves and others. Towards this end, a social constructivist approach was followed and an online community of interest was created (compatibility). The book ÒLit Book of the Great Psychological OppositesÓ was used as the basis for the creation of the digital resources, the forum was used to enable asynchronous communication, the webconferencing system and the chat were used for synchronous sessions, a digital glossary was shared among participants, online quizzes were generated for assessment purposes and, finally, a range of open-ended activities were created to serve the learning goals.

Tools

The open-source web conferencing system ÒBig Blue ButtonÓ a customised version of the ÒMoodleÓ open source Learning Management System,) other elearning services, like linoit, a free sticky and canvas service, and a projector

Scaffolds

ÒBookieÓ a pedagogical agent, integrated in the moodle e-course, designed by the participant teachers; its aim was to help students (conceptual and procedural scaffolds) while they were coping with the respective learning tasks and to foster self-regulating learning. Also, teachers literally undertook the role of the avatar ÒBookieÓ occasionally and facilitated the synchronous discussions in the chat. As already mentioned, the change agent teacher provided continuous support to the participant teachers throughout the scenario including their presentation in the contest. The change-agent teacher managed to reduce the complexity of the whole endeavour.

Process description

The students read the book, gained information about the 10 pairs of opposites unravelled in the book while wrapping their minds around abstract notions through the different types of activities (see section resources) and exercising their critical judgment.

Impact

The use of web 2.0 tools to foster an online community support mechanisms among participants (relative advantage). This scenario in action has:

- Bridged the gap between formal and informal learning (game-based activities were incorporated: hangman, crossword, wordsearch puzzle)
- Fostered collaborative learning and work within groups of students and teachers and across different schools,
- Motivated students to produce written word (through forum and chat), and
- Enhanced teachersÕ skills and motivation. In particular, pupils were highly motivated by thought-provoking collaborative activities: they could present their ideas, share the results of their assignments and participate in discussions in order to extend their conclusions.

Lessons learned

A significant enabler was collaboration across schools from different cultures and change management experiences because they facilitated lateral learning (Hargreaves, 2003) between schools. This new paradigm of social learning created new forms of interaction. One of the major features included in the transformed education system, whose contours are coming into view is the presence of Òrich, extended models of school organisation using networks and highly varied forms of learning to engage directly with wider communities and jointly produce the wider conditions under which successful educational attainment and learning take placeÓ (Hargreaves, 2003). This scenario in action is the manifestation of this feature.

Read more

http://meetings.ellak.gr/bigbluebutton/
http://mathisis.org/
http://en.linoit.com/

ParentsÕ engagement & involvement: Meeting Parent Teacher Association (PTA)

Context

Parents are always seeking ways to boost their childrenÕs interest in learning, however they donÕt always possess the knowledge to identify which content is suitable for them. During the school year, teachers might be able to point to certain content, but during school holidays a teacher is not always (physically) available. Various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families. Recognising the potential of parent inclusion in the development and use of ODS, a number of presentations took place in Cyprus with representatives of the Parent Teacher Association (PTA) Union, representing all PTAs in the country. Great interest was shown on the potential of the platform and its possible uses, and was agreed that prior to the completion of the project, during the next stage of implementation, a Cyprus PTA community will be developed in order to disseminate results to schools in Cyprus and their respective PTAs.

Resources

Open Discovery Space can be used to offer parents a viable, free and open solution for collaborating with teachers, not only from their school but from other schools as well, to discuss issues of interest with parents from other schools and other countries, and to easily locate and use educational content that might be suitable for their children. ODS can offer access to online quality content, access to discussion forums on topics of interest, communities of parents with similar anxieties and interests, parent academies with online events and seminars. Additionally, ODS can offer parents webinars that will help them improve their skills in helping their children, while giving them an active voice in the ongoing development of the platform and methodologies, through an active participation through feedback. As such, it is essential that parent teacher associations both on local levels (school) as well as national levels, are given adequate information on what ODS is and what are the benefits of its implementation for students and families, so that they can assume a more active role.

Tools

The ODS Community portal provides Open Educational Resources and communication tools to build online communities (forum, blogs, social bookmarking etc). Google hangout is an open and free digital environment that is being used to host webinars (web seminars).

Scaffolds

ODS is an educational as well as a social platform. It provides a central point where many opportunities for communication/collaboration are announced: online events, contests, schools, webinars, seminars, workshops, good practices, e-noticeboards etc. It also provides educational digital resources and pedagogical scenarios, accompanied by quality indicators either in the form of validation checks by official educational institutes or in the form of rankings by peers, or both.

Impact

School family collaboration has been found to be beneficial in improving learning outcomes and also in reducing other problems (i.e. problematic student behaviour). Online systems exist and are used in many countries, especially in Europe, the United States of America, Australia and Canada, which support family-school collaboration and communication. Research, especially in the area of Computer Mediated Communication, has shown that various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families

Lessons learned

The practices mentioned above aim at opening the school towards parents through a Parent Teacher Association. Broker alliances with PTAs may make parents feel confident in offering ideas and opportunities for community building, as well as, encouraging them to play a bigger part in the school life, as a whole.

http://www.google.com/+/learnmore/hangouts/

Eratosthenes Experiment

Context

The Eratosthenes Experiment is based on the very fundamental idea Eratosthenes had in order to measure the circumference of the Earth. Students have to proceed to uncomplicated measurements using uncomplicated equipment and to exchange their scientific evidence obtained with another school they have been matched up with. The match-up is affected by the longitude of the schools: the participating schools must share the same longitude for the success of the experiment. They provide their

latitude and longitude during the online registration process.

Resources
Teachers who are willing to conduct the Eratosthenes Experiment with their students can take advantage of the lesson plans offered on the Open Science Resources portal (OSR) - a repository hosting educational scenarios regarding science teaching for all grades. The material consists of full scenarios that assist the teachers to prepare their students for the experiment and they offer detailed description of the procedure and material for further discussion. They are based on the Inquiry Based Learning Model with educational objectives applied serving the educational interest. These resources are available in Greek and English. Teachers are encouraged to adjust the resources to their studentsÕ needs. Additionally to the lesson plans, eLearning tools are also suggested to be used. Participants are encouraged to use Stellarium and Google Maps in order to identify the local noon at their location and to measure the distance between their school and the school they have matched up with, accordingly (explained under Process Description).

Tools
Internet connection, computer/ tablet/ mobile device.

Scaffolds
Students are supported by their educators, (specially designed worksheets are included in the available lesson plans). And in consequence teachers are supported by the lesson plans offered and by the organisers who are accessible for online responding to questions before, during and after the conduction of the experiment.

Process description
For the need of this activity the students along with their teachers define the local noon at their location. They use a one-meter stick that they place vertically to the ground. At the time scheduled to conduct the experiment, students measure the length of the stickÕs shadow. They repeat the measurement 5 times and write their values down to submit them later. Students need to know the value for length of the third side of the triangle shaped or they can calculate it themselves by using the Pythagorean Theorem. Then, they calculate the distance using Google Maps between their school and the school they have matched up with. This year the experiment will take place on the 21st of March, on the equinox day. Students can now calculate the circumference of the Earth.

Impact
The Eratosthenes Experiment although it is actually a representation of an ancient and fundamental experiment succeeds in drawing the attraction of students of all ages. The lesson plans accompanying the experiment involves successfully project-based learning in combination with evidence-based learning; students are learning outdoors collecting evidence. Also, there is a dynamic fusion of informal with formal learning. Likewise, it comprises all types of collaboration (teacher-teacher, student-student and studentteacher).

Lessons learned
Carrying out the data analysis with the students in class helped them to identify issues and gave them immediate verbal and visual explanations. Many of the students were challenged with the spatial reasoning skills required to compute the distance, and to relate this with the circumference of the Earth. Working together with students and teachers from another country provided a concrete illustration of how students from different backgrounds and living in different countries can collaborate to solve scientific problems.

Read more
http://eratosthenes.ea.gr/en
http://www.osrportal.eu/en/node/94354
http://portal.opendiscoveryspace.eu/community/eratosthenes-experiment-667944

Scenarios in action from the ÒeLearning 2.0Ó project
Teachers and students from four schools in one virtual classroom
In the project titled ÒeLearning 2.0Ó, best practices are described in a similar way as scenarios in action are in the context of ODS. Their structure is: introduction, description, user profile and organisation of the community, technological aspects, outcomes, motivational aspects and impacts, results of the survey among participants, success factors and barriers, lessons learnt. In ODS, we identified the success factors and barriers with regards to the adoption of Resource-based learning and school innovation at the beginning of the project and we built upon them to create scenarios in action designed to provide roadmaps that alleviate the barriers and enable the success factors. A scenario in action from the elearning 2.0 project that may also have an added value for ODS is titled ÒLeMill (Calibrate) Ð A Web 2.0-enhanced Community for TeachersÓ (available online in http://ftp.jrc.es/EURdoc/ JRC53212_TN.pdf).

The Calibrate project promotes the idea of free and open learning resources and international transfer of online learning material, while LeMill develops a webservice for exchanging national learning materials within the Calibrate project. Among the lessons learned that particularly apply to ODS are those: a) multimedia and interactive content are requested by teachers and b) group functions of social communities can support learning resource exchange.

Scenarios: Easing transitions

Scenarios in action provide a roadmap for the incubation-to-acceleration phase, i.e. the transition from the small, pilot scale to the large scale utilization of ICT in education, school innovation and Resource-Based Learning

School example

Although there no known or safe ÔrecipesÕ on how to make your school an innovation centre, the cultivation of team spirit, the continuous support on ICT-related issues coming from the change-agent teacher and the rewarding systems (like contests), can play an important role in teachersÕ intrinsic motivation and, in turn, to their professional development.

Classroom example 1: 3D printing @ schools

Teachers are learning from each other during their co-ordinated efforts to design learning ÒecosystemsÓ that invite their students and other participants to discover history and the added value of technology and ICT tools. Teachers gain confidence, skills and knowledge while trying to meet the curriculum standards set out for this learning topic.

Classroom example 2: Love of reading

Teachers and students from four schools and two different European countries come together in one Virtual classroom. This scenario in action of social learning illustrates how new forms of interactions and joint intellectual student and teachers production can be facilitated effectively by technological means.

Emerging practice: engaging the parents

The Open Discovery Space approach to school education and school development recognises the important impact of studentsÕ families on successful education. ODS sets out to empower parents by providing them with: resources, social network tools and the eParents Training programme.

Scenarios in action from another project

The LeMill project promoted the idea of free and open learning resources and international transfer of online learning material. A series of best practices and lessons learnt were identified by the end of the project. The most relevant ones are mentioned in this section.

My educational institution is not a physical plant with classrooms and tress, but a ÔhubÕ of resources no longer constrained by time and place.
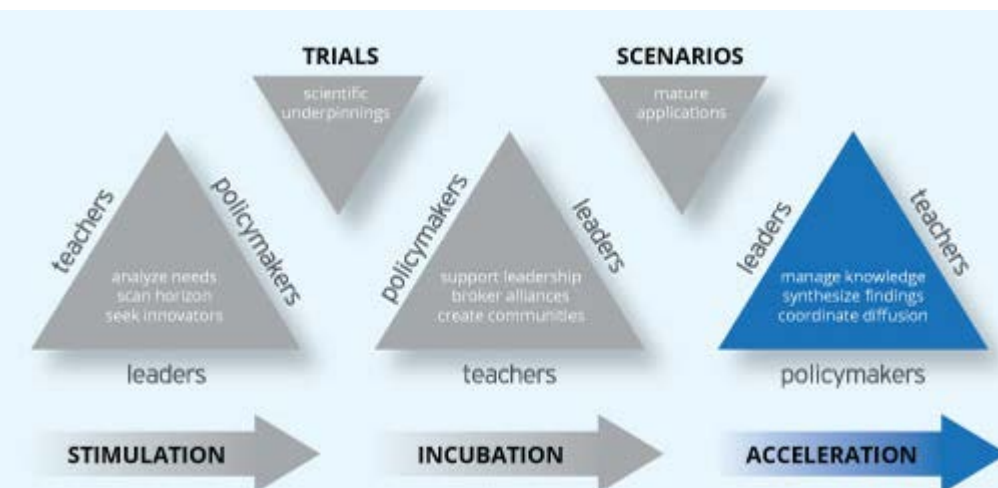
-Dillon & Granger

Scenarios

Technology-rich innovation in schools

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Acceleration

Key concepts
What does it mean to accellerate, through dissemination and diffusion?

How does it work?
How is acceleration powered through government reform, local initiatives or both?

Examples
Acceleration stories from the ODS activities in Greece

Recommendations
Key considerations for acceleration

The accelerating phase is the period where the educational change is expanded to significant portions of the student population, activities are taken up in representative schools, and knowledge management is used among partners

Key concepts

Accelerating
This phase aims to spreading the innovation. In a centralized educational system, this stands to be achieved through a governmental educational reform. In the decentralized systems, the district superintendents and school principals are likely to play significant roles.

Dissemination
One-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media.

Diffusion
Process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other.

How does acceleration work?
Accelerating through government reform, local initiatives, or both
Forces at play
Throughout this phase, attention is given to:

- exploiting knowledge management techniques (sharing what is known within ODS partners and participants);
- synthesizing evaluation and research (to inform efforts);
- accelerating diffusion with national agencies (to reach increased numbers of users on the ground).

There are two kinds of processes in this phase: dissemination and diffusion. School principals and headmasters play vital role in both of them (both directly and indirectly). Dissemination is a one-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media. Complementary to this, diffusion is the process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other. It is not necessarily the scope of diffusion that measures an interventionÕs success, but its presence is one important indicator. It is a Òspread withinÓ which can be seen, for example, when reform principles or norms of social interaction become embedded in school policies and routines, or when teachers draw on those ideas and put them to use in other aspects of their practice, which were not explicitly addressed by the intervention.

Diffusion tends to be less common than dissemination; and innovators can sometimes be both delighted and overwhelmed when it starts to take place. In order to be successful, diffusion should be encouraged by the school management. Educational leaders can be very supportive in these processes. First of all, they can initiate dissemination activities. In order to motivate the teachers, ODS headmasters are offered a gamut of ODS presentations, workshops, webinars, training academies, meetings, etc. to choose from. They can decide on the actual school poliicy and in accordance with it use what ODS offeres. No other portal has been created with such meticulous attention only for education needs and teachers as its target audience. In the following passages there are some tips and practical ideas how headmasters can benefit from ODS in order to motivate teachers.

Headmasters, teachers, ODS Ð whatÕs the connection?

The most important task for headmasters is to motivate teachers (and learners) to use eLearning resources. That means:

- to provide reward (e.g. not directly by giving money but by offering professional development trips, professional advancement)
- to insist on implementing e-register and obligatory number of ICT lessons throughout the school year (this should be systematically done)
- to insist on teachers having electronic lesson plans, electronic portfolio and documentation
- to have teachers attend obligatory ICT seminars in order to develop their ICT competencies
- to have teachers categorized based on their ICT competencies in order to have motivational approach to teachers' development
- to embed successful projects (competitions) into the educational system and impose them on teachers as official
- to synchronize the needs of students with the instructional methods (not only by implementing ICT but also by involving creativity, task-based learning, challenge in learning)
- to implement e-learning carefully and cleverly: it could be at first for extra curricular classes, then to move on to regular teaching process

In order to overcome organizational and technical barriers, the following should be done:

- to educate constantly the school management and teaching stuff
- to provide positive examples from the teaching systems that managed to raise the quality of studentsÕ knowledge by means of e-learning
- to raise awareness with teachers that their private e-activity could also be used in teaching (Google account, one drive account, social networks)
- to provide education for teachers to use LMS / CMS (e.g. Moodle)
- to involve expert teachers into sharing-and-caring activities
- to engage school and regional coordinators for ICT implementation
- to participate in both international and national projects
- to provide a good personal example by having an

official headmasterÕs webpage/FB profile

Acceleration stories from ODS activities in Greece
Overview

ODS cases from Greece ODS has up-to-date (January 2015) achieved to engage 433 schools in Greece, whose participation is being coordinated and supported by Ellinogermaniki Agogi Research and Development Department. Other Greek partners are the University of Piraeus, the Technical University of Crete, the Greek Research and Technology Network, Agro-know Technologies, as well as CTI Diophantus and the Institute of Educational Policy, which are supervised by the Greek Ministry of Education. Out of these schools, 312 were recruited from January 2013 to December 2014 through various channels (ODS visionary and practice reflection workshops, conferences, presentations and other dissemination events, previous projects), while 122 schools were added in January 2015 after a general call that the Institute of Educational Policy addressed to all schools of the country. This formal call was in fact a significant step in the official adoption of Open Discovery Space by the National Educational Policy and the acknowledgement of its potential impact on the modernization of school practice and the promotion of innovation in Greek schools.

A variety of activities is suggested to schools by the Ellinogermaniki Agogi team and a series of respective ODS communities has been set-up to support their implementation. In terms of curriculum areas, these activities involve Science and High Energy Physics, Environmental Education, Music, Entrepreneurship, as well as teacher training on educational design and a focus on pupilsÕ transversal key competences. The schools are free to choose more than one of the supported activities and, although Ellinogermaniki Agogi provides them with tools and educational scenarios, they are also encouraged to adapt these resources to their own needs and specific contexts, using the ODS template for the schoolÕs action plan.

Below is a short description of three selected cases and implementation activities from Greek schools that share the following characteristics:

- Connection, community building and sharing of resources among remote schools through the ODS portal.
- Increase of access to resources for remote and Ðsubsequently- underprivileged schools through the ODS portal and tools.
- TeachersÕ increased familiarisation with digital educational design tools and implementation of innovative teaching methods, such as the inquiry-based model and project-based practices.
- SchoolsÕ collaboration through ODS with regional policy makers, universities, professional artists and other organisations and thus networking and opening-up of the school.

Connecting schools through music
Context

"Akriton Mousiki" was a live interactive performance audiovisual event combining Music and Digital Shadow Theatre. The performance was inspired by the Greek Acritan heritage and included the collaborative preparation, co-creation and realization of an online event between multiple distant ODS schools linked together via videoconference. During the "Linkcast" (webcasted videoconference) pupils from four remote schools presented a virtual-stage role-playing educational activity by moving digital figures (e-shadow platform) accompanied with shared live Music performance. The scenario included an advanced interaction between these five remote educational communities on the islands of Karpathos, Gavdos, Kastelorizo and Cyprus hosted by Athens.

Part of the dialogues arranged for the event was based upon the Byzantine epos of Digenis Akritas digitized by the University of Crete Anemi Database. The development of the "Akriton Mousiki" activity is the first attempt to produce advanced-interaction scenarios between 4 remote islands in Greece including Cyprus via live videoconference involving Music as a performance art.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Online mentoring, collaborative working with use of online resources.

Process
A new community was formed inspired by the "Akriton Mousiki" activity. ÒTravelling in the era of ErotokritosÓ is a community of teachers in Chania-Crete exploring educational aspects of Vincenzo KornaroÕs epos of ÒErotokritosÓ and other personalities of the post-Byzantine era such as the famous painter Domenikos Theotokopoulos and the composer Frangiskos Leontaritis. The community through its manager in Chania, took part in a group of the ÒLet Us Share The Music/Let Us Link The WorldÓ community along with community-members from Athens and Evros (Northern East of Greece) The group contributed in the preparation of an ODS scenario based on the above prominent Renaissance figures and their Art. After online training, provided by the parent community manager, the teacher in Chania recorded and edited digital audio files of her pupils narrating extracts of the poem she had prepared. Digital contributions were uploaded as extracts next to music excerpts from the same era, performed by professional musicians who granted the group with their permission to use their content for educational purposes. Original Digital Audio Workstation music was also arranged, composed and produced by the parent-community-manager to accompany the pupilsÕ narration. PupilsÕ paintings were uploaded as well.

Impact
The outputs of these activities leaded and with an aim to create a Virtual school on the theme of Music the ODS Teachers Training Academy ÒLive-Music EducationÓ has been developed in order to lead future members into advanced methods of exploring ICT in musical interactive scenarios http://portal.opendiscoveryspace.eu/topic-courses/live-music-education-academ.

Read more
http://portal.opendiscoveryspace.eu/community/moirastoyme-ti-moysiki-enosoyme-ton-kosmo-let-us-share-music-let-us-link-world-347.

Increased interest and greater interaction in Remote Tychero

Context
The High School and Senior High School of Tychero are located in a rural agricultural town of North-eastern Greece, near river Evros. The area, as all rural areas in Greece that are situated on the borders of the country, is defined as a remote one, with accessibility problems that the educational authorities officially recognize and attempt to address. The two schools are relatively small in terms of student population and face practical difficulties, such as inadequate number of teachers, frequently moving staff, poor infrastructure and accessibility issues due to their location. However, in the last few years the schools of Tychero have been having an increased interest participating in European networks, in collaborating with peers and other schools and

in searching for opportunities to improve their quality of teaching and developing the studentsÕ 21st century key- competences.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Face to face and online training material made available.

Process
Both schools entered ODS at the beginning of Pilot Phase 2 (September 2014) after being introduced to it in a Practice Reflection workshop organized by the regional school counsellor who collaborates with the Ellinogermaniki Agogi team. Regional school counsellors are appointed by the Ministry of Education and the experience of ODS in Greece has shown that their role can be significant in disseminating innovative projects, such as ODS, as well as in recruiting and motivating schools to participate. In addition, since they are working at local level they can act as mediators in identifying and supporting individual teachers that are already active and motivated. Mrs Stella Tryfonidou, Science and Technology teacher, is an example of this type of teachers, who, acting as a change agent, recruited in turn both of the schools of Tychero in ODS in order- as she identifies Ð to: a) enhance the access of her school to qualitative and innovative educational content from ODS, and especially the repositories of OSR and Discover the Cosmos, b) take opportunities for various educational activities, c) participate in teachersÕ professional development training. Within this framework, Mrs Tryfonidou designed four innovative educational scenarios that are based on the inquiry model and made use of resources from these repositories, as well as of the ODS authoring tool. The scenarios have been implemented in the schools of Tychero or are currently still in progress (January 2015) with the support of the Ellinogermaniki Agogi R&D Department.

The first scenario was implemented within the ICT Curriculum with First-graders (15 years old students) of the Senior High school of Tychero and was entitled ÒPacman with ScratchÓ. The idea of the scenario is the development of an application in an optical programming environment, such as Scratch. The students worked in groups, designed the application and implemented it through Scratch. They then tested and evaluated it and disseminated it to peers and the local community. The results of the work of Tychero were presented at the Panhellenic Student Festival of Digital Creativity, which is organized every year by the regional ICT school counsellors. The scenario has been uploaded onto the Greek community of educational Scratch programming of the ODS portal http://portal.opendiscoveryspace.eu/community/senaria-didaskalias-se-perivallonta-optikoy-programmatismoy-me-plakidia-668762

The second scenario was entitled ÒHow did Thales calculate the height of Pyramid of Cheops?Ó and was implemented at Tychero in the school year 2014-15. The scenario was based on the Project Based Learning approach and engaged the students (15-year-olds) to construct a simulacrum of the Pyramid and calculate its height, following the same method that Thales used in the 6th century B.C. Mrs Tryfonidou based her work on an original scenario that was already available on the OSR portal http://www.osrportal.eu/el/node/95028 that she then adapted.

The implementation of the third educational scenario was inspired and initiated by the Eratosthenes experiment http://eratosthenes.ea.gr/, an international activity, which was offered to ODS and ISE (Inspiring Science Education) schools in March 2014 attracting 350 schools from 37 countries. Here again, the activity implemented at Tychero with second-graders (16-year-old students) was based on an original scenario of the OSR portal http://www.osrportal.eu/el/node/94691 that Mrs Tryfonidou adapted to her school and studentsÕ needs.

Finally, the fourth scenario, that is currently being implemented in the High School of Tychero, is entitled ÒGood night to the starsÓ and its objective is to introduce the students (12 -15 year-olds) to basic concepts of Astronomy and prepare them for a virtual connection with the Faulkes robotic telescopes, that will be conducted with the support of the Ellinogermaniki Agogi R&D team. The scenario will also engage the students in constructing a model of the solar system and disseminating their final report onto a wiki environment.

Impact
The evaluation of the impact of these scenarios on pupilsÕ learning is still in progress, however some significant remarks made by the teacher include: increased interest on the part of students, greater satisfaction from hands-on learning compared to conventional teaching and thus accomplishment of affective educational objectives. There was also improvement in classroom time management and psychomotor objectives, such as the pupils working effectively in groups, taking initiatives and volunteering to work on these projects in their free time. The teacher herself also reported that the resources of ODS supported her in terms of Scientific expertise and motivated her to be more creative and inspired.

Lessons learned

In summary, the overall experience from the implementation of ODS in Greece has shown that the following practices can have a positive impact on schoolsÕ engagement to a project that promotes school innovation and on making the most of the opportunities it provides them:

- The ODS approach based on its innovation model, that considers the schools and the teachers as capable of innovating, can be unprecedented or even challenging for schools, especially in countries with centrally governed educational systems, like Greece. Providing individualized and personal support to is crucial in helping schools develop their own innovation strategy and convince them that they have the power to change and improve education.
- To the same end, engaging and collaborating with regional educational authorities and policy makers also helps in creating a safer environment for schools and teachers that seek change and innovation. - Opportunities for disseminating individual cases of innovating teachers and schools to their local or wider educational community (e.g. teachers presenting their own work in conferences or presentations through the press/ media) can have a very positive impact on schoolsÕ engagement: In this way individual efforts are rewarded and further encouraged, acting also as multipliers and sources of inspiration for other teachers and schools.
- Similarly, it is important to promote regular networking activities that bring together teachers from different school settings in order to build trust and a common vision that will encourage them to share their resources on a public platform, such as ODS.

Tips for accelerating

In order to motivate and inspire teachers, headmasters need to set up a personal example of lifelong learning and professional development. Their influence starts from their internal engagement on personal and professional development in order to provide good example and set up the atmosphere. Further steps include external influence which they make on teachers by creating the climate for ÒpullÓ approach (with the main aim to show Òfollow meÓ instead of Ògo aheadÓ). Finally, one of their external influences to motivate teachers is to nurturing life-long learning and professional development of teachers by providing (funding for) seminars, workshops, trainings, sometimes even their consent and approval for teachers to take a day off for development sessions.

As an example of a success story, there is a story about the headmaster from Technical School in Knjazevac, Serbia. Her name is Ljiljana Zikic and she was the first to introduce ICT into her school. She went to seminars and trainings, created lesson plans for teachersÕ competitions, etc. In the end, she became a good example to the teachers from her school. The result is that in 2013 at the competition ÒCreative SchoolÓ (organized by Microsoft Serbia and Institute for Improving Education) there were eleven teams, three teachers in each of them, from her school! She personally took part in three of them.

To accelerate the process, headmasters play an important role. They disseminate the information but they also make the diffusion phase more likely to happen when they create the positive atmosphere among teachers. It needs time, but it always ended successfully when headmasters were involved in the process.

Important factors
Acceleration is influenced by the innovation itself, the strategies used in implementation, the context and the actors Ð efforts muse be attuned accordingly.

Synthesize findings
Results from evaluation and research in this phase inform future work but can also provide justification for increased acceleration efforts.

Coordinate dissemination & diffusion
Across various push and pull activities, core ideas and goals help projects stay focused during this phase.

ItÕs not about the tools, itÕs using the tools to facilitate learning.

- Andrew Churches

Μεθοδολογία για την εισαγωγή
της Καινοτομίας στη Σχολική Μονάδα

Περιγραφή ODS

Το έργο Open Discovery Space (http://www.opendiscoveryspace.eu/) θεωρείται ως ο βασικός άξονας εισαγωγής της καινοτομίας στο σχολικό περιβάλλον και αποτελεί μια συντονισμένη πανευρωπαϊκή προσπάθεια με στόχο την ενθάρρυνση και υποστήριξη των σχολείων της Ευρώπης στην αξιοποίηση ψηφιακού εκπαιδευτικού υλικού στη διδασκαλία. Το έργο συγχρηματοδοτείται από την Ευρωπαϊκή Επιτροπή στο πλαίσιο του Policy Support Program (PSP) και υλοποιεί τους βασικούς στόχους της «Digital Agenda for Europe - Action 68».

Στο έργο συμμετέχουν ως εταίροι 50 φορείς από 25 ευρωπαϊκές χώρες, όπως Πανεπιστήμια, Εταιρείες, Εκπαιδευτικά και Τεχνολογικά Κέντρα και πολυάριθμες εκπαιδευτικές κοινότητες από όλες τις χώρες της Ευρώπης.
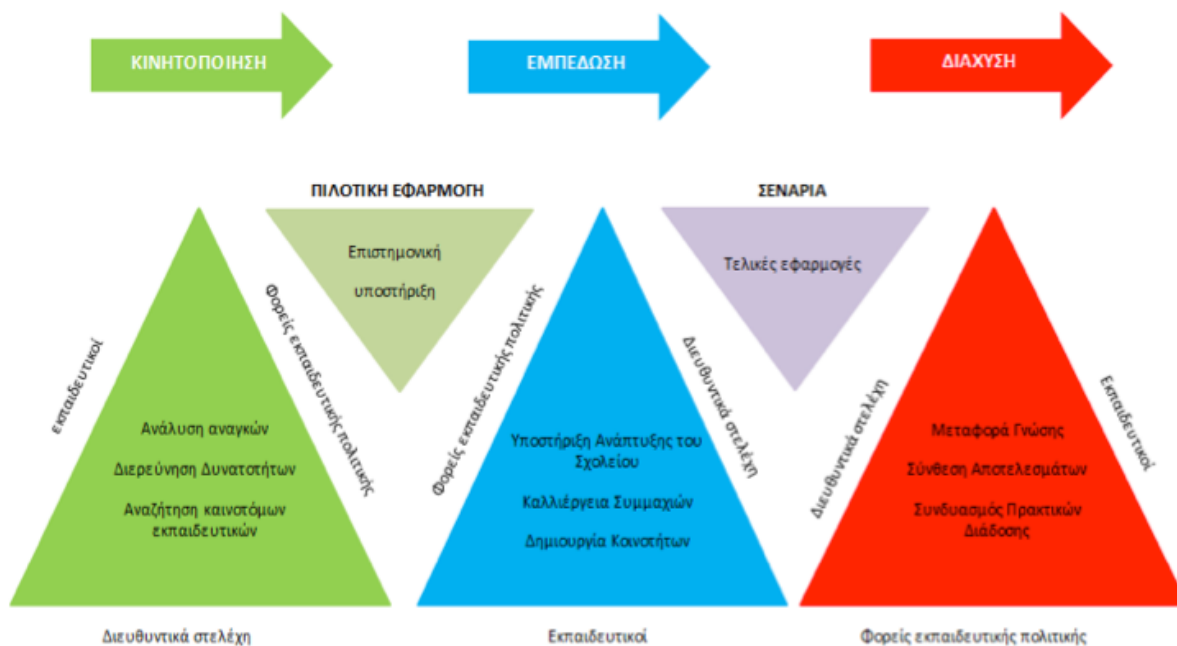
Στο πλαίσιο του Open Discovery Space δημιουργείται μια πολύγλωσση πύλη κοινωνικής δικτύωσης, που αποτελεί ενιαίο σημείο πρόσβασης για τους εκπαιδευτικούς και τους γονείς στους ψηφιακούς εκπαιδευτικούς πόρους πολλών Ευρωπαϊκών Αποθετηρίων εκπαιδευτικού υλικού. Το Πανελλήνιο Ψηφιακό Αποθετήριο Μαθησιακών Αντικειμένων «Φωτόδεντρο» του ΥΠΑΙΘΠΑ, που υλοποιεί το Ινστιτούτο Τεχνολογίας Υπολογιστών & Εκδόσεων «ΔΙΟΦΑΝΤΟΣ» στο πλαίσιο του «Ψηφιακού Σχολείου», αποτελεί ένα από τα βασικά αποθετήρια που έχουν συνδεθεί με το Open Discovery Space. Ειδικότερα, το Open Discovery Space παρέχει μια υπερσύγχρονη μηχανή αναζήτησης εκπαιδευτικού υλικού, η οποία προσαρμόζει τα αποτελέσματα αναζητήσεων στις δυνατότητες και προτιμήσεις των χρηστών και συνδέει το υλικό με τη διδακτέα ύλη κάθε χώρας. Επίσης, στην πύλη του Open Discovery Space λειτουργούν Ακαδημίες Εκπαιδευτικών και Γονέων με πλούσιο υλικό κατάρτισης (videos, moocs, crash courses κ.λπ.).
 Επιπλέον, το Open Discovery Space παρέχει στον εκπαιδευτικό τα κατάλληλα εργαλεία για να δημιουργήσει, να αποθηκεύσει και να μοιραστεί με άλλους τα δικά του εκπαιδευτικά σχέδια και σενάρια, ακόμη και σε επίπεδο σχολικής μονάδας. Πέρα από εκπαιδευτικό υλικό, το Open Discovery Space δίνει τη δυνατότητα σε κάθε σχολείο να δημιουργήσει γρήγορα, εύκολα και χωρίς κόστος τη δική του σχολική πύλη ή στον κάθε εκπαιδευτικό να αναπτύξει τη δική του εκπαιδευτική κοινότητα. Μέσα από αυτές τις σχολικές κοινότητες έχουν ήδη αναπτυχθεί πολλές καινοτόμες δράσεις μεταξύ των σχολείων από διαφορετικές ευρωπαϊκές χώρες.

Μοντέλο Σχολικής Καινοτομίας

Το μοντέλο σχολικής καινοτομίας που προτείνει το Open Discovery Space αποτελείται από τρία στάδια: κινητοποίηση, εμπέδωση & διάχυση και 5 βασικά χαρακτηριστικά. Το μοντέλο αποδίδεται γραφικά στην Εικόνα 1 και ακολουθεί η ανάλυση των βασικών του στοιχείων.

Εικόνα 1: Γραφική αναπαράσταση του μοντέλου σχολικής καινοτομίας Open Discovery Space

Ακολουθεί η ανάλυση των τριών φάσεων του μοντέλου:

1

Κινητοποίηση

Η φάση της κινητοποίησης περιλαμβάνει την ανάλυση των αναγκών μιας σχολική μονάδας και την κατάρτιση ενός Σχεδίου Δράσης. Τρία κομβικά εργαλεία βρίσκονται στη διάθεση του Διευθυντή του Σχολείου:

• Η αποτίμηση της ψηφιακής ωριμότητας του σχολείου με τη μέθοδο ερωτηματολογίων που μετρούν μεταξύ άλλων, τον βαθμό ένταξης και χρήσης ΤΠΕ, τις υποδομές, την κουλτούρα καινοτομίας με όχημα πάλι τις ΤΠΕ, το όραμα και στοιχεία που αφορούν στην επαγγελματική εξέλιξη των εκπαιδευτικών. Οι διευθυντές των σχολικών μονάδων θα πρέπει να μεριμνούν, ώστε να ενταχθούν στη διαδικασία όσο το δυνατόν περισσότεροι εκπαιδευτικοί, εφαρμόζοντας έτσι μια ολιστική προσέγγιση.

• Την αυτο-αξιολόγηση των ικανοτήτων των εκπαιδευτικών με χρήση ψηφιακών εργαλείων και σύμφωνα με το Πλαίσιο Επάρκειας στις ΤΠΕ για Εκπαιδευτικούς της UNESCO (2011). Οι διευθυντές πρέπει να συμπληρώνουν πρώτοι το δικό τους προφίλ ικανοτήτων και να ενθαρρύνουν τους εκπαιδευτικούς να κάνουν το ίδιο. Η αυτοξιολόγηση δεν έχει ανταγωνιστικό χαρακτήρα αλλά αποτελεί όχημα ανάλυσης των αναγκών του σχολείου.

Την αυτο-αξιολόγηση ακολουθεί η δημιουργία ενός σχεδίου επιμορφώσεων που κάνει χρήση εθνικών και διεθνών πρωτοβουλιών, όπως το ODS και το Erasmus+ και εμπλουτίζεται με συμμετοχή σε θερινές ακαδημίες, διαδικτυακά σεμινάρια, MOOCS, ψηφιακές κοινότητες καλών πρακτικών, κλπ.

• Την κατάρτιση ενός ολοκληρωμένου Σχεδίου Δράσης που θα περιέχει συνεργασίες με διεθνείς και εθνικές πρωτοβουλίες και δράσεις σε συγκεκριμένους τομείς, χρήση εργαλείων ΤΠΕ, εφαρμογή παιδαγωγικών μεθόδων, συμμετοχή σε εκπαιδευτικούς διαγωνισμούς, προβλέψεις σχετικές με τα εμπόδια και τις αντιστάσεις στην αλλαγή και την καινοτομία.

2

Εμπέδωση

Η υποστήριξη, οι στοχευμένες παρεμβάσεις και οι εφαρμογές καινοτόμων πρακτικών και δράσεων, με στόχο την εδραίωση της κουλτούρας της αλλαγής και της αυτονομίας της γνώσης συγκροτούν τις βασικές αρχές της διαδικασίας της εμπέδωσης της καινοτομίας στο σχολικό περιβάλλον. Κατά την φάση της εμπέδωσης εφαρμόζονται νέες τεχνικές και μεθοδολογίες μάθησης και διδασκαλίας.

Κυρίαρχο ρόλο σε αυτή τη διαδικασία διαδραματίζουν οι ανοιχτές ψηφιακές πηγές, η διάδραση μεταξύ των εκπαιδευτικών-χρηστών με το ψηφιακό περιβάλλον (ODS) και η συγκρότηση δραστήριων εκπαιδευτικών κοινοτήτων μέσα σε αυτό το ψηφιακό περιβάλλον συνεργασίας και ανταλλαγής εμπειριών.

Η διαρκής εφαρμογή καινοτόμων σεναρίων, η έμφαση στην ενεργητική χρήση Ανοιχτών Εκπαιδευτικών Πηγών και η σύνδεση αυτών με την ανάπτυξη της σχολικής καινοτομίας είναι επίσης σημαντικά στοιχεία. Και εδώ δίνεται έμφαση στο ρόλο της διαρκούς επιμόρφωσης μέσω συμμετοχής σε διεθνείς και εθνικές πρωτοβουλίες και πιλοτικές δράσεις καινοτομίας που αφορούν στη χρήση εργαλείων ΤΠΕ και ψηφιακού υλικού.

Όσον αφορά στη συγκρότηση ψηφιακών κοινοτήτων εκπαιδευτικών, κύριο μέλημα ενός διευθυντή είναι η ανάδειξη τόσο πρακτικών όσο και συγκεκριμένων εκπαιδευτικών που μπορούν να λειτουργήσουν ως φορείς αλλαγής και καινοτομίας. Οι ψηφιακές κοινότητες πρέπει να ανταποκρίνονται στις ανάγκες του σχολείου και της υποστήριξης του αναλυτικού προγράμματος. Πρέπει, επίσης, να χαρακτηρίζονται από εμπιστοσύνη, ενσυναίσθηση και αναγνώριση των ιδιαίτερων συνθηκών τόσο του σχολείου, όσο και του κάθε εκπαιδευτικού. Στη διεθνή βιβλιογραφία διατυπώνεται ξεκάθαρα (Wideman 2010), ότι αυτές είναι οι προϋποθέσεις που υποστηρίζουν τους εκπαιδευτικούς στη μετάβασή τους στο τρίτο επίπεδο σε «δημιουργούς/σχεδιαστές εκπαιδευτικού περιεχομένου με τη χρήση ΤΠΕ».

3

Διάχυση

Κατά τη διάρκεια της διάχυσης, οι όποιες μικρές ή και μεγάλες αλλαγές δύναται να επεκταθούν σε όλο το σχολείο, αλλά και να μεταφερθούν σε γειτονικές σχολικές μονάδες ή/και στην τοπική κοινωνία. Ιδιαίτερη προσοχή δίνεται στην αξιοποίηση των τεχνικών διαχείρισης και μεταφοράς της γνώσης (διαμοιράζεται ό,τι είναι οικείο και τεκμηριωμένο στους εκπαιδευτικούς και τη διοίκηση του σχολείου), με στόχο την αύξηση του αριθμού των εκπαιδευτικών που χρησιμοποιούν ψηφιακό περιεχόμενο και καινοτόμες πρακτικές.

Οι φάσεις της κινητοποίησης και της εμπέδωσης παρέχουν υλικό, δομές και τεχνογνωσία σχετικά με τη χρήση ΤΠΕ, τη δημιουργία ψηφιακών κοινοτήτων και βιβλιοθηκών του σχολείου, την εφαρμογή καινοτόμων σεναρίων, την επαγγελματική εξέλιξη των εκπαιδευτικών, κλπ. Η δημιουργική χρήση και σύνθεση όλων αυτών είναι υπόθεση των διευθυντών και των καινοτόμων εκπαιδευτικών που θα πρέπει, με προσοχή, και λαμβάνοντας υπόψη τα αποτελέσματα των πιλοτικών εφαρμογών, τις τεκμηριωμένες καλές πρακτικές, κλπ., να επιχειρήσουν τη διάχυση και την εδραίωση της καινοτομίας στο σχολείο και στην τοπική εκπαιδευτική κοινότητα.

Περισσότερες πληροφορίες σχετικά μπορείτε να βρείτε στα Παραρτήματα: Εγχειρίδια για Διευθυντικά Στελέχη. Ακολουθεί η παρουσίαση ενδεικτικών παραδειγμάτων/ σεναρίων εφαρμογής του μοντέλου καινοτομίας του ODS στην Ελλάδα.

Παραδείγματα εφαρμογής του μοντέλου καινοτομίας του ODS στην Ελλάδα

Μέχρι σήμερα (Φεβρουάριος 2015) το ODS έχει επιτύχει να εμπλέξει 445 σχολεία απ' όλη την Ελλάδα, η συμμετοχή των οποίων συντονίζεται από το Τμήμα Έρευνας και Ανάπτυξης της Ελληνογερμανικής Αγωγής. Άλλοι εταίροι είναι το Πανεπιστήμιο Πειραιά, το Πολυτεχνείο Κρήτης, η ΕΔΕΤ, η AGROknow Technologies, όπως και το ΙΤΥΕ «Διόφαντος» και το Ινστιτούτο Εκπαιδευτικής Πολιτικής. Από τα σχολεία αυτά, 312 ξεκίνησαν να συμμετέχουν στο πρόγραμμα από τον Ιανουάριο 2013. Τα σχολεία αυτά ενημερώθηκαν για το πρόγραμμα μέσω διαφόρων καναλιών και πρακτικών διάχυσης και επιμόρφωσης, όπως εργαστήρια που διοργανώθηκαν ανά την Ελλάδα κατά την πρώτη φάση της κινητοποίησης και τη δεύτερη φάση, της «εμπέδωσης», όπως και μέσω συνεδρίων και παρουσιάσεων. Τα υπόλοιπα από τα τρέχοντα ελληνικά σχολεία προστέθηκαν τον Ιανουάριο του 2015 μετά από γενική πρόσκληση του Ινστιτούτου Εκπαιδευτικής Πολιτικής προς το σύνολο των σχολικών μονάδων της χώρας.

Μία ευρεία γκάμα δραστηριοτήτων προτείνεται από την ομάδα της Ελληνογερμανικής Αγωγής στα σχολεία και έχει δημιουργηθεί μια σειρά από αντίστοιχες ψηφιακές κοινότητες στην πύλη του ODS για την υποστήριξη της εφαρμογής τους. Ως προς τα γνωστικά αντικείμενα, οι προτεινόμενες αυτές δραστηριότητες αφορούν τις Φυσικές Επιστήμες ευρύτερα, τη Φυσική Υψηλών Ενεργειών, την Περιβαλλοντική Εκπαίδευση, τη Μουσική, την Επιχειρηματικότητα και τη Συμβουλευτική Σταδιοδρομίας, καθώς και επιμόρφωση των εκπαιδευτικών στον εκπαιδευτικό σχεδιασμό δράσεων που στοχεύουν στην καλλιέργεια όχι μόνο των γνώσεων αλλά –κυρίως- των οριζόντιων ικανοτήτων των μαθητών. Τα σχολεία είναι ελεύθερα να επιλέξουν περισσότερες από μία δραστηριότητες και ενθαρρύνονται όχι μόνο να εφαρμόσουν τα εργαλεία και τα εκπαιδευτικά σενάρια που τους προτείνονται, αλλά και να τα προσαρμόσουν στις δικές τους ανάγκες και ενδιαφέροντα. Για το σκοπό αυτό καλούνται να χρησιμοποιήσουν ένα σχέδιο δράσης το οποίο συνδέει τις επιλεγείσες δράσεις με τις ανάγκες του σχολείου, τα καθοδηγεί στη στοχοθεσία και στη σύνδεσή τους με ένα ευρύτερο πλαίσιο ανάπτυξης του σχολείου.

Ακολουθούν δύο παραδείγματα από επιλεγμένες περιπτώσεις εφαρμογής σε ελληνικά σχολεία, οι οποίες διακρίνονται από τα εξής χαρακτηριστικά:

- Σύνδεση, δικτύωση και διαμοιρασμό εκπαιδευτικών πηγών μεταξύ απομακρυσμένων σχολείων μέσω της πύλης του ODS.
- Βελτίωση της πρόσβασης σε πηγές για σχολεία σε απομακρυσμένες περιοχές.
- Εξοικείωση των εκπαιδευτικών με ψηφιακά εργαλεία εκπαιδευτικού σχεδιασμού και με την εφαρμογή καινοτόμων διδακτικών μεθόδων, όπως τη μέθοδο project και το μοντέλο Ανακαλυπτικής Μάθησης.
- Στενή συνεργασία των σχολείων με τοπικούς φορείς εκπαιδευτικής πολιτικής, όπως οι Σχολικοί Σύμβουλοι, πανεπιστήμια, επαγγελματίες καλλιτέχνες και άλλους φορείς ή φυσικά πρόσωπα, η οποία προωθεί τη δικτύωση και το άνοιγμα του σχολείου στην κοινωνία.

Η δράση «Ακριτών Μουσική»

Η δράση «Ακριτών Μουσική»

Η δράση «Ακριτών Μουσική» ήταν ένα ζωντανό διαδικτυακό οπτικοακουστικό δρώμενο, που συνδύασε τη Μουσική με το Ψηφιακό Θέατρο Σκιών. Η εφαρμογή της είναι η πρώτη απόπειρα ανάπτυξης ενός εκπαιδευτικού σεναρίου αυξημένης διάδρασης μεταξύ τεσσάρων (4) απομακρυσμένων σχολείων από την Ελλάδα και την Κύπρο μέσω τεχνολογίας ζωντανής τηλεδιάσκεψης, η οποία περιλαμβάνει τη Μουσική ως παραστατική τέχνη. Βασίστηκε στο εκπαιδευτικό σενάριο που αναπτύχθηκε από το συνεργάτη της Ελληνογερμανικής Αγωγής, κ. Πέτρο Στεργιόπουλο, με πηγή έμπνευσης την Ακριτική κληρονομιά. Η εφαρμογή της δράσης περιελάμβανε τη συνεργατική προετοιμασία, συν-δημιουργία και υλοποίηση μιας ψηφιακής παράστασης από τέσσερα απομακρυσμένα σχολεία του ODS στην Κάρπαθο, τη Γαύδο, το Καστελλόριζο και τη Λευκωσία της Κύπρου, ενώ ο όλος συντονισμός έγινε από τον κ. Στεργιόπουλο στην Αθήνα. Τα σχολεία συνεργάστηκαν εξ αποστάσεως καθ' όλη τη διάρκεια αυτής της διαδικασίας μέσω εργαλείων τηλεδιάσκεψης. Κατά τη διάρκεια της τελικής παράστασης οι μαθητές των τεσσάρων σχολείων έστησαν την παράσταση χρησιμοποιώντας εργαλεία ψηφιακού Θεάτρου Σκιών, τα οποία συνοδεύτηκαν από μία συνεργατική Μουσική πα-

ράσταση. Μέρος των διαλόγων της παράστασης, οι οποίοι βασίζονταν στο Βυζαντινό έπος του Διγενή Ακρίτα, είχαν ψηφιοποιηθεί από το Πανεπιστήμιο Κρήτης και είναι διαθέσιμα στη βάση δεδομένων «Ανέμη». Αποτέλεσμα και επέκταση της εφαρμογής της δράσης ήταν η δημιουργία της ψηφιακής κοινότητας «Ταξιδεύοντας στην εποχή του Ερωτόκριτου», στην οποία εκπαιδευτικοί από τα Χανιά της Κρήτης εξερευνούν πτυχές από τον «Ερωτόκριτο», που μπορούν να αξιοποιηθούν εκπαιδευτικά, όπως και άλλες προσωπικότητες της μετα-Βυζαντινής εποχής, όπως ο Δομήνικος Θεοτοκόπουλος και ο συνθέτης Φραγκίσκος Λεονταρίτης. Η κοινότητα συνεργάζεται επίσης ψηφιακά μέσω της πλατφόρμας του ODS με την ομάδα «Ας μοιραστούμε τη Μουσική, ας ενώσουμε τον κόσμο» και άλλους εκπαιδευτικούς- μέλη από την Αθήνα και τον Έβρο http://portal.opendiscoveryspace. eu/community/moirastoyme-ti-moysiki- enosoyme-ton-kosmo-let-us-share-music- let-us-link-world-347. Η ομάδα αυτή συνέβαλε στην προετοιμασία ενός άλλου ψηφιακού εκπαιδευτικού σεναρίου για τις προσωπικότητες αυτές της Ελληνικής Αναγέννη-

σης και το έργο τους. Διοργανώθηκε επίσης επιμόρφωση μέσω διαδικτύου της δεύτερης ομάδας από τον συντονιστή της δράσης και στη συνέχεια ο εκπαιδευτικός από τα Χανιά κατέγραψε και επεξεργάστηκε οπτικοακουστικό υλικό στο οποίο οι μαθητές απαγγέλλουν χωρία. Αναρτήθηκαν επίσης ψηφιακές ηχογραφήσεις από μουσικά έργα της ίδιας εποχής, εκτελεσμένα από επαγγελματίες μουσικούς, οι οποίοι επέτρεψαν στην κοινότητα να χρησιμοποιήσει το υλικό αυτό για εκπαιδευτικούς σκοπούς. Πρωτότυπη μουσική συντέθηκε επίσης από τον συντονιστή της κοινότητας, εκτελέστηκε και αναρτήθηκε για να συνοδέψει τις ψηφιακές αφηγήσεις των παιδιών, ενώ έργα ζωγραφικής των μαθητών αναρτήθηκαν επίσης. Το τελικό αποτέλεσμα όλων αυτών των δραστηριοτήτων αποτελεί πλέον υλικό της Ψηφιακής Μουσικής Ακαδημίας του ODS και είναι ελεύθερα προσβάσιμο σε εκπαιδευτικούς που ενδιαφέρονται να εξερευνήσουν και να εφαρμόσουν τη χρήση ψηφιακών μέσων σε διαδραστικά εκπαιδευτικά σενάρια Μουσικής Αγωγής http://portal.opendiscoveryspace. eu/topic-courses/live-music-education- academy.

Εφαρμόζοντας το Ανακαλυπτικό Μοντέλο μάθησης μέσω ψηφιακών πηγών σε δύο σχολεία στο Τυχερό του Έβρου

Το Γυμνάσιο και Λύκειο Τυχερού βρίσκονται στην ακριτική περιοχή του Έβρου. Πρόκειται για δύο σχετικά μικρά σχολεία ως προς τον αριθμό των μαθητών, τα οποία λόγω της γεωγραφικής τους θέσης αντιμετωπίζουν πρακτικές δυσκολίες που σχετίζονται με ανεπαρκή αριθμό εκπαιδευτικών, συχνές μετακινήσεις του εκπαιδευτικού προσωπικού και μειωμένη πρόσβαση σε υλικό, ψηφιακά μέσα και εξοπλισμό. Παρ' όλα αυτά τα τελευταία χρόνια οι εκπαιδευτικοί έχουν αποκτήσει αυξημένο ενδιαφέρον για συμμετοχή σε Ευρωπαϊκά δίκτυα σχολείων, για συνεργασία με άλλους συναδέλφους εντός και εκτός Ελλάδας και αναζητούν ευκαιρίες για βελτίωση των διδακτικών τους πρακτικών και σύνδεσή τους με την καλλιέργεια ικανοτήτων των μαθητών.

Τα σχολεία του Τυχερού ξεκίνησαν να συμμετέχουν στο ODS από την έναρξη της δεύτερης πιλοτικής φάσης (Σεπτέμβριος 2014) μετά από συμμετοχή τους σε εργαστήριο ανατροφοδότησης ('Practice reflection') που διοργανώθηκε στην περιοχή από τον Σχολικό Σύμβουλο κ. Χρήστο Γκοτζαρίδη

σε συνεργασία με την ομάδα της Ελληνογερμανικής Αγωγής. Στο εργαστήριο συμμετείχε η εκπαιδευτικός κ. Στέλλα Τρυφωνίδου, που είχε ήδη αυξημένο ενδιαφέρον για καινοτόμες δράσεις, και η οποία στη συνέχεια ενέπλεξε τα δύο σχολεία του Τυχερού στο δίκτυο του ODS. Στόχοι της συμμετοχής τους ήταν: α) Η βελτίωση της πρόσβασης του σχολείου σε περιεχόμενο από ψηφιακά αποθετήρια όπως το Open Science Resources και το Discover the Cosmos, (β) η αναζήτηση ευκαιριών για εφαρμογή ποικίλων καινοτόμων δράσεων, (γ) η συμμετοχή σε επιμορφώσεις εκπαιδευτικών.

Σε αυτό το πλαίσιο η κ. Τρυφωνίδου σχεδίασε τέσσερα εκπαιδευτικά σενάρια που βασίζονται στο διερευνητικό μοντέλο μάθησης και αξιοποιούν πηγές από τα παραπάνω αποθετήρια, όπως και το εργαλείο δημιουργίας εκπαιδευτικών σεναρίων του ODS. Κάποια από αυτά έχουν ήδη εφαρμοστεί στα σχολεία του Τυχερού, ενώ άλλα εξακολουθούν να εξελίσσονται (Φεβρουάριος 2015).

Το πρώτο σενάριο εφαρμόστηκε με μαθητές

Α΄ Λυκείου στο Λύκειο του Τυχερού και έχει τίτλο «Pacman με Scratch». Η βασική ιδέα είναι η ανάπτυξη μιας εφαρμογής σε περιβάλλον οπτικού προγραμματισμού, όπως το Scratch. Οι μαθητές δουλεύοντας σε ομάδες σχεδίασαν την εφαρμογή και την υλοποίησαν μέσω του Scratch. Στη συνέχεια την εφάρμοσαν και την αξιολόγησαν, ενώ ακολούθησε παρουσίαση στην τοπική κοινότητα καθώς και στο Πανελλήνιο Φεστιβάλ Ψηφιακής Δημιουργικότητας. Το σενάριο είναι διαθέσιμο στην πλατφόρμα του ODS, στην κοινότητα του προγραμματισμού μέσω Scratch http://portal.opendiscoveryspace. eu/community/senaria-didaskalias-se-perivallonta-optikoy-programmatismoy-me-plakidia-668762

Το δεύτερο σενάριο εφαρμόστηκε στο Λύκειο Τυχερού το σχολικό έτος 2014-15 (α΄ τετράμηνο), στα πλαίσια του μαθήματος Ερευνητικής Εργασίας Α΄ Λυκείου. Κεντρική ιδέα του σεναρίου είναι οι μαθητές εργαζόμενοι με τη μέθοδο Project να κατασκευάσουν υπό κλίμακα ένα ομοίωμα της Πυραμίδας του Χέοπα και να μετρήσουν το ύψος της, ακολουθώντας τη μέθοδο που εφάρμοσε ο Θαλής τον 6ο αιώνα π.Χ. Το τελικό σενάριο βασίστηκε σε ένα ήδη υπάρχον το οποίο η εκπαιδευτικός του Τυχερού προσάρμοσε στη δική της τάξη http://www. osrportal.eu/el/node/95028.

Το τρίτο σενάριο εφαρμόστηκε στο Λύκειο Τυχερού το σχολικό έτος 2014-15 ως project μικρής διάρκειας στα πλαίσια του μαθήματος Τεχνολογία Επικοινωνιών Β΄ Τεχν. Λυκείου. Αφορμή υπήρξε η δράση το «Πείραμα του Ερατοσθένη» http://eratosthenes.ea.gr/, που διοργάνωσε το πρόγραμμα Inspiring Science Education με την υποστήριξη του ODS τον Μάρτιο του 2014 με συμμετοχή 350 σχολείων από 37

χώρες. Για την υλοποίησή του χρησιμοποιήθηκε το προϋπάρχον εκπαιδευτικό σενάριο «Το πείραμα του Ερατοσθένη» http://www. osrportal.eu/el/node/94691, το οποίο επίσης προσαρμόστηκε στις ανάγκες του συγκεκριμένου σχολείου.

Τέλος, **το τέταρτο σενάριο** εφαρμόζεται τη σχολική χρονιά 2014-15 στο Γυμνάσιο Τυχερού, στα πλαίσια του μαθήματος της Τεχνολογίας. Κεντρική ιδέα είναι οι μαθητές να εξοικειωθούν με τις βασικές έννοιες της αστρονομίας εστιάζοντας στο Ηλιακό Σύστημα και να προετοιμαστούν για τη σύνδεση με το ρομποτικό τηλεσκόπιο Faulkes που θα ακολουθήσει. Επίσης, θα κατασκευάσουν εργαζόμενοι σε ομάδες μοντέλο του ηλιακού συστήματος, μοντέλο Γη-Σελήνης –Τεχνητού Δορυφόρου και Τηλεσκόπιο. Στο τέλος θα εκπονήσουν την γραπτή τους εργασία σε μορφή wiki.

Παρ' ότι η εφαρμογή και αποτίμηση της αποτελεσματικότητας των παραπάνω δράσεων είναι ακόμα σε εξέλιξη, ορισμένες παρατηρήσεις που έχουν διατυπωθεί από την εκπαιδευτικό από την μέχρι τώρα εφαρμογή τους περιλαμβάνουν: αυξημένο ενδιαφέρον από τους μαθητές, μεγαλύτερη ικανοποίηση από τη βιωματική μάθηση σε σύγκριση με τη συμβατική διδασκαλία και μέσω αυτής περισσότερες δυνατότητες για επίτευξη μαθησιακών στόχων. Οι μαθητές απαλλάσσονται από το άγχος της απόδοσης, νιώθουν ότι δεν θα βαθμολογηθούν, δεν προσπαθούν να αποδείξουν ότι κατέχουν τη γνώση, αλλά αντιθέτως έχουν το χρόνο να αναρωτηθούν, να θυμηθούν, να ανακαλέσουν, να υποθέσουν, να διαφωνήσουν, να υποστηρίξουν, να αξιολογήσουν. Παρατηρήθηκε επίσης βελτίωση σε θέματα διαχείρισης χρόνου και ευρύτερης ανάπτυξης ικανοτήτων των παιδιών, όπως ανάληψη πρωτοβουλίας

και εκούσια συμμετοχή τους σε τέτοιες δράσεις πέραν του σχολικού χρόνου. Οι ψηφιακές πηγές που χρησιμοποιήθηκαν αναφέρονται επίσης ως σημαντικές στην υποστήριξη από άποψης επιστημονικής γνώσης, εμπνέοντας ταυτόχρονα περισσότερη δημιουργικότητα για ευρύτερη ανάπτυξη και άλλων πηγών από την εκπαιδευτικό.

Περισσότερα σχετικά με τον αντίκτυπο που έχει η εφαρμογή των δράσεων αυτών στα σχολεία του Τυχερού θα παρουσιαστούν από την κ. Τρυφωνίδου σε Πανευρωπαϊκό Συνέδριο που διοργανώνει το ODS στις Βρυξέλλες τον Απρίλιο 2015.

Συμπεράσματα/επισημάνσεις

Συνοπτικά η έως τώρα εμπειρία από την εφαρμογή του ODS στην Ελλάδα έχει δείξει ότι πρακτικές, όπως αυτές που περιγράφηκαν παραπάνω μπορούν να έχουν θετικό αποτέλεσμα στη δέσμευση των σχολείων σε μία πρωτοβουλία που προωθεί τη σχολική καινοτομία και στην κατά το δυνατό μεγαλύτερη αξιοποίηση των ευκαιριών που ένα καινοτόμο πρόγραμμα τους παρέχει:

- Η προσέγγιση του ODS, βάσει του μοντέλου καινοτομίας του, που θεωρεί τον εκπαιδευτικό και το σχολείο ως ικανούς να εισαγάγουν τη σχολική καινοτομία μπορεί να παρουσιάσει ιδιαίτερες προκλήσεις, ιδιαίτερα σε χώρες με ενιαίο Αναλυτικό Πρόγραμμα και κεντρικά διοικούμενο εκπαιδευτικό σύστημα. Η παροχή προσωπικής και εξατομικευμένης υποστήριξης είναι κρίσιμη για την υποστήριξη των σχολείων, ώστε να αναπτύξουν τη δική τους στρατηγική καινοτομίας και να πεισθούν ότι έχουν τη δυνατότητα και τα εργαλεία για να βελτιώσουν τη σχολική πραγματικότητα.
- Προς την ίδια κατεύθυνση, η συνεργασία με φορείς εκπαιδευτικής πολιτικής σε τοπικό ή κεντρικό επίπεδο είναι ιδιαίτερα σημαντική για τη δημιουργία κλίματος ασφάλειας και εμπιστοσύνης για τα σχολεία που επιθυμούν να υιοθετήσουν καινοτόμες πρακτικές.
- Ευκαιρίες για διάχυση παραδειγμάτων και περιπτώσεων εκπαιδευτικών και σχολείων στο τοπικό ή και ευρύτερο περιβάλλον (π.χ. παρουσιάσεις από τους ίδιους τους εκπαιδευτικούς σε συνέδρια, εργαστήρια, ΜΜΕ) μπορούν να επιδράσουν πολύ θετικά στην κινητοποίηση των σχολείων και στην αναγνώριση των προσπαθειών τους. Ταυτόχρονα μπορούν να δράσουν πολλαπλασιαστικά και να λειτουργήσουν ως πηγές έμπνευσης για άλλους εκπαιδευτικούς και σχολεία.
- Τέλος, είναι σημαντική η προώθηση τακτικών δράσεων δικτύωσης που φέρνουν κοντά εκπαιδευτικούς με διαφορετικές εμπειρίες, έτσι ώστε να καλλιεργείται η αίσθηση της συνεργασίας μέσα σε μια κοινότητα με κοινό όραμα και στόχους, τα οποία αποτελούν και προϋποθέσεις για την ψηφιακή δικτύωση και συνεργασία μέσω μιας πλατφόρμας όπως του ODS.

Μεθοδολογία εισαγωγής της Καινοτομίας στη Σχολική Μονάδα.
Στάδια εξέλιξης σχολικής μονάδας

Στο σημείο αυτό παρουσιάζεται η μεθοδολογία και ταεργαλεία που διαθέτει το Open Discovery Space στο πλαίσιο εισαγωγής της Καινοτομίας στη Σχολική Μονάδα για την καταγραφής της εξέλιξης των σχολικών μονάδων. (βλ. επίσης Αποτίμηση της «ψηφιακής ωριμότητας» του σχολείου σας)

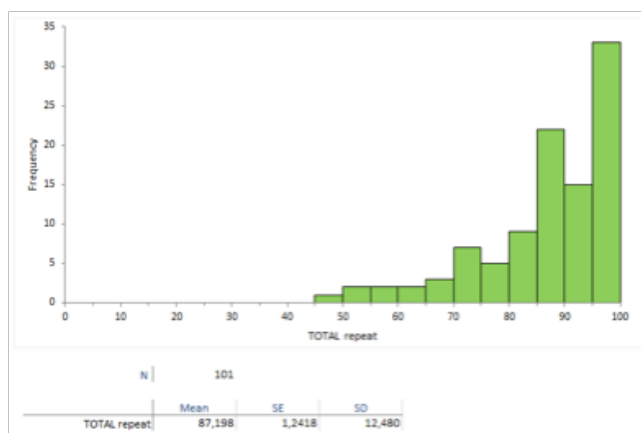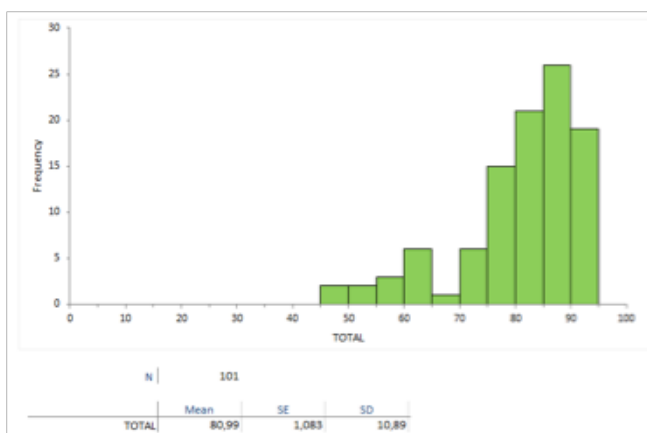|		Στάδια εξέλιξης σχολικής μονάδας (στάδια αποτίμησης ψηφιακής ωριμότητας σχολικής μονάδας)			
Εστίαση	Βασικές ιδέες	Αρχικό στάδιο	Υποβοηθούμενο στάδιο	Αυτάρκες στάδιο	Ψηφιακά ώριμο στάδιο
Γνώση τεχνολογίας	Η επίδραση της ταχείας ανάπτυξης της γνώσης και πληροφορίας στη διδασκαλία και τη μάθηση από τεχνολογική άποψη	Γενική αντίληψη του τρόπου με τον οποίο η τεχνολογία μπορεί να συντελέσει στη βελτίωση της διδασκαλίας και της μάθησης	Κατανόηση των μεθοδολογιών ένταξης των ΤΠΕ στο αναλυτικό πρόγραμμα σπουδών	Κατανόηση του τρόπου με τον οποίο οι ΤΠΕ μπορούν να έχουν θετικό αντίκτυπο στη μάθηση	Σχεδίαση μεθοδολογιών για ένταξη των ΤΠΕ στη μάθηση
Κινητοποίηση	Γνώση των παγκόσμιων και των τοπικών αναγκών και προκλήσεων όσον αφορά τη χρήση των ΤΠΕ και την εξοικείωση με αυτές	Δημιουργείται ένα αρχικό σχέδιο για τις βασικές υπάρχουσες ανάγκες του σχολείου, το οποίο θα ανταποκρίνεται σε όλες τις βασικές ανάγκες όσον αφορά τον εξοπλισμό, την επαγγελματική ανάπτυξη και την υιοθέτησή τους στο μαθησιακό περιβάλλον.	Τα σχολεία με τις ήδη υπάρχουσες υποδομές ΤΠΕ αρχίζουν να σχεδιάζουν τις απαραίτητες ευκαιρίες επαγγελματικής ανάπτυξης και εφαρμογής στο πλαίσιο του προγράμματος μαθημάτων.	Το αυτάρκες σχολείο όσον αφορά τις ΤΠΕ θα χαρτογραφήσει τις υπάρχουσες ευκαιρίες στη σχολική κοινότητα για τη συμμετοχή σε έργα ανταλλαγής και να βελτιώσει τις μαθησιακές εμπειρίες όπως τη χρήση πραγματικής έρευνας στην τάξη.	Οι ευκαιρίες που προσφέρονται από τις Ανοικτές Εκπαιδευτικές Πηγές και τα Μαζικά Ανοικτά Διαδικτυακά Μαθήματα χαρτογραφούνται και χτίζεται ένα όραμα για την ενσωμάτωσή τους στο μαθησιακό περιβάλλον. Το σχολείο μπορεί να δοκιμάσει καινοτόμα μοντέλα που έχουν ως επίκεντρο τον μαθητή.
	Έρευνα για αναζήτηση παραδειγμάτων βέλτιστων πρακτικών	Το σχέδιο που έχει διαμορφωθεί στο πρώτο βήμα περιέχει πλέον υπάρχοντα παραδείγματα βέλτιστων πρακτικών προκειμένου να σχεδιαστεί όλη η διαδικασία εφαρμογής.	Τα παραδείγματα βέλτιστων πρακτικών ενσωματώνονται σε αυτό το στάδιο και οι εκπαιδευτικοί συμμετέχουν σε πραγματικές ασκήσεις εφαρμογής.	Σε αυτό το στάδιο προβλέπεται η διερεύνηση των ευκαιριών έρευνας και συμμετοχής των μαθητών σε πραγματικά ερευνητικά έργα .	Δημιουργούνται καινοτόμες εμπειρίες που βασίζονται σε υπάρχοντα παραδείγματα βέλτιστων πρακτικών ή νέες ευκαιρίες που εμπλέκουν τους μαθητές σε εξελιγμένες και δημιουργικές εκπαιδευτικές - ερευνητικές εμπειρίες.
	Εύρεση καινοτόμων παραδειγμάτων και συνεργατών	Σε αυτό το στάδιο προτείνονται οι συνεργασίες με άλλες σχολικές μονάδες που έχουν ήδη μπει στο δρόμο της καινοτομίας.	Θα πρέπει να γίνουν συνεργασίες ανάμεσα στα σχολεία όπου οι εκπαιδευτικοί μπορούν να εφαρμόσουν επιτυχημένα παραδείγματα που έχουν δοκιμαστεί στην τάξη.	Το σχολείο μπορεί για παράδειγμα να συμμετέχει σε δράσεις πραγματικής έρευνας με την υποστήριξη διάφορων οργανισμών που προωθούν τέτοιες πρωτοβουλίες.	Τα σχολεία μπορούν να σχεδιάσουν τα δικά τους πειράματα και να κάνουν τους μαθητές να συμμετέχουν στην ανάπτυξη των δικών τους έργων που προωθούν - μεταξύ άλλων- την ικανότητα επιχειρηματικότητας και καινοτομίας.

	Συμμετοχή της τοπικής κοινωνίας	Το σχολείο και η τοπική κοινότητα διαδραματίζουν σημαντικό ρόλο στη διασφάλιση της πραγματοποίησης του σχεδίου δράσης που έχει καταρτιστεί στο πρώτο στάδιο. Πρόκειται για τους διαμεσολαβητές και τους βασικούς παίκτες σε αυτό το στάδιο.	Η σχολική κοινότητα είναι ιδανική για την ανταλλαγή καλών παραδειγμάτων μεταξύ των μαθητών πάνω στο ίδιο γνωστικό αντικείμενο ή για ανταλλαγή και συνεργασία μεταξύ διαφορετικών τάξεων και γνωστικών αντικειμένων.	Η τοπική κοινότητα μπορεί να διαδραματίσει πολύ σημαντικό ρόλο σε αυτό το στάδιο, ειδικά όταν οι εμπλεκόμενοι υποστηρίζουν το όραμα του σχολείου σχετικά με την υιοθέτηση καινοτόμων μεθόδων και λύσεων.	Το σχολείο και οι τοπικές κοινότητες μπορούν να είναι φορείς αλλαγής σε αυτό το στάδιο και θα μπορούσαν/ θα έπρεπε να υποστηρίζουν όλο το εγχείρημα.
	Δεκτικότητα στις νέες ιδέες	Τα σχολεία θα πρέπει να είναι ανοικτά στη χρήση των ΤΠΕ για την αναβάθμιση της διαδικασίας μάθησης και διδασκαλίας,	Τα σχολεία θα πρέπει να γνωρίζουν τις νέες ιδέες και τις τάσεις στον τομέα της εκπαίδευσης που βασίζεται στις ΤΠΕ.	Νέες μορφές μαθησιακού περιβάλλοντος εμφανίζονται και το σχολείο που είναι ηλεκτρονικά αυτάρκες όσον αφορά τις ΤΠΕ θα πρέπει να εκμεταλλευτεί τα εξελιγμένα παραδείγματα βέλτιστων πρακτικών στο χώρο της εκπαίδευσης.	Τα ψηφιακά ώριμα σχολεία είναι τα πλέον κατάλληλα για να δοκιμάσουν νέες ιδέες και να φέρουν την αλλαγή στο χώρο της εκπαίδευσης
	Εύρεση αποτελεσματικών διαύλων επικοινωνίας	Ολόκληρη η σχολική κοινότητα θα πρέπει να εμπλέκεται στις αλλαγές που προβλέπονται και να ενημερώνεται συνεχώς για τις εξελίξεις που λαμβάνουν χώρα.	Η επικοινωνία από την κορυφή προς τη βάση και το αντίθετο θα πρέπει να λαμβάνει χώρα σε όλα τα στάδια για τον επανασχεδιασμό της χρήσης των υφιστάμενων λειτουργιών και ρόλων των διαφορετικών εμπλεκομένων.	Τα ψηφιακά αυτάρκη σχολεία καινοτομούν πιο γρήγορα και νέες λύσεις εμφανίζονται σε διαφορετικούς τομείς. Σωστοί δίαυλοι επικοινωνίας πρέπει να σχεδιαστούν ώστε να διασφαλιστεί η μέγιστη αξιοποίηση των καλών αποτελεσμάτων.	Τα ψηφιακά ώριμα σχολεία μπορούν να χρησιμοποιούν μοντέρνους διαύλους, ώστε να διασφαλίζουν άμεση επικοινωνία μεταξύ όλων των ομάδων που προωθούν την καινοτομία στο σχολείο.
Δοκιμές	Επίπεδο ικανότητας του σχολείου όσον αφορά τις δοκιμές σε πραγματικές συνθήκες	Οι εκπαιδευτικοί γνωρίζουν γενικά πώς να χρησιμοποιούν υπολογιστές αλλά δεν είναι κάτι που το χρησιμοποιούν στις καθημερινές σχολικές δραστηριότητες. Δεν υπάρχει κάποιο πρόγραμμα ανάπτυξης προγράμματος μαθημάτων ή ηλεκτρονικής μάθησης ή κάποια συστηματική κατάρτιση των εκπαιδευτικών. Υπάρχει περιορισμένη πρόσβαση σε ηλεκτρονικούς μαθησιακούς πόρους. Στην τάξη επικρατεί η διδακτική/μαθησιακή μέθοδος συμπεριφοριστικού τύπου "Drill & Practice". Η κοινότητα (γονείς κ.α.) δεν ενημερώνεται/ δεν συμμετέχει στις εκπαιδευτικές δραστηριότητες.	Κάποιες εμπειρίες σχετικά με τη χρήση των εργαλείων ΤΠΕ στην τάξη. Ομαδική εργασία και ενεργά μαθησιακά στοιχεία χρησιμοποιούνται στην τάξη. Αύξηση της αυτοπεποίθησης των εκπαιδευτικών όσον αφορά τη χρήση των νέων μαθησιακών μεθόδων. Οι εκπαιδευτικοί αρχίζουν να μοιράζονται τις μαθησιακές ιδέες μεταξύ τους και να ενημερώνουν τους γονείς.	Τα αυτάρκη σχολεία σε επίπεδο ΤΠΕ χρησιμοποιούν νέες μεθοδολογίες μάθησης που επικεντρώνονται στην ενεργό συμμετοχή των μαθητών. Ακολουθείται πρόγραμμα ανάπτυξης και σχέδιο δράσης. Το σχολείο συμμετέχει σε διαδικτυακές δραστηριότητες κατάρτισης και δέχεται καθοδήγηση/ συντονισμό για πιο απλές δραστηριότητες. Το σχολείο προσπαθεί ενεργά να οικοδομήσει καλές σχέσεις με τους γονείς και την κοινότητα που περιβάλλει το σχολείο.	Οι εκπαιδευτικοί ή το σχολείο έχουν εκτενή εμπειρία στη χρήση νέων μαθησιακών μεθοδολογιών και ΤΠΕ και έχουν συμμετάσχει σε συνεργατικές διαδικτυακές μαθησιακές δραστηριότητες και ερευνητικά έργα. Οι εκπαιδευτικοί διαθέτουν εμπειρία και κατανόηση σχετικά με πολιτισμικές διαφορές ανάμεσα στις χώρες που εμπλέκονται σε δράσεις διασχολικής συνεργασίας.

Εμπέδωση	Επίπεδο πολυπλοκότητας των δοκιμών σε πραγματικές συνθήκες Βιωσιμότητα	Σχεδιασμός σχεδίου ανάπτυξης ηλεκτρονικής μάθησης και προγράμματος κατάρτισης Εστίαση σε βραχυπρόθεσμο επίπεδο	Συμμετοχή σε ενδοσχολικές, ενδοπεριφερειακές μαθησιακές εκδηλώσεις και Εστίαση σε μεσοπρόθεσμο επίπεδο	Δοκιμές σε πραγματικές συνθήκες σε τοπικό Εστίαση σε μακροπρόθεσμο επίπεδο	Συμμετοχή σε διαφορετικές διαδικτυακές Εστίαση στην οργανική κοινότητα προκειμένου να αυτορρυθμιστεί.
	Δράση	Παροχή τυπικής μεθόδου αξιολόγησης και περιορισμένης ανατροφοδότησης	Βελτίωση των τυπικών μεθόδων αξιολόγησης και της ανατροφοδότησης	Παροχή πεδίου δράσης για αυτοαξιολόγηση	Χρήση ψηφιακών πόρων για μαθητές με στόχο την αλληλεπίδραση και παροχή ανατροφοδότησης
	Υποστήριξη	Αναζήτηση υποστήριξης στο πλαίσιο οργάνωσης σεμιναρίων	Αναζήτηση υποστήριξης από τον δημιουργό/ συγγραφέα των πόρων	Αναζήτηση υποστήριξης από την ψηφιακή κοινότητα	Παροχή υποστήριξης σε μια κοινότητα
	Προσαρμογή στο περιβάλλον του σχολείου	Χρήση πόρων που είναι διαθέσιμοι	Προσαρμογή μικρής κλίμακας σε πόρους που είναι διαθέσιμοι	Προσαρμογή μεγάλης κλίμακας σε πόρους που είναι διαθέσιμοι	Συνεισφορά στην κοινότητα με καθοδήγηση και υποστήριξη για επιτυχή προσαρμογή
	Ευελιξία	Άμεση χρήση των πόρων που έχουν μεταφορτωθεί από τη δικτυακή πύλη του ODS	Αλλαγές μικρής κλίμακας σε πόρους που έχουν μεταφορτωθεί	Αλλαγές μεγάλης κλίμακας σε πόρους που έχουν μεταφορτωθεί	Σχεδίαση νέου εκπαιδευτικού περιεχομένου
Σενάρια					
Διάχυση	Διάδοση και διάχυση	Οι διευθυντές οργανώνουν παρουσιάσεις και σεμινάρια σχετικά με το ODS. Επίσης, ορίζουν μια ομάδα ηλεκτρονικής μάθησης ODS.	Η ομάδα ηλεκτρονικής μάθησης ODS αναπτύσσει με τη βοήθεια του διευθυντή όραμα για την ένταξη των ΤΠΕ και τη γενικότερη ανάπτυξη του σχολείου.	Το όραμα γύρω από την ηλεκτρονική μάθηση ενσωματώνεται στο πρόγραμμα σπουδών.	Η ηλεκτρονική μάθηση εφαρμόζεται στην τάξη και χρησιμοποιείται τόσο από τους μαθητές όσο και από τους εκπαιδευτικούς.
	Παροχή κινήτρων	Οι διευθυντές αναζητούν χρηματοδότηση για την υποστήριξη της κατάρτισης και ανάπτυξης του εκπαιδευτικού προσωπικού του σχολείου.	Οι εκπαιδευτικοί που έχουν παρακολουθήσει την κατάρτιση καταρτίζουν με τη σειρά τους τους ενδιαφερόμενους εκπαιδευτικούς ενδοσχολικά.	Όλοι οι εκπαιδευτικοί καταρτίζονται ώστε να χρησιμοποιούν συστήματα/εργαλεία ηλεκτρονικής μάθησης.	Οι εκπαιδευτικοί εφαρμόζουν πρακτικές και εργαλεία ηλεκτρονικής μάθησης στην τάξη τους και προετοιμάζουν δοκιμαστικά μαθήματα/σενάρια στο πλαίσιο της επαγγελματικής τους ανάπτυξης.

Πίνακας 1. Παράμετροι μελέτης και καταγραφής του μοντέλου σχολικής καινοτομίας του Open Discovery Space και στάδια εξέλιξης σχολικής μονάδας ως προς την αξιοποίηση των ΤΠΕ (Πηγή: http://www.pdsttechnologyineducation. ie/en/Planning/e-Learning-Roadmap/English-version.pdf)

Ο Πίνακας 1 παρουσιάζει παραμέτρους με-λέτης και καταγραφής του μοντέλου σχο-λικής καινοτομίας του Open Discovery Space,καθώς και τα στάδια εξέλιξης της σχολικής μονάδας. Στο πλαίσιο του Open Discovery Space μελετήθηκε η εφαρμο-γή του μοντέλου καινοτομίας σε ένα δείγμα 100 σχολείων από όλη την Ευρώπη και η εξέλιξη τους για μία ολόκληρη σχολική χρο-νιά, κατά την οποία υποστηρίχθηκε το έργο των εκπαιδευτικών και η διοργάνωση σει-ράς καινοτόμων δραστηριοτήτων στα σχο-λεία αυτά. Παρατηρήθηκε σημαντική βελτί-ωση στην απόδοση των σχολείων αυτών όσον αφορά την εισαγωγή της καινοτομίας και την ανάπτυξη «ψηφιακής» κουλτούρας, η οποία που κρίνεται απαραίτητη για την εξέ-λιξη του σχολείου σε έναν σύγχρονο οργα-νισμό μάθησης που ανταποκρίνεται τις ανά-γκες του κάθε μαθητή.

N		101		
		Mean	SE	SD
TOTAL		80,99	1,083	10,89

N		101		
		Mean	SE	SD
TOTAL repeat		87,198	1,2418	12,480

Εικόνα 2: Η Ελληνογερμανική Αγωγή υποστήριξε συστηματικά την εισαγωγή της εκπαιδευτικής καινοτομίας σε 100 σχολικές μονάδες στην Ευρώπη για χρονικό διάστημα ενός έτους (2013-2014). Τα σχολεία αυτά σημείωσαν ση-μαντική βελτίωση στην εισαγωγή της καινοτομίας και την ανάπτυξη «ψηφιακής» κουλτούρας σε όλες τις λειτουργίες τους, εκπαιδευτικές, επιμορφωτικές και οργανωτικές.

Εγχειρίδιο για τη διεύθυνση του Σχολείου: Σχετικά θέματα

Εγχειρίδιο για τη διεύθυνση του Σχολείου: Αξιολόγηση των αναγκών του σχολείου σας και κατάρτιση Σχεδίου Δράσης

Η έννοια της καινοτομίας στα σχολεία διαφέρει κατά πολύ ανάλογα με τη χώρα, το εκπαιδευτικό σύστημα, τα επίπεδα σχολικής αυτονομίας, τις κοινότητες, το κοινωνικο-οικονομικό περιβάλλον, το περιβάλλον και προφίλ του σχολείου. Για να είναι εποικοδομητική η αλλαγή, είναι σημαντικό να αξιολογηθεί η τρέχουσα κατάσταση, η ανοικτότητα στην καινοτομία και ποιες είναι οι ανάγκες του σχολείου και του προσωπικού, ώστε να σχεδιαστεί μετέπειτα ένα σχέδιο δράσης. Το Open Discovery Space σας προσφέρει εργαλεία που θα σας βοηθήσουν να αξιολογήσετε την τρέχουσα κατάσταση και να θέσετε σαφείς στόχους σε βασικούς τομείς που θεωρούνται σημαντικοί για τη συνολική ανάπτυξη του σχολείου ως ανοικτή κοινότητα μάθησης. Αυτό θα σας βοηθήσει να προχωρήσετε σε σταδιακές και βιώσιμες αλλαγές που ταιριάζουν στις προτεραιότητές σας. Το στάδιο της κινητοποίησης είναι ένα από τα πιο σημαντικά όσον αφορά τη δημιουργία μιας κοινότητας που θα υποστηρίξει τις δοκιμές, θα εφαρμόσει πιλοτικά τα σενάρια, θα πιστοποιήσει και θα αξιολογήσει τη χρησιμότητα και τον αντίκτυπο των καινοτόμων προτάσεων. Επομένως είναι σημαντικό σε αυτό το στάδιο να συμπεριληφθούν όλοι οι συμμετέχοντες στις διάφορες προβλεπόμενες δραστηριότητες. Το αίσθημα της κυριότητας/ιδιοκτησίας αποτελεί πολύ σημαντικό κίνητρο και ένα βήμα προς τη βιωσιμότητα των αλλαγών, ώστε να είναι επιτυχείς.

ΒΗΜΑ 1
Αποτίμηση της «ψηφιακής ωριμότητας» του σχολείου σας

Αναφορικά με την τρέχουσα εξοικείω-ση του σχολείου σας με τις Τεχνολογί-ες Πληροφορικής και Επικοινωνιών, το πρώτο βήμα είναι η ανάδειξη των δυνα-τών σημείων και των αδυναμιών.

Το Open Discovery Space σας προσφέ-ρει ένα ερωτηματολόγιο αυτοαξιολό-γησης της ψηφιακής ωριμότητας για το σκοπό αυτό. Η έρευνα προσαρμόστη-κε βάσει του έργου που πραγματοποι-ήθηκε στην Ιρλανδία, στο πλαίσιο του προγράμματος για τα Ψηφιακά Σχολεία «Digital Schools of Distinction». Το πα-ρεχόμενο ερωτηματολόγιο είχε συμπλη-ρωθεί από περισσότερα από 800 σχο-λεία σε όλη την Ευρώπη μέχρι τον Ιούνιο του 2014, ενώ υιοθετείται σταδιακά ως εθνικό εργαλείο αξιολόγησης σε χώρες όπως η Κροατία και η Βουλγαρία. Στο πλαίσιο αυτό ο όρος ΤΠΕ χρησιμοποιεί-ται για να υποδείξει τη χρήση των Τεχνο-λογιών Πληροφορικής και Επικοινωνιών γενικότερα στην εκπαίδευση με έμφαση στις εφαρμογές ηλεκτρονικής μάθησης για τη διδασκαλία και τη μάθηση.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Σκεφτείτε ποια μέλη του διδακτικού προσωπικού πρέπει να συμβουλευτείτε πριν συμπληρώσετε το ερωτηματολόγιο. Προσπαθήστε να εμπλέξετε όσο περισσότερα μέλη μπορείτε π.χ. εκπαιδευτικούς διαφόρων ειδικοτήτων, από διαφορετικές βαθμίδες, με διαφορετική ηλικία και διδακτική εμπειρία. Εκτός από την απόκτηση μιας ολιστικής εικόνας για την τρέχουσα ψηφιακή ωριμότητα (e-maturity) του σχολείου σας, ζητώντας τη γνώμη τους εξαρχής θα τους εμπλέξετε και θα μπορέσετε να οικοδομήσετε ένα κοινό όραμα.

• Να είστε όσο πιο ακριβείς γίνεται. Η έρευνα αποσκοπεί αποκλειστικά στο να σας βοηθήσει να αυτό-αξιολογηθείτε και να βελτιώσετε το σχολείο σας και δεν χρησιμοποιείται ως εξωτερική αξιολόγηση.

Κάντε το τεστ για να αξιολογήσετε το τρέχον επίπεδο της ψηφιακής ωριμότητας του σχολείου σας σε 5 συγκεκριμένες παραμέτρους:

1. **Ηγεσία και όραμα:** Υιοθέτηση μιας πολιτικής ΤΠΕ που αφορά όλο το σχολείο και τονίζει την ύπαρξη οράματος και στρατηγικής, ενώ δείχνει μια θετική αντιμετώπιση στη χρήση ΤΠΕ στο σχολείο σας. Η πολιτική αυτή στοχεύει στο πρόγραμμα μαθημάτων, το σχεδιασμό για δομημένη πρόσβαση σε ΤΠΕ για όλους και τη διαδικτυακή ασφάλεια.

2. **Οι ΤΠΕ στο πρόγραμμα μαθημάτων:** Ένταξη των ΤΠΕ στο πρόγραμμα μαθημάτων για τη μάθηση και τη διδασκαλία, και κατανόηση εκ μέρους του προσωπικού του τρόπου με τον οποίο μπορούν να χρησιμοποιηθούν οι ΤΠΕ στο πρόγραμμα μαθημάτων για να βελτιωθεί η μάθηση.

3. **Σχολική κουλτούρα ΤΠΕ:** Συνειδητοποίηση ότι οι ΤΠΕ έχουν αντίκτυπο στην ποιότητα της μάθησης και της διδασκαλίας, στη στάση και τις συμπεριφορές των μαθητών και την ευρύτερη σχολική κοινότητα.

4. **Επαγγελματική ανάπτυξη:** Στοιχεία που αποδεικνύουν τη δέσμευση του σχολείου στη διαρκή επαγγελματική ανάπτυξη σχετικά με τις ΤΠΕ.

5. **Πόροι και υποδομές:** Πρόσβαση στους κατάλληλους πόρους ΤΠΕ που επιτρέπει να υποστηριχθούν συγκεκριμένα περιβάλλοντα μάθησης και στοιχεία που αποδεικνύουν ότι το σχολείο έχει αναπτύξει τους κατάλληλους πόρους ΤΠΕ που αντανακλούν ένα σχέδιο για μελλοντική βελτίωση και ανάπτυξη των ΤΠΕ, όπως τονίζεται στην πολιτική για όλο το σχολείο.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Κρατήστε τα αποτελέσματα και κοινοποιήστε τα στο υπόλοιπο διδακτικό προσωπικό. Χρησιμοποιήστε τα ως αφορμή για προβληματισμό και εντοπίστε τα δυνατά σημεία και τις αδυναμίες.

• Επαναλάβατε την έρευνα 6 μήνες μετά και παρακολουθήστε τυχόν αλλαγές. Ποια βήματα και ποιες δραστηριότητες από αυτές που πραγματοποιήσατε φαίνεται ότι έκαναν κάποια διαφορά;

ΒΗΜΑ 2
Αυτο-αξιολόγηση ατομικού προφίλ ικανοτήτων

Ενώ επιδιώκεται η ανάπτυξη του σχολείου ως οργανισμού, η επαγγελματική ανάπτυξη των εκπαιδευτικών πρέπει επίσης να αποτελεί στόχο προκειμένου να επιτευχθούν διαρκείς αλλαγές στην ποιότητα διδασκαλίας και μάθησης. Η πύλη του Open Discovery Space προσφέρει στο διδακτικό προσωπικό και σε εσάς ένα εργαλείο αυτο-αξιολόγησης των ικανοτήτων σας βάσει του Πλαισίου Επάρκειας στις ΤΠΕ για Εκπαιδευτικούς της UNESCO (2011) «UNESCO ICT Competency Framework for Teachers».

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Συμπληρώστε πρώτα το προφίλ με τις ικανότητές σας και ενθαρρύνετε το διδακτικό προσωπικό να σας μιμηθεί. Ανάλογα με τον τρέχοντα βαθμό εμπιστοσύνης και συνεργασίας στο σχολείο σας, οργανώστε μια συνάντηση για να εξετάσετε και να συζητήσετε τα αποτελέσματα, χωρίς πίεση για αποκάλυψη ατομικών βαθμολογιών. Εστιάστε σε τομείς που το προσωπικό πρέπει να βελτιώσει περαιτέρω μέσω κατάρτισης.

• Εντοπίστε εθνικά και διεθνή προγράμματα κατάρτισης που καλύπτουν τις ανάγκες αυτές μέσω της πλατφόρμας του Open Discovery Space, π.χ. θερινά και χειμερινά σχολεία για εκπαιδευτικούς, τα οποία χρηματοδοτούνται μέσω του Erasmus+, δωρεάν διαδικτυακά σεμινάρια, υλικό στην Ακαδημία Κατάρτισης Εκπαιδευτικών (Teachers' Training Academy) και πόρους διαθέσιμους στις κοινότητες.

Το εργαλείο αναφέρεται σε ικανότητες γύρω από 6 βασικούς τομείς:

1. Κατανόηση χρήσης των ΤΠΕ στην εκπαίδευση
2. Αναλυτικό πρόγραμμα & αξιολόγηση
3. Παιδαγωγική
4. Εργαλεία ΤΠΕ
5. Οργάνωση και διοίκηση
6. Επαγγελματική ανάπτυξη εκπαιδευτικών.

Τα συνολικά αποτελέσματα υποδεικνύουν τρία (3) επίπεδα ικανοτήτων για τους εκπαιδευτικούς: Βασικός χρήστης, Προχωρημένος χρήστης και Σχεδιαστής/δημιουργός εκπαιδευτικού περιεχομένου με τη χρήση ΤΠΕ.

Περισσότερες πληροφορίες στη διεύθυνση: http://portal.opendiscoveryspace.eu/sites/default/files/manual/ODS_Introduction_on_how_to_join.pdf

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Αφιερώστε λίγο χρόνο να ρωτήσετε το προσωπικό για τις επαγγελματικές του φιλοδοξίες.
• Εντάξτε την κοινότητα του σχολείου σας στην πύλη του Open Discovery Space και αλληλεπιδράτε τακτικά με τους εκπαιδευτικούς του σχολείου σας για να αναπτύξετε περισσότερο τις ικανότητες ΤΠΕ όλων. Ενθαρρύνετέ τους να συμμετέχουν σε διαγωνισμούς που προωθούν ικανότητες ΤΠΕ, π.χ. στον ευρωπαϊκό διαγωνισμό σχεδίασης εκπαιδευτικού σεναρίου «Open Discovery Space Digital Educational Scenario Contest» http://www.ods-contests.eu/the-odscontest/rules-of-participation/.
νΠροτείνετε στο προσωπικό σας να χρησιμοποιεί το προφίλ ικανοτήτων ως εργαλείο που μπορεί να χρησιμοποιηθεί στο πλαίσιο των διαδικασιών παρακολούθησης του Erasmus+ σχετικά με τη συμμετοχή σε δραστηριότητες κατάρτισης εκπαιδευτικών.

ΒΗΜΑ 2
Αυτο-αξιολόγηση ατομικού προφίλ ικανοτήτων

Αφού έχετε αξιολογήσει και επανεξετάσει τα αποτελέσματα της ηλεκτρονικής ωριμότητας του σχολείου και το προφίλ ικανοτήτων του προσωπικού, προχωρήστε στην ανάπτυξη ενός σχεδίου για τις μελλοντικές σας δραστηριότητες που θα στοχεύει στη βελτίωση του σχολείου σας στους τομείς που εντοπίσατε. Η ανάπτυξη ενός τέτοιου σχεδίου μπορεί να είναι κάτι ιδιαίτερα απαιτητικό για τα σχολεία, παρόλα αυτά οι ευρωπαϊκές πολιτικές εμπλέκουν σταδιακά τα σχολεία σε τέτοιες διαδικασίες, όπως το σχέδιο του Erasmus+, αντίστοιχο του «Ευρωπαϊκού Σχεδίου Σχολικής Ανάπτυξης» που ζητείται από τα σχολεία να συμπληρώσουν προκειμένου να χρηματοδοτηθούν για δραστηριότητες κινητικότητας προσωπικού (ΚΑ1). Το Open Discovery Space σάς παρέχει ένα αναλυτικό πρότυπο που σας βοηθά να θέσετε στόχους σε βασικούς τομείς που συνδέονται με τη σχολική καινοτομία.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Βεβαιωθείτε ότι έχετε συμπληρώσει πρώτα το ερωτηματολόγιο για την ψηφιακή ωριμότητα (Βήμα 1) και ότι έχετε κοινοποιήσει τα αποτελέσματα στο διδακτικό προσωπικό.

• Εμπλέξτε στη διαδικασία οικοδόμησης οράματος και κατάρτισης του σχεδίου δράσης όσο περισσότερα μέλη του προσωπικού μπορείτε. Εάν ανταποκριθούν μόνο ορισμένα μέλη, δημιουργήστε μια αφοσιωμένη ομάδα που θα συμμετέχει εθελοντικά.

• Αναγνωρίστε την αξία των ανθρώπινων πόρων σας: Βεβαιωθείτε ότι αναγνωρίζετε τα δυνατά σημεία και τις αδυναμίες κάθε μέλους της ομάδας (συμπεριλαμβανομένου του εαυτού σας) και αναθέστε σαφείς ρόλους. Σκεφτείτε προσεκτικά τη διαδικασία πριν αναθέσετε το βασικό ρόλο του εκπαιδευτικού που θα λειτουργεί ως φορέας αλλαγής. Συνιστάται να το συζητήσετε πρώτα με την ομάδα.

• Εμπλέξτε την ομάδα του διδακτικού προσωπικού στην κατάρτιση του σχεδίου δράσης και τη λήψη αποφάσεων. Ίσως χρειαστεί να πραγματοποιηθούν αρκετές συναντήσεις για την κατάρτιση και αναθεώρηση του σχεδίου σας.

• Να είστε σαφής σχετικά με το όραμα και να καλέσετε την ομάδα να συμβάλει στην οικοδόμησή του.

• Βεβαιωθείτε ότι το σχέδιο δράσης ανταποκρίνεται σε πραγματικές σχολικές ανάγκες.

• Προετοιμαστείτε: Σκεφτείτε πού θα θέσετε προτεραιότητες και πώς θα διασφαλίσετε ότι τυχόν οφέλη θα έχουν διάρκεια.

Συμπληρώνοντας το σχέδιο δράσης, διαμορφώνετε μια στρατηγική ανάπτυξης των πέντε παραμέτρων ψηφιακής ωριμότητας (βλ. ΒΗΜΑ 1) σε διάστημα δύο ετών, που περιλαμβάνει επίσης:

1. Συνεργασία με άλλα σχολεία, φορείς χάραξης πολιτικών, γονείς, την κοινότητα ή άλλους τοπικούς φορείς
2. Σχεδιασμό των δραστηριοτήτων που θα αναλάβει το σχολείο προκειμένου να επιτύχει τους στόχους του
3. Λήψη αποφάσεων σχετικά με τους τομείς του προγράμματος μαθημάτων τους οποίους θα αφορούν οι στόχοι ή άλλες πτυχές που σχετίζονται με την παιδαγωγική και την οργάνωση των σχολείων
4. Σχεδιασμός των πόρων και των εργαλείων που θα χρησιμοποιηθούν
5. Εκτίμηση της απαραίτητης παιδαγωγικής και τεχνικής υποστήριξης
6. Καταγραφή τυχόν εμποδίων και πρόβλεψη της υπέρβασής τους.

Σημειώσεις για τη Διεύθυνση του σχολείου:

- Κοινοποιήστε το σχέδιο δράσης σας στο υπόλοιπο διδακτικό προσωπικό, τους μαθητές, τους γονείς ή άλλους ενδιαφερόμενους και εξηγήστε με σαφήνεια τη λογική και τους στόχους του. Ζητήστε τη γνώμη τους και καλέστε τους να στηρίξουν την υλοποίηση του σχεδίου δράσης. Μπορείτε να δημιουργήσετε ακόμα και ένα πλαίσιο προτάσεων για να μπορούν οι μαθητές και οι εκπαιδευτικοί να σχολιάσουν την υλοποίηση των δραστηριοτήτων σας.
- Μεταφέρετε τυχόν δραστηριότητες, αποτελέσματα ή επιτεύγματα της υλοποίησης του σχεδίου δράσης σας στα τοπικά μέσα.
- Κατά τη διάρκεια της εφαρμογής των δραστηριοτήτων που έχετε σχεδιάσει, οργανώστε τακτικές συναντήσεις με την ομάδα για να βελτιώσετε, αν χρειαστεί, το σχέδιο δράσης.
- Επανεξετάστε το αρχικό σχέδιο δράσης σας στο τέλος του χρονοδιαγράμματος που είχατε θέσει: Τι πετύχατε; Τι θα κάνατε διαφορετικά; Ποια είναι τα επόμενα βήματα; Στην κοινότητα των φορέων αλλαγής στην πύλη του Open Discovery Space θα βρείτε χρήσιμους πόρους για την ανάπτυξη, καινοτομία και ηγεσία: http://portal.opendiscoveryspace.eu/educational-objects/70112

Ένα μοντέλο δημιουργίας επιτυχημένων Ψηφιακών Κοινοτήτων στο Open Discovery Space

Ένα μοντέλο δημιουργίας Επιτυχημένων Ψηφιακών Κοινοτήτων στο Open Discovery Space

Ο ρόλος των ψηφιακών κοινοτήτων πρακτικής & μάθησης στο σύγχρονο σχολείο εισαγωγή των νέων Τεχνολογιών Πληροφορίας & Επικοινωνίας (ΤΠΕ) στην εκπαίδευση δεν εξαντλείται στην αδιάλειπτη χρήση ψηφιακών εργαλείων και υλικού στην τάξη, ούτε, φυσικά, σε έναν φετιχισμό των εφαρμογών (educational apps). Η πραγματική αξία των ΤΠΕ αναδεικνύεται στην επανατοποθέτηση του δημιουργικού και καινοτόμου εκπαιδευτικού στο κέντρο της διαδικασίας της μάθησης και όχι στον παραγκωνισμό του από ένα ψηφιακό βοήθημα. Σε αυτή την κατεύθυνση κυρίαρχο ρόλο έχουν οι ψηφιακές κοινότητες πρακτικής και μάθησης. Αυτές οι κοινότητες είναι ένα πεδίο «ανοικτής πρόσβασης» όπου οι εκπαιδευτικοί δημιουργούν και συν-δημιουργούν περιεχόμενο, αξιολογούν συλλογικά εκπαιδευτικό υλικό, εργαλεία κλπ., μοιράζονται ψηφιακούς πόρους, δημιουργούν και συντηρούν θεματικές και σχολικές κοινότητες και ομάδες ψηφιακών συζητήσεων. Οι ευδοκιμούσες ψηφιακές κοινότητες πρακτικής και μάθησης διέπονται από εμπιστοσύνη και συμμετοχικότητα. Είναι ο «φυσικός» χώρος όπου τα μέλη όχι μόνο αποκομίζουν δεξιότητες, αλλά μεταφέρουν το όραμά τους για το σχολείο, αλλά και τους φόβους τους ή τα παράπονά τους για ό,τι στέκεται εμπόδιο στο δύσκολο ρόλο τους. Υπό προϋποθέσεις, μετατρέπονται σε ομάδες πίεσης προς την κατεύθυνση των αναγκαίων αλλαγών τόσο σε επίπεδο παγιωμένων νοοτροπιών όσο και εκπαιδευτικής πολιτικής. Το σημαντικότερο όμως πλεονέκτημα αυτών των κοινοτήτων είναι η εν δυνάμει μετατροπή τους σε ψηφιακές ακαδημίες εκπαιδευτικών. Και αυτό γιατί, η ταχύτητα με την οποία ενσωματώνουν και εξελίσσουν νέες παιδαγωγικές προσεγγίσεις, εργαλεία, καλές πρακτικές, καινοτόμες και συνεργατικές δράσεις, πρωτοβουλίες για ζητήματα και πρωτοεμφανιζόμενα προβλήματα δεν απαντάται σε κανένα άλλο συλλογικό πεδίο. Το ζητούμενο λοιπόν είναι η επιτάχυνση της εμπλοκής των εκπαιδευτικών κοινοτήτων πρακτικής και μάθησης στο σύγχρονο σχολείο, μέσα από την έρευνα, τις πιλοτικές εφαρμογές και την υποστήριξη σε κεντρικό πλέον επίπεδο. Ο στόχος είναι προφανής: η βελτίωση της οργανωσιακής και συναισθηματικής νοημοσύνης του σχολείου που όλοι οι κοινωνικοί εταίροι δηλώνουν ότι επιθυμούν.

Σύντομος οδηγός για διευθυντικό προσωπικό και εκπαιδευτικούς -φορείς αλλαγής

1.Σαφήνεια και σχετικότητα.

Τα μέλη επιτυχημένων κοινοτήτων επιδεικνύουν κοινή προσήλωση και στόχευση στις δραστηριότητες της κοινότητάς τους. Τα μέλη αλληλεπιδρούν σε έναν προσδιορισμένο τομέα ενδιαφέροντος με σκοπό την επαγγελματική τους ανάπτυξη (Carr & Chambers, 2006). Αυτή η κοινή προσήλωση διαπιστώθηκε ότι είναι βασικό προαπαιτούμενο της επιτυχίας σε όλες τις μελέτες που εξετάστηκαν. Πώς θα επιτευχθεί αυτή η προσήλωση στις διαδικτυακές κοινότητες διδασκαλίας και μάθησης; Σύμφωνα με τα σύγχρονα δεδομένα, ο σημαντικότερος παράγοντας είναι η κοινή αντίληψη περί σαφήνειας και σχετικότητας του σκοπού και των στόχων της κοινότητας (Widenman, 2010). Οι διαδικτυακές κοινότητες με γενικό περιεχόμενο τείνουν να αποδυναμώνονται γρήγορα. Οι κοινότητες που στοχεύουν σε ομάδες εκπαιδευτικών με κοινές ανάγκες και ενδιαφέροντα θα αντέξουν περισσότερο στο χρόνο και στον ανταγωνισμό (Widenman 2010, Carr & Chambers, 2006).

Στα πρώτα στάδια της ανάπτυξης μιας κοινότητας, οι διευθυντές των σχολείων και οι δάσκαλοι-φορείς αλλαγής, που είναι ενδεχομένως ειδικοί σε συγκεκριμένα πεδία, πρέπει να δημιουργήσουν και υποστηρίξουν συγκεκριμένες κοινότητες με περιεχόμενο, εργαλεία, σενάρια, κ.λπ. και να εμπλέξουν εκπαιδευτικούς με εμπειρία στη χρήση ΤΠΕ ή/και στη δημιουργία ψηφιακού υλικού.

2. Εμπιστοσύνη, κατανόηση, στήριξη.

Οι εκπαιδευτικοί δεν θα μοιραστούν την προσέγγισή τους ή τα σενάρια τους με συναδέλφους, αν φοβούνται μια αποκάλυψη τυχόν αδυναμιών και δεν θα επικρίνουν τις διδακτικές μεθόδους άλλων (Widenman 2010, Baek & Barab, 2005, Barab, 2006, Scheckler, 2010). Στις λεγόμενες ψευδο-κοινότητες, τα μέλη τείνουν να προβάλλουν μια «ασφαλή» εικόνα ικανοτήτων. Στις πραγματικές κοινότητες τα μέλη δεν φοβούνται να αποκαλύψουν το πραγματικό τους έργο.

Η ανταλλαγή πληροφοριών, υλικού και ιδεών είναι απαραίτητη: Όταν ένας εκπαιδευτικός γνωρίζει ένα χρήσιμο σύνδεσμο ή εργαλείο, μια καλή προσέγγιση είναι να το προτείνει σε άλλους. Ο Διευθυντής θα πρέπει να ενθαρρύνει την ανταλλαγή υλικού, σεναρίων, κλπ. μεταξύ των εκπαιδευτικών, ειδικά στις περιπτώσεις που υπάρχουν στελέχη με εξελιγμένες δεξιότητες σε συγκεκριμένους τομείς, οι οποίοι θα πρέπει να αναλαμβάνουν τον ρόλο του επιμορφωτή, έστω και άτυπου.

Οι εκπαιδευτικοί ενός σχολείου που εντάσσονται σε ψηφιακές κοινότητες για πρώτη φορά δεν θα πρέπει να πέφτουν θύματα της πλάνης ότι κάθε τι που δημιουργούν ή προτείνουν πρέπει να είναι πρωτότυπο και εντυπωσιακό. Ο λεγόμενος «φετιχισμός της πρωτοπορίας» ενδέχεται να δημιουργήσει αρνητικό κλίμα εντός μιας κοινότητας εκπαιδευ-

τικών είτε ενδοσχολικής, είτε ψηφιακής. Ο ρόλος του Διευθυντή εδώ είναι σημαντικός: Πρέπει να ενθαρρύνει όλες τις απόπειρες ψηφιακής εμπλοκής και δημιουργίας, ειδικότερα όσων το αποφασίζουν σε αργότερο στάδιο της επαγγελματικής τους εξέλιξης.

Επίσημη αναγνώριση: Η συμμετοχή στη ζωή μιας ψηφιακής κοινότητας είναι μικρότερη όταν τα μέλη συμμετέχουν εθελοντικά. Αντιθέτως, όταν η συμμετοχή αποτελεί μέρος μιας πιο επίσημης διαδικασίας (Widenman 2010) τα μέλη επιδεικνύουν έναν μεγαλύτερο επαγγελματισμό. Ο διευθυντής μπορεί να δημιουργήσει ένα άτυπο πλαίσιο αποτίμησης της προσπάθειας των εκπαιδευτικών στη χρήση ψηφιακών κοινοτήτων διδασκαλίας και μάθησης, στη δημιουργία ψηφιακού υλικού, κλπ. Για παράδειγμα, εκπαιδευτικοί με έντονη διάθεση για εμπλοκή στις ψηφιακές κοινότητες του σχολείου, να αποτελούν προτεραιότητα της διεύθυνσης σε μια αίτηση για το πρόγραμμα κατάρτισης του Erasmus+.

Κατάρτιση εκπαιδευτικών Open Discovery Space

Σύντομος οδηγός για διευθυντικό προσωπικό και εκπαιδευτικούς -φορείς αλλαγής

Οι νέες τεχνολογίες αλλάζουν τις μορφές, το χώρο/μέρος, τα εργαλεία/συσκευές και τις διαδικασίες μάθησης. Πλέον είναι διαθέσιμες διαδικασίες μάθησης μέσω φορητών και ασύρματων συσκευών, παιχνιδιού/παιγνιώδους προσέγγισης, συνεργατικής, κοινωνικής μάθησης κ.λπ. Είναι σημαντικό για τους εκπαιδευτικούς να αποκτήσουν γνώση των υφιστάμενων μοντέλων μάθησης/ εκπαιδευτικών σεναρίων και να μπορούν να τα εφαρμόσουν σε νέες και συνεχώς εξελισσόμενες τεχνολογικές λύσεις και εφαρμογές. Το πρόγραμμα κατάρτισης του ODS προσφέρει εξειδικευμένα μαθήματα για τη μάθηση μέσω ανοιχτών ψηφιακών πηγών και για τον σχεδιασμό ψηφιακού εκπαιδευτικού υλικού από τον ίδιο τον εκπαιδευτικό. Παρέχεται στους εκπαιδευτικούς η δυνατότητα να αναπτύξουν καινοτόμες λύσεις και να συνεργαστούν με ευρωπαϊκές κοινότητες εκπαιδευτικών.

Παράλληλα στόχος είναι η ενίσχυση των δεξιοτήτων και ικανοτήτων του εκπαιδευτικού για να εντάξει τις ψηφιακές πηγές στο μάθημά του, να επαναχρησιμοποιεί, να προσαρμόζει και να δημιουργεί νέο ψηφιακό περιεχόμενο. Στο πλαίσιο αυτό δημιουργούνται ψηφιακές σχολικές βιβλιοθήκες ή θεματικές κοινότητες ψηφιακού περιεχομένου στην πύλη του Open Discovery Space, με δυνατότητες διαμοιρασμού του υλικού αλλά και κοινωνικής δικτύωσης μεταξύ των χρηστών.

Περιγραφή του περιεχομένου
της Ακαδημίας Κατάρτισης Εκπαιδευτικών

Η ακαδημία αυτή απευθύνεται τόσο σε εκπαιδευτικούς με μικρή εμπειρία στη χρήση των νέων τεχνολογιών εν γένει, αλλά και σε πιο εξοικειωμένους ή και σε καθηγητές ειδικότητας Πληροφορικής.

Το υλικό είναι σχεδιασμένο με ευέλικτο τρόπο και προσφέρει δυνατότητες κατάρτισης σε ατομικό επίπεδο, λαμβάνοντας υπόψη διαφορετικά επίπεδα ικανοτήτων στη χρήση των ΤΠΕ και εμπειρίας σε μεταδεδομένα και ψηφιακά εκπαιδευτικά αποθετήρια. Μερικές ενότητες απευθύνονται σε όσους έχουν μικρή εμπειρία σε ΤΠΕ και παρέχουν μια πρακτική εισαγωγή, ενώ άλλες στηρίζονται σε προηγούμενη γνώση.

Δυνατότητες επαγγελματικής ανάπτυξης των εκπαιδευτικών

- Οι εκπαιδευτικοί συμμετέχουν στην ανάπτυξη εξειδικευμένων μαθημάτων και υλικού και έτσι αποκτούν δεξιότητες ως προς τη σύλληψη, τον σχεδιασμό και την αξιολόγηση μιας πληθώρας διδακτικών προσεγγίσεων
- Καλλιεργούν γνώσεις και δεξιότητες και αποκτούν εμπειρία στην οργάνωση ψηφιακών πηγών, συνδέοντάς τις με μεταδεδομένα, εντάσσοντάς τις σε ψηφιακές βιβλιοθήκες και διευκολύνοντας την κοινοποίησή τους και την ανταλλαγή με τρίτους.
- Με αυτό τον τρόπο αποκτούν επίσης εμπειρία στη χρήση ψηφιακών εκπαιδευτικών εργαλείων στην τάξη και μπορούν να προσφέρουν καινοτόμες μαθησιακές εμπειρίες στους μαθητές τους.
- Ενισχύουν τη διαπολιτισμική συνείδησή τους μέσω της συνεργασίας με συναδέλφους από διαφορετικές ευρωπαϊκές χώρες, εντάσσοντας παράλληλα τη διάσταση αυτή στη διδασκαλία τους.
- Αποκτούν δυνατότητες για αντιμετώπιση καθημερινών πρακτικών προβλημάτων και έρχονται σε επαφή με νέες ιδέες χάρη στην επαφή με τις προτάσεις της σύγχρονης εκπαιδευτικής έρευνας

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Οι εκπαιδευτικοί έχουν πρόσβαση σε κάθε είδους υποστηρικτικό υλικό που μπορεί να βοηθήσει στη χρήση, τον σχεδιασμό και την προσαρμογή ψηφιακών εκπαιδευτικών πηγών. Το υλικό αυτό είναι διαθέσιμο στους παρακάτω συνδέσμους:

Ψηφιακές εκπαιδευτικές πηγές
- Διδασκαλία και μάθηση
- Εγχειρίδιο χρήστη
- Βιβλιοθήκη εργαλείων
- Περισσότερες πληροφορίες εδώ:
- http://portal.opendiscoveryspace.eu/teachers-academy
- Νέες εκδηλώσεις της Ακαδημιών Εκπαιδευτικών του Open Discovery Space:
- http://ods.ea.gr/
- Πακέτο ψηφιακών εργαλείων του ODS για τον εκπαιδευτικό http://portal.opendiscoveryspace.eu/ods-toolbox-668542

Αναφορές

- Baek, E., & Barab, S. A. (2005). A study of dynamic design dualities in a web-supported community of practice for teachers. Educational Technology & Society, 8(4), 161-177.
- Barab, S. (2006). Design-based research. In R. K. Sawyer, (Ed.), The Cambridge handbook of the learning sciences (pp. 153-169). Cambridge: Cambridge University Press.
- Carr, N., & Chambers, D. P. (2006). Teacher professional learning in an online community: The experiences of the National Quality Schooling Framework Pilot Project. Technology, Pedagogy and Education, 15(2), 143-157.
- Digital Agenda: investment in digital economy holds key to Europe's future prosperity, says Commission report, available at: http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=5789
- Lock, J. V. (2006). A New Image: Online Communities to Facilitate Teacher Professional Development. Journal of Technology and Teacher Education, 14 (4), 663-678.
- Scheckler, R.K. (2010). Case studies from the Inquiry Learning Forum. In J. O. Lindberg, & A. D. Ologsson (Eds.), Online learning communities and teacher professional development: Methods for improved education delivery. (pp. 43-59). Hershey, PA: IGI Global.
- Widenman, H. (2010). Online Teacher Learning Communities: A Literature Review. Institute for Research on Learning Technologies. Technical Report. University of York.
- UNESCO ICT Competency Framework for Teachers. United Nations: (2011). http://unesdoc.unesco.org/images/0021/002134/213475e.pdf

Contents

Technology-rich innovation *in schools*

powered by **ODS OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

What's inside?
Click here for other languages and formats

Introduction
Key forces at play

Model
A phased process for innovation

Stimulation
Awakening interest and identifying promising pathways

Trials
Seeking early lessons from experiences in the field

Incubation
Steady, supportive development

Scenarios
From pilot to stable change

Acceleration
Becoming self-generative

About this resource

Educational change is extremely challenging in any setting, and when the change involves technology Ð as most changes do in this day and age Ð the complications increase. This booklet was designed to support educational leaders in the exciting yet daunting task of initiating and maintaining technology-rich innovation in schools.

This booklet is part of a series produced by a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS). Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work.

The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders. This booklet harvests insights that are particularly relevant to educational leaders, and makes them available for use in other initiatives to achieve lasting and meaningful changes involving the use of modern technologies.

Tip: Key activities are summarized in the roadmap, which can be accessed here and from any page.

Other languages and formats
Portions of this resource are available in the following languages:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- This brochure in English as pdf

Contents

- Short animated video of this brochure

Testimonials
What headmasters say about this resource

"A sharp coherent publication, very aesthetic with its good use of text, studies.contexts, images and graphics, easily read online, good balance of theory and digital case studies ... It would make a good summer course."

- Tom Roche, Ireland

"As a digital disciple I found the handbook a well laid out document with a very defined framework. From the very start it outlined the change from traditional to digital pedagogies. This key element of change is well illustrated."

- Robbie O'Leary, Ireland

"You can see what ODS actually means now in practice and not just theory."

- Daithi O'Murchu, Ireland

"I think that the document is an excellent production which is grounded in theory, sets out a framework for involvement with ODS."

- Fin Martin, Ireland

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References and related reading

Online reading
Websites related to technology-rich innovation in schools

Print and download
Journals, books and other reading available for offline access

Inspiring initiatives
What have others already done? What are they sharing?

Online reading
Websites related to initiating and sustaining technology-rich innovation in schools

International links

- http://ods.ea.gr
    - ODS Summer Academy 2015
- http://portal.opendiscoveryspace.eu/training-academies
    - ODS Teacher Training Academy
- http://tpack.org
    - Technological Pedagogical Content Knowledge (TPACK) is a framework that identifies the knowledge teachers need to teach effectively with technology.The TPACK framework extends ShulmanÕs idea of Pedagogical Content Knowledge.
- http://www.eschoolnews.com/2015/01/13/questions-innovation-303/
    - Think your school is innovative with tech? Answer these 6 questions and prepare to reassess
- http://www.digitalpromise.org/blog/entry/a-teacher-driven-approach-to-21st-century-learning-in-meridian
    - Innovation Starts in the Classroom: a series of case studies produced by Digital Promise examining the work of members in our League of Innovative Schools.

Country-specific links

Estonia

- https://www.ekool.eu
    - E-school for the schools in Estonia, which shows grades, information and homework for students and parents.

- http://koolielu.ee/
  - Educational portal for the schools of Estonia, which includes learning material, information for schools etc.
- http://www.haridusportaal.ee/
  - Portal, which gives information for schools.
- https://www.hm.ee/et
  - Portal of the Estonian Ministry of Education and Research.
- http://miksike.ee
  - Miksike in Estonia offers different online collaborative learning events, contests (quizzes, Pranglimine, contests built on interctive exercises etc.) and also educational content.

Greece

- http://photodentro.edu.gr/lor/
  - Photodentro.

Latvia

- http://www.e-klase.lv
  - Leading website in education. The website gives an opportunity for parents to see their children success in school. Website keeps updated class journal, grades, homework and other recorded remarks done by teacher.
- https://www.mykoob.lv
  - The site keeps class journal, grades and homework. The aim of the website is to inform parents of their children success in school.
- http://www.uzdevumi.lv
  - Website with wide range digital tasks online.
- http://macibas.e-skola.lv
  - E-classes and Mykoob setting Óstudy cloudÓ.
- http://visc.gov.lv/vispizglitiba/saturs/digit_maclidz.shtml#lv_pam
  - Ministry of Education and Science offers website with online training exercises for educational purposes.
- http://miksike.lv
  - Miksike in Latvia offers different online collaborative learning events. It also offers contests like quizzes, Pranglimine, contests built on interctive exercises etc. and also educational content.

Print and download
Journals, books and other relevant reading available offline

- Sandholtz, J. H. (1997). *Teaching with technology: Creating student-centered classrooms*. Teachers College Press, Teachers College, Columbia University, 1234 Amsterdam Ave., New York, NY 10027.
- Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational technology research and development, 53*(4), 25-39.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.
- Vannatta, R. A., & Nancy, F. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education, 36*(3), 253-271.
- McKenney, S. (2013). Designing and researching technology enhanced learning for the zone of proximal implementation. *Research in Learning Technology* Supplement 2013, 21: 17374.

Inspiring initiatives
Schools, projects and other real world examples of technology-rich innovation in schools

- http://gettingsmart.com/2014/11/100-schools-worth-visiting/
  - School visits are a great ways to learn and they are key to developing an innovatio mindest. This page lists 100 schools worth visiting. These are schools that create powerful learning experiences, often using innovative technology blends.
- http://www.policulturaexpo.it/world/pcem/
  - Politecnico di Milano organizes PoliCulturaExpoMilano2015, a digital storytelling competition for schools aimed at creating an engaging learning experience, based on modern technological techniques and methods, connected to the Universal Explosion in Milano 2015.

References

Technology-rich innovation in schools

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Roadmap
The roadmap is a planning tool for schools in various stages of eMaturity

Stimulation
Awakening interest and identifying promising pathways

Trials
Seeking early lessons

Incubation
Steady, supportive development

Scenarios
From pilots to stable change

Acceleration
Becoming self-generative

Phase	Key ideas	Initial	Enabled	E-confident	E-mature
	Impact on teaching and learning of rapid growth of knowledge and information from a technological perspective	*General understanding of how technology can improve teaching and learning*	*Understanding methodologies of how ICT can be integrated into the curriculum*	*Understand how ICT can improve learning of the curriculum*	*Design methodologies for integration of technologies in learning*
Stimulation	Knowledge of global and local needs and challenges in terms of ICT use and familiarity	An initial map of the basic existing needs of the school is built addressing all the basic needs in terms of equipment, professional development, and its uptake in the institution learning environments.	Schools with already existing ICT infrastructure start designing the necessary professional development and implementation opportunities in the framework of the curricula.	ICT confident school will map the existing opportunities in the school community to engage in exchange projects and enhance learning experiences such as the use of real research in classroom.	Opportunities offered by OER and MOOCs are mapped and a vision for their integration in learning environment built. The school can rehearse innovative student centred models.

Trials					
	Scan the horizon to search for best practice examples	The map built in the first step is now populated with existing best practice examples in order to design the whole implementation process	Best practice examples are integrated in this phase and teacher will engage in actual implementation exercises	Exploration of research opportunities and engagement of students in real research projects is foreseen for this phase	Innovative experiences, based in existing best practice examples, or new creative opportunities are created in this phase involving students in cutting edge educational research experiences.
	Find innovative examples and partners	Partnership with other institutions that already started their change path towards a more ICT based development is advised at this stage	Interschool collaboration where teachers can implement already successfully tested examples in classroom should be implemented	School can participate for instance in real research campaigns with support of various institutions that promote such possibilities	Schools can design their own experiments and engage students in development of their own projects promoting entrepreneurship skills and ICT innovation.
	Involvement of the community	The school and local community play a major role in ensuring the feasibility of the roadmap designed in the first place. They are the facilitators and key players at stage.	School community is a perfect stage to exchange good examples between peers in the same subject area or for interchange and collaboration between different grade levels and subject areas	The local community can play a very important part in this phase, in particular when stakeholders can support the vision of the school for the uptake of innovative methods and solutions.	School and local communities can be drivers of change in this phase and could/should support the whole vision.
	Receptivity to new ideas	Schools should be opened to the use of ICT innovation for upgrading the teaching/learning process.	Schools should be aware of new ideas and new trends emerging in the field of ICT based education	New forms of learning environments are emerging and the ICT e-confident school should take advantage of cutting edge best practice examples in the field of education	e-mature schools are in a perfect position to pilot new ideas and to create change in the field of education.
	Finding effective communication channels	The whole school community have to be involved in the changes foreseen and continuously informed about the developments taking place	Communication from top-dow and vice-versa should take place at all stages when redesigning the use of existing facilities and roles played by the different stakeholders	e-confident schools can innovate faster and new solutions will pop-up in diverse areas. A proper communication channels has to be designed to ensure maximal uptake of good outcomes	e-mature schools can use modern channels to ensure instant communication between all teams fostering the innovative path in the school
Trials	School proficiency level related to	Teachers have general computer	Some experiences in using ICT tools	ICT confident school uses actively new	Teachers/school has extensive

	field trial	literacy but they do not use it in everyday classroom activities. No systematic teacher training and curriculum/eLearning development program and action plan. Limited access to electronic learning resources. ÒDrill & PracticeÓ learning/teaching method prevails in the classroom. Community (parents etc.) is not informed/involved in educational activities.	in the classroom. Teamwork and some active learning elements are used in the classroom. Growing confidence among teachers how to use new learning methods. Teachers are starting to share learning ideas with each other and inform parents.	pupil centered learning methodologies. Schools development program and action plan is followed. School participates in online learning events and is taking lead/coordination in more simple events. School is working actively to set up good relations with parents and community around the school	experiences in using new learning methodologies and ICT and they have participated in collaborative online learning events and research projects. Teachers have experiences and understanding about cultures (cultural differences) in countries involved with projects.
	The level of complexity of field trials	Designing elearning development plan and teacher training programme. Using simple electronic presentation and content in the classroom.	Participating in intra-school, intra-region learning events and contests (quizzes etc.). Making learning flexible in the classroom though using interactive / electronic content and programs	Filed trials, which engage pupils and teachers into more simple learning events internationally and more systematic collaborative project in own region / country. Starting to organize/coordinate learning events on their own.	Taking part in different online collaborative learning events, also the ones, which last months and involve synchronous communication and series of activities (like storytelling projects etc.) and often also travels.
	Organisational Òto-do listÓ	Preparing elearning development plan and teacher training programme in the school. Searching for contacts, teacher training opportunities. Upgrading school's ICT infrastructure. Involving/informing community (parents) into development plans of the school.	Starting to implement development plan, selecting filed trials, which require collaboration between classes and learning situations. Actively participating in teacher training events, networking events, information days.	Participating in different online learning events and trials. Coordinating events on regional level and simple events also multiculturally.	Maintaining and developing learning contacts in all levels. Coordinating learning events and participating in them. Functioning like a regional innovation centre and sharing experiences.
Incubation	Sustainability	Focus on short term	Focus on medium term	Focus on long term	Focus on organic community to auto-administer
	Active	Provide classical assessment method and limited feedback	Improve classical assessment methods and improve feedback	Provide a ground for self-assessment	Use digital resources for students to interact as peer and provide feedback

	Support	Get support from workshop organization	Get support from author of the resources	Get support from a community	Provides support to a community
	Localization	Use downloaded resources directly	Minor localization to downloaded resources	Major localization to downloaded resources	Contribute back to the community with a guide and support for successful localization
	Versatility	Use downloaded resources directly	Minor changes to downloaded resources	Major changes to downloaded resources	Contribute with own resources
Scenarios					
Acceleration	Dissemination and diffusion	Headmasters organize some basic presentations and workshops about ODS. They appoint an e-Learning ODS team.	The e-Learning ODS team develops e-Learning vision with the help of the headmaster.	E-learning vision is integraded into the school curriculum.	E-learning is implemented in classrooms. Both eachers and students use it.
	Motivation	Headmasters find funds for a couple of teachers who will be sent to some basic e-Learning trainings, seminars or academies.	The trained teachers train the interested groups of teachers in school.	All of the teachers are trained to use e-Learning systems.	The teachers implement e-Learning in their classrooms, prepare demonstration lessons and get points for professional development.

Technology-rich innovation in schools

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

About the authors

This booklet was produced as part of a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS).

Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work. The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders.

Project coordination
Open discovery space is co-coordinated by Intrasoft

Related resources
Related resources are available on the ODS website

Previous versions
Previous versions of this booklet are available upon request

Authoring team
The authors of this booklet have been working on various tasks within the ODS project. Their affiliations represent many of the 51 partners in the consortium.

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What is technology-rich innovation?

Considerations for educational leaders who are initiating and maintaining change in the 21st century

Key ideas
How do we look at change in education today? What is considered excellent technology use?

School-based innovation
How do learning technologies yesterday and today differ? How are these altering school-based innovation?

The knowledge economy
In modern society witnessing a revolution? Are traditional educational methods disappearing? Should they?

Themes and trends
What European initiatives are currently promoting teacher competence in ICT use?

Key ideas about change in education today

Learners central
All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill

Education - schooling
Education, as both process and outcome, is now seen as very different from schooling in structure and intent
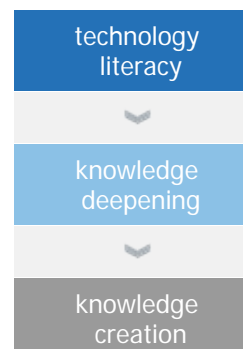
Knowledge creation
Knowledge creation is the ultimate goal in technology-rich innovation

Rapid changes
The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history

New priorities
Education is now shaped by critical factors that include: openness, adaptability, accessibility, innovation and learner-centric

technology literacy

⌄

knowledge deepening

⌄

knowledge creation

Three levels of excellence in teaching according to the UNESCO ICT Framework

School-based innovation: Learning technologies yesterday and today

All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill. Educational methods and techniques have, however, historically developed in response not only to learnersÕ needs, but also to the needs of wider social, political and economic structures. TodayÕs advanced technologies environment is in many ways an issue as old as education itself. It is the link between what individuals need to know, do and learn at a time of profound change.

At their most basic, learning technologies focus on the tools, methods, techniques and operational modalities that envelop the learning and didactic process. Over the past few decades, a complete revolution has occurred regarding not only our approach to the understanding of educational theories, but also our ability to use new and innovative methods to design and deliver learning. This process has promoted a significant re-evaluation of the role and purpose of education and the most appropriate delivery methodologies to ensure optimum learner engagement. Education, as both process and outcome, is now seen as very different from schooling in structure and intent. This point was originally articulated by Ivan Illich in the 1970s (*De-schooling Society*). Today, learning technologies permit the acquisition of knowledge, skills and attitudes in many new and innovative ways.

> The fundamental intellectual activities of discovery and learning are being transformed by the rapid evolution of ICT. Although many technologies have transformed the course of human history, the pace and impact of digital information technology is unprecedented.
>
> *- J. Duderstadt, 2013*

In all teaching contexts, learning technologies are important. The emergence of standardized methods of instruction took on a radically new dimension during the Industrial Revolution. This marked growing synchronization of teaching methodologies with requirements for improved work performance and productivity. The knowledge explosion and information revolution of our own era is still deeply marked by the experiences, structures and expectations of the industrialization process. Knowledge acquisition is central to the ODS endeavour as well as its underlying model of innovation and reform. Knowledge creation is the core of a set of skills, values and attitudes that, in their structure and imparting to others, are the essence of culture.

The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history. The mode of production and the distribution of knowledge have changed so radically that it is considered legitimate to speak of a new era. This is described as the information society. In this new paradigm, we see more production, distribution and use of knowledge than before.

The knowledge economy

The scale of growth in the knowledge economy is tied to complexity, change and technology. Increasingly, schools today are more complex. Talcott Parsons talked about social differentiation - as institutions grow in size and complexity the functions they have to perform become specialized and distinct subsystems. With the growth of these subsystems new distinct problems of coordination, hierarchy and social control emerge. While the pace and rate of change have been universally acknowledged, the scope and impact in recent times have been transformative. Technology has increased human mastery of nature - and altered human social relationships. In this profoundly different world, traditional education and learning patterns are challenged. New skills are required. New methods of acquiring skills are also required. Traditional schools often struggle to meet the new needs of learners. *Modern society is witnessing a revolution where traditional educational methods are not so much superseded by technology but altered and transformed in new and unexpected ways.*

Themes and trends

Whatever the technologies or methods, human learning remains driven by motivation, skill acquisition, improved understanding and tangible benefit. Educational institutions must respond to the paradigm shifts affecting society and relationships in the 21st century. Advanced technologies enable open learning to be a powerful tool in advancing learner competence. These technologies create new forms of delivery, assessment and research. At first unfamiliar, these can develop extraordinarily rich paths to improved learning, skill and knowledge. The key characteristics for the success of such technologies can be viewed through the evaluative framework outline by McManus and Lyne in their 1992 book on open learning in changing professions. They stress the importance of learning technologies to embody the following characteristics: accessible; available throughout a lifespan; responsive to individual life circumstances; able to cope with learner diversity; affordable; demonstrably effective.

Across Europe, many initiatives promote teacher competence and information and communications technology (ICT) usage. A few examples include: *Key Competences for Lifelong Learning* (2007); *Strategic Framework for Education and Training 2020* (2013); and the *Digital Agenda for Europe* (2010). The Key Competences document defines digital competence for all citizens, and identifies relevant knowledge, skills and attitudes to live and work in the 21st century. Inclusion of Digital Literacy as one of eight key competences indicates the importance attributed to ICT skills at European level. Combining ICT skills with emerging views in pedagogy, curriculum and school organization, the Standards reinforce professional development of teachers who use ICT skills and resources to improve their teaching, collaborate with colleagues and ultimately become innovation leaders themselves. As shown above, the UNESCO ICT Framework has three different levels of excellence in teaching:

technology literacy; knowledge deepening; knowledge creation.

The Open Discovery Space (ODS) approach is designed to recognize the profile of registered teachers and use it as an additional element to decide most appropriate learning objects. Instructional environments in some classrooms (including activities around preparation for paper-based state examinations) may not easily lend themselves to the development of and usage of e-learning environments. The local contextualization of innovations is therefore a critical concern that affects the uptake and use of new ideas. Various initiatives across Europe support tailoring and customization to specific settings.

For example, the Irish NCTE handbook - Planning and Implementing e-Learning in Your School: A Handbook for Principals and ICT Co-ordinating Teachers - recognises the important role of school leaders in promoting ICT in teaching and learning at school level. It provides a definition of e-learning, and outlines how schools can develop under five headings: leadership and planning, ICT in the curriculum, professional development, e-learning culture and ICT infrastructure. The handbook includes an e-Learning Roadmap which helps schools to plot their development reflected on a four-point rating scale of e-maturity: Initial; e-Enabled; e-Confident; e-Mature. The Irish roadmap facilitates planning and goal setting and targets at an individual school level.

Research has also consistently demonstrated that computer-based interventions and open education resources tend to be more effective when combined with constructivist approaches to teaching, rather than with more traditional approaches. Having identified trends and issues, the innovation model is challenging. However much has been achieved already. The obstacles and opportunities have been identified.

ICT in schools requires both leadership and vision. This helps it to move beyond a simply perceived technical skill to recognition of its critical role in shaping competence and learning innovation at a time of profound transformative and globalized change. The ODS model offers one clear, yet flexible vision for technology-rich innovation that can be tailored to meet the needs of specific learners, in particular schools, in varied contexts across Europe.

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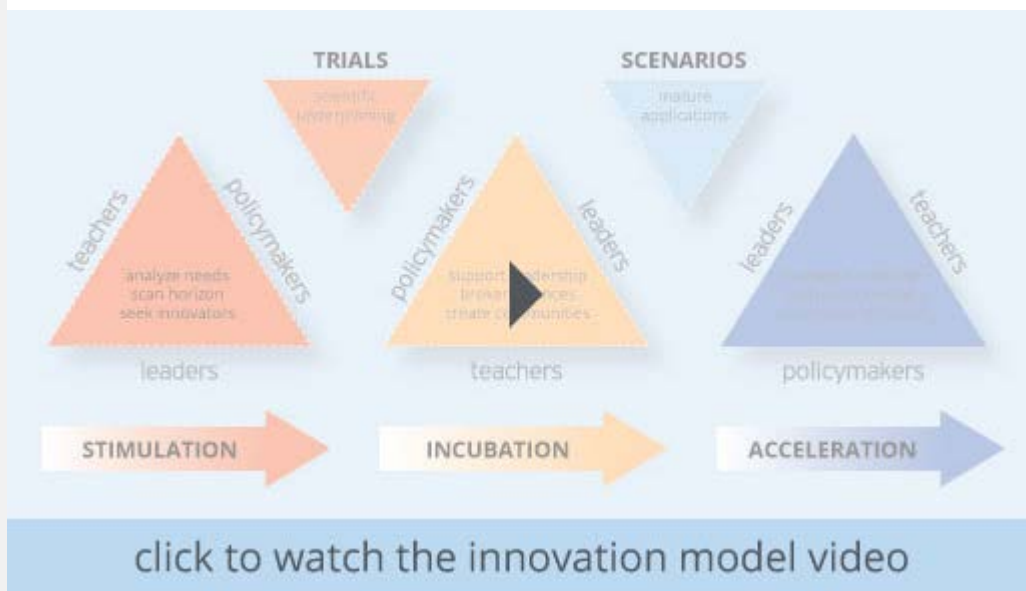
a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Modelling innovation and reform

click to watch the innovation model video

Key ideas and origins
What are core considerations embodied in the ODS innovation model?

Innovation and reform
What is innovation? What is reform?

Innovation model
What does a visual representation of the innovation model look like?

Innovation and technology
What technolocy changes constitute innovation? What forces are at play?

Key ideas embodied in the model

Multiple forces
Top-down, bottom-up and side-side interactions shape the activities in this model of innovation.

Field work
Three main phases are strategically informed by field work and reflection on actual experiences.

Three key phases
Stimulating, incubating and accelerating are three main phases throughout the process, each with its own focus and concerns.

People are key
Individual and team development is central to the model, which also recognizes different and changing roles played by teachers, educational leaders and policymakers.

Context
Some factors in innovation settings can be manipulated, others are fixed Ð both powerfully affect the uptake and use of new ideas, at micro, meso and macro levels.

Model origins
The main objective of Open Discovery Space (ODS) is to mainstream eLearning in schools and national policies of the EU member states. ODS supports Action 68 of the Digital Agenda for Europe through an innovation, as it offers: A web-based resource giving teachers access to teaching and learning materials.

The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools. The model was originally conceived to *prescribe* ODS project activities. After the project was launched, the model has been updated to reflect the lessons learned based on real world experiences.

The model presented in this chapter *describes* how each element has been undertaken in the ODS project. The combination of authentic examples and clear guidelines make the ODS model presented here a clear and accessible resource for educational leaders.

Click here to visit the ODS YouTube channel, which offers much more background and examples from the ODS initiative.

What is innovation? What is reform?

Innovation is characterized as a bottom-up/grassroots approach, based on internal processes; whereas *reform* is characterized as a top-down approach, either system-wide or anchored within several different institutions, based on external processes. The
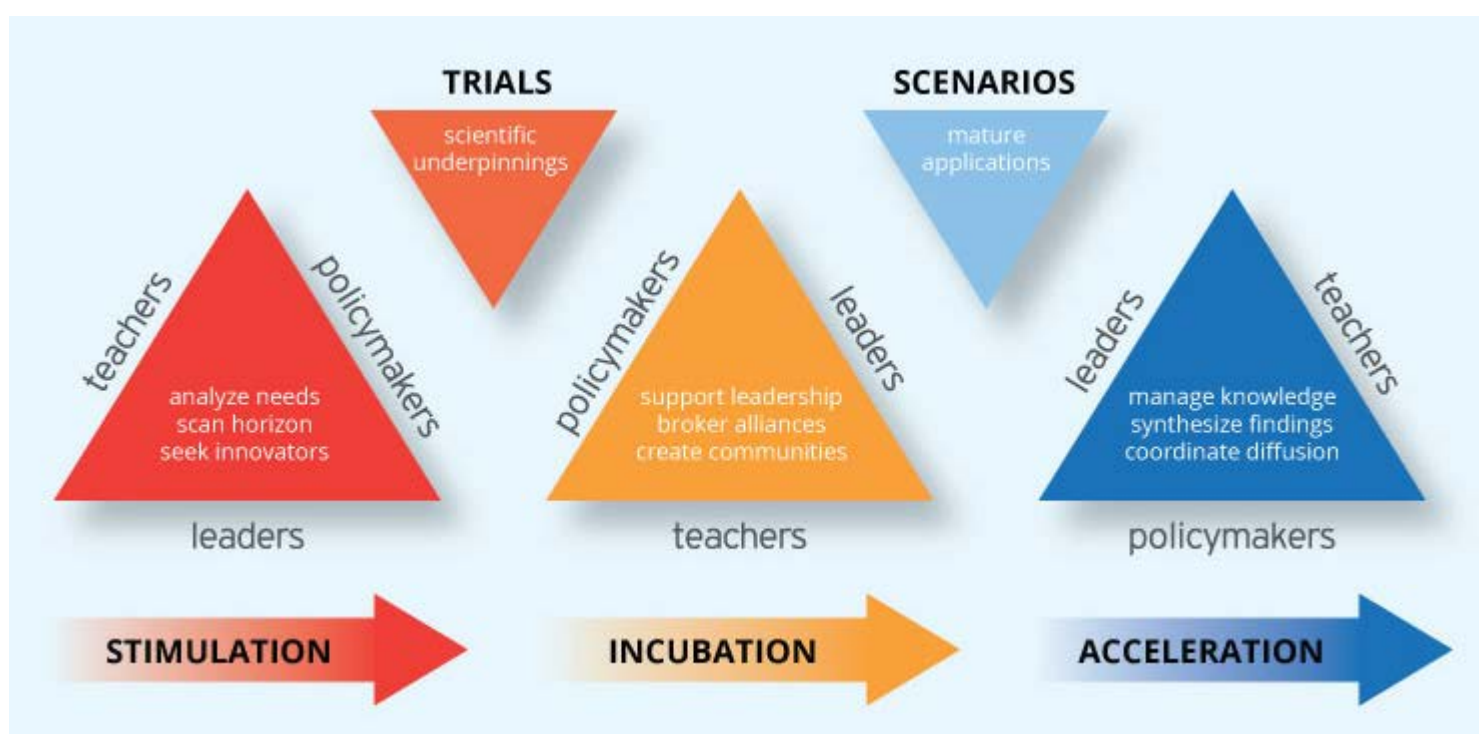
ODS model incorporates aspects of both innovation and reform.

Three characteristics of ODS illustrate aspects of *innovation* that are present in the underlying approach. First, there is a strong emphasis on stimulating broad involvement embracing all stakeholders at all levels: local/regional, national and European. Second, there is a hands-on approach to working with actors of change to ensure successful transformation Ð empowering teachers, school managers, and learners. Third, the approach explicitly supports excellence (centres of expertise and clusters), encourages dissemination of success stories (virtual eLearning communities and information portals), as well as promotes enhanced cooperation and experimentation. Across ODS (and thus, embedded in its model) is the central appreciation for human capacity and the need to share that across all dimensions of work, from the ground up.

At the same time, the formal, externally-based facets of change are crucial to success, particularly for within-country initiation. Classic elements of *reform*, these include the top-down pressures and incentives that pose powerful levers for change, such as: new assessment policies, new funding mechanisms, and revised curricular frameworks. Because sustainable change requires sound alignment between policy and practice, the connection with external agents (e.g. policymakers) remains an integral part of the ongoing process.

The ODS model of innovation and reform
An experience-based approach to technology-rich innovation in European schools

5 key components in the ODS model of innovation and reform
The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools.

Stimulation
This phase features the awakening of interest and the identification of promising pathways to technology- rich innovation. Needs analysis helps understand stakeholder concerns. Inspiration is sought by scanning the horizon. And innovators that can lead the work (from program champions to team coaches) are identified.

Trials
Field trials are undertaken early in the process to (1) engage key stakeholders; as well as (2) to learn important lessons that can inform the rest of the project. Like mini-innovations themselves, field trials participation often prompt creative developments, and are especially helpful for studying localized adaptations.

Incubation
Incubation refers to the steady, supportive development of new learning, techniques or methods so that sustained development can occur. During this phase, innovation capacity is cultivated so that the change can become self-generative.

Scenarios
Whereas field trials fostered the development and testing of new ideas, scenarios portray the transition from small pilots to stable ways of working under regular teaching and learning circumstances. Scenarios are informed by the experiences to date, and lay the foundation for the final phase of acceleration.

Acceleration

Once technology-rich innovation is up and running in representative settings, attention is turned to issues of sustained maintenance so that they can continue. This includes exploiting the knowledge available within the change setting and establishing routines for continuous quality assessment.

How do innovation and reform relate to changing technologies?

About changing technologies in schools

Technology-rich innovation is a term used often, in ODS and elsewhere. This is an umbrella term for teacher and school led change involving any kind of technology. But these days, most people think especially of electronic technologies (e.g. computers, mobile devices) as well as the use of specific applications for learners (e.g. simulations, communication tools) and/or teachers (e.g. electronic access to lessons plans or assessment rubrics). The rationale and goals of technology-rich innovation vary tremendously. The range includes: increasing equitable access to resources for remote schools; fostering EuropeÕs cultural pluralism; serving the educational needs of all students; and stimulating active learning.

Many people may be involved in technology-rich innovation, and of course each setting is unique. But across most innovations, attention is typically required for at least three core groups of actors: policymakers, teachers and educational leaders. *Policy makers* are those positioned to activate top-down interaction in some way. This includes (national, state or local) representatives of government, as well as representatives of teacher associations, funding bodies, curriculum agencies and assessment boards. Here, we use the term, *teachers*, broadly Ð to represent all educational practitioners who interact directly with pupils. In addition to regular classroom teachers, this includes classroom aids, therapists, remedial teachers, special subject teachers and counsellors. This group is positioned to initiate bottom-up interaction. *Educational leaders* are those able to lead side-side interaction. This group includes, but is not limited to: headmasters, superintendents, department heads and instructional coaches. Educational leaders play critical roles in implementing policy. They also support the work of teachers both directly (e.g. by ensuring that professional development opportunities are regularly available) and indirectly (e.g. by creating a healthy and stably organization).

What forces are at play during change?

Various *forces* come into play during change, and the inter-dependencies between actors are central to the different types of interaction: top-down; bottom-up; and side-side. It is well understood that sustaining change requires a balance of pressure and support. Key activities in earlier stages of *top-down* reform as well as *bottom-up* innovation therefore frequently require processes that seek or enable alignment of priorities and goals across the key stakeholder groups. By later stages, the driving forces have typically shifted hands. Whether initiated top down (e.g. by policy makers) or bottom-up (e.g. by teachers), the sustained maintenance of change is greatly dependent on the educational leadership present.

School-school interactions were major factors that contributed to the successful introduction of a new subject in Dutch secondary schools.

When schools saw how others handled the new curriculum they were both inspired to participate and reassured that doing so would be within their reach.
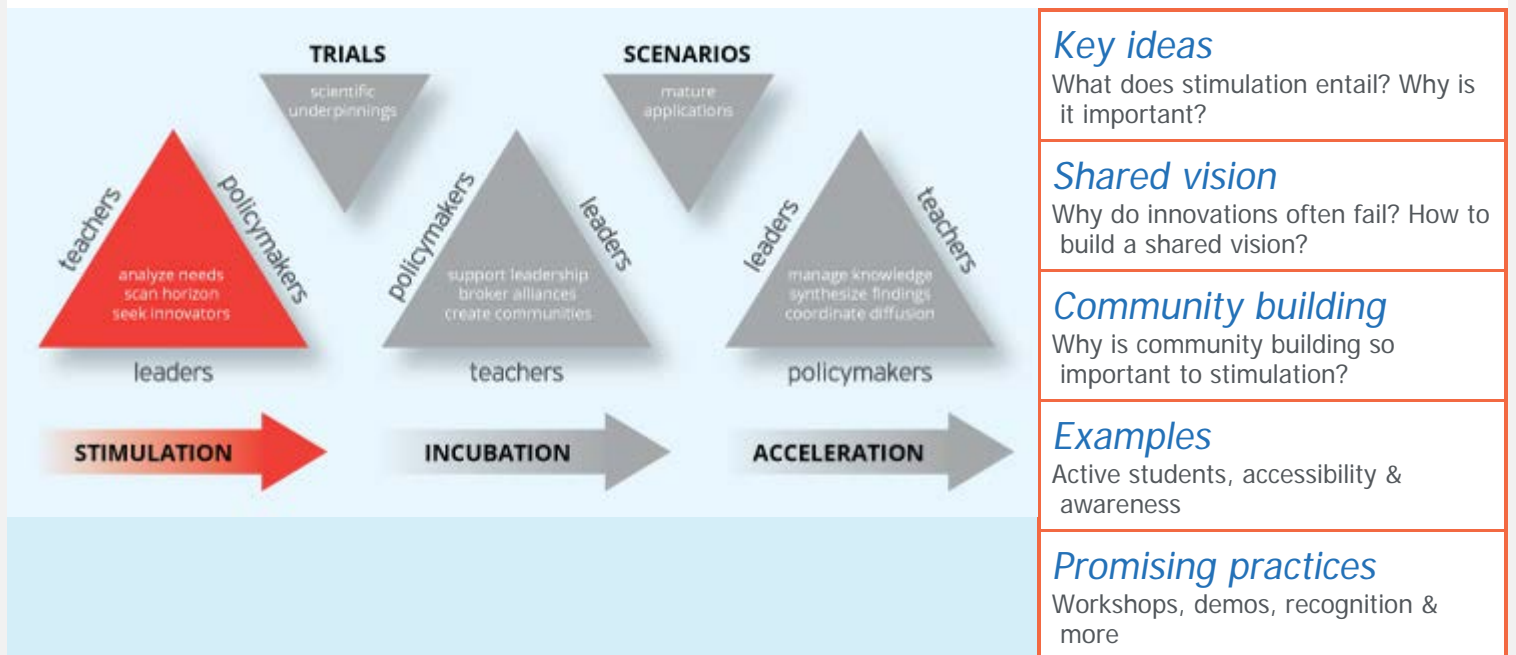

The importance of *side-side* interactions is comparatively less well documented as a force that helps initiate change, but is known to be especially important for developing change. Side-side interaction is therefore needed to enable schools to ascertain the degree to which a particular change is within their Õzone of proximal implementationÕ (ZPI). McKenney (2013) refers to the ZPI as distance between what teachers and schools can implement independently and what they can implement through guidance or collaboration. The ODS model designs for the zone of proximal implementation by planning for implementation scaffolding (e.g. externally-led coaches, workshops or subsidies) to fade away in a timely fashion, while simultaneously developing the ownership and expertise among practitioners that will engender the desire and ability to locally sustain change.

Model of innovation and reform

Technology-rich innovation *in schools*

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Stimulation

Key ideas
What does stimulation entail? Why is it important?

Shared vision
Why do innovations often fail? How to build a shared vision?

Community building
Why is community building so important to stimulation?

Examples
Active students, accessibility & awareness

Promising practices
Workshops, demos, recognition & more

Stimulating: the first key phase in the model

Knowledge of global and local needs and challenges in terms of ICT use and familiarity is a very important step towards the construction of a feasible innovative plan.

Scan the horizon to search for best practice examples and optimum resources to support actions that address identified needs.

Find innovative examples and partners that can bring new opportunities to the school and change the institutional vision by embracing relevant and engaging new methods and practices.

Involvement of the community helps to foster leadership, democratization of opportunities collaboration, network and team building.

Receptivity to new ideas is increased by mutual openness among all parties, to collaboratively define and embrace new proposed strategies.

Effective communication channels are essential for ensuring proper exchange of ideas and outcomes.

The stimulation phase is one of the most important in terms of creating the community that will support the trials, pilot the implementation of scenarios, validate and evaluate the usefulness and impact of innovative proposals. Thus, it is important in this phase to involve all participants in the different foreseen activities. A sense of ownership is a crucial motivating element and a step towards the sustainability of the successful changes.

An effective stimulation phase must encompass a careful analysis of local needs, review goals given existing possibilities, identify innovative key players and ideas, encourage teambuilding and brainstorming activities to seek out creative options that can be implemented in relation to the identified needs and the capabilities of the team addressing these needs and proposing innovation.

The importance of developing a shared vision
Innovations that fail to take sufficient time in the stimulation phase risk plowing ahead of the interests and abilities of those who will eventually carry the change in the long term.

The vision of a school towards innovative approaches for teaching and learning processes can only be achieved if solutions are designed in a collaborative environment where all stakeholders actively participate. Stimulating the adoption of innovative ways to solve contemporary (yet often unexplored) emerging needs in schools is a key to success. The stimulus to adopt new or different strategies should follow a planned direction:

- Involve all stakeholders from the start, and acknowledge that the forms of involvement will evolve along with the project.
- Remember to include headmasters, students, teachers, administrative staff, parents and education authorities and policy framers.
- From the very start, consider how to use the following approaches: strengths/weaknesses/opportunities/threats (swot) analysis, needs analysis, solution generation, solution refinement, design and development, attending to factors enabling solutions, and evaluating results and impact even of initial pilot activities.

Innovative schools embrace the challenge to explore unknown and poorly studied new fields. Education and opportunities to learn are changing swiftly and new ways must be adopted in order to ensure schools continue to be key innovative players when preparing new generations for the world of work.

Community building is at the heart of stimulation

The involvement of the school and local community is very important in the stimulation phase. Stakeholders, as mentioned already, have to be part of the innovation from the very start. Promotion of brainstorming sessions can be very useful in fostering support from the community and implementation of good ideas. Holding discussion evenings, forum, social events, and Ôvillage hallÕ debates are excellent methods to initiate discussion of options.

Innovative solutions and best practice examples can be easily found and assessed nowadays with the support of platforms such as ODS. Community support for their adoption is critical in order to overcome any possible existing barriers Ð which are usually more related to worries and attitudes than they are to technologies themselves. It is of utmost importance that all participant stakeholders have autonomy and the means to research which are the best options and adopt/adapt them to the local identified needs. Potential solutions ideally meet stakeholder needs and also promote student centered methodologies, use freely available content, serve cross curricular connections, have some form of quality assessment, and can be tailored in order to meet specific local needs.

The design phase for stimulating innovative ICT uptake has to take into account needs but also psychological concerns. Most people experience hesitation when dealing with the unfamiliar. The stimulating phase enables stakeholders to gain familiarity with elements of the innovation that could cause concerns, such as tools, pedagogies, or collaborations. By involving stakeholders, familiarity and exposure can lead to trust, ownership and engagement in the whole process.

School participation in projects such as ODS opens up new possibilities for the innovative solution seekers. Support and examples from communities are a key to future implementations. This model and the ODS internet portal offer such ideas.

Learner benefit is the primary added value

We must bear in mind that we are preparing students for future careers that are changing and reshaping the world of work at the speed of light. Career and skill requirements are something that we cannot possibly imagine at this stage. The task of school leadership is to prepare students in the best manner possible to allow them to embrace unanticipated challenges and opportunities in a transformed world. They have to be able to work in inclusive environment, to be tolerant, to have problem solving skills, to be critical thinkers, to be creative and to embrace innovation. They will enter a world of work where they are learning and interacting all the time and will need to be connected anywhere at any time.

Learners only benefit if schools are supported

While the world is changing rapidly, most schools are not. Despite thriving opportunities and extraordinary potential, schools struggle. Teachers lack time to develop ICT skills, schools are poorly equipped, teaching is often limited by rigid and dense curricula, and exams fail to measure use of innovative approaches or acquired competences. Successful innovation attends realistically to the challenges in everyday schools.

While we seek for innovative projects, most important of all, we seek for innovative minds

In any learning environment, we need to identify innovative teachers, those eager to tackle new challenges and not afraid of emerging struggles and opportunities. It is important to provide freedom of choice, tools to adapt and localize their experience and opportunity to freely share their developments and creations.

> If you always do what you always did, you will always get what you always got.
>
> *- Albert Einstein*

The profile of such innovators is not rigid - it depends on specific needs and challenges of the target audience. Each school has its own characteristics, each classroom has its own personality and each student will have their own special need. Innovative teachers also have different levels of expertise and projects must seek out for those innovators, eager to adopt a new vision, and take on the mission of adapting existing successes to their own professional development.

Innovative design solutions are a free enterprise and the measures of success are defined for each case. The education revolution is upon us: MOOCs, OER, OCW are the new trends in education. Schools and local communities are adapting to this reality and restructuring accordingly. Pilot innovative teachers are thus key players in this process. Innovative projects encompass interdisciplinary approaches, contextualized teaching, student centered methodologies and involvement of school and local communities. Global citizenship awareness and entrepreneurship are the critical skills and must be in the backbone of any innovative solutions adopted by houses of education.

School innovators explore new ideas with support of others, sharing results, incorporating and remodeling existing knowledge and adapting/localizing and adopting best practices in the field of education.

It is a challenge to try to time-stamp an effective road map for stimulating schools on taking the road of elearning, integration of student centered methodologies in classroom daily practices and the graceful use of ICT as a supporting tool for knowledge delivery, exploration and construction. Many barriers have to be overcome starting with the psychological. It is necessary to ensure each interested party has a sense of ownership of the process. An example of a careful possible design might be by introducing the idea and brainstorming with participants in short workshops where the vision is presented, discussed and improved.

What might stimulation activities look like?
Three examples from the ODS experience

Many initiatives are producing good results on adoption of school elearning and community building. For example, existing ODS experiences have shown that creating thematic communities around specific elearning tools and resources is a very strong motivation factor. The effort promotes community building at a national level but also promotes local practitioner involvement. Schools have become associated in groups under the same school board of directors. Many of the teachers belonging to the same group don't know each other and never collaborated before.

The support of the community has proven key to ensuring sustainability. The Galileo Teacher Training Program is a good example where experts in astronomy train teachers on use of real research in the classroom. Trained teachers, after mastering the use of specific tools and resources, can then train other teachers in a very efficient and sustainable cascade effect. This includes a worldwide help desk that supports teachers 24 hours a day.

Active students

In Portugal, the theme selected to exploit the Open Discovery Space concept was the fight against light pollution. Light pollution is the direct or indirect introduction of artificial light into the environment. Light pollution competes with starlight in the night sky, interferes with astronomical observatories, disrupts ecosystems and has adverse health effects.

In the stimulating phase, a vision-building workshop was promoted around the topic and at a later stage teachers participated in a training workshop. A community was created in the ODS online portal where all materials were shared.

As an outcome of this activity, the initial workshop ideas evolved into several scenarios that were created and implemented in various schools in the region. One of the teachers invited another school to

collaborate in the project. As a result, students from the new school participated in the experience by creating their own ICT-based material to address the topic. The teacher from the second school presented the work of her students to the ODS international contest promoted by the Portuguese national coordination. Her student won the first prize with a movie asking the mayor of the municipality to change the illumination of the streets to a more user-friendly setting

The image here shows the student who won first prize, proudly receiving his certificate from the mayor. The chain of events that lead to his achievement was initiated by the initial activities during the stimulation phase.

Touch the night sky: Astronomy for visually imparied students

Context

In the framework of ODS pilot efforts, and in partnership with other projects (A Touch of the Universe by Astronomical Observatory of the University of Valencia), the project is envisioning a significant contribution towards the adoption of an inclusive approach where blind students work with their non-visually impaired peers and educators. In collaborative settings, they engage in the exploration of content knowledge and use of e-learning tools that can help understand topics that seem, at first, unreachable by students with visual impairment. In the framework of this project, a school in Moimenta da Beira (Portugal), organizer of one of the largest telescope gatherings in the country, promoted a special observing session for blind attendees.

Resources

The project uses materials that can be found in school environments and enrich the experience by the use of freely available ICT tools and an apparatus specially designed for students with special needs. For the observing session, it was necessary to use a thermal printer that reproduced the images that were being acquired by a regular telescope in real time, processed by an image software and printed in a special swelling paper and thermal printer.

Tools

Telescopes, computers, image processing tools, thermal printers.

Scaffolds

Participants where supported by the promoters of the event and the activity was embedded in a regular environment where usual night sky observing sessions take place.

Process

The site was specially chosen for the beauty of its night sky, where light pollution is not yet causing too much damage. Over 50 telescopes from all over the country were gathered at the event. A Òspecial telescopeÓ, devoted for this special public was assembled, connected to a computer and printing the tactile images acquired. Participants with visual impairment were then assisted by educators in order to fully understand the ÒobservedÓ object and thus having the same full experience that all others were having on site.

Impact

Alongside their non-visually impaired colleagues, they could experience on site and on Òreal timeÓ the astronomical images collected by the telescopes there present. In terms of innovative ways of reaching audiences that usually donÕt attend these events this activity has proven to be a success gathering visually impaired and sighted students in a fully inclusive experience in terms of physical, social and knowledge acquisitions.

Lessons learned

The main goal was fully and successfully achieved - to showcase the possibility to involve blind students in purely observational and sight based experiences, otherwise inaccessible to blind or visually impaired audiences. Promoting an environment of collaboration and exchange of knowledge between educators and among the students themselves, sustaining peer-to-peer exploration and support, all students explored the tactile images observed (whether by sight or touch).

Dark Skies Rangers: Building communities and creating awareness

Context

Policy towards school administration in Portugal has been changing drastically over the last few years. Schools in the same region are now aggregated in big groups with the school main headquarters being located in one of the schools, usually the most central one in terms of geographical importance. Most groups have now schools ranging from primary to secondary level. Teachers have now to teach in the various establishments of the group and facilities are now shared by a larger number of users. This has brought new challenges to school boards and now demands new dynamics in terms of a common vision, well-orchestrated mission, design and activity implementation. Many of the educators of the same group, even within the same subject area, donÕt know each other. In order to support the team building and community building in this new groups, ODS-Portugal engaged in supporting teachers in the mission of promoting interschool projects. The theme of choice was the fight against light pollution.

Resources

The project proposal uses existing light pollution audit tools, available at the ODS portal, planetary software and online tutorials for its use. Communities were created at the portal with members from different parts of the country.

Tools

Online communities, digital tools and resources for the implementation of the different projects. Social media for publicity of achievements and sharing experiences and results.

Scaffolds

Face-to-face and online training material made available to the participants.

Process

Pilot teachers received training on the use of the specific tools and resources and support to implement the project in their school settings. Teachers on the field trained their lower secondary students (7th to 9th grade) who acted as mentors to younger students. Pilot teachers involved and supported primary school teachers as well as involved colleagues working in science subject areas. The main outcome was the learning process for the older students involved and the entrepreneurship skills developed in the younger kids who have developed their own project towards innovative solutions for better illumination in their streets with efficient energy and proposals for new settings.

Impact

Teachers involved in the process, namely pilot and those working with them, were very enthusiastic about the results and the impact on their students that participated in the project. The local community (mostly parents) was involved in the process and was very pleased with the achievement of their children.

Lessons learned

This experience in Portugal set the tone for the next school year approach for ODS as a powerful tool to engage communities in collaborative work and the next step for these communities is to engage all the schools in the same group in further collaborative projects, exploring other field s of expertise supported by ODS and the existing tools. In one of the schools, the target audience was students from a specific group in a primary school. Most of the students in the class come from a gipsy community and their attitude towards science was not very positive. In this particular case, students of the 8th grade of a school in the same group were their tutors and with the support of the pilot teacher they brought the project to the children's school. As a result of this project all students (4th grade) that are now going to the school hosting ODS project pre-registered to be members of the science club and are now exhibiting great excitement towards science issues.

Promising practices in the stimulation phase

Each context offers its own opportunities and hosts unique constraints. While adjustments are required for all settings, the four practices described below have been tailored for use in multiple settings with both pleasant and productive outcomes.

Vision-building workshops

Several such events must take place in order to involve as many people as possible. Some initial participants will then participate in a pilot trial. The vision-building workshops are brainstorming sessions involving all the important stakeholders in the creative process.

Training workshops

Following the initial teaser, participants are invited to create their own learning scenarios, using OER and ICT for a particular topic they are interested in and/or to use already existing ones, already tested in other schools/classrooms. These sessions will promote a sense of support and community building will take place.

On site demos and awareness campaigns

Activities that involve the whole school and local community are promoted, though of course time intervals between all actions vary according to the objectives and concrete implementation phase of each project. In demos, students and teachers gain first-hand experiences with innovative tools. Also, school and local community is welcomed to get involved in the innovation process taking place at school.

Establish a recognition system

Endorsing the work implemented and the achieved results is advisable. The whole path should be carefully designed and participants can then have a sense of the overall mission they are committing to and can evaluate their own progress.

Stimulation

Technology-rich innovation *in schools*

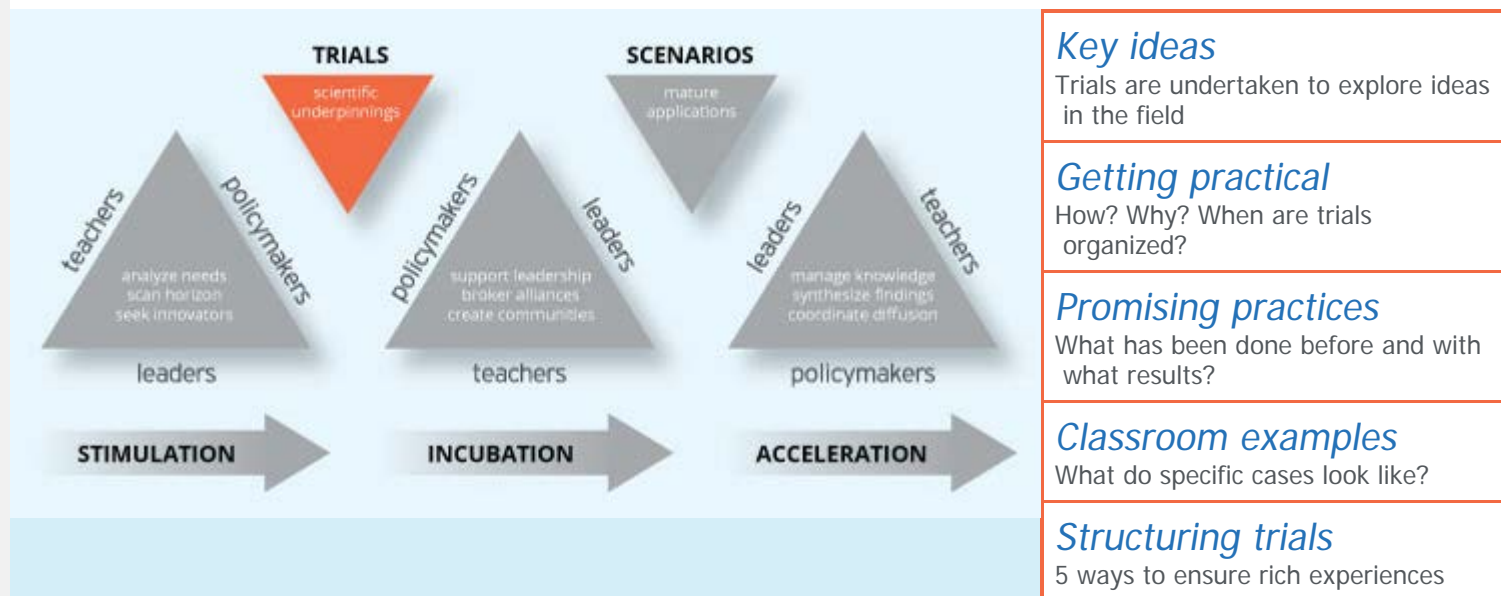a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

contents / trials

Trials

How are these new ideas related to our existing school plans? How can this be accomplished in our setting? Field trials give hands-on answers to questions posed by schools

Key ideas
Trials are undertaken to explore ideas in the field

Getting practical
How? Why? When are trials organized?

Promising practices
What has been done before and with what results?

Classroom examples
What do specific cases look like?

Structuring trials
5 ways to ensure rich experiences

Trials are undertaken early to exlore ideas in the field

Harness creativity
Field trials prompt innovators to creatively develop and try out new approaches to teaching, perspectives about learning, or resources.

Document events
Well-documented field trials have the power to share across time and settings, by recreating essential elements of the experiences and making them accessible to others.

Use science
Well-conceived trials are not only the products of inspiration or creative energy, but they are also underpinned by scientific research.

Popular or practical?
Trials do not have to include the use of popular, high-end materials or techniques Ð readily available tools are often easier for teachers to later integrate into their own environments.

Learning first, technology second
Educators care more about the benefits for their students than about the tools used Ð field trials offer a chance to experience new learning consequences first hand.

Trials are critical to piloting ideas, testing assumptions and exploring how users respond to initial changed and resources (human and material).

Field trials offer the opportunity for supporting and studying localized adaptation and commensurate results.

Field trials themselves can even be perceived as mini-innovations within a broader change agenda. As such, they provide interesting cases of creative adaptations and/or development of learning ecosystems.

The primary function of trials is to serve the development of the innovation and resources used to bring the change to life. The experiences of trials provide realistic inputs for subsequent development and the establishment of scenarios of use.

Trials not only help understand core change components. They also prompt linguistic and/or cultural considerations. Learning how to accommodate and respect the different views among geographical regions or cultural groups can also be part of the trial process.

Getting practical
What do trials entail? How are they organized? What are important features?

Trial events are organised to work out practical implementations of different educational scenarios in real learning situations. Often, trials are built around some learning event, which supports everyday learning in the classroom. As innovation champions speak about opening learning and widening borders of classrooms, collaborative learning events between different classrooms and regions and countries are encouraged.

Trials may be viewed as a set of experiments and observations undertaken to decide how and whether new learning methodologies and educational scenarios can be used regularly in everyday learning process at the school. During field trials schools get hands-on experience. Trials are excellent opportunities for adapting new learning solutions to school needs, especially when they feature commentary or feedback for the participating groups.

Field trials are performed in schools often during normal learning hours, but they still have an informal flavour in many cases. During field trials, teachers and pupils tend to be more free to experiment and try out different solutions. This enables the opportunity to see how new approaches or tools might better suit existing curricula. During field trials, schools may create opportunities to explain to parents and the local community how they are using new learning methodologies to help children get better education. During field trials, schools also gain valuable information for budgeting and investments.

Promising practices

This section offers sample field trial practices undertaken in ODS to facilitate elearning resources adoption in education. Each introduced participants to key concepts and uses of digital resources, while also engaging them in practical activities.

Summer schools

The first ODS Summer school took place in Crete. The Summer School activities were based on the exploitation and enrichment of two existing, open access repositories: Natural Europe and Discover the Cosmos. 81 European educators participated as trainees, attending 15 hours of lectures and demonstrations as well as 10 hours of hands-on workshops. Activities addressed three key-areas: inquiry-based science education; high energy physics and astronomy; and connections between formal and informal learning through museum visits. http://www.education.natural-europe.eu/natural_europe http://portal.discoverthecosmos.eu repositories

Webinars

Webinars are interactive conferences, online-workshops with a certain target group and goals. They give for schools new information, ideas and contacts. For example, ODS hosted a webinar entitled: How to build a strong Action Plan/European Development Plan for your school according to the Erasmus+ Framework. http://www.galileoteachers.org/live-ods-webinar/

Training academies

The ultimate goal of the ODS training academies is to nurture innovation leaders who will promote the uptake of eContent in schools. It delivers training programmes and online support specially targeted for a set of stakeholders key to the uptake of eContent. Four training activity themes are shown here. Each on addresses a different group of stakeholders.

Teacher training and ICT support academy

This programme assists teachers in acquiring and reinforcing the skills and knowledge they need to exploit the rich potential of eContent. They learn how to incorporate eLearning in their courses, to reuse and create eContent. It trains ICT support staff and administrators in schools to facilitate teachers and students working with eContent and to implement local eContent repositories, linking them to ODS.

Technology developer academy

This programme provides theoretical and practical training (e.g. in coding and interoperability) to developers in content use (packaging formats, access control, and licensing) and content discovery (metadata, vocabularies, protocols, and registries). Developers create learning resources and incorporate them in ODS immediately.

Content provider academy

This training offers guidelines and support to content providers to adopt learning technology specifications, standards, and tools in view of sharing their content with the eLearning community in general, and through ODS in particular.

eParents Academy

This is designed to inspire parents to become promoters in the uptake, sharing, and reuse of digital learning resources in schools. It also gives insight into eLearning and working with eContent that can support childrenÕs learning.

Contests & competitions

Different kind of contests can be organized online or face-to-face. Several kinds of competitions have shown to be motivating for schools and interesting for teachers and students. Here, two examples from the ODS project work are given

ODS contest: "Let's move teaching process to the limelight!"

The submission period lasted for two months. During this time, teachers from all over Europe were encouraged to create learning scenarios (reusable ideas, similar to lesson plans). This contest was exciting because it was open to teachers from all over Europe. Eligibility was based on three simple conditions, each of which contributed to the advancement of the ODS mission:

- the participating teacher had to be a registered ODS teacher
- the teacherÕs school that had to be a registered ODS school

- the learning scenario had to be created with ODS authoring tools
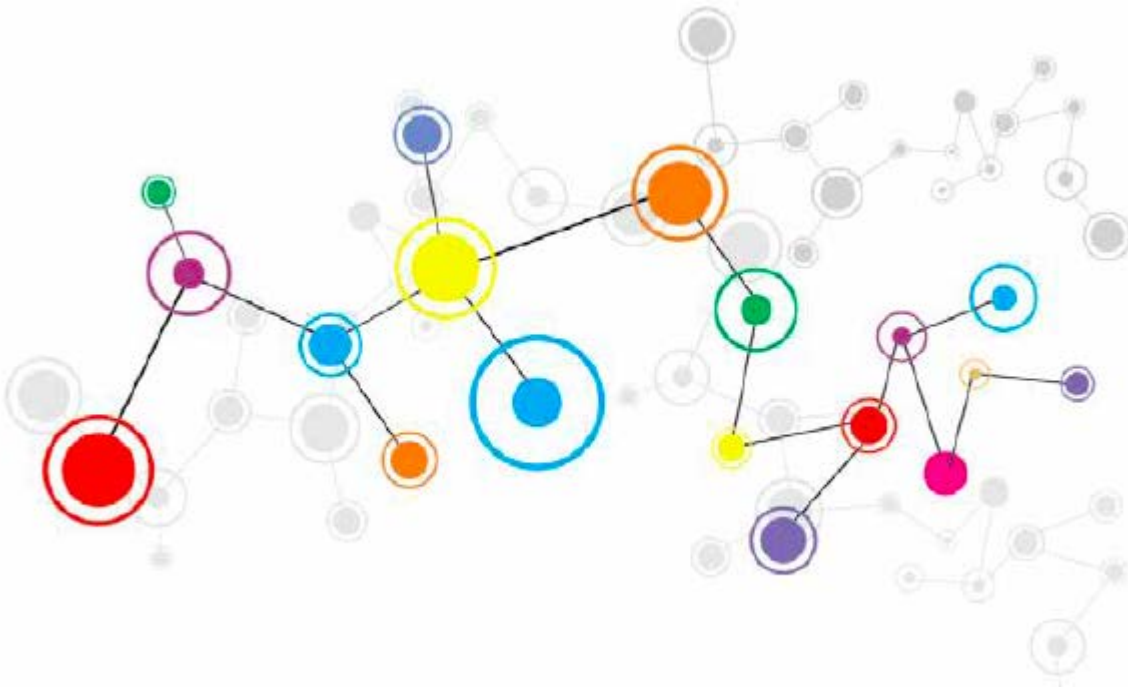
Multilingual international online contest

This competition featured and required automatic translation. The contest aimed to promote the use of automatic translation in regular schools. The contest was linked to the Organic.Lingua project, but was also connected with ODS. It Organic.Lingua project results. All together, 1846 participants from Estonia, Latvia and Crimea participated. Planning of the contest started months ahead. This included selecting student ages, identifying topics of interest to schools, and exploring tools and innovative solutions available to meet schools needs. It also featured discussions among teachers from different countries to select questions that should be included. Various schools and educational stakeholders were also involved. A few months later, the contest was ready to be translated and put online for all partners countries. After the contest was over, a finalizing phase took place. Teachers presented their experiences at a workshop in addition to their approaches to dissemination, promotion and feedback.

Informal teacher networking events

Informal mechanisms also foster teacher networking. For example, teachers can use eTwinning or participate in the Erasmus+ programme. Additional online collabrative learning events are being launched each day by various communities, universities, and development centres.

http://opendiscoveryspace.eu/eTwinning http://www.etwinning.net/

Masterclasses

The field trial can also take the form of a masterclass. This may, but does not necessarily, take place with support of local research facilities. Masterclasses are characterized by talks, given by a researcher or scientist, to teachers and students on specific topics. Following the presentation, debate usually takes place. Thereafter, the program follows with a hands-on session where students are introduced to a specific ICT hands-on tool with the purpose of exploring the subject in greater depth. The day may end with an event for the whole school and local community, for example, in the form of a science cafŽ.

This type of event can varied forms of impact. Here, three are mentioned in particular. First, it sparkles student interest for science. Second, it engages them in real research experiences via real, remote or virtual labs. And third, it promotes awareness among the overall community about the power of such approaches to influence the learning pathways of students.

Classroom examples
Masterclass example: The sky is my lab

Beginning

The day starts with a talk about modern trends in Astronomy. Researchers discuss recent discoveries and challenges. They are excited and detailed because they are speaking about their own fields of investigation. A hands-on session follows where students are introduced to specialized software. Stellarium, a powerful planetaria application, allows students to explore the night and day skies. This helps them to understand the most important phenomena related to celestial mechanics. This kind of

e-Confident

A more advanced session can take the work a step further, by engaging students in real research experiences. For example, students can participate in the regular campaigns for citizen science, promoted by robotic telescopes. In these events, citizens (including students) are invited to participate in observing the skies and following analysis of the results. Students

masterclass was viewed as very powerful to teach (in this case): moon phases, eclipses, seasons, and planetary motion.

can, for instance, begin to understand the life cycle of stars while observing different stages predicted for such phenomena.

Providing onlines tests for basic schools

Context

Online-tests are offered for teachers in Estonia by the Miksike Learning Environment. Miksike is a private institution in Estonia, which offers electronic learning content and services built on electronic content. Online-tests are part of the formal learning in Estonian schools, which are created to measure how well pupils have learned (skills and knowledge) relating to certain topics. Tests are done according to the curriculum and schools are using them as a part of their lessons. Grades are given according to the curriculum. Initial grading is done by Miksike's teacher assistant Ð an educational professional working on MiksikeÕs behalf who is supporting teachers in the classroom. A classroom teacher can change the grade, if she considers it necessary. In the 2013/2014 academic year much online testing took place: http://miksike.ee 445. There were many different online-tests and 76500 graded tests. In total, 428 teachers from 127 (nearly 1/3) Estonian schools benefited from this online testing service.

Resources

Miksike's teacher assistant coordinates the creation of questions and exercises in online tests. MiksikeÕs teacher assistant gets feedback from teachers communities and takes into consideration their wishes and suggestions. Questions are taken from electronic collections, which are also available freely though the ODS portal. When necessary, new questions are formulated and illustrations are obtained though images Miksike has the right to publish, open source libraries, commercial image services such as clipart.com.

Tools

Miksike's own e-learning platform is used for online tests, which was initially created in the Frames of Socrates/Minerva project. It is a platform for teachers and learners. In Estonia the addresses are: http://miksike.ee (for Estonian schools) and http://miksike.net (for Estonian Russian schools). The platform has different rights for different users (teachers have special rights and students have limited rights) to be able to work so that teachers see more information than students do.

Process

In the portal on the Minu Miksike (My Miksike) page there is an area called Online-tests. Taking a test is an easy process for the teacher and student. Teachers can easily connect tests with certain classes and make the tests public, the time they are needed. Pupils do not see the tests before the time assigned by the teacher. Results contains the list of tests taken, points for every test, and the grade (mark). If a test has been graded, users can view it once again; see mistakes and points earned for each question. Teachers can also see how successful his or her students were in tests, also teachers can see the student mistakes.

Impact

Miksike has offered online tests over 5 years and now, it can be considered more a mainstream service than an innovation. There are several factors, which keep schools using it. First, it saves teachers time. Now teacher evening hours can be spent confirming, not initially correcting, test results; this leavesmore time for organizing and planning creative things in the classroom. Second (and importance of this aspect is growing), online tests facilitate cooperation between schools, classes and teachers. Teachers like to discuss with their collegues how to measure learning and also compare results with other classes.

Lessons learned

Online testing services are suitable for eMature and eConfident schools as this requires good organizational skills on schools ICT personnel and teachers (enable whole class taking online tests same time etc.) and also some explanation needs to be done among parents and community as sometimes people outside of schools prefer to see classic paper tests when we speak about measuring pupils skills and knowledge. Teachers have to keep their eyes on security issues. It has sometimes happened that teachers forget their Ôteachers accountÕ password openly available and also primary grades are nowadays informed enough how to ÔbenefitÕ from this and cheating is possible.

Combining competition and learning

Context

V›istumiks is a set of learning activities offered for schools in Estonia by the Miksike Learning Environment. V›istumiks combines formal learning with elements of informal learning by using a contest/competition concept. Official grades are normally not given as a result of these events. V›istumiks helps learners to learn and repeat concepts, rules etc, which seem to be boring and difficult to remember. So this is just a small additional measure to help learners achieve learning goals set by the national curriculum. Learners learn in ways that they do not notice, because they are busy gaining as scores and points. V›istumiks is organized and coordinated by Miksike's teacher assistants Ð educational professionals working on MiksikeÕs behalf to support teachers in the classroom. V›istumiks is built up according to the teachers/schools needs and is community-centered. So, Miksike's teacher assistant`s task is to summarize and harmonize interests coming from schools. V›istumiks services started in the 2012/2013 study year and they continued 2013/2014. During 2013/2014, 20 V›istumiks learning events/contests were organized for the 1st - 9th grade students. 200-300 students normally participate in one V›istumiks event/contest.

Resources

Miksike's teacher assistant coordinates the creation of contests necessary for V›istumiks. Already existing exercises (over 8000 exercises) are used and if necessary, existing exercises are ÔclonedÕ and modified. Miksike's teacher assistant gets feedback from teacher communities and takes into consideration their wishes and suggestions. Contest exercises are often attended by schools teachers and they follow the national curriculum. Miksike's teacher assistant sets exercises up for the contest.

Tools

Miksike's own e-learning platforms subplatform is used for V›istumiks and it is available currently for schools in Estonia working in Estonian language http://miksike.ee and in Russian http://miksike.net. The platform has different rights for different users (teachers have teachers rights and students have usual rights) to be able to work so that teachers see more information than students do.

Process

In the portal on the Minu Miksike (My Miksike) page there is an area called āV›istumiksÒ. V›istumiks contains of 3 phases. First 2 phases are contests, which are built on interactive exercises. Contests are published for a certain time (1-3 weeks). Students are supposed to answer questions correctly, and as quickly as possible. Quicker responses earn more points. Incorrect answers of course deduct points. For one attempt, students are given a certain amount of time (normally 4 minutes, but this can vary according to organizers plans). After time is up, results are saved in a results table. Students can make unlimited attempts during the period contest is open. It is also allowed to participate after school hours. Result tables contain only the highest scores students have made. Result tables are visible to all contestants/learners. Results of these 2 phases are summarized. During the 3rd phase, students have to take a quiz, which is built on questions/themes of the interactive exercises. Results are summarized and winners announced, prizes distributed for individual students and also for teams/classes.

Impact

V›istumiks is a comparatively new service in Miksike (started 2012/2013 study year) but it is gaining popularity. Combining competition and learning is a powerful tool and additionally motivates learners to learn concepts, which are normally considered as ÔboringÕ ones. V›istumiks is suitable for eMature and eConfident schools and also to schools with less advanced eLearning practices. V›istumiks service is not explicitly aligned with the national curriculum.

Lessons learned

We need to find a good balance between learning and competition and keep in mind that the V›istumiks focus is on learning and not on figuring out who is the winner. Some pupils/teachers/schools get carried away so much by competition that the actualy learning is left in the background. Miksike strives to let much more contestants shine then just the ones gaining first places.

How to structure trials?

5 different ways to ensure both rich experiences for participants and collection of relevant insights to inform the innovation endeavor

Summer schools

Lectures and demonstrations and hands-on workshops combine to address three key-areas of substantive interest to teachers, while relevant outings and a pleasant atmosphere motivates participants.

Webinars

Like nteractive conferences, webinars are online workshops designed to speak to a certain target group and meat specific goals. They give for schools new information, ideas and contacts.

Training academies

These events nurture innovation leaders who will promote the uptake of change in schools. These deliver training programmes and online support specially target different sets of stakeholders.

Contests

Competitions have shown to be motivating for schools and interesting for teachers and students. An international dimension can also be stimulating.

Masterclasses
Specialist talks on specific topics are followed by active debate. This sets the stage for a hands-on session that engages participants directly with the issue at hand.
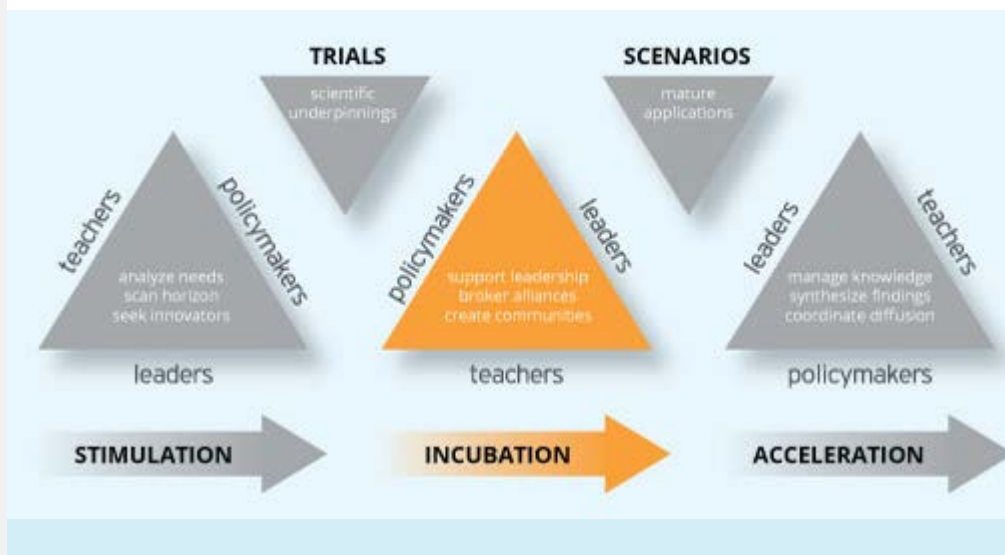
Technology-rich innovation in schools

powered by **OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Incubation

Key ideas
How to obtain steady, supportive change over time?

Requirements
What supports, interventions and innovative applications develop self-generative change?

Examples
Gadget supported learning? Creative learning processes?

Tips
Which incubation practices have proven useful before?

Incubation means a steady and supportive development of new learning, techniques or methodologies so that sustained and independent development occurs.

Sustainable innovation takes time
There are different aspects that have to be taking into account when changing teaching: take your time to reflect in the incubation phase.

Be creative and active!
Educational experiences that explicitly have an assessment-focused and creative activity are not only more engaging, but they influence and incubate further educational practices.

Innovation needs support
The ODS portal does not only provide resources, but also communities that will interact to support teachers willing to innovate.

Innovation starts locally
Preliminary workshops showed innovative teacher the advantages of change. Now it is the time to think how to start in your local environment.

Digital resources are versatile
Open Educational Resources can be adapted to your needs and (usually) run in computers at school or home.

Incubation requires a range of supports, interventions and innovative applications to develop self-sustaining self-generative change

After the phase of stimulating the teaching-learning process, and the different trials to explore Resource Based Learning (RBL), teachers need time to re-visit their own perspectives and experiment in their own classrooms: Incubation is that phase. RBL is a powerful and versatile pedagogical approach that needs time to be successfully applied in classrooms.

Innovative educational practices are more fruitful when Òfocused aroundÓ digital resources (e.g. slides, social networks, mobile devices, robots). It is important to take into account the importance of considering the total cost of operation (TCO) of the experiences. Digital gadgets are usually made up hardware (the ÒobjectÓ) and software (the programs executed on the hardware, including the operating system and other dependencies needed for it to operate). The use of open-source software could significantly reduce the cost of the system. First, obviously, in license expenditures, but also in hardware amortization (as usually open source software need less hardware resources to run and does not have fall into planned obsolescence practices).

Digital artefacts are key in Incubation phase, to support relationships and alliances between schools, help localization of the success experiences, and understanding how structures, hierarchies, system operational modes and learning cultures will adopt the change.

Examples
Gadget-Supported Learning
Handing useful gadgets (in general sense: hardware gadgets or digital Ðvirtual- ones) out to teachers and students to support well-designed educational practices can foster their adoption, use and spread over other colleagues, so facilitating the incubation of educational innovations and communities of practice. Gadgets must not come alone in the learning experience, but they should be accompanied by RBL approaches with the design of the experience that describes the real focus of learning (gadgets might be only a pretext to engage in).

An example of gadgetsÕ involvement is a workshop on Scratch programming carried out as a practice and reflection workshop for teachers. The first part of the workshop utilized a visual programming environment installed on desktop computers, and the second part used Lego Education WeDo robots to teach the same concepts. The second part resulted more engaging for teachers than the first one. Nevertheless, the first one is more cost efficient, just needing a computer and simulation software, and not specific gadgets. Later, teachers can see programs to finance the purchase of the robots. Then, check a large Scratch repository of resources that are promising as long as they are readily available in RBL portals. The social and pedagogical aspects of the portal ease sharing ideas on the key aspects for successful adoption in the classroom. But, the teacher has to reflect on the organizational change and learning cycles for implementation. Finally the teacher should contribute back to his/her community (and any other interested audience) thought the portal, resulting in new collaboration and networking.

Above: During the ODS incubation phase in Spain, Scratch proved to be a nice tool for programming simple programs for a computer or Lego robots. It is also suitable to a wide range of ages.

Creative Learning Practices
Educational experiences must foster to search, reflect upon, and create things that can be eventually delivered out of the educational environment, exchanged and assessed with/by others. The outcome of previous educational experiences can incubate future ones derived from the originals. New techniques like gamification are welcome.

An example of engagement by means of assessment-focused, creative activities is the Erathostenes experiment. First, it relied on a community of schools all over the world, each of them had to find a school to match up (this is, on the same longitude). Then, the Equinox day, students annotated their measurements in a shared document. In this experiment they had autonomy and freedom, but also guidance and supervision from their teachers. After the experiment took place, schools and school members have the chance to compare and assess othersÕ measurements, so fostering collaboration and incubating future practices.

It is important to highlight the importance of a web portal in the success of technology-rich incubation. It supports the leadership of change, easing connection of the participants, engagement, visibility and supporting broker relationships and alliances. Additionally, other digital artifacts (Facebook page, Twitter feeds, etc) can help highlight the good practices more properly.

RESOURCES	COMMUNITIES	SCHOOLS	TEACHERS	ODS ACADEMIES
EXPLORE OUR TO USE IN THE CLASSROOM AND PLAN YOUR LESSONS	SHARE EDUCATIONAL CONTENT THROUGH COMMUNITIES OR START YOUR OWN	NAVIGATE THROUGH THE SCHOOLS OF ODS NETWORK	BEING CONNECTED WITH OUR TEACHERS FROM ALL OVER THE EUROPE	FOLLOW THE ODS ACADEMIES TO IMPROVE YOUR PROFESSIONAL EDUCATION
813764 RESOURCES	627 COMMUNITIES	3170 SCHOOLS	8204 TEACHERS	163 ACTIVITIES

NEWS >

Innovative science...
Thursday, April 16, 2015
Conference on innovation and dissemination in math /...

ITK ja MAOL 15-18.4.2015
Tuesday, April 07, 2015
Interaktiivinen tekniikka koulutuksessa, ITK 25-...

Η Φυσική των Ολυμπιακών...
Tuesday, April 07, 2015
Η Ελληνογερμανική Αγωγή και το Γραφείο Σχολικών Συμβούλων...

COMMUNITY EVENTS >

Game Design - CS First
Tuesday, April 21, 2015
Activitatea 4 din club

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

ODS THEMATIC PORTALS

Science & Technology

World of Enterpreneuship

Geospatial Thinking

Above: ODS webportal http://www.opendiscoveryspace.eu

Incubation tips

Social platforms can incubate educational innovations that teachers and schools construct. But incubation requires support: a sense of community; connections to the environment; feasible and sustainable use of resources; and creativity.

Create your community of practice
ODS portal is community oriented, so it is the right place to find other teacher wish common interests and create your community to support you all and get visibility.

Listen to your environment
Experiences shown in workshops proved to be successful in their environment. Every country, every school and every group of student have their own dynamics, interest and experiences have to be updated accordingly before adoption.

Infrastructure and cost
When using digital resource user must set a proper digital environment and check sustainability. Not every hardware (computer, table, smartphone) is suitable for any resource. This could increase the cost (if affordable) of the experience.

Be creative
Open Educational (digital) resources can be improved over and over again. So do not shy to be creative and try new adaption of both the resources and practices.

Contribute back to your community
Your experiences (whether they were successful or not) are interesting to other members of

Tell me and I forget, teach me and I may remember, involve me and I learn.

-Benjamin Franklin

your community. Please, take your time to reflect on the key aspects of your experience and contribute back to your colleagues.
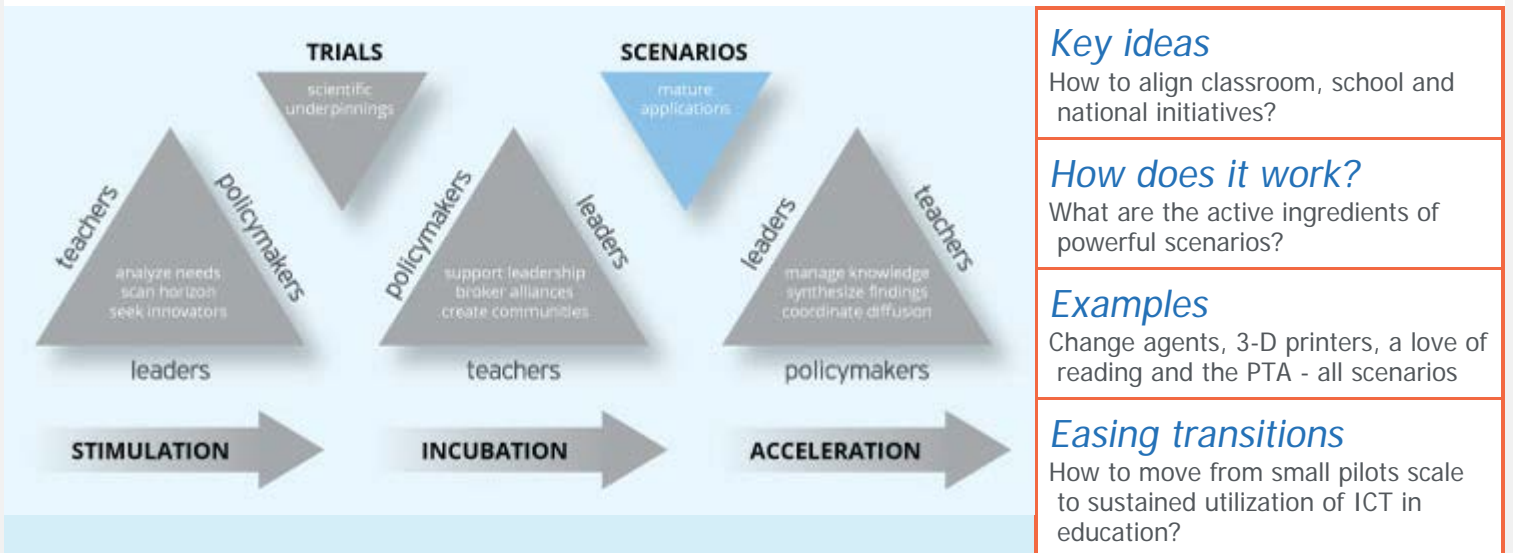
Technology-rich innovation *in schools*

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Scenarios

Key ideas
How to align classroom, school and national initiatives?

How does it work?
What are the active ingredients of powerful scenarios?

Examples
Change agents, 3-D printers, a love of reading and the PTA - all scenarios

Easing transitions
How to move from small pilots scale to sustained utilization of ICT in education?

Scenarios exemplify, in scalable ways, how the intended outcomes can be achieved. Key elements for the scenarios are the contexts, the resources, the tools, the scaffolds, the impacts on school innovation and the lessons learned.

The triad: scenario in action, resource-based learning and school innovation
What is the interplay among them and how can research inform our efforts?

Classroom-wide scenario in action
The ÒCreating a model of Chirokitia Neolithic settlement using a 3D printerÓ scenario provides a roadmap from the creation of Communities of Practice to the exploitation of knowledge management techniques within participant teachers.

School-wide scenario in action
The scenario of a disadvantaged school becoming an innovation centre provides a roadmap from the invocation of the power to innovate to the acceleration of diffusion with national agencies.

National-wide scenario in action
A scenario in action related to the parentsÕ active involvement provides a roadmap from the support of the leadership of change to synthesis of evaluation and research.

How does it work?

What is it that will facilitate a large number of teachers, schools and learning communities to adopt resource-based learning in their everyday practices? What can we do about that?

Scenarios in action transition innovation work from the Incubation to the Acceleration phase. Scenarios are propelled by the change-agent teachers and supported by external agents (e.g. national coordinators). Both the people, and the innovation itself influence the ways in which scenarios unfold. In his classic work on diffusion, Rogers identified characteristics of innovations that determine their uptake and use. These characteristics are woven throughout an example of a change-agent scenario:

- Relative advantage: WhatÕs the added value?
- Compatibility: Will this change require other changes?
- Complexity: How detailed is the change?
- Trialability: Can I experiment with it before committing?
- Observability: Can I see it in action?

Real life examples
Change agent scenario

Mr. Alexandros Kofteros, Cyprus teacher in a disadvantaged school, managed to attract five other teachers from the same school to the ODS organisation and implementation process during scenarios in action. The participant teachers put a lot of hard work, while exemplifying many evidences of engagement and commitment. Finally, they decided to present their work to the national contest for the best ICT-infused scenario, organised by the Pedagogical Institute of Cyprus. During this process, the presentation skills of the participant teachers were greatly enhanced. The result was that two out of the five scenarios, presented by the participant teachers from the school of Mr. Kofteros, were rewarded in the final contest with prizes for innovation (Creating a model of Chirokitia Neolithic settlement using a 3D printer) and good practice (Learning about myself and others).

The hidden curriculum behind this scenario in action is related to how a disadvantaged school can become a school innovation center. Also, it exemplifies the importance of triggering the intrinsic motivation of the participant teachers in tandem with the courage and determination of the change-agent teacher. Another lesson learnt is related to the crucial role of the change agent teachers, provided that they have realised their roles, as well as, to how satisfying are reward systems and recognition for the hard working teachers (observability).

The change agent teacher of the disadvantaged school often quotes John Woods by saying: ÒThe player who makes the team great is more valuable than a great player. Losing yourself in the group, for the good of the group, thatÕs teamwork!Ó

Another enabler is the close relationship of the learning topics with topics of the curriculum: the participant teachers were challenged to use resources and tools in order to serve their learning goals, while gaining important ICT and presentation skills throughout this process (trialability). Taking into account their relationship with RBL and school innovation, scenarios in action might best be described using the structure of Hill & Hannafin (2001).

- Context, which includes a set of similar settings or learning situations in which the scenario in action can be applied successfully (like: combining formal with informal learning, enhance teacher motivation, foster self-regulating learning, use the affordances of learning analytics, provide community support mechanisms etc).
- Resources that are Òmedia, people, places or ideas that have the potential to support learningÓ
- Tools that Òaid individuals to engage and manipulate resources and ideasÓ
- Scaffolds through which Òindividuals are supported in identifying, interpreting, or otherwise using resourcesÓ
- Process description (data-->information--> knowledge-->meaning): how was this process established?
- Impact with regards to school innovation: how was school innovation fostered and/or sustained?
- Lessons learned (trialability): how can this scenario in action be generalized and transferred to other similar settings or learning situations? Which of the main actions included in the incubating phase trigger outcomes of the accelerating phase? And which outcomes are those?

Creating a model of Chirokitia Neolithic settlement using a 3D printer

Context
Based on an initiative to develop 3D printing, schools formed collaborations and worked in developing original content. Eventually, 3D models of the ancient Chirokitia settlement were created. Students from four different grades (aged 9-12 years) and educators that teach three different knowledge domains (history, technology and maths) participated. Participants engaged in a cross-disciplinary project with various forms of learning and multiple sources of information.

Resources
3D printing is an innovative teaching and learning practice. The ODS 3D printing @ Schools Community focuses on discussing and organising 3D printing actions, in order to address learning and teaching needs with poweful digital and physical representations while reusing existing infrastructure in a dynamic pedagogical context. Aim of this community is to raise teachers awareness on 3D printing, organise training events on design, use and deployment of design software and 3D printing infrastructures in schools and elsewhere, initiate cross discipline, augmented reality driven, projects between schools and other institutions using, mainly, 3D design and printing activities (relative advantage).

Tools
M obile devices, an easy-to-use 3D CAD tool for modelling 3D designs, history educational software and 3D printer.

Scaffolds
Students were supported by their educators (through dialogue and especially designed worksheets). The teachers were supported by the change-agent teacher (reduced complexity) and also they helped each other (reduced complexity, observability), since the project was a cross-disciplinary one.

Process description
An educational visit to the settlement in the context of the history course where data about the settlement were gathered (mobile learning, evidence-based learning); creation of a digital replication of the monument by modelling a 3D representation through a cross-disciplinary approach that combined mathematics (volume and area of 3D shapes, ratio and analogies) and technology education (3D modelling and 3D printing).

Impact
Regarding to school innovation, this scenario embraces project-based learning and mobile learning in conjunction with evidence-based learning (students are learning outdoors using mobile devices to collect evidences) while bridging informal with formal learning. Also, it embraces all kinds of collaboration (teacher-teacher, student-student and student-teacher). Finally, it has provided insights to the participant teachers about the affordances of mobile learning (Relative advantage). By the end of the project the participants had a holistic idea about life in the ancient Chirokitia Neolithic settlement.

Lessons learnt
RBL as a means of providing a) a protective environment to enable the collaboration and the exchange of knowledge between colleagues and b) an intriguing learning environment with lots of cognitive and social stimuli to enable peer learning between students. Also, unintended learning on behalf of the participant teachers in their effort to design an ICT-infused learning ÒecosystemÓ that would best serve the learning goals and the studentsÕ needs.

Read more
http://portal.opendiscoveryspace.eu/blog/alexandroskofteros/20130603-433
http://portal.opendiscoveryspace.eu/community/3d-printing-schools-community-270
https://tinkercad.com/

Love of reading: Learning about myself and others

Context

A common project between 4 schools (1 in Cyprus and 3 in Greece) based on the book ÒLit Book of the Great Psychological OppositesÓ (Oscar Brenifier). Schools came together through their participation in the ODS project. Even though material was developed (and shared) by the participating teachers, additional digital resources were used, saving time and effort for all involved in the project (relative advantage).

Resources

The idea was to change the attitudes of the students towards reading books - instill to them the love of reading- while they learn about themselves and others. Towards this end, a social constructivist approach was followed and an online community of interest was created (compatibility). The book ÒLit Book of the Great Psychological OppositesÓ was used as the basis for the creation of the digital resources, the forum was used to enable asynchronous communication, the webconferencing system and the chat were used for synchronous sessions, a digital glossary was shared among participants, online quizzes were generated for assessment purposes and, finally, a range of open-ended activities were created to serve the learning goals.

Tools

The open-source web conferencing system ÒBig Blue ButtonÓ a customised version of the ÒMoodleÓ open source Learning Management System,) other elearning services, like linoit, a free sticky and canvas service, and a projector

Scaffolds

ÒBookieÓ a pedagogical agent, integrated in the moodle e-course, designed by the participant teachers; its aim was to help students (conceptual and procedural scaffolds) while they were coping with the respective learning tasks and to foster self-regulating learning. Also, teachers literally undertook the role of the avatar ÒBookieÓ occasionally and facilitated the synchronous discussions in the chat. As already mentioned, the change agent teacher provided continuous support to the participant teachers throughout the scenario including their presentation in the contest. The change-agent teacher managed to reduce the complexity of the whole endeavour.

Process description

The students read the book, gained information about the 10 pairs of opposites unravelled in the book while wrapping their minds around abstract notions through the different types of activities (see section resources) and exercising their critical judgment.

Impact

The use of web 2.0 tools to foster an online community support mechanisms among participants (relative advantage). This scenario in action has:

- Bridged the gap between formal and informal learning (game-based activities were incorporated: hangman, crossword, wordsearch puzzle)
- Fostered collaborative learning and work within groups of students and teachers and across different schools,
- Motivated students to produce written word (through forum and chat), and
- Enhanced teachersÕ skills and motivation. In particular, pupils were highly motivated by thought-provoking collaborative activities: they could present their ideas, share the results of their assignments and participate in discussions in order to extend their conclusions.

Lessons learned
A significant enabler was collaboration across schools from different cultures and change management experiences because they facilitated lateral learning (Hargreaves, 2003) between schools. This new paradigm of social learning created new forms of interaction. One of the major features included in the transformed education system, whose contours are coming into view is the presence of Òrich, extended models of school organisation using networks and highly varied forms of learning to engage directly with wider communities and jointly produce the wider conditions under which successful educational attainment and learning take placeÓ (Hargreaves, 2003). This scenario in action is the manifestation of this feature.

Read more
http://meetings.ellak.gr/bigbluebutton/
http://mathisis.org/
http://en.linoit.com/

ParentsÕ engagement & involvement: Meeting Parent Teacher Association (PTA)
Context
Parents are always seeking ways to boost their childrenÕs interest in learning, however they donÕt always possess the knowledge to identify which content is suitable for them. During the school year, teachers might be able to point to certain content, but during school holidays a teacher is not always (physically) available. Various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families. Recognising the potential of parent inclusion in the development and use of ODS, a number of presentations took place in Cyprus with representatives of the Parent Teacher Association (PTA) Union, representing all PTAs in the country. Great interest was shown on the potential of the platform and its possible uses, and was agreed that prior to the completion of the project, during the next stage of implementation, a Cyprus PTA community will be developed in order to disseminate results to schools in Cyprus and their respective PTAs.

Resources
Open Discovery Space can be used to offer parents a viable, free and open solution for collaborating with teachers, not only from their school but from other schools as well, to discuss issues of interest with parents from other schools and other countries, and to easily locate and use educational content that might be suitable for their children. ODS can offer access to online quality content, access to discussion forums on topics of interest, communities of parents with similar anxieties and interests, parent academies with online events and seminars. Additionally, ODS can offer parents webinars that will help them improve their skills in helping their children, while giving them an active voice in the ongoing development of the platform and methodologies, through an active participation through feedback. As such, it is essential that parent teacher associations both on local levels (school) as well as national levels, are given adequate information on what ODS is and what are the benefits of its implementation for students and families, so that they can assume a more active role.

Tools
The ODS Community portal provides Open Educational Resources and communication tools to build online communities (forum, blogs, social bookmarking etc). Google hangout is an open and free digital environment that is being used to host webinars (web seminars).

Scaffolds
ODS is an educational as well as a social platform. It provides a central point where many opportunities for communication/collaboration are announced: online events, contests, schools, webinars, seminars, workshops, good practices, e-noticeboards etc. It also provides educational digital resources and pedagogical scenarios, accompanied by quality indicators either in the form of validation checks by official educational institutes or in the form of rankings by peers, or both.

Impact
School family collaboration has been found to be beneficial in improving learning outcomes and also in reducing other problems (i.e. problematic student behaviour). Online systems exist and are used in many countries, especially in Europe, the United States of America, Australia and Canada, which support family-school collaboration and communication. Research, especially in the area of Computer Mediated Communication, has shown that various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families

Lessons learned
The practices mentioned above aim at opening the school towards parents through a Parent Teacher Association. Broker alliances with PTAs may make parents feel confident in offering ideas and opportunities for community building, as well as, encouraging them to play a bigger part in the school life, as a whole.

http://www.google.com/+/learnmore/hangouts/

Eratosthenes Experiment
Context
The Eratosthenes Experiment is based on the very fundamental idea Eratosthenes had in order to measure the circumference of the Earth. Students have to proceed to uncomplicated measurements using uncomplicated equipment and to exchange their scientific evidence obtained with another school they have been matched up with. The match-up is affected by the longitude of the schools: the participating schools must share the same longitude for the success of the experiment. They provide their

latitude and longitude during the online registration process.

Resources
Teachers who are willing to conduct the Eratosthenes Experiment with their students can take advantage of the lesson plans offered on the Open Science Resources portal (OSR) - a repository hosting educational scenarios regarding science teaching for all grades. The material consists of full scenarios that assist the teachers to prepare their students for the experiment and they offer detailed description of the procedure and material for further discussion. They are based on the Inquiry Based Learning Model with educational objectives applied serving the educational interest. These resources are available in Greek and English. Teachers are encouraged to adjust the resources to their studentsÕ needs. Additionally to the lesson plans, eLearning tools are also suggested to be used. Participants are encouraged to use Stellarium and Google Maps in order to identify the local noon at their location and to measure the distance between their school and the school they have matched up with, accordingly (explained under Process Description).

Tools
Internet connection, computer/ tablet/ mobile device.

Scaffolds
Students are supported by their educators, (specially designed worksheets are included in the available lesson plans). And in consequence teachers are supported by the lesson plans offered and by the organisers who are accessible for online responding to questions before, during and after the conduction of the experiment.

Process description
For the need of this activity the students along with their teachers define the local noon at their location. They use a one-meter stick that they place vertically to the ground. At the time scheduled to conduct the experiment, students measure the length of the stickÕs shadow. They repeat the measurement 5 times and write their values down to submit them later. Students need to know the value for length of the third side of the triangle shaped or they can calculate it themselves by using the Pythagorean Theorem. Then, they calculate the distance using Google Maps between their school and the school they have matched up with. This year the experiment will take place on the 21st of March, on the equinox day. Students can now calculate the circumference of the Earth.

Impact
The Eratosthenes Experiment although it is actually a representation of an ancient and fundamental experiment succeeds in drawing the attraction of students of all ages. The lesson plans accompanying the experiment involves successfully project-based learning in combination with evidence-based learning; students are learning outdoors collecting evidence. Also, there is a dynamic fusion of informal with formal learning. Likewise, it comprises all types of collaboration (teacher-teacher, student-student and studentteacher).

Lessons learned
Carrying out the data analysis with the students in class helped them to identify issues and gave them immediate verbal and visual explanations. Many of the students were challenged with the spatial reasoning skills required to compute the distance, and to relate this with the circumference of the Earth. Working together with students and teachers from another country provided a concrete illustration of how students from different backgrounds and living in different countries can collaborate to solve scientific problems.

Read more
http://eratosthenes.ea.gr/en
http://www.osrportal.eu/en/node/94354
http://portal.opendiscoveryspace.eu/community/eratosthenes-experiment-667944

Scenarios in action from the ÒeLearning 2.0Ó project
Teachers and students from four schools in one virtual classroom
In the project titled ÒeLearning 2.0Ó, best practices are described in a similar way as scenarios in action are in the context of ODS. Their structure is: introduction, description, user profile and organisation of the community, technological aspects, outcomes, motivational aspects and impacts, results of the survey among participants, success factors and barriers, lessons learnt. In ODS, we identified the success factors and barriers with regards to the adoption of Resource-based learning and school innovation at the beginning of the project and we built upon them to create scenarios in action designed to provide roadmaps that alleviate the barriers and enable the success factors. A scenario in action from the elearning 2.0 project that may also have an added value for ODS is titled ÒLeMill (Calibrate) Ð A Web 2.0-enhanced Community for TeachersÓ (available online in http://ftp.jrc.es/EURdoc/ JRC53212_TN.pdf).

The Calibrate project promotes the idea of free and open learning resources and international transfer of online learning material, while LeMill develops a webservice for exchanging national learning materials within the Calibrate project. Among the lessons learned that particularly apply to ODS are those: a) multimedia and interactive content are requested by teachers and b) group functions of social communities can support learning resource exchange.

Scenarios: Easing transitions

Scenarios in action provide a roadmap for the incubation-to-acceleration phase, i.e. the transition from the small, pilot scale to the large scale utilization of ICT in education, school innovation and Resource-Based Learning

School example

Although there no known or safe ÔrecipesÕ on how to make your school an innovation centre, the cultivation of team spirit, the continuous support on ICT-related issues coming from the change-agent teacher and the rewarding systems (like contests), can play an important role in teachersÕ intrinsic motivation and, in turn, to their professional development.

Classroom example 1: 3D printing @ schools

Teachers are learning from each other during their co-ordinated efforts to design learning ÒecosystemsÓ that invite their students and other participants to discover history and the added value of technology and ICT tools. Teachers gain confidence, skills and knowledge while trying to meet the curriculum standards set out for this learning topic.

Classroom example 2: Love of reading

Teachers and students from four schools and two different European countries come together in one Virtual classroom. This scenario in action of social learning illustrates how new forms of interactions and joint intellectual student and teachers production can be facilitated effectively by technological means.

Emerging practice: engaging the parents

The Open Discovery Space approach to school education and school development recognises the important impact of studentsÕ families on successful education. ODS sets out to empower parents by providing them with: resources, social network tools and the eParents Training programme.
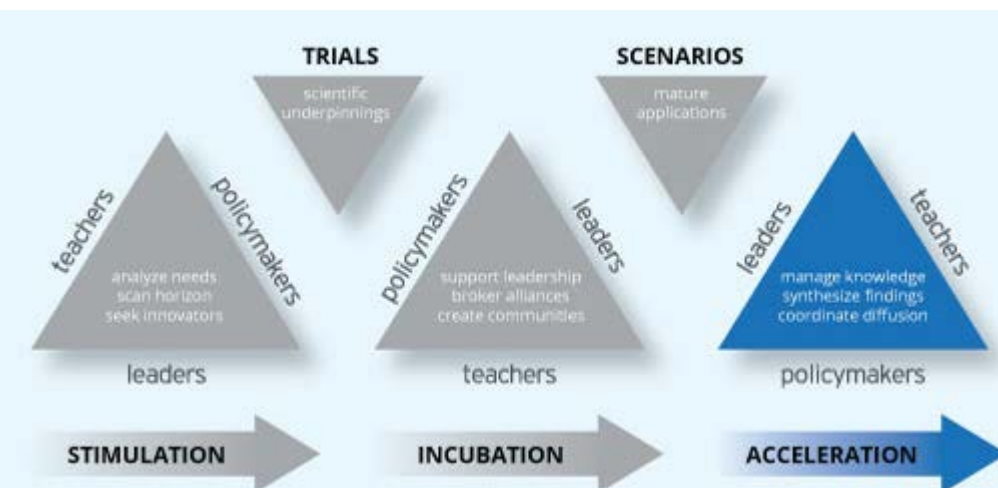
Scenarios in action from another project

The LeMill project promoted the idea of free and open learning resources and international transfer of online learning material. A series of best practices and lessons learnt were identified by the end of the project. The most relevant ones are mentioned in this section.

My educational institution is not a physical plant with classrooms and tress, but a ÔhubÕ of resources no longer constrained by time and place.

-Dillon & Granger

Scenarios

Technology-rich innovation in schools

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Acceleration

Key concepts
What does it mean to accellerate, through dissemination and diffusion?

How does it work?
How is acceleration powered through government reform, local initiatives or both?

Examples
Acceleration stories from the ODS activities in Greece

Recommendations
Key considerations for acceleration

The accelerating phase is the period where the educational change is expanded to significant portions of the student population, activities are taken up in representative schools, and knowledge management is used among partners

Key concepts

Accelerating
This phase aims to spreading the innovation. In a centralized educational system, this stands to be achieved through a governmental educational reform. In the decentralized systems, the district superintendents and school principals are likely to play significant roles.

Dissemination
One-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media.

Diffusion
Process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other.

How does acceleration work?
Accelerating through government reform, local initiatives, or both

Forces at play
Throughout this phase, attention is given to:

- exploiting knowledge management techniques (sharing what is known within ODS partners and participants);
- synthesizing evaluation and research (to inform efforts);
- accelerating diffusion with national agencies (to reach increased numbers of users on the ground).

There are two kinds of processes in this phase: dissemination and diffusion. School principals and headmasters play vital role in both of them (both directly and indirectly). Dissemination is a one-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media. Complementary to this, diffusion is the process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other. It is not necessarily the scope of diffusion that measures an interventionÕs success, but its presence is one important indicator. It is a Òspread withinÓ which can be seen, for example, when reform principles or norms of social interaction become embedded in school policies and routines, or when teachers draw on those ideas and put them to use in other aspects of their practice, which were not explicitly addressed by the intervention.

Diffusion tends to be less common than dissemination; and innovators can sometimes be both delighted and overwhelmed when it starts to take place. In order to be successful, diffusion should be encouraged by the school management. Educational leaders can be very supportive in these processes. First of all, they can initiate dissemination activities. In order to motivate the teachers, ODS headmasters are offered a gamut of ODS presentations, workshops, webinars, training academies, meetings, etc. to choose from. They can decide on the actual school poliicy and in accordance with it use what ODS offeres. No other portal has been created with such meticulous attention only for education needs and teachers as its target audience. In the following passages there are some tips and practical ideas how headmasters can benefit from ODS in order to motivate teachers.

Headmasters, teachers, ODS Ð whatÕs the connection?

The most important task for headmasters is to motivate teachers (and learners) to use eLearning resources. That means:

- to provide reward (e.g. not directly by giving money but by offering professional development trips, professional advancement)
- to insist on implementing e-register and obligatory number of ICT lessons throughout the school year (this should be systematically done)
- to insist on teachers having electronic lesson plans, electronic portfolio and documentation
- to have teachers attend obligatory ICT seminars in order to develop their ICT competencies
- to have teachers categorized based on their ICT competencies in order to have motivational approach to teachers' development
- to embed successful projects (competitions) into the educational system and impose them on teachers as official
- to synchronize the needs of students with the instructional methods (not only by implementing ICT but also by involving creativity, task-based learning, challenge in learning)
- to implement e-learning carefully and cleverly: it could be at first for extra curricular classes, then to move on to regular teaching process

In order to overcome organizational and technical barriers, the following should be done:

- to educate constantly the school management and teaching stuff
- to provide positive examples from the teaching systems that managed to raise the quality of studentsÕ knowledge by means of e-learning
- to raise awareness with teachers that their private e-activity could also be used in teaching (Google account, one drive account, social networks)
- to provide education for teachers to use LMS / CMS (e.g. Moodle)
- to involve expert teachers into sharing-and-caring activities
- to engage school and regional coordinators for ICT implementation
- to participate in both international and national projects
- to provide a good personal example by having an

official headmasterÕs webpage/FB profile

Acceleration stories from ODS activities in Greece
Overview

ODS cases from Greece ODS has up-to-date (January 2015) achieved to engage 433 schools in Greece, whose participation is being coordinated and supported by Ellinogermaniki Agogi Research and Development Department. Other Greek partners are the University of Piraeus, the Technical University of Crete, the Greek Research and Technology Network, Agro-know Technologies, as well as CTI Diophantus and the Institute of Educational Policy, which are supervised by the Greek Ministry of Education. Out of these schools, 312 were recruited from January 2013 to December 2014 through various channels (ODS visionary and practice reflection workshops, conferences, presentations and other dissemination events, previous projects), while 122 schools were added in January 2015 after a general call that the Institute of Educational Policy addressed to all schools of the country. This formal call was in fact a significant step in the official adoption of Open Discovery Space by the National Educational Policy and the acknowledgement of its potential impact on the modernization of school practice and the promotion of innovation in Greek schools.

A variety of activities is suggested to schools by the Ellinogermaniki Agogi team and a series of respective ODS communities has been set-up to support their implementation. In terms of curriculum areas, these activities involve Science and High Energy Physics, Environmental Education, Music, Entrepreneurship, as well as teacher training on educational design and a focus on pupilsÕ transversal key competences. The schools are free to choose more than one of the supported activities and, although Ellinogermaniki Agogi provides them with tools and educational scenarios, they are also encouraged to adapt these resources to their own needs and specific contexts, using the ODS template for the schoolÕs action plan.

Below is a short description of three selected cases and implementation activities from Greek schools that share the following characteristics:

- Connection, community building and sharing of resources among remote schools through the ODS portal.
- Increase of access to resources for remote and Ðsubsequently- underprivileged schools through the ODS portal and tools.
- TeachersÕ increased familiarisation with digital educational design tools and implementation of innovative teaching methods, such as the inquiry-based model and project-based practices.
- SchoolsÕ collaboration through ODS with regional policy makers, universities, professional artists and other organisations and thus networking and opening-up of the school.

Connecting schools through music
Context

"Akriton Mousiki" was a live interactive performance audiovisual event combining Music and Digital Shadow Theatre. The performance was inspired by the Greek Acritan heritage and included the collaborative preparation, co-creation and realization of an online event between multiple distant ODS schools linked together via videoconference. During the "Linkcast" (webcasted videoconference) pupils from four remote schools presented a virtual-stage role-playing educational activity by moving digital figures (e-shadow platform) accompanied with shared live Music performance. The scenario included an advanced interaction between these five remote educational communities on the islands of Karpathos, Gavdos, Kastelorizo and Cyprus hosted by Athens.

Part of the dialogues arranged for the event was based upon the Byzantine epos of Digenis Akritas digitized by the University of Crete Anemi Database. The development of the "Akriton Mousiki" activity is the first attempt to produce advanced-interaction scenarios between 4 remote islands in Greece including Cyprus via live videoconference involving Music as a performance art.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Online mentoring, collaborative working with use of online resources.

Process
A new community was formed inspired by the "Akriton Mousiki" activity. ÒTravelling in the era of ErotokritosÓ is a community of teachers in Chania-Crete exploring educational aspects of Vincenzo KornaroÕs epos of ÒErotokritosÓ and other personalities of the post-Byzantine era such as the famous painter Domenikos Theotokopoulos and the composer Frangiskos Leontaritis. The community through its manager in Chania, took part in a group of the ÒLet Us Share The Music/Let Us Link The WorldÓ community along with community-members from Athens and Evros (Northern East of Greece) The group contributed in the preparation of an ODS scenario based on the above prominent Renaissance figures and their Art. After online training, provided by the parent community manager, the teacher in Chania recorded and edited digital audio files of her pupils narrating extracts of the poem she had prepared. Digital contributions were uploaded as extracts next to music excerpts from the same era, performed by professional musicians who granted the group with their permission to use their content for educational purposes. Original Digital Audio Workstation music was also arranged, composed and produced by the parent-community-manager to accompany the pupilsÕ narration. PupilsÕ paintings were uploaded as well.

Impact
The outputs of these activities leaded and with an aim to create a Virtual school on the theme of Music the ODS Teachers Training Academy ÒLive-Music EducationÓ has been developed in order to lead future members into advanced methods of exploring ICT in musical interactive scenarios http://portal.opendiscoveryspace.eu/topic-courses/live-music-education-academ.

Read more
http://portal.opendiscoveryspace.eu/community/moirastoyme-ti-moysiki-enosoyme-ton-kosmo-let-us-share-music-let-us-link-world-347.

Increased interest and greater interaction in Remote Tychero

Context
The High School and Senior High School of Tychero are located in a rural agricultural town of North-eastern Greece, near river Evros. The area, as all rural areas in Greece that are situated on the borders of the country, is defined as a remote one, with accessibility problems that the educational authorities officially recognize and attempt to address. The two schools are relatively small in terms of student population and face practical difficulties, such as inadequate number of teachers, frequently moving staff, poor infrastructure and accessibility issues due to their location. However, in the last few years the schools of Tychero have been having an increased interest participating in European networks, in collaborating with peers and other schools and

in searching for opportunities to improve their quality of teaching and developing the studentsÕ 21st century key- competences.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Face to face and online training material made available.

Process
Both schools entered ODS at the beginning of Pilot Phase 2 (September 2014) after being introduced to it in a Practice Reflection workshop organized by the regional school counsellor who collaborates with the Ellinogermaniki Agogi team. Regional school counsellors are appointed by the Ministry of Education and the experience of ODS in Greece has shown that their role can be significant in disseminating innovative projects, such as ODS, as well as in recruiting and motivating schools to participate. In addition, since they are working at local level they can act as mediators in identifying and supporting individual teachers that are already active and motivated. Mrs Stella Tryfonidou, Science and Technology teacher, is an example of this type of teachers, who, acting as a change agent, recruited in turn both of the schools of Tychero in ODS in order- as she identifies Ð to: a) enhance the access of her school to qualitative and innovative educational content from ODS, and especially the repositories of OSR and Discover the Cosmos, b) take opportunities for various educational activities, c) participate in teachersÕ professional development training. Within this framework, Mrs Tryfonidou designed four innovative educational scenarios that are based on the inquiry model and made use of resources from these repositories, as well as of the ODS authoring tool. The scenarios have been implemented in the schools of Tychero or are currently still in progress (January 2015) with the support of the Ellinogermaniki Agogi R&D Department.

The first scenario was implemented within the ICT Curriculum with First-graders (15 years old students) of the Senior High school of Tychero and was entitled ÒPacman with ScratchÓ. The idea of the scenario is the development of an application in an optical programming environment, such as Scratch. The students worked in groups, designed the application and implemented it through Scratch. They then tested and evaluated it and disseminated it to peers and the local community. The results of the work of Tychero were presented at the Panhellenic Student Festival of Digital Creativity, which is organized every year by the regional ICT school counsellors. The scenario has been uploaded onto the Greek community of educational Scratch programming of the ODS portal http://portal.opendiscoveryspace.eu/community/senaria-didaskalias-se-perivallonta-optikoy-programmatismoy-me-plakidia-668762

The second scenario was entitled ÒHow did Thales calculate the height of Pyramid of Cheops?Ó and was implemented at Tychero in the school year 2014-15. The scenario was based on the Project Based Learning approach and engaged the students (15-year-olds) to construct a simulacrum of the Pyramid and calculate its height, following the same method that Thales used in the 6th century B.C. Mrs Tryfonidou based her work on an original scenario that was already available on the OSR portal http://www.osrportal.eu/el/node/95028 that she then adapted.

The implementation of the third educational scenario was inspired and initiated by the Eratosthenes experiment http://eratosthenes.ea.gr/, an international activity, which was offered to ODS and ISE (Inspiring Science Education) schools in March 2014 attracting 350 schools from 37 countries. Here again, the activity implemented at Tychero with second-graders (16-year-old students) was based on an original scenario of the OSR portal http://www.osrportal.eu/el/node/94691 that Mrs Tryfonidou adapted to her school and studentsÕ needs.

Finally, the fourth scenario, that is currently being implemented in the High School of Tychero, is entitled ÒGood night to the starsÓ and its objective is to introduce the students (12 -15 year-olds) to basic concepts of Astronomy and prepare them for a virtual connection with the Faulkes robotic telescopes, that will be conducted with the support of the Ellinogermaniki Agogi R&D team. The scenario will also engage the students in constructing a model of the solar system and disseminating their final report onto a wiki environment.

Impact
The evaluation of the impact of these scenarios on pupilsÕ learning is still in progress, however some significant remarks made by the teacher include: increased interest on the part of students, greater satisfaction from hands-on learning compared to conventional teaching and thus accomplishment of affective educational objectives. There was also improvement in classroom time management and psychomotor objectives, such as the pupils working effectively in groups, taking initiatives and volunteering to work on these projects in their free time. The teacher herself also reported that the resources of ODS supported her in terms of Scientific expertise and motivated her to be more creative and inspired.

Lessons learned

In summary, the overall experience from the implementation of ODS in Greece has shown that the following practices can have a positive impact on schoolsÕ engagement to a project that promotes school innovation and on making the most of the opportunities it provides them:

- The ODS approach based on its innovation model, that considers the schools and the teachers as capable of innovating, can be unprecedented or even challenging for schools, especially in countries with centrally governed educational systems, like Greece. Providing individualized and personal support to is crucial in helping schools develop their own innovation strategy and convince them that they have the power to change and improve education.
- To the same end, engaging and collaborating with regional educational authorities and policy makers also helps in creating a safer environment for schools and teachers that seek change and innovation. - Opportunities for disseminating individual cases of innovating teachers and schools to their local or wider educational community (e.g. teachers presenting their own work in conferences or presentations through the press/ media) can have a very positive impact on schoolsÕ engagement: In this way individual efforts are rewarded and further encouraged, acting also as multipliers and sources of inspiration for other teachers and schools.
- Similarly, it is important to promote regular networking activities that bring together teachers from different school settings in order to build trust and a common vision that will encourage them to share their resources on a public platform, such as ODS.

Tips for accelerating

In order to motivate and inspire teachers, headmasters need to set up a personal example of lifelong learning and professional development. Their influence starts from their internal engagement on personal and professional development in order to provide good example and set up the atmosphere. Further steps include external influence which they make on teachers by creating the climate for ÒpullÓ approach (with the main aim to show Òfollow meÓ instead of Ògo aheadÓ). Finally, one of their external influences to motivate teachers is to nurturing life-long learning and professional development of teachers by providing (funding for) seminars, workshops, trainings, sometimes even their consent and approval for teachers to take a day off for development sessions.

As an example of a success story, there is a story about the headmaster from Technical School in Knjazevac, Serbia. Her name is Ljiljana Zikic and she was the first to introduce ICT into her school. She went to seminars and trainings, created lesson plans for teachersÕ competitions, etc. In the end, she became a good example to the teachers from her school. The result is that in 2013 at the competition ÒCreative SchoolÓ (organized by Microsoft Serbia and Institute for Improving Education) there were eleven teams, three teachers in each of them, from her school! She personally took part in three of them.

To accelerate the process, headmasters play an important role. They disseminate the information but they also make the diffusion phase more likely to happen when they create the positive atmosphere among teachers. It needs time, but it always ended successfully when headmasters were involved in the process.

Important factors

Acceleration is influenced by the innovation itself, the strategies used in implementation, the context and the actors Ð efforts muse be attuned accordingly.

Synthesize findings

Results from evaluation and research in this phase inform future work but can also provide justification for increased acceleration efforts.

Coordinate dissemination & diffusion

Across various push and pull activities, core ideas and goals help projects stay focused during this phase.

ItÕs not about the tools, itÕs using the tools to facilitate learning.

- Andrew Churches

Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα

Περιγραφή ODS

Το έργο Open Discovery Space (http://www.opendiscoveryspace.eu/) θεωρείται ως ο βασικός άξονας εισαγωγής της καινοτομίας στο σχολικό περιβάλλον και αποτελεί μια συντονισμένη πανευρωπαϊκή προσπάθεια με στόχο την ενθάρρυνση και υποστήριξη των σχολείων της Ευρώπης στην αξιοποίηση ψηφιακού εκπαιδευτικού υλικού στη διδασκαλία. Το έργο συγχρηματοδοτείται από την Ευρωπαϊκή Επιτροπή στο πλαίσιο του Policy Support Program (PSP) και υλοποιεί τους βασικούς στόχους της «Digital Agenda for Europe - Action 68».

Στο έργο συμμετέχουν ως εταίροι 50 φορείς από 25 ευρωπαϊκές χώρες, όπως Πανεπιστήμια, Εταιρείες, Εκπαιδευτικά και Τεχνολογικά Κέντρα και πολυάριθμες εκπαιδευτικές κοινότητες από όλες τις χώρες της Ευρώπης.
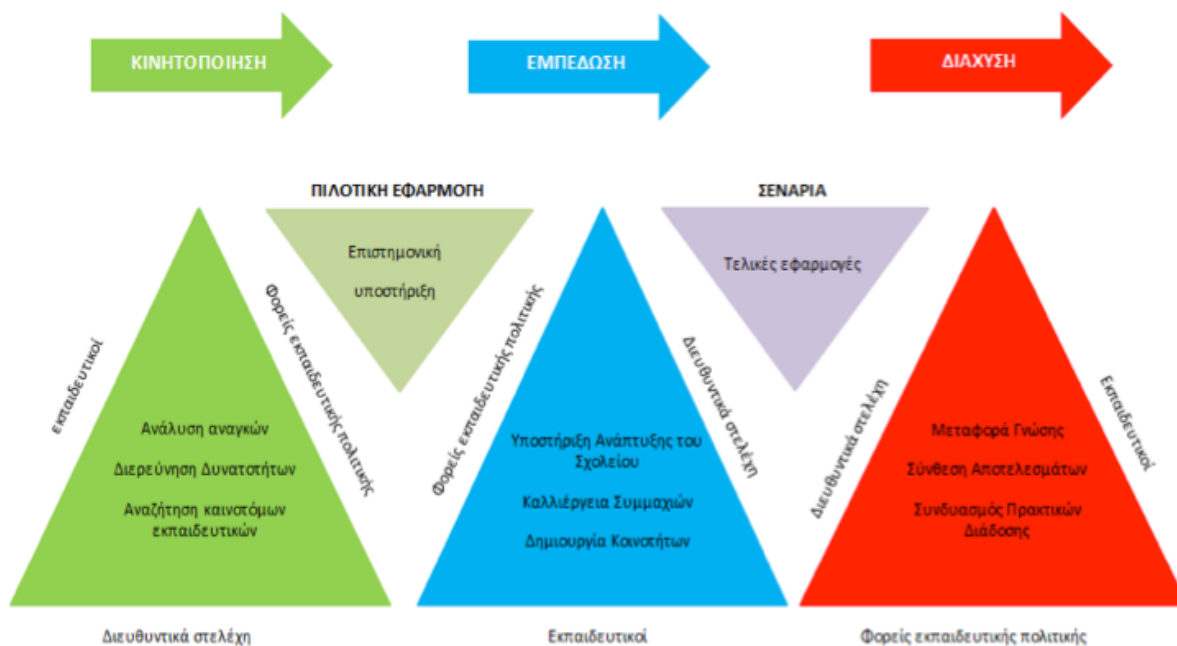
Στο πλαίσιο του Open Discovery Space δημιουργείται μια πολύγλωσση πύλη κοινωνικής δικτύωσης, που αποτελεί ενιαίο σημείο πρόσβασης για τους εκπαιδευτικούς και τους γονείς στους ψηφιακούς εκπαιδευτικούς πόρους πολλών Ευρωπαϊκών Αποθετηρίων εκπαιδευτικού υλικού. Το Πανελλήνιο Ψηφιακό Αποθετήριο Μαθησιακών Αντικειμένων «Φωτόδεντρο» του ΥΠΑΙΘΠΑ, που υλοποιεί το Ινστιτούτο Τεχνολογίας Υπολογιστών & Εκδόσεων «ΔΙΟΦΑΝΤΟΣ» στο πλαίσιο του «Ψηφιακού Σχολείου», αποτελεί ένα από τα βασικά αποθετήρια που έχουν συνδεθεί με το Open Discovery Space. Ειδικότερα, το Open Discovery Space παρέχει μια υπερσύγχρονη μηχανή αναζήτησης εκπαιδευτικού υλικού, η οποία προσαρμόζει τα αποτελέσματα αναζητήσεων στις δυνατότητες και προτιμήσεις των χρηστών και συνδέει το υλικό με τη διδακτέα ύλη κάθε χώρας. Επίσης, στην πύλη του Open Discovery Space λειτουργούν Ακαδημίες Εκπαιδευτικών και Γονέων με πλούσιο υλικό κατάρτισης (videos, moocs, crash courses κ.λπ.). Επιπλέον, το Open Discovery Space παρέχει στον εκπαιδευτικό τα κατάλληλα εργαλεία για να δημιουργήσει, να αποθηκεύσει και να μοιραστεί με άλλους τα δικά του εκπαιδευτικά σχέδια και σενάρια, ακόμη και σε επίπεδο σχολικής μονάδας. Πέρα από εκπαιδευτικό υλικό, το Open Discovery Space δίνει τη δυνατότητα σε κάθε σχολείο να δημιουργήσει γρήγορα, εύκολα και χωρίς κόστος τη δική του σχολική πύλη ή στον κάθε εκπαιδευτικό να αναπτύξει τη δική του εκπαιδευτική κοινότητα. Μέσα από αυτές τις σχολικές κοινότητες έχουν ήδη αναπτυχθεί πολλές καινοτόμες δράσεις μεταξύ των σχολείων από διαφορετικές ευρωπαϊκές χώρες.

Μοντέλο Σχολικής Καινοτομίας

Το μοντέλο σχολικής καινοτομίας που προτείνει το Open Discovery Space αποτελείται από τρία στάδια: κινητοποίηση, εμπέδωση & διάχυση και 5 βασικά χαρακτηριστικά. Το μοντέλο αποδίδεται γραφικά στην Εικόνα 1 και ακολουθεί η ανάλυση των βασικών του στοιχείων.

Εικόνα 1: Γραφική αναπαράσταση του μοντέλου σχολικής καινοτομίας Open Discovery Space

Ακολουθεί η ανάλυση των τριών φάσεων του μοντέλου:

1

Κινητοποίηση

Η φάση της κινητοποίησης περιλαμβάνει την ανάλυση των αναγκών μιας σχολική μονάδας και την κατάρτιση ενός Σχεδίου Δράσης. Τρία κομβικά εργαλεία βρίσκονται στη διάθεση του Διευθυντή του Σχολείου:

- Η αποτίμηση της ψηφιακής ωριμότητας του σχολείου με τη μέθοδο ερωτηματολογίων που μετρούν μεταξύ άλλων, τον βαθμό ένταξης και χρήσης ΤΠΕ, τις υποδομές, την κουλτούρα καινοτομίας με όχημα πάλι τις ΤΠΕ, το όραμα και στοιχεία που αφορούν στην επαγγελματική εξέλιξη των εκπαιδευτικών. Οι διευθυντές των σχολικών μονάδων θα πρέπει να μεριμνούν, ώστε να ενταχθούν στη διαδικασία όσο το δυνατόν περισσότεροι εκπαιδευτικοί, εφαρμόζοντας έτσι μια ολιστική προσέγγιση.

- Την αυτο-αξιολόγηση των ικανοτήτων των εκπαιδευτικών με χρήση ψηφιακών εργαλείων και σύμφωνα με το Πλαίσιο Επάρκειας στις ΤΠΕ για Εκπαιδευτικούς της UNESCO (2011). Οι διευθυντές πρέ-

πει να συμπληρώνουν πρώτοι το δικό τους προφίλ ικανοτήτων και να ενθαρρύνουν τους εκπαιδευτικούς να κάνουν το ίδιο. Η αυτοξιολόγηση δεν έχει ανταγωνιστικό χαρακτήρα αλλά αποτελεί όχημα ανάλυσης των αναγκών του σχολείου.

Την αυτο-αξιολόγηση ακολουθεί η δημιουργία ενός σχεδίου επιμορφώσεων που κάνει χρήση εθνικών και διεθνών πρωτοβουλιών, όπως το ODS και το Erasmus+ και εμπλουτίζεται με συμμετοχή σε θερινές ακαδημίες, διαδικτυακά σεμινάρια, MOOCS, ψηφιακές κοινότητες καλών πρακτικών, κλπ.

- Την κατάρτιση ενός ολοκληρωμένου Σχεδίου Δράσης που θα περιέχει συνεργασίες με διεθνείς και εθνικές πρωτοβουλίες και δράσεις σε συγκεκριμένους τομείς, χρήση εργαλείων ΤΠΕ, εφαρμογή παιδαγωγικών μεθόδων, συμμετοχή σε εκπαιδευτικούς διαγωνισμούς, προβλέψεις σχετικές με τα εμπόδια και τις αντιστάσεις στην αλλαγή και την καινοτομία.

2

Εμπέδωση

Η υποστήριξη, οι στοχευμένες παρεμβάσεις και οι εφαρμογές καινοτόμων πρακτικών και δράσεων, με στόχο την εδραίωση της κουλτούρας της αλλαγής και της αυτονομίας της γνώσης συγκροτούν τις βασικές αρχές της διαδικασίας της εμπέδωσης της καινοτομίας στο σχολικό περιβάλλον. Κατά την φάση της εμπέδωσης εφαρμόζονται νέες τεχνικές και μεθοδολογίες μάθησης και διδασκαλίας.

Κυρίαρχο ρόλο σε αυτή τη διαδικασία διαδραματίζουν οι ανοιχτές ψηφιακές πηγές, η διάδραση μεταξύ των εκπαιδευτικών-χρηστών με το ψηφιακό περιβάλλον (ODS) και η συγκρότηση δραστήριων εκπαιδευτικών κοινοτήτων μέσα σε αυτό το ψηφιακό περιβάλλον συνεργασίας και ανταλλαγής εμπειριών.

Η διαρκής εφαρμογή καινοτόμων σεναρίων, η έμφαση στην ενεργητική χρήση Ανοιχτών Εκπαιδευτικών Πηγών και η σύνδεση αυτών με την ανάπτυξη της σχολικής καινοτομίας είναι επίσης σημαντικά στοιχεία. Και εδώ δίνεται έμφαση στο ρόλο της διαρκούς επιμόρφωσης μέσω συμμετοχής σε διεθνείς και εθνικές πρωτοβουλίες και πιλοτικές δράσεις καινοτομίας που αφορούν στη χρήση εργαλείων ΤΠΕ και ψηφιακού υλικού.

Όσον αφορά στη συγκρότηση ψηφιακών κοινοτήτων εκπαιδευτικών, κύριο μέλημα ενός διευθυντή είναι η ανάδειξη τόσο πρακτικών όσο και συγκεκριμένων εκπαιδευτικών που μπορούν να λειτουργήσουν ως φορείς αλλαγής και καινοτομίας. Οι ψηφιακές κοινότητες πρέπει να ανταποκρίνονται στις ανάγκες του σχολείου και της υποστήριξης του αναλυτικού προγράμματος. Πρέπει, επίσης, να χαρακτηρίζονται από εμπιστοσύνη, ενσυναίσθηση και αναγνώριση των ιδιαίτερων συνθηκών τόσο του σχολείου, όσο και του κάθε εκπαιδευτικού. Στη διεθνή βιβλιογραφία διατυπώνεται ξεκάθαρα (Wideman 2010), ότι αυτές είναι οι προϋποθέσεις που υποστηρίζουν τους εκπαιδευτικούς στη μετάβασή τους στο τρίτο επίπεδο σε «δημιουργούς/σχεδιαστές εκπαιδευτικού περιεχομένου με τη χρήση ΤΠΕ».

3

Διάχυση

Κατά τη διάρκεια της διάχυσης, οι όποιες μικρές ή και μεγάλες αλλαγές δύναται να επεκταθούν σε όλο το σχολείο, αλλά και να μεταφερθούν σε γειτονικές σχολικές μονάδες ή/και στην τοπική κοινωνία. Ιδιαίτερη προσοχή δίνεται στην αξιοποίηση των τεχνικών διαχείρισης και μεταφοράς της γνώσης (διαμοιράζεται ό,τι είναι οικείο και τεκμηριωμένο στους εκπαιδευτικούς και τη διοίκηση του σχολείου), με στόχο την αύξηση του αριθμού των εκπαιδευτικών που χρησιμοποιούν ψηφιακό περιεχόμενο και καινοτόμες πρακτικές.

Οι φάσεις της κινητοποίησης και της εμπέδωσης παρέχουν υλικό, δομές και τεχνογνωσία σχετικά με τη χρήση ΤΠΕ, τη δημιουργία ψηφιακών κοινοτήτων και βιβλιοθηκών του σχολείου, την εφαρμογή καινοτόμων σεναρίων, την επαγγελματική εξέλιξη των εκπαιδευτικών, κλπ. Η δημιουργική χρήση και σύνθεση όλων αυτών είναι υπόθεση των διευθυντών και των καινοτόμων εκπαιδευτικών που θα πρέπει, με προσοχή, και λαμβάνοντας υπόψη τα αποτελέσματα των πιλοτικών εφαρμογών, τις τεκμηριωμένες καλές πρακτικές, κλπ., να επιχειρήσουν τη διάχυση και την εδραίωση της καινοτομίας στο σχολείο και στην τοπική εκπαιδευτική κοινότητα.

Περισσότερες πληροφορίες σχετικά μπορείτε να βρείτε στα Παραρτήματα: Εγχειρίδια για Διευθυντικά Στελέχη. Ακολουθεί η παρουσίαση ενδεικτικών παραδειγμάτων/ σεναρίων εφαρμογής του μοντέλου καινοτομίας του ODS στην Ελλάδα.

Παραδείγματα εφαρμογής του μοντέλου καινοτομίας του ODS στην Ελλάδα

Μέχρι σήμερα (Φεβρουάριος 2015) το ODS έχει επιτύχει να εμπλέξει 445 σχολεία απ' όλη την Ελλάδα, η συμμετοχή των οποίων συντονίζεται από το Τμήμα Έρευνας και Ανάπτυξης της Ελληνογερμανικής Αγωγής. Άλλοι εταίροι είναι το Πανεπιστήμιο Πειραιά, το Πολυτεχνείο Κρήτης, η ΕΔΕΤ, η AGROknow Technologies, όπως και το ΙΤΥΕ «Διόφαντος» και το Ινστιτούτο Εκπαιδευτικής Πολιτικής. Από τα σχολεία αυτά, 312 ξεκίνησαν να συμμετέχουν στο πρόγραμμα από τον Ιανουάριο 2013. Τα σχολεία αυτά ενημερώθηκαν για το πρόγραμμα μέσω διαφόρων καναλιών και πρακτικών διάχυσης και επιμόρφωσης, όπως εργαστήρια που διοργανώθηκαν ανά την Ελλάδα κατά την πρώτη φάση της κινητοποίησης και τη δεύτερη φάση, της «εμπέδωσης», όπως και μέσω συνεδρίων και παρουσιάσεων. Τα υπόλοιπα από τα τρέχοντα ελληνικά σχολεία προστέθηκαν τον Ιανουάριο του 2015 μετά από γενική πρόσκληση του Ινστιτούτου Εκπαιδευτικής Πολιτικής προς το σύνολο των σχολικών μονάδων της χώρας.

Μία ευρεία γκάμα δραστηριοτήτων προτείνεται από την ομάδα της Ελληνογερμανικής Αγωγής στα σχολεία και έχει δημιουργηθεί μια σειρά από αντίστοιχες ψηφιακές κοινότητες στην πύλη του ODS για την υποστήριξη της εφαρμογής τους. Ως προς τα γνωστικά αντικείμενα, οι προτεινόμενες αυτές δραστηριότητες αφορούν τις Φυσικές Επιστήμες ευρύτερα, τη Φυσική Υψηλών Ενεργειών, την Περιβαλλοντική Εκπαίδευση, τη Μουσική, την Επιχειρηματικότητα και τη Συμβουλευτική Σταδιοδρομίας, καθώς και επιμόρφωση των εκπαιδευτικών στον εκπαιδευτικό σχεδιασμό δράσεων που στοχεύουν στην καλλιέργεια όχι μόνο των γνώσεων αλλά –κυρίως- των οριζόντιων ικανοτήτων των μαθητών. Τα σχολεία είναι ελεύθερα να επιλέξουν περισσότερες από μία δραστηριότητες και ενθαρρύνονται όχι μόνο να εφαρμόσουν τα εργαλεία και τα εκπαιδευτικά σενάρια που τους προτείνονται, αλλά και να τα προσαρμόσουν στις δικές τους ανάγκες και ενδιαφέροντα. Για το σκοπό αυτό καλούνται να χρησιμοποιήσουν ένα σχέδιο δράσης το οποίο συνδέει τις επιλεγείσες δράσεις με τις ανάγκες του σχολείου, τα καθοδηγεί στη στοχοθεσία και στη σύνδεσή τους με ένα ευρύτερο πλαίσιο ανάπτυξης του σχολείου.

Ακολουθούν δύο παραδείγματα από επιλεγμένες περιπτώσεις εφαρμογής σε ελληνικά σχολεία, οι οποίες διακρίνονται από τα εξής χαρακτηριστικά:

- Σύνδεση, δικτύωση και διαμοιρασμό εκπαιδευτικών πηγών μεταξύ απομακρυσμένων σχολείων μέσω της πύλης του ODS.
- Βελτίωση της πρόσβασης σε πηγές για σχολεία σε απομακρυσμένες περιοχές.
- Εξοικείωση των εκπαιδευτικών με ψηφιακά εργαλεία εκπαιδευτικού σχεδιασμού και με την εφαρμογή καινοτόμων διδακτικών μεθόδων, όπως τη μέθοδο project και το μοντέλο Ανακαλυπτικής Μάθησης.
- Στενή συνεργασία των σχολείων με τοπικούς φορείς εκπαιδευτικής πολιτικής, όπως οι Σχολικοί Σύμβουλοι, πανεπιστήμια, επαγγελματίες καλλιτέχνες και άλλους φορείς ή φυσικά πρόσωπα, η οποία προωθεί τη δικτύωση και το άνοιγμα του σχολείου στην κοινωνία.

Η δράση «Ακριτών Μουσική»

Η δράση «Ακριτών Μουσική»

Η δράση «Ακριτών Μουσική» ήταν ένα ζωντανό διαδικτυακό οπτικοακουστικό δρώμενο, που συνδύασε τη Μουσική με το Ψηφιακό Θέατρο Σκιών. Η εφαρμογή της είναι η πρώτη απόπειρα ανάπτυξης ενός εκπαιδευτικού σεναρίου αυξημένης διάδρασης μεταξύ τεσσάρων (4) απομακρυσμένων σχολείων από την Ελλάδα και την Κύπρο μέσω τεχνολογίας ζωντανής τηλεδιάσκεψης, η οποία περιλαμβάνει τη Μουσική ως παραστατική τέχνη. Βασίστηκε στο εκπαιδευτικό σενάριο που αναπτύχθηκε από το συνεργάτη της Ελληνογερμανικής Αγωγής, κ. Πέτρο Στεργιόπουλο, με πηγή έμπνευσης την Ακριτική κληρονομιά. Η εφαρμογή της δράσης περιελάμβανε τη συνεργατική προετοιμασία, συν-δημιουργία και υλοποίηση μιας ψηφιακής παράστασης από τέσσερα απομακρυσμένα σχολεία του ODS στην Κάρπαθο, τη Γαύδο, το Καστελλόριζο και τη Λευκωσία της Κύπρου, ενώ ο όλος συντονισμός έγινε από τον κ. Στεργιόπουλο στην Αθήνα. Τα σχολεία συνεργάστηκαν εξ αποστάσεως καθ' όλη τη διάρκεια αυτής της διαδικασίας μέσω εργαλείων τηλεδιάσκεψης. Κατά τη διάρκεια της τελικής παράστασης οι μαθητές των τεσσάρων σχολείων έστησαν την παράσταση χρησιμοποιώντας εργαλεία ψηφιακού Θεάτρου Σκιών, τα οποία συνοδεύτηκαν από μία συνεργατική Μουσική πα-

ράσταση. Μέρος των διαλόγων της παράστασης, οι οποίοι βασίζονταν στο Βυζαντινό έπος του Διγενή Ακρίτα, είχαν ψηφιοποιηθεί από το Πανεπιστήμιο Κρήτης και είναι διαθέσιμα στη βάση δεδομένων «Ανέμη». Αποτέλεσμα και επέκταση της εφαρμογής της δράσης ήταν η δημιουργία της ψηφιακής κοινότητας «Ταξιδεύοντας στην εποχή του Ερωτόκριτου», στην οποία εκπαιδευτικοί από τα Χανιά της Κρήτης εξερευνούν πτυχές από τον «Ερωτόκριτο», που μπορούν να αξιοποιηθούν εκπαιδευτικά, όπως και άλλες προσωπικότητες της μετα-Βυζαντινής εποχής, όπως ο Δομήνικος Θεοτοκόπουλος και ο συνθέτης Φραγκίσκος Λεονταρίτης. Η κοινότητα συνεργάζεται επίσης ψηφιακά μέσω της πλατφόρμας του ODS με την ομάδα «Ας μοιραστούμε τη Μουσική, ας ενώσουμε τον κόσμο» και άλλους εκπαιδευτικούς- μέλη από την Αθήνα και τον Έβρο http://portal.opendiscoveryspace.eu/community/moirastoyme-ti-moysiki-enosoyme-ton-kosmo-let-us-share-music-let-us-link-world-347. Η ομάδα αυτή συνέβαλε στην προετοιμασία ενός άλλου ψηφιακού εκπαιδευτικού σεναρίου για τις προσωπικότητες αυτές της Ελληνικής Αναγέννησης και το έργο τους. Διοργανώθηκε επίσης επιμόρφωση μέσω διαδικτύου της δεύτερης ομάδας από τον συντονιστή της δράσης και στη συνέχεια ο εκπαιδευτικός από τα Χανιά κατέγραψε και επεξεργάστηκε οπτικοακουστικό υλικό στο οποίο οι μαθητές απαγγέλλουν χωρία. Αναρτήθηκαν επίσης ψηφιακές ηχογραφήσεις από μουσικά έργα της ίδιας εποχής, εκτελεσμένα από επαγγελματίες μουσικούς, οι οποίοι επέτρεψαν στην κοινότητα να χρησιμοποιήσει το υλικό αυτό για εκπαιδευτικούς σκοπούς. Πρωτότυπη μουσική συντέθηκε επίσης από τον συντονιστή της κοινότητας, εκτελέστηκε και αναρτήθηκε για να συνοδέψει τις ψηφιακές αφηγήσεις των παιδιών, ενώ έργα ζωγραφικής των μαθητών αναρτήθηκαν επίσης. Το τελικό αποτέλεσμα όλων αυτών των δραστηριοτήτων αποτελεί πλέον υλικό της Ψηφιακής Μουσικής Ακαδημίας του ODS και είναι ελεύθερα προσβάσιμο σε εκπαιδευτικούς που ενδιαφέρονται να εξερευνήσουν και να εφαρμόσουν τη χρήση ψηφιακών μέσων σε διαδραστικά εκπαιδευτικά σενάρια Μουσικής Αγωγής http://portal.opendiscoveryspace.eu/topic-courses/live-music-education-academy.

Εφαρμόζοντας το Ανακαλυπτικό Μοντέλο μάθησης μέσω ψηφιακών πηγών σε δύο σχολεία στο Τυχερό του Έβρου

Το Γυμνάσιο και Λύκειο Τυχερού βρίσκονται στην ακριτική περιοχή του Έβρου. Πρόκειται για δύο σχετικά μικρά σχολεία ως προς τον αριθμό των μαθητών, τα οποία λόγω της γεωγραφικής τους θέσης αντιμετωπίζουν πρακτικές δυσκολίες που σχετίζονται με ανεπαρκή αριθμό εκπαιδευτικών, συχνές μετακινήσεις του εκπαιδευτικού προσωπικού και μειωμένη πρόσβαση σε υλικό, ψηφιακά μέσα και εξοπλισμό. Παρ' όλα αυτά τα τελευταία χρόνια οι εκπαιδευτικοί έχουν αποκτήσει αυξημένο ενδιαφέρον για συμμετοχή σε Ευρωπαϊκά δίκτυα σχολείων, για συνεργασία με άλλους συναδέλφους εντός και εκτός Ελλάδας και αναζητούν ευκαιρίες για βελτίωση των διδακτικών τους πρακτικών και σύνδεσή τους με την καλλιέργεια ικανοτήτων των μαθητών.

Τα σχολεία του Τυχερού ξεκίνησαν να συμμετέχουν στο ODS από την έναρξη της δεύτερης πιλοτικής φάσης (Σεπτέμβριος 2014) μετά από συμμετοχή τους σε εργαστήριο ανατροφοδότησης ('Practice reflection') που διοργανώθηκε στην περιοχή από τον Σχολικό Σύμβουλο κ. Χρήστο Γκοτζαρίδη

σε συνεργασία με την ομάδα της Ελληνογερμανικής Αγωγής. Στο εργαστήριο συμμετείχε η εκπαιδευτικός κ. Στέλλα Τρυφωνίδου, που είχε ήδη αυξημένο ενδιαφέρον για καινοτόμες δράσεις, και η οποία στη συνέχεια ενέπλεξε τα δύο σχολεία του Τυχερού στο δίκτυο του ODS. Στόχοι της συμμετοχής τους ήταν: α) Η βελτίωση της πρόσβασης του σχολείου σε περιεχόμενο από ψηφιακά αποθετήρια όπως το Open Science Resources και το Discover the Cosmos, (β) η αναζήτηση ευκαιριών για εφαρμογή ποικίλων καινοτόμων δράσεων, (γ) η συμμετοχή σε επιμορφώσεις εκπαιδευτικών.

Σε αυτό το πλαίσιο η κ. Τρυφωνίδου σχεδίασε τέσσερα εκπαιδευτικά σενάρια που βασίζονται στο διερευνητικό μοντέλο μάθησης και αξιοποιούν πηγές από τα παραπάνω αποθετήρια, όπως και το εργαλείο δημιουργίας εκπαιδευτικών σεναρίων του ODS. Κάποια από αυτά έχουν ήδη εφαρμοστεί στα σχολεία του Τυχερού, ενώ άλλα εξακολουθούν να εξελίσσονται (Φεβρουάριος 2015).

Το πρώτο σενάριο εφαρμόστηκε με μαθητές

Α΄ Λυκείου στο Λύκειο του Τυχερού και έχει τίτλο «Pacman με Scratch». Η βασική ιδέα είναι η ανάπτυξη μιας εφαρμογής σε περιβάλλον οπτικού προγραμματισμού, όπως το Scratch. Οι μαθητές δουλεύοντας σε ομάδες σχεδίασαν την εφαρμογή και την υλοποίησαν μέσω του Scratch. Στη συνέχεια την εφάρμοσαν και την αξιολόγησαν, ενώ ακολούθησε παρουσίαση στην τοπική κοινότητα καθώς και στο Πανελλήνιο Φεστιβάλ Ψηφιακής Δημιουργικότητας. Το σενάριο είναι διαθέσιμο στην πλατφόρμα του ODS, στην κοινότητα του προγραμματισμού μέσω Scratch http://portal.opendiscoveryspace. eu/community/senaria-didaskalias-se-perivallonta-optikoy-programmatismoy-me-plakidia-668762

Το δεύτερο σενάριο εφαρμόστηκε στο Λύκειο Τυχερού το σχολικό έτος 2014-15 (α΄ τετράμηνο), στα πλαίσια του μαθήματος Ερευνητικής Εργασίας Α΄ Λυκείου. Κεντρική ιδέα του σεναρίου είναι οι μαθητές εργαζόμενοι με τη μέθοδο Project να κατασκευάσουν υπό κλίμακα ένα ομοίωμα της Πυραμίδας του Χέοπα και να μετρήσουν το ύψος της, ακολουθώντας τη μέθοδο που εφάρμοσε ο Θαλής τον 6ο αιώνα π.Χ. Το τελικό σενάριο βασίστηκε σε ένα ήδη υπάρχον το οποίο η εκπαιδευτικός του Τυχερού προσάρμοσε στη δική της τάξη http://www. osrportal.eu/el/node/95028.

Το τρίτο σενάριο εφαρμόστηκε στο Λύκειο Τυχερού το σχολικό έτος 2014-15 ως project μικρής διάρκειας στα πλαίσια του μαθήματος Τεχνολογία Επικοινωνιών Β΄ Τεχν. Λυκείου. Αφορμή υπήρξε η δράση το «Πείραμα του Ερατοσθένη» http://eratosthenes.ea.gr/, που διοργάνωσε το πρόγραμμα Inspiring Science Education με την υποστήριξη του ODS τον Μάρτιο του 2014 με συμμετοχή 350 σχολείων από 37 χώρες. Για την υλοποίησή του χρησιμοποιήθηκε το προϋπάρχον εκπαιδευτικό σενάριο «Το πείραμα του Ερατοσθένη» http://www. osrportal.eu/el/node/94691, το οποίο επίσης προσαρμόστηκε στις ανάγκες του συγκεκριμένου σχολείου.

Τέλος, **το τέταρτο σενάριο** εφαρμόζεται τη σχολική χρονιά 2014-15 στο Γυμνάσιο Τυχερού, στα πλαίσια του μαθήματος της Τεχνολογίας. Κεντρική ιδέα είναι οι μαθητές να εξοικειωθούν με τις βασικές έννοιες της αστρονομίας εστιάζοντας στο Ηλιακό Σύστημα και να προετοιμαστούν για τη σύνδεση με το ρομποτικό τηλεσκόπιο Faulkes που θα ακολουθήσει. Επίσης, θα κατασκευάσουν εργαζόμενοι σε ομάδες μοντέλο του ηλιακού συστήματος, μοντέλο Γη-Σελήνης –Τεχνητού Δορυφόρου και Τηλεσκόπιο. Στο τέλος θα εκπονήσουν την γραπτή τους εργασία σε μορφή wiki.

Παρ' ότι η εφαρμογή και αποτίμηση της αποτελεσματικότητας των παραπάνω δράσεων είναι ακόμα σε εξέλιξη, ορισμένες παρατηρήσεις που έχουν διατυπωθεί από την εκπαιδευτικό από την μέχρι τώρα εφαρμογή τους περιλαμβάνουν: αυξημένο ενδιαφέρον από τους μαθητές, μεγαλύτερη ικανοποίηση από τη βιωματική μάθηση σε σύγκριση με τη συμβατική διδασκαλία και μέσω αυτής περισσότερες δυνατότητες για επίτευξη μαθησιακών στόχων. Οι μαθητές απαλλάσσονται από το άγχος της απόδοσης, νιώθουν ότι δεν θα βαθμολογηθούν, δεν προσπαθούν να αποδείξουν ότι κατέχουν τη γνώση, αλλά αντιθέτως έχουν το χρόνο να αναρωτηθούν, να θυμηθούν, να ανακαλέσουν, να υποθέσουν, να διαφωνήσουν, να υποστηρίξουν, να αξιολογήσουν. Παρατηρήθηκε επίσης βελτίωση σε θέματα διαχείρισης χρόνου και ευρύτερης ανάπτυξης ικανοτήτων των παιδιών, όπως ανάληψη πρωτοβουλίας

και εκούσια συμμετοχή τους σε τέτοιες δράσεις πέραν του σχολικού χρόνου. Οι ψηφιακές πηγές που χρησιμοποιήθηκαν αναφέρονται επίσης ως σημαντικές στην υποστήριξη από άποψης επιστημονικής γνώσης, εμπνέοντας ταυτόχρονα περισσότερη δημιουργικότητα για ευρύτερη ανάπτυξη και άλλων πηγών από την εκπαιδευτικό.

Περισσότερα σχετικά με τον αντίκτυπο που έχει η εφαρμογή των δράσεων αυτών στα σχολεία του Τυχερού θα παρουσιαστούν από την κ. Τρυφωνίδου σε Πανευρωπαϊκό Συνέδριο που διοργανώνει το ODS στις Βρυξέλλες τον Απρίλιο 2015.

Συμπεράσματα/επισημάνσεις

Συνοπτικά η έως τώρα εμπειρία από την εφαρμογή του ODS στην Ελλάδα έχει δείξει ότι πρακτικές, όπως αυτές που περιγράφηκαν παραπάνω μπορούν να έχουν θετικό αποτέλεσμα στη δέσμευση των σχολείων σε μία πρωτοβουλία που προωθεί τη σχολική καινοτομία και στην κατά το δυνατό μεγαλύτερη αξιοποίηση των ευκαιριών που ένα καινοτόμο πρόγραμμα τους παρέχει:

- Η προσέγγιση του ODS, βάσει του μοντέλου καινοτομίας του, που θεωρεί τον εκπαιδευτικό και το σχολείο ως ικανούς να εισαγάγουν τη σχολική καινοτομία μπορεί να παρουσιάσει ιδιαίτερες προκλήσεις, ιδιαίτερα σε χώρες με ενιαίο Αναλυτικό Πρόγραμμα και κεντρικά διοικούμενο εκπαιδευτικό σύστημα. Η παροχή προσωπικής και εξατομικευμένης υποστήριξης είναι κρίσιμη για την υποστήριξη των σχολείων, ώστε να αναπτύξουν τη δική τους στρατηγική καινοτομίας και να πεισθούν ότι έχουν τη δυνατότητα και τα εργαλεία για να βελτιώσουν τη σχολική πραγματικότητα.
- Προς την ίδια κατεύθυνση, η συνεργασία με φορείς εκπαιδευτικής πολιτικής σε τοπικό ή κεντρικό επίπεδο είναι ιδιαίτερα σημαντική για τη δημιουργία κλίματος ασφάλειας και εμπιστοσύνης για τα σχολεία που επιθυμούν να υιοθετήσουν καινοτόμες πρακτικές.
- Ευκαιρίες για διάχυση παραδειγμάτων και περιπτώσεων εκπαιδευτικών και σχολείων στο τοπικό ή και ευρύτερο περιβάλλον (π.χ. παρουσιάσεις από τους ίδιους τους εκπαιδευτικούς σε συνέδρια, εργαστήρια, ΜΜΕ) μπορούν να επιδράσουν πολύ θετικά στην κινητοποίηση των σχολείων και στην αναγνώριση των προσπαθειών τους. Ταυτόχρονα μπορούν να δράσουν πολλαπλασιαστικά και να λειτουργήσουν ως πηγές έμπνευσης για άλλους εκπαιδευτικούς και σχολεία.
- Τέλος, είναι σημαντική η προώθηση τακτικών δράσεων δικτύωσης που φέρνουν κοντά εκπαιδευτικούς με διαφορετικές εμπειρίες, έτσι ώστε να καλλιεργείται η αίσθηση της συνεργασίας μέσα σε μια κοινότητα με κοινό όραμα και στόχους, τα οποία αποτελούν και προϋποθέσεις για την ψηφιακή δικτύωση και συνεργασία μέσω μιας πλατφόρμας όπως του ODS.

Μεθοδολογία εισαγωγής της Καινοτομίας στη Σχολική Μονάδα.
Στάδια εξέλιξης σχολικής μονάδας

Στο σημείο αυτό παρουσιάζεται η μεθοδολογία και ταεργαλεία που διαθέτει το Open Discovery Space στο πλαίσιο εισαγωγής της Καινοτομίας στη Σχολική Μονάδα για την καταγραφής της εξέλιξης των σχολικών μονάδων. (βλ. επίσης Αποτίμηση της «ψηφιακής ωριμότητας» του σχολείου σας)

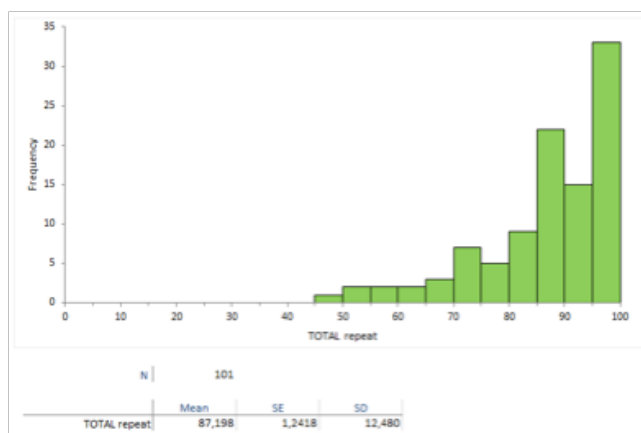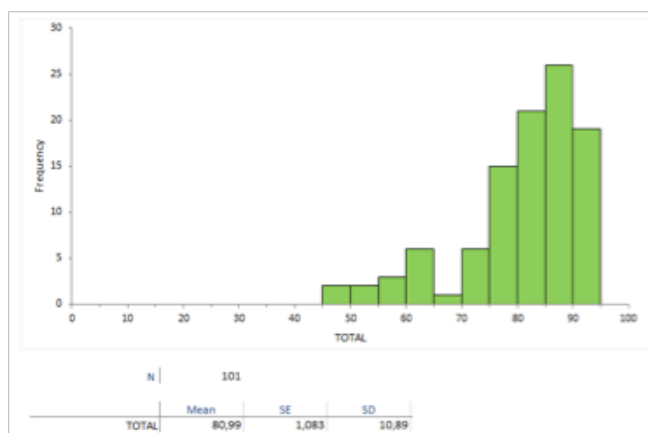|		Στάδια εξέλιξης σχολικής μονάδας (στάδια αποτίμησης ψηφιακής ωριμότητας σχολικής μονάδας)			
Εστίαση	Βασικές ιδέες	Αρχικό στάδιο	Υποβοηθούμενο στάδιο	Αυτάρκες στάδιο	Ψηφιακά ώριμο στάδιο
Γνώση τεχνολογίας	Η επίδραση της ταχείας ανάπτυξης της γνώσης και πληροφορίας στη διδασκαλία και τη μάθηση από τεχνολογική άποψη	Γενική αντίληψη του τρόπου με τον οποίο η τεχνολογία μπορεί να συντελέσει στη βελτίωση της διδασκαλίας και της μάθησης	Κατανόηση των μεθοδολογιών ένταξης των ΤΠΕ στο αναλυτικό πρόγραμμα σπουδών	Κατανόηση του τρόπου με τον οποίο οι ΤΠΕ μπορούν να έχουν θετικό αντίκτυπο στη μάθηση	Σχεδίαση μεθοδολογιών για ένταξη των ΤΠΕ στη μάθηση
Κινητοποίηση	Γνώση των παγκόσμιων και των τοπικών αναγκών και προκλήσεων όσον αφορά τη χρήση των ΤΠΕ και την εξοικείωση με αυτές	Δημιουργείται ένα αρχικό σχέδιο για τις βασικές υπάρχουσες ανάγκες του σχολείου, το οποίο θα ανταποκρίνεται σε όλες τις βασικές ανάγκες όσον αφορά τον εξοπλισμό, την επαγγελματική ανάπτυξη και την υιοθέτησή τους στο μαθησιακό περιβάλλον.	Τα σχολεία με τις ήδη υπάρχουσες υποδομές ΤΠΕ αρχίζουν να σχεδιάζουν τις απαραίτητες ευκαιρίες επαγγελματικής ανάπτυξης και εφαρμογής στο πλαίσιο του προγράμματος μαθημάτων.	Το αυτάρκες σχολείο όσον αφορά τις ΤΠΕ θα χαρτογραφήσει τις υπάρχουσες ευκαιρίες στη σχολική κοινότητα για τη συμμετοχή σε έργα ανταλλαγής και να βελτιώσει τις μαθησιακές εμπειρίες όπως τη χρήση πραγματικής έρευνας στην τάξη.	Οι ευκαιρίες που προσφέρονται από τις Ανοικτές Εκπαιδευτικές Πηγές και τα Μαζικά Ανοικτά Διαδικτυακά Μαθήματα χαρτογραφούνται και χτίζεται ένα όραμα για την ενσωμάτωσή τους στο μαθησιακό περιβάλλον. Το σχολείο μπορεί να δοκιμάσει καινοτόμα μοντέλα που έχουν ως επίκεντρο τον μαθητή.
	Έρευνα για αναζήτηση παραδειγμάτων βέλτιστων πρακτικών	Το σχέδιο που έχει διαμορφωθεί στο πρώτο βήμα περιέχει πλέον υπάρχοντα παραδείγματα βέλτιστων πρακτικών προκειμένου να σχεδιαστεί όλη η διαδικασία εφαρμογής.	Τα παραδείγματα βέλτιστων πρακτικών ενσωματώνονται σε αυτό το στάδιο και οι εκπαιδευτικοί συμμετέχουν σε πραγματικές ασκήσεις εφαρμογής.	Σε αυτό το στάδιο προβλέπεται η διερεύνηση των ευκαιριών έρευνας και συμμετοχής των μαθητών σε πραγματικά ερευνητικά έργα .	Δημιουργούνται καινοτόμες εμπειρίες που βασίζονται σε υπάρχοντα παραδείγματα βέλτιστων πρακτικών ή νέες ευκαιρίες που εμπλέκουν τους μαθητές σε εξελιγμένες και δημιουργικές εκπαιδευτικές - ερευνητικές εμπειρίες.
	Εύρεση καινοτόμων παραδειγμάτων και συνεργατών	Σε αυτό το στάδιο προτείνονται οι συνεργασίες με άλλες σχολικές μονάδες που έχουν ήδη μπει στο δρόμο της καινοτομίας.	Θα πρέπει να γίνουν συνεργασίες ανάμεσα στα σχολεία όπου οι εκπαιδευτικοί μπορούν να εφαρμόσουν επιτυχημένα παραδείγματα που έχουν δοκιμαστεί στην τάξη.	Το σχολείο μπορεί για παράδειγμα να συμμετέχει σε δράσεις πραγματικής έρευνας με την υποστήριξη διάφορων οργανισμών που προωθούν τέτοιες πρωτοβουλίες.	Τα σχολεία μπορούν να σχεδιάσουν τα δικά τους πειράματα και να κάνουν τους μαθητές να συμμετέχουν στην ανάπτυξη των δικών τους έργων που προωθούν - μεταξύ άλλων- την ικανότητα επιχειρηματικότητας και καινοτομίας.

	Συμμετοχή της τοπικής κοινωνίας	Το σχολείο και η τοπική κοινότητα διαδραματίζουν σημαντικό ρόλο στη διασφάλιση της πραγματοποίησης του σχεδίου δράσης που έχει καταρτιστεί στο πρώτο στάδιο. Πρόκειται για τους διαμεσολαβητές και τους βασικούς παίκτες σε αυτό το στάδιο.	Η σχολική κοινότητα είναι ιδανική για την ανταλλαγή καλών παραδειγμάτων μεταξύ των μαθητών πάνω στο ίδιο γνωστικό αντικείμενο ή για ανταλλαγή και συνεργασία μεταξύ διαφορετικών τάξεων και γνωστικών αντικειμένων.	Η τοπική κοινότητα μπορεί να διαδραματίσει πολύ σημαντικό ρόλο σε αυτό το στάδιο, ειδικά όταν οι εμπλεκόμενοι υποστηρίζουν το όραμα του σχολείου σχετικά με την υιοθέτηση καινοτόμων μεθόδων και λύσεων.	Το σχολείο και οι τοπικές κοινότητες μπορούν να είναι φορείς αλλαγής σε αυτό το στάδιο και θα μπορούσαν/ θα έπρεπε να υποστηρίζουν όλο το εγχείρημα.
	Δεκτικότητα στις νέες ιδέες	Τα σχολεία θα πρέπει να είναι ανοικτά στη χρήση των ΤΠΕ για την αναβάθμιση της διαδικασίας μάθησης και διδασκαλίας,	Τα σχολεία θα πρέπει να γνωρίζουν τις νέες ιδέες και τις τάσεις στον τομέα της εκπαίδευσης που βασίζεται στις ΤΠΕ.	Νέες μορφές μαθησιακού περιβάλλοντος εμφανίζονται και το σχολείο που είναι ηλεκτρονικά αυτάρκες όσον αφορά τις ΤΠΕ θα πρέπει να εκμεταλλευτεί τα εξελιγμένα παραδείγματα βέλτιστων πρακτικών στο χώρο της εκπαίδευσης.	Τα ψηφιακά ώριμα σχολεία είναι τα πλέον κατάλληλα για να δοκιμάσουν νέες ιδέες και να φέρουν την αλλαγή στο χώρο της εκπαίδευσης
	Εύρεση αποτελεσματικών διαύλων επικοινωνίας	Ολόκληρη η σχολική κοινότητα θα πρέπει να εμπλέκεται στις αλλαγές που προβλέπονται και να ενημερώνεται συνεχώς για τις εξελίξεις που λαμβάνουν χώρα.	Η επικοινωνία από την κορυφή προς τη βάση και το αντίθετο θα πρέπει να λαμβάνει χώρα σε όλα τα στάδια για τον επανασχεδιασμό της χρήσης των υφιστάμενων λειτουργιών και ρόλων των διαφορετικών εμπλεκομένων.	Τα ψηφιακά αυτάρκη σχολεία καινοτομούν πιο γρήγορα και νέες λύσεις εμφανίζονται σε διαφορετικούς τομείς. Σωστοί δίαυλοι επικοινωνίας πρέπει να σχεδιαστούν ώστε να διασφαλιστεί η μέγιστη αξιοποίηση των καλών αποτελεσμάτων.	Τα ψηφιακά ώριμα σχολεία μπορούν να χρησιμοποιούν μοντέρνους διαύλους, ώστε να διασφαλίζουν άμεση επικοινωνία μεταξύ όλων των ομάδων που προωθούν την καινοτομία στο σχολείο.
Δοκιμές	Επίπεδο ικανότητας του σχολείου όσον αφορά τις δοκιμές σε πραγματικές συνθήκες	Οι εκπαιδευτικοί γνωρίζουν γενικά πώς να χρησιμοποιούν υπολογιστές αλλά δεν είναι κάτι που το χρησιμοποιούν στις καθημερινές σχολικές δραστηριότητες. Δεν υπάρχει κάποιο πρόγραμμα ανάπτυξης προγράμματος μαθημάτων ή ηλεκτρονικής μάθησης ή κάποια συστηματική κατάρτιση των εκπαιδευτικών. Υπάρχει περιορισμένη πρόσβαση σε ηλεκτρονικούς μαθησιακούς πόρους. Στην τάξη επικρατεί η διδακτική/μαθησιακή μέθοδος συμπεριφοριστικού τύπου "Drill & Practice". Η κοινότητα (γονείς κ.α.) δεν ενημερώνεται/ δεν συμμετέχει στις εκπαιδευτικές δραστηριότητες.	Κάποιες εμπειρίες σχετικά με τη χρήση των εργαλείων ΤΠΕ στην τάξη. Ομαδική εργασία και ενεργά μαθησιακά στοιχεία χρησιμοποιούνται στην τάξη. Αύξηση της αυτοπεποίθησης των εκπαιδευτικών όσον αφορά τη χρήση των νέων μαθησιακών μεθόδων. Οι εκπαιδευτικοί αρχίζουν να μοιράζονται τις μαθησιακές ιδέες μεταξύ τους και να ενημερώνουν τους γονείς.	Τα αυτάρκη σχολεία σε επίπεδο ΤΠΕ χρησιμοποιούν νέες μεθοδολογίες μάθησης που επικεντρώνονται στην ενεργό συμμετοχή των μαθητών. Ακολουθείται πρόγραμμα ανάπτυξης και σχέδιο δράσης. Το σχολείο συμμετέχει σε διαδικτυακές δραστηριότητες κατάρτισης και δέχεται καθοδήγηση/ συντονισμό για πιο απλές δραστηριότητες. Το σχολείο προσπαθεί ενεργά να οικοδομήσει καλές σχέσεις με τους γονείς και την κοινότητα που περιβάλλει το σχολείο.	Οι εκπαιδευτικοί ή το σχολείο έχουν εκτενή εμπειρία στη χρήση νέων μαθησιακών μεθοδολογιών και ΤΠΕ και έχουν συμμετάσχει σε συνεργατικές διαδικτυακές μαθησιακές δραστηριότητες και ερευνητικά έργα. Οι εκπαιδευτικοί διαθέτουν εμπειρία και κατανόηση σχετικά με πολιτισμικές διαφορές ανάμεσα στις χώρες που εμπλέκονται σε δράσεις διασχολικής συνεργασίας.

Εμπέδωση	Επίπεδο πολυπλοκότητας των δοκιμών σε πραγματικές συνθήκες Βιωσιμότητα	Σχεδιασμός σχεδίου ανάπτυξης ηλεκτρονικής μάθησης και προγράμματος κατάρτισης Εστίαση σε βραχυπρόθεσμο επίπεδο	Συμμετοχή σε ενδοσχολικές, ενδοπεριφερειακές μαθησιακές εκδηλώσεις και Εστίαση σε μεσοπρόθεσμο επίπεδο	Δοκιμές σε πραγματικές συνθήκες σε τοπικό Εστίαση σε μακροπρόθεσμο επίπεδο	Συμμετοχή σε διαφορετικές διαδικτυακές Εστίαση στην οργανική κοινότητα προκειμένου να αυτορρυθμιστεί.
	Δράση	Παροχή τυπικής μεθόδου αξιολόγησης και περιορισμένης ανατροφοδότησης	Βελτίωση των τυπικών μεθόδων αξιολόγησης και της ανατροφοδότησης	Παροχή πεδίου δράσης για αυτοαξιολόγηση	Χρήση ψηφιακών πόρων για μαθητές με στόχο την αλληλεπίδραση και παροχή ανατροφοδότησης
	Υποστήριξη	Αναζήτηση υποστήριξης στο πλαίσιο οργάνωσης σεμιναρίων	Αναζήτηση υποστήριξης από τον δημιουργό/ συγγραφέα των πόρων	Αναζήτηση υποστήριξης από την ψηφιακή κοινότητα	Παροχή υποστήριξης σε μια κοινότητα
	Προσαρμογή στο περιβάλλον του σχολείου	Χρήση πόρων που είναι διαθέσιμοι	Προσαρμογή μικρής κλίμακας σε πόρους που είναι διαθέσιμοι	Προσαρμογή μεγάλης κλίμακας σε πόρους που είναι διαθέσιμοι	Συνεισφορά στην κοινότητα με καθοδήγηση και υποστήριξη για επιτυχή προσαρμογή
	Ευελιξία	Άμεση χρήση των πόρων που έχουν μεταφορτωθεί από τη δικτυακή πύλη του ODS	Αλλαγές μικρής κλίμακας σε πόρους που έχουν μεταφορτωθεί	Αλλαγές μεγάλης κλίμακας σε πόρους που έχουν μεταφορτωθεί	Σχεδίαση νέου εκπαιδευτικού περιεχομένου
Σενάρια					
Διάχυση	Διάδοση και διάχυση	Οι διευθυντές οργανώνουν παρουσιάσεις και σεμινάρια σχετικά με το ODS. Επίσης, ορίζουν μια ομάδα ηλεκτρονικής μάθησης ODS.	Η ομάδα ηλεκτρονικής μάθησης ODS αναπτύσσει με τη βοήθεια του διευθυντή όραμα για την ένταξη των ΤΠΕ και τη γενικότερη ανάπτυξη του σχολείου.	Το όραμα γύρω από την ηλεκτρονική μάθηση ενσωματώνεται στο πρόγραμμα σπουδών.	Η ηλεκτρονική μάθηση εφαρμόζεται στην τάξη και χρησιμοποιείται τόσο από τους μαθητές όσο και από τους εκπαιδευτικούς.
	Παροχή κινήτρων	Οι διευθυντές αναζητούν χρηματοδότηση για την υποστήριξη της κατάρτισης και ανάπτυξης του εκπαιδευτικού προσωπικού του σχολείου.	Οι εκπαιδευτικοί που έχουν παρακολουθήσει την κατάρτιση καταρτίζουν με τη σειρά τους τους ενδιαφερόμενους εκπαιδευτικούς ενδοσχολικά.	Όλοι οι εκπαιδευτικοί καταρτίζονται ώστε να χρησιμοποιούν συστήματα/εργαλεία ηλεκτρονικής μάθησης.	Οι εκπαιδευτικοί εφαρμόζουν πρακτικές και εργαλεία ηλεκτρονικής μάθησης στην τάξη τους και προετοιμάζουν δοκιμαστικά μαθήματα/σενάρια στο πλαίσιο της επαγγελματικής τους ανάπτυξης.

Πίνακας 1. Παράμετροι μελέτης και καταγραφής του μοντέλου σχολικής καινοτομίας του Open Discovery Space και στάδια εξέλιξης σχολικής μονάδας ως προς την αξιοποίηση των ΤΠΕ (Πηγή: http://www.pdsttechnologyineducation. ie/en/Planning/e-Learning-Roadmap/English-version.pdf)

Ο Πίνακας 1 παρουσιάζει παραμέτρους μελέτης και καταγραφής του μοντέλου σχολικής καινοτομίας του Open Discovery Space,καθώς και τα στάδια εξέλιξης της σχολικής μονάδας. Στο πλαίσιο του Open Discovery Space μελετήθηκε η εφαρμογή του μοντέλου καινοτομίας σε ένα δείγμα 100 σχολείων από όλη την Ευρώπη και η εξέλιξη τους για μία ολόκληρη σχολική χρονιά, κατά την οποία υποστηρίχθηκε το έργο των εκπαιδευτικών και η διοργάνωση σειράς καινοτόμων δραστηριοτήτων στα σχολεία αυτά. Παρατηρήθηκε σημαντική βελτίωση στην απόδοση των σχολείων αυτών όσον αφορά την εισαγωγή της καινοτομίας και την ανάπτυξη «ψηφιακής» κουλτούρας, η οποία που κρίνεται απαραίτητη για την εξέλιξη του σχολείου σε έναν σύγχρονο οργανισμό μάθησης που ανταποκρίνεται τις ανάγκες του κάθε μαθητή.

Εικόνα 2: Η Ελληνογερμανική Αγωγή υποστήριξε συστηματικά την εισαγωγή της εκπαιδευτικής καινοτομίας σε 100 σχολικές μονάδες στην Ευρώπη για χρονικό διάστημα ενός έτους (2013-2014). Τα σχολεία αυτά σημείωσαν σημαντική βελτίωση στην εισαγωγή της καινοτομίας και την ανάπτυξη «ψηφιακής» κουλτούρας σε όλες τις λειτουργίες τους, εκπαιδευτικές, επιμορφωτικές και οργανωτικές.

Εγχειρίδιο για τη διεύθυνση του Σχολείου: Σχετικά θέματα

OPEN DISCOVERY SPACE

Εγχειρίδιο για τη διεύθυνση του Σχολείου: Αξιολόγηση των αναγκών του σχολείου σας και κατάρτιση Σχεδίου Δράσης

Η έννοια της καινοτομίας στα σχολεία διαφέρει κατά πολύ ανάλογα με τη χώρα, το εκπαιδευτικό σύστημα, τα επίπεδα σχολικής αυτονομίας, τις κοινότητες, το κοινωνικο-οικονομικό περιβάλλον, το περιβάλλον και προφίλ του σχολείου. Για να είναι εποικοδομητική η αλλαγή, είναι σημαντικό να αξιολογηθεί η τρέχουσα κατάσταση, η ανοικτότητα στην καινοτομία και ποιες είναι οι ανάγκες του σχολείου και του προσωπικού, ώστε να σχεδιαστεί μετέπειτα ένα σχέδιο δράσης. Το Open Discovery Space σας προσφέρει εργαλεία που θα σας βοηθήσουν να αξιολογήσετε την τρέχουσα κατάσταση και να θέσετε σαφείς στόχους σε βασικούς τομείς που θεωρούνται σημαντικοί για τη συνολική ανάπτυξη του σχολείου ως ανοικτή κοινότητα μάθησης. Αυτό θα σας βοηθήσει να προχωρήσετε σε σταδιακές και βιώσιμες αλλαγές που ταιριάζουν στις προτεραιότητές σας. Το στάδιο της κινητοποίησης είναι ένα από τα πιο σημαντικά όσον αφορά τη δημιουργία μιας κοινότητας που θα υποστηρίξει τις δοκιμές, θα εφαρμόσει πιλοτικά τα σενάρια, θα πιστοποιήσει και θα αξιολογήσει τη χρησιμότητα και τον αντίκτυπο των καινοτόμων προτάσεων. Επομένως είναι σημαντικό σε αυτό το στάδιο να συμπεριληφθούν όλοι οι συμμετέχοντες στις διάφορες προβλεπόμενες δραστηριότητες. Το αίσθημα της κυριότητας/ιδιοκτησίας αποτελεί πολύ σημαντικό κίνητρο και ένα βήμα προς τη βιωσιμότητα των αλλαγών, ώστε να είναι επιτυχείς.

ΒΗΜΑ 1
Αποτίμηση της «ψηφιακής ωριμότητας» του σχολείου σας

Αναφορικά με την τρέχουσα εξοικείω-ση του σχολείου σας με τις Τεχνολογί-ες Πληροφορικής και Επικοινωνιών, το πρώτο βήμα είναι η ανάδειξη των δυνα-τών σημείων και των αδυναμιών.

Το Open Discovery Space σας προσφέ-ρει ένα ερωτηματολόγιο αυτοαξιολό-γησης της ψηφιακής ωριμότητας για το σκοπό αυτό. Η έρευνα προσαρμόστη-κε βάσει του έργου που πραγματοποι-ήθηκε στην Ιρλανδία, στο πλαίσιο του προγράμματος για τα Ψηφιακά Σχολεία «Digital Schools of Distinction». Το πα-ρεχόμενο ερωτηματολόγιο είχε συμπλη-ρωθεί από περισσότερα από 800 σχο-λεία σε όλη την Ευρώπη μέχρι τον Ιούνιο του 2014, ενώ υιοθετείται σταδιακά ως εθνικό εργαλείο αξιολόγησης σε χώρες όπως η Κροατία και η Βουλγαρία. Στο πλαίσιο αυτό ο όρος ΤΠΕ χρησιμοποιεί-ται για να υποδείξει τη χρήση των Τεχνο-λογιών Πληροφορικής και Επικοινωνιών γενικότερα στην εκπαίδευση με έμφαση στις εφαρμογές ηλεκτρονικής μάθησης για τη διδασκαλία και τη μάθηση.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Σκεφτείτε ποια μέλη του διδακτικού προσωπικού πρέπει να συμβουλευτείτε πριν συμπληρώσετε το ερωτηματολόγιο. Προσπαθήστε να εμπλέξετε όσο περισσότερα μέλη μπορείτε π.χ. εκπαιδευτικούς διαφόρων ειδικοτήτων, από διαφορετικές βαθμίδες, με διαφορετική ηλικία και διδακτική εμπειρία. Εκτός από την απόκτηση μιας ολιστικής εικόνας για την τρέχουσα ψηφιακή ωριμότητα (e-maturity) του σχολείου σας, ζητώντας τη γνώμη τους εξαρχής θα τους εμπλέξετε και θα μπορέσετε να οικοδομήσετε ένα κοινό όραμα.

• Να είστε όσο πιο ακριβείς γίνεται. Η έρευνα αποσκοπεί αποκλειστικά στο να σας βοηθήσει να αυτό-αξιολογηθείτε και να βελτιώσετε το σχολείο σας και δεν χρησιμοποιείται ως εξωτερική αξιολόγηση.

Κάντε το τεστ για να αξιολογήσετε το τρέχον επίπεδο της ψηφιακής ωριμότητας του σχολείου σας σε 5 συγκεκριμένες παραμέτρους:

1. **Ηγεσία και όραμα:** Υιοθέτηση μιας πολιτικής ΤΠΕ που αφορά όλο το σχολείο και τονίζει την ύπαρξη οράματος και στρατηγικής, ενώ δείχνει μια θετική αντιμετώπιση στη χρήση ΤΠΕ στο σχολείο σας. Η πολιτική αυτή στοχεύει στο πρόγραμμα μαθημάτων, το σχεδιασμό για δομημένη πρόσβαση σε ΤΠΕ για όλους και τη διαδικτυακή ασφάλεια.

2. **Οι ΤΠΕ στο πρόγραμμα μαθημάτων:** Ένταξη των ΤΠΕ στο πρόγραμμα μαθημάτων για τη μάθηση και τη διδασκαλία, και κατανόηση εκ μέρους του προσωπικού του τρόπου με τον οποίο μπορούν να χρησιμοποιηθούν οι ΤΠΕ στο πρόγραμμα μαθημάτων για να βελτιωθεί η μάθηση.

3. **Σχολική κουλτούρα ΤΠΕ:** Συνειδητοποίηση ότι οι ΤΠΕ έχουν αντίκτυπο στην ποιότητα της μάθησης και της διδασκαλίας, στη στάση και τις συμπεριφορές των μαθητών και την ευρύτερη σχολική κοινότητα.

4. **Επαγγελματική ανάπτυξη:** Στοιχεία που αποδεικνύουν τη δέσμευση του σχολείου στη διαρκή επαγγελματική ανάπτυξη σχετικά με τις ΤΠΕ.

5. **Πόροι και υποδομές:** Πρόσβαση στους κατάλληλους πόρους ΤΠΕ που επιτρέπει να υποστηριχθούν συγκεκριμένα περιβάλλοντα μάθησης και στοιχεία που αποδεικνύουν ότι το σχολείο έχει αναπτύξει τους κατάλληλους πόρους ΤΠΕ που αντανακλούν ένα σχέδιο για μελλοντική βελτίωση και ανάπτυξη των ΤΠΕ, όπως τονίζεται στην πολιτική για όλο το σχολείο.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Κρατήστε τα αποτελέσματα και κοινοποιήστε τα στο υπόλοιπο διδακτικό προσωπικό. Χρησιμοποιήστε τα ως αφορμή για προβληματισμό και εντοπίστε τα δυνατά σημεία και τις αδυναμίες.

• Επαναλάβατε την έρευνα 6 μήνες μετά και παρακολουθήστε τυχόν αλλαγές. Ποια βήματα και ποιες δραστηριότητες από αυτές που πραγματοποιήσατε φαίνεται ότι έκαναν κάποια διαφορά;

ΒΗΜΑ 2
Αυτο-αξιολόγηση ατομικού προφίλ ικανοτήτων

Ενώ επιδιώκεται η ανάπτυξη του σχολείου ως οργανισμού, η επαγγελματική ανάπτυξη των εκπαιδευτικών πρέπει επίσης να αποτελεί στόχο προκειμένου να επιτευχθούν διαρκείς αλλαγές στην ποιότητα διδασκαλίας και μάθησης. Η πύλη του Open Discovery Space προσφέρει στο διδακτικό προσωπικό και σε εσάς ένα εργαλείο αυτο-αξιολόγησης των ικανοτήτων σας βάσει του Πλαισίου Επάρκειας στις ΤΠΕ για Εκπαιδευτικούς της UNESCO (2011) «UNESCO ICT Competency Framework for Teachers».

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Συμπληρώστε πρώτα το προφίλ με τις ικανότητές σας και ενθαρρύνετε το διδακτικό προσωπικό να σας μιμηθεί. Ανάλογα με τον τρέχοντα βαθμό εμπιστοσύνης και συνεργασίας στο σχολείο σας, οργανώστε μια συνάντηση για να εξετάσετε και να συζητήσετε τα αποτελέσματα, χωρίς πίεση για αποκάλυψη ατομικών βαθμολογιών. Εστιάστε σε τομείς που το προσωπικό πρέπει να βελτιώσει περαιτέρω μέσω κατάρτισης.

• Εντοπίστε εθνικά και διεθνή προγράμματα κατάρτισης που καλύπτουν τις ανάγκες αυτές μέσω της πλατφόρμας του Open Discovery Space, π.χ. θερινά και χειμερινά σχολεία για εκπαιδευτικούς, τα οποία χρηματοδοτούνται μέσω του Erasmus+, δωρεάν διαδικτυακά σεμινάρια, υλικό στην Ακαδημία Κατάρτισης Εκπαιδευτικών (Teachers' Training Academy) και πόρους διαθέσιμους στις κοινότητες.

Το εργαλείο αναφέρεται σε ικανότητες γύρω από 6 βασικούς τομείς:

1. Κατανόηση χρήσης των ΤΠΕ στην εκπαίδευση
2. Αναλυτικό πρόγραμμα & αξιολόγηση
3. Παιδαγωγική
4. Εργαλεία ΤΠΕ
5. Οργάνωση και διοίκηση
6. Επαγγελματική ανάπτυξη εκπαιδευτικών.

Τα συνολικά αποτελέσματα υποδεικνύουν τρία (3) επίπεδα ικανοτήτων για τους εκπαιδευτικούς: Βασικός χρήστης, Προχωρημένος χρήστης και Σχεδιαστής/δημιουργός εκπαιδευτικού περιεχομένου με τη χρήση ΤΠΕ.

Περισσότερες πληροφορίες στη διεύθυνση: http://portal.opendiscoveryspace.eu/sites/default/files/manual/ODS_Introduction_on_how_to_join.pdf

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Αφιερώστε λίγο χρόνο να ρωτήσετε το προσωπικό για τις επαγγελματικές του φιλοδοξίες.
• Εντάξτε την κοινότητα του σχολείου σας στην πύλη του Open Discovery Space και αλληλεπιδράτε τακτικά με τους εκπαιδευτικούς του σχολείου σας για να αναπτύξετε περισσότερο τις ικανότητες ΤΠΕ όλων. Ενθαρρύνετέ τους να συμμετέχουν σε διαγωνισμούς που προωθούν ικανότητες ΤΠΕ, π.χ. στον ευρωπαϊκό διαγωνισμό σχεδίασης εκπαιδευτικού σεναρίου «Open Discovery Space Digital Educational Scenario Contest» http://www.ods-contests.eu/the-odscontest/rules-of-participation/.
νΠροτείνετε στο προσωπικό σας να χρησιμοποιεί το προφίλ ικανοτήτων ως εργαλείο που μπορεί να χρησιμοποιηθεί στο πλαίσιο των διαδικασιών παρακολούθησης του Erasmus+ σχετικά με τη συμμετοχή σε δραστηριότητες κατάρτισης εκπαιδευτικών.

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BHMA 2
Αυτο-αξιολόγηση ατομικού προφίλ ικανοτήτων

Αφού έχετε αξιολογήσει και επανεξετάσει τα αποτελέσματα της ηλεκτρονικής ωριμότητας του σχολείου και το προφίλ ικανοτήτων του προσωπικού, προχωρήστε στην ανάπτυξη ενός σχεδίου για τις μελλοντικές σας δραστηριότητες που θα στοχεύει στη βελτίωση του σχολείου σας στους τομείς που εντοπίσατε. Η ανάπτυξη ενός τέτοιου σχεδίου μπορεί να είναι κάτι ιδιαίτερα απαιτητικό για τα σχολεία, παρόλα αυτά οι ευρωπαϊκές πολιτικές εμπλέκουν σταδιακά τα σχολεία σε τέτοιες διαδικασίες, όπως το σχέδιο του Erasmus+, αντίστοιχο του «Ευρωπαϊκού Σχεδίου Σχολικής Ανάπτυξης» που ζητείται από τα σχολεία να συμπληρώσουν προκειμένου να χρηματοδοτηθούν για δραστηριότητες κινητικότητας προσωπικού (ΚΑ1). Το Open Discovery Space σάς παρέχει ένα αναλυτικό πρότυπο που σας βοηθά να θέσετε στόχους σε βασικούς τομείς που συνδέονται με τη σχολική καινοτομία.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Βεβαιωθείτε ότι έχετε συμπληρώσει πρώτα το ερωτηματολόγιο για την ψηφιακή ωριμότητα (Βήμα 1) και ότι έχετε κοινοποιήσει τα αποτελέσματα στο διδακτικό προσωπικό.

• Εμπλέξτε στη διαδικασία οικοδόμησης οράματος και κατάρτισης του σχεδίου δράσης όσο περισσότερα μέλη του προσωπικού μπορείτε. Εάν ανταποκριθούν μόνο ορισμένα μέλη, δημιουργήστε μια αφοσιωμένη ομάδα που θα συμμετέχει εθελοντικά.

• Αναγνωρίστε την αξία των ανθρώπινων πόρων σας: Βεβαιωθείτε ότι αναγνωρίζετε τα δυνατά σημεία και τις αδυναμίες κάθε μέλους της ομάδας (συμπεριλαμβανομένου του εαυτού σας) και αναθέστε σαφείς ρόλους. Σκεφτείτε προσεκτικά τη διαδικασία πριν αναθέσετε το βασικό ρόλο του εκπαιδευτικού που θα λειτουργεί ως φορέας αλλαγής. Συνιστάται να το συζητήσετε πρώτα με την ομάδα.

• Εμπλέξτε την ομάδα του διδακτικού προσωπικού στην κατάρτιση του σχεδίου δράσης και τη λήψη αποφάσεων. Ίσως χρειαστεί να πραγματοποιηθούν αρκετές συναντήσεις για την κατάρτιση και αναθεώρηση του σχεδίου σας.

• Να είστε σαφής σχετικά με το όραμα και να καλέσετε την ομάδα να συμβάλει στην οικοδόμησή του.

• Βεβαιωθείτε ότι το σχέδιο δράσης ανταποκρίνεται σε πραγματικές σχολικές ανάγκες.

• Προετοιμαστείτε: Σκεφτείτε πού θα θέσετε προτεραιότητες και πώς θα διασφαλίσετε ότι τυχόν οφέλη θα έχουν διάρκεια.

Συμπληρώνοντας το σχέδιο δράσης, διαμορφώνετε μια στρατηγική ανάπτυξης των πέντε παραμέτρων ψηφιακής ωριμότητας (βλ. ΒΗΜΑ 1) σε διάστημα δύο ετών, που περιλαμβάνει επίσης:

1. Συνεργασία με άλλα σχολεία, φορείς χάραξης πολιτικών, γονείς, την κοινότητα ή άλλους τοπικούς φορείς
2. Σχεδιασμό των δραστηριοτήτων που θα αναλάβει το σχολείο προκειμένου να επιτύχει τους στόχους του
3. Λήψη αποφάσεων σχετικά με τους τομείς του προγράμματος μαθημάτων τους οποίους θα αφορούν οι στόχοι ή άλλες πτυχές που σχετίζονται με την παιδαγωγική και την οργάνωση των σχολείων
4. Σχεδιασμός των πόρων και των εργαλείων που θα χρησιμοποιηθούν
5. Εκτίμηση της απαραίτητης παιδαγωγικής και τεχνικής υποστήριξης
6. Καταγραφή τυχόν εμποδίων και πρόβλεψη της υπέρβασής τους.

Σημειώσεις για τη Διεύθυνση του σχολείου:

• Κοινοποιήστε το σχέδιο δράσης σας στο υπόλοιπο διδακτικό προσωπικό, τους μαθητές, τους γονείς ή άλλους ενδιαφερόμενους και εξηγήστε με σαφήνεια τη λογική και τους στόχους του. Ζητήστε τη γνώμη τους και καλέστε τους να στηρίξουν την υλοποίηση του σχεδίου δράσης. Μπορείτε να δημιουργήσετε ακόμα και ένα πλαίσιο προτάσεων για να μπορούν οι μαθητές και οι εκπαιδευτικοί να σχολιάσουν την υλοποίηση των δραστηριοτήτων σας.

• Μεταφέρετε τυχόν δραστηριότητες, αποτελέσματα ή επιτεύγματα της υλοποίησης του σχεδίου δράσης σας στα τοπικά μέσα.

• Κατά τη διάρκεια της εφαρμογής των δραστηριοτήτων που έχετε σχεδιάσει, οργανώστε τακτικές συναντήσεις με την ομάδα για να βελτιώσετε, αν χρειαστεί, το σχέδιο δράσης.

• Επανεξετάστε το αρχικό σχέδιο δράσης σας στο τέλος του χρονοδιαγράμματος που είχατε θέσει: Τι πετύχατε; Τι θα κάνατε διαφορετικά; Ποια είναι τα επόμενα βήματα; Στην κοινότητα των φορέων αλλαγής στην πύλη του Open Discovery Space θα βρείτε χρήσιμους πόρους για την ανάπτυξη, καινοτομία και ηγεσία: http://portal.opendiscoveryspace.eu/educational-objects/70112

Ένα μοντέλο δημιουργίας επιτυχημένων Ψηφιακών Κοινοτήτων στο Open Discovery Space

OPEN DISCOVERY SPACE

Ένα μοντέλο δημιουργίας Επιτυχημένων Ψηφιακών Κοινοτήτων στο Open Discovery Space

Ο ρόλος των ψηφιακών κοινοτήτων πρακτικής & μάθησης στο σύγχρονο σχολείο εισαγωγή των νέων Τεχνολογιών Πληροφορίας & Επικοινωνίας (ΤΠΕ) στην εκπαίδευση δεν εξαντλείται στην αδιάλειπτη χρήση ψηφιακών εργαλείων και υλικού στην τάξη, ούτε, φυσικά, σε έναν φετιχισμό των εφαρμογών (educational apps). Η πραγματική αξία των ΤΠΕ αναδεικνύεται στην επανατοποθέτηση του δημιουργικού και καινοτόμου εκπαιδευτικού στο κέντρο της διαδικασίας της μάθησης και όχι στον παραγκωνισμό του από ένα ψηφιακό βοήθημα. Σε αυτή την κατεύθυνση κυρίαρχο ρόλο έχουν οι ψηφιακές κοινότητες πρακτικής και μάθησης. Αυτές οι κοινότητες είναι ένα πεδίο «ανοικτής πρόσβασης» όπου οι εκπαιδευτικοί δημιουργούν και συν-δημιουργούν περιεχόμενο, αξιολογούν συλλογικά εκπαιδευτικό υλικό, εργαλεία κλπ., μοιράζονται ψηφιακούς πόρους, δημιουργούν και συντηρούν θεματικές και σχολικές κοινότητες και ομάδες ψηφιακών συζητήσεων. Οι ευδοκιμούσες ψηφιακές κοινότητες πρακτικής και μάθησης διέπονται από εμπιστοσύνη και συμμετοχικότητα. Είναι ο «φυσικός» χώρος όπου τα μέλη όχι μόνο αποκομίζουν δεξιότητες, αλλά μεταφέρουν το όραμά τους για το σχολείο, αλλά και τους φόβους τους ή τα παράπονά τους για ό,τι στέκεται εμπόδιο στο δύσκολο ρόλο τους. Υπό προϋποθέσεις, μετατρέπονται σε ομάδες πίεσης προς την κατεύθυνση των αναγκαίων αλλαγών τόσο σε επίπεδο παγιωμένων νοοτροπιών όσο και εκπαιδευτικής πολιτικής. Το σημαντικότερο όμως πλεονέκτημα αυτών των κοινοτήτων είναι η εν δυνάμει μετατροπή τους σε ψηφιακές ακαδημίες εκπαιδευτικών. Και αυτό γιατί, η ταχύτητα με την οποία ενσωματώνουν και εξελίσσουν νέες παιδαγωγικές προσεγγίσεις, εργαλεία, καλές πρακτικές, καινοτόμες και συνεργατικές δράσεις, πρωτοβουλίες για ζητήματα και πρωτοεμφανιζόμενα προβλήματα δεν απαντάται σε κανένα άλλο συλλογικό πεδίο. Το ζητούμενο λοιπόν είναι η επιτάχυνση της εμπλοκής των εκπαιδευτικών κοινοτήτων πρακτικής και μάθησης στο σύγχρονο σχολείο, μέσα από την έρευνα, τις πιλοτικές εφαρμογές και την υποστήριξη σε κεντρικό πλέον επίπεδο. Ο στόχος είναι προφανής: η βελτίωση της οργανωσιακής και συναισθηματικής νοημοσύνης του σχολείου που όλοι οι κοινωνικοί εταίροι δηλώνουν ότι επιθυμούν.

Σύντομος οδηγός για διευθυντικό προσωπικό και εκπαιδευτικούς -φορείς αλλαγής

1.Σαφήνεια και σχετικότητα.

Τα μέλη επιτυχημένων κοινοτήτων επιδεικνύουν κοινή προσήλωση και στόχευση στις δραστηριότητες της κοινότητάς τους. Τα μέλη αλληλεπιδρούν σε έναν προσδιορισμένο τομέα ενδιαφέροντος με σκοπό την επαγγελματική τους ανάπτυξη (Carr & Chambers, 2006). Αυτή η κοινή προσήλωση διαπιστώθηκε ότι είναι βασικό προαπαιτούμενο της επιτυχίας σε όλες τις μελέτες που εξετάστηκαν. Πώς θα επιτευχθεί αυτή η προσήλωση στις διαδικτυακές κοινότητες διδασκαλίας και μάθησης; Σύμφωνα με τα σύγχρονα δεδομένα, ο σημαντικότερος παράγοντας είναι η κοινή αντίληψη περί σαφήνειας και σχετικότητας του σκοπού και των στόχων της κοινότητας (Widenman, 2010). Οι διαδικτυακές κοινότητες με γενικό περιεχόμενο τείνουν να αποδυναμώνονται γρήγορα. Οι κοινότητες που στοχεύουν σε ομάδες εκπαιδευτικών με κοινές ανάγκες και ενδιαφέροντα θα αντέξουν περισσότερο στο χρόνο και στον ανταγωνισμό (Widenman 2010, Carr & Chambers, 2006).

Στα πρώτα στάδια της ανάπτυξης μιας κοινότητας, οι διευθυντές των σχολείων και οι δάσκαλοι-φορείς αλλαγής, που είναι ενδεχομένως ειδικοί σε συγκεκριμένα πεδία, πρέπει να δημιουργήσουν και υποστηρίξουν συγκεκριμένες κοινότητες με περιεχόμενο, εργαλεία, σενάρια, κ.λπ. και να εμπλέξουν εκπαιδευτικούς με εμπειρία στη χρήση ΤΠΕ ή/και στη δημιουργία ψηφιακού υλικού.

2. Εμπιστοσύνη, κατανόηση, στήριξη.

Οι εκπαιδευτικοί δεν θα μοιραστούν την προσέγγισή τους ή τα σενάρια τους με συναδέλφους, αν φοβούνται μια αποκάλυψη τυχόν αδυναμιών και δεν θα επικρίνουν τις διδακτικές μεθόδους άλλων (Widenman 2010, Baek & Barab, 2005, Barab, 2006, Scheckler, 2010). Στις λεγόμενες ψευδο-κοινότητες, τα μέλη τείνουν να προβάλλουν μια «ασφαλή» εικόνα ικανοτήτων. Στις πραγματικές κοινότητες τα μέλη δεν φοβούνται να αποκαλύψουν το πραγματικό τους έργο.

Η ανταλλαγή πληροφοριών, υλικού και ιδεών είναι απαραίτητη: Όταν ένας εκπαιδευτικός γνωρίζει ένα χρήσιμο σύνδεσμο ή εργαλείο, μια καλή προσέγγιση είναι να το προτείνει σε άλλους. Ο Διευθυντής θα πρέπει να ενθαρρύνει την ανταλλαγή υλικού, σεναρίων, κλπ. μεταξύ των εκπαιδευτικών, ειδικά στις περιπτώσεις που υπάρχουν στελέχη με εξελιγμένες δεξιότητες σε συγκεκριμένους τομείς, οι οποίοι θα πρέπει να αναλαμβάνουν τον ρόλο του επιμορφωτή, έστω και άτυπου.

Οι εκπαιδευτικοί ενός σχολείου που εντάσσονται σε ψηφιακές κοινότητες για πρώτη φορά δεν θα πρέπει να πέφτουν θύματα της πλάνης ότι κάθε τι που δημιουργούν ή προτείνουν πρέπει να είναι πρωτότυπο και εντυπωσιακό. Ο λεγόμενος «φετιχισμός της πρωτοπορίας» ενδέχεται να δημιουργήσει αρνητικό κλίμα εντός μιας κοινότητας εκπαιδευ-

τικών είτε ενδοσχολικής, είτε ψηφιακής. Ο ρόλος του Διευθυντή εδώ είναι σημαντικός: Πρέπει να ενθαρρύνει όλες τις απόπειρες ψηφιακής εμπλοκής και δημιουργίας, ειδικότερα όσων το αποφασίζουν σε αργότερο στάδιο της επαγγελματικής τους εξέλιξης.

Επίσημη αναγνώριση: Η συμμετοχή στη ζωή μιας ψηφιακής κοινότητας είναι μικρότερη όταν τα μέλη συμμετέχουν εθελοντικά. Αντιθέτως, όταν η συμμετοχή αποτελεί μέρος μιας πιο επίσημης διαδικασίας (Widenman 2010) τα μέλη επιδεικνύουν έναν μεγαλύτερο επαγγελματισμό. Ο διευθυντής μπορεί να δημιουργήσει ένα άτυπο πλαίσιο αποτίμησης της προσπάθειας των εκπαιδευτικών στη χρήση ψηφιακών κοινοτήτων διδασκαλίας και μάθησης, στη δημιουργία ψηφιακού υλικού, κλπ. Για παράδειγμα, εκπαιδευτικοί με έντονη διάθεση για εμπλοκή στις ψηφιακές κοινότητες του σχολείου, να αποτελούν προτεραιότητα της διεύθυνσης σε μια αίτηση για το πρόγραμμα κατάρτισης του Erasmus+.

Κατάρτιση εκπαιδευτικών Open Discovery Space

Σύντομος οδηγός για διευθυντικό προσωπικό και εκπαιδευτικούς -φορείς αλλαγής

Οι νέες τεχνολογίες αλλάζουν τις μορφές, το χώρο/μέρος, τα εργαλεία/συσκευές και τις διαδικασίες μάθησης. Πλέον είναι διαθέσιμες διαδικασίες μάθησης μέσω φορητών και ασύρματων συσκευών, παιχνιδιού/παιγνιώδους προσέγγισης, συνεργατικής, κοινωνικής μάθησης κ.λπ. Είναι σημαντικό για τους εκπαιδευτικούς να αποκτήσουν γνώση των υφιστάμενων μοντέλων μάθησης/ εκπαιδευτικών σεναρίων και να μπορούν να τα εφαρμόσουν σε νέες και συνεχώς εξελισσόμενες τεχνολογικές λύσεις και εφαρμογές. Το πρόγραμμα κατάρτισης του ODS προσφέρει εξειδικευμένα μαθήματα για τη μάθηση μέσω ανοιχτών ψηφιακών πηγών και για τον σχεδιασμό ψηφιακού εκπαιδευτικού υλικού από τον ίδιο τον εκπαιδευτικό. Παρέχεται στους εκπαιδευτικούς η δυνατότητα να αναπτύξουν καινοτόμες λύσεις και να συνεργαστούν με ευρωπαϊκές κοινότητες εκπαιδευτικών.

Παράλληλα στόχος είναι η ενίσχυση των δεξιοτήτων και ικανοτήτων του εκπαιδευτικού για να εντάξει τις ψηφιακές πηγές στο μάθημά του, να επαναχρησιμοποιεί, να προσαρμόζει και να δημιουργεί νέο ψηφιακό περιεχόμενο. Στο πλαίσιο αυτό δημιουργούνται ψηφιακές σχολικές βιβλιοθήκες ή θεματικές κοινότητες ψηφιακού περιεχομένου στην πύλη του Open Discovery Space, με δυνατότητες διαμοιρασμού του υλικού αλλά και κοινωνικής δικτύωσης μεταξύ των χρηστών.

Περιγραφή του περιεχομένου
της Ακαδημίας Κατάρτισης Εκπαιδευτικών

Η ακαδημία αυτή απευθύνεται τόσο σε εκπαιδευτικούς με μικρή εμπειρία στη χρήση των νέων τεχνολογιών εν γένει, αλλά και σε πιο εξοικειωμένους ή και σε καθηγητές ειδικότητας Πληροφορικής.

Το υλικό είναι σχεδιασμένο με ευέλικτο τρόπο και προσφέρει δυνατότητες κατάρτισης σε ατομικό επίπεδο, λαμβάνοντας υπόψη διαφορετικά επίπεδα ικανοτήτων στη χρήση των ΤΠΕ και εμπειρίας σε μεταδεδομένα και ψηφιακά εκπαιδευτικά αποθετήρια. Μερικές ενότητες απευθύνονται σε όσους έχουν μικρή εμπειρία σε ΤΠΕ και παρέχουν μια πρακτική εισαγωγή, ενώ άλλες στηρίζονται σε προηγούμενη γνώση.

Δυνατότητες επαγγελματικής ανάπτυξης των εκπαιδευτικών

- Οι εκπαιδευτικοί συμμετέχουν στην ανάπτυξη εξειδικευμένων μαθημάτων και υλικού και έτσι αποκτούν δεξιότητες ως προς τη σύλληψη, τον σχεδιασμό και την αξιολόγηση μιας πληθώρας διδακτικών προσεγγίσεων

- Καλλιεργούν γνώσεις και δεξιότητες και αποκτούν εμπειρία στην οργάνωση ψηφιακών πηγών, συνδέοντάς τις με μεταδεδομένα, εντάσσοντάς τις σε ψηφιακές βιβλιοθήκες και διευκολύνοντας την κοινοποίησή τους και την ανταλλαγή με τρίτους.

- Με αυτό τον τρόπο αποκτούν επίσης εμπειρία στη χρήση ψηφιακών εκπαιδευτικών εργαλείων στην τάξη και μπορούν να προσφέρουν καινοτόμες μαθησιακές εμπειρίες στους μαθητές τους.

- Ενισχύουν τη διαπολιτισμική συνείδησή τους μέσω της συνεργασίας με συναδέλφους από διαφορετικές ευρωπαϊκές χώρες, εντάσσοντας παράλληλα τη διάσταση αυτή στη διδασκαλία τους.

- Αποκτούν δυνατότητες για αντιμετώπιση καθημερινών πρακτικών προβλημάτων και έρχονται σε επαφή με νέες ιδέες χάρη στην επαφή με τις προτάσεις της σύγχρονης εκπαιδευτικής έρευνας

Σημειώσεις για τη Διεύθυνση του σχολείου:

- Οι εκπαιδευτικοί έχουν πρόσβαση σε κάθε είδους υποστηρικτικό υλικό που μπορεί να βοηθήσει στη χρήση, τον σχεδιασμό και την προσαρμογή ψηφιακών εκπαιδευτικών πηγών. Το υλικό αυτό είναι διαθέσιμο στους παρακάτω συνδέσμους:

Ψηφιακές εκπαιδευτικές πηγές
- Διδασκαλία και μάθηση
- Εγχειρίδιο χρήστη
- Βιβλιοθήκη εργαλείων
- Περισσότερες πληροφορίες εδώ:
- http://portal.opendiscoveryspace.eu/teachers-academy
- Νέες εκδηλώσεις της Ακαδημιών Εκπαιδευτικών του Open Discovery Space:
- http://ods.ea.gr/
- Πακέτο ψηφιακών εργαλείων του ODS για τον εκπαιδευτικό http://portal.opendiscoveryspace.eu/ods-toolbox-668542

Αναφορές

- Baek, E., & Barab, S. A. (2005). A study of dynamic design dualities in a web-supported community of practice for teachers. Educational Technology & Society, 8(4), 161-177.
- Barab, S. (2006). Design-based research. In R. K. Sawyer, (Ed.), The Cambridge handbook of the learning sciences (pp. 153-169). Cambridge: Cambridge University Press.
- Carr, N., & Chambers, D. P. (2006). Teacher professional learning in an online community: The experiences of the National Quality Schooling Framework Pilot Project. Technology, Pedagogy and Education, 15(2), 143-157.
- Digital Agenda: investment in digital economy holds key to Europe's future prosperity, says Commission report, available at: http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=5789
- Lock, J. V. (2006). A New Image: Online Communities to Facilitate Teacher Professional Development. Journal of Technology and Teacher Education, 14 (4), 663-678.
- Scheckler, R.K. (2010). Case studies from the Inquiry Learning Forum. In J. O. Lindberg, & A. D. Ologsson (Eds.), Online learning communities and teacher professional development: Methods for improved education delivery. (pp. 43-59). Hershey, PA: IGI Global.
- Widenman, H. (2010). Online Teacher Learning Communities: A Literature Review. Institute for Research on Learning Technologies. Technical Report. University of York.
- UNESCO ICT Competency Framework for Teachers. United Nations: (2011). http://unesdoc.unesco.org/images/0021/002134/213475e.pdf

Contents

Technology-rich innovation *in schools*

powered by **OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

What's inside?
Click here for other languages and formats

Introduction
Key forces at play

Model
A phased process for innovation

Stimulation
Awakening interest and identifying promising pathways

Trials
Seeking early lessons from experiences in the field

Incubation
Steady, supportive development

Scenarios
From pilot to stable change

Acceleration
Becoming self-generative

About this resource

Educational change is extremely challenging in any setting, and when the change involves technology Ð as most changes do in this day and age Ð the complications increase. This booklet was designed to support educational leaders in the exciting yet daunting task of initiating and maintaining technology-rich innovation in schools.

This booklet is part of a series produced by a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS). Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work.

The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders. This booklet harvests insights that are particularly relevant to educational leaders, and makes them available for use in other initiatives to achieve lasting and meaningful changes involving the use of modern technologies.

Tip: Key activities are summarized in the roadmap, which can be accessed here and from any page.

Other languages and formats
Portions of this resource are available in the following languages:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- This brochure in English as pdf

Contents

Testimonials
What headmasters say about this resource

"A sharp coherent publication, very aesthetic with its good use of text, studies.contexts, images and graphics, easily read online, good balance of theory and digital case studies ... It would make a good summer course."

    - Tom Roche

"As a digital disciple I found the handbook a well laid out document with a very defined framework. From the very start it outlined the change from traditional to digital pedagogies. This key element of change is well illustrated."

    - Robbie O'Leary

"You can see what ODS actually means now in practice and not just theory."

    - Daithi O'Murchu

"I think that the document is an excellent production which is grounded in theory, sets out a framework for involvement with ODS."

    - Fin Martin

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contents / references   roadmap | references | authors

References and related reading

Online reading
Websites related to technology-rich innovation in schools

Print and download
Journals, books and other reading available for offline access

Inspiring initiatives
What have others already done? What are they sharing?

Online reading
Websites related to initiating and sustaining technology-rich innovation in schools

International links

- http://tpack.org
  - Technological Pedagogical Content Knowledge (TPACK) is a framework that identifies the knowledge teachers need to teach effectively with technology.The TPACK framework extends ShulmanÕs idea of Pedagogical Content Knowledge.
- http://www.eschoolnews.com/2015/01/13/questions-innovation-303/
  - Think your school is innovative with tech? Answer these 6 questions and prepare to reassess
- http://www.digitalpromise.org/blog/entry/a-teacher-driven-approach-to-21st-century-learning-in-meridian
  - Innovation Starts in the Classroom: a series of case studies produced by Digital Promise examining the work of members in our League of Innovative Schools.

Country-specific links
Latvia

- http://www.e-klase.lv
  - Leading website in education. The website gives an opportunity for parents to see their children success in school. Website keeps updated class journal, grades, homework and other recorded remarks done by teacher.
- https://www.mykoob.lv
  - The site keeps class journal, grades and homework. The aim of the website is to inform parents of their children success in school.
- http://www.uzdevumi.lv

- Website with wide range digital tasks online.
- http://macibas.e-skola.lv
  - E-classes and Mykoob setting Óstudy cloudÓ.
- http://visc.gov.lv/vispizglitiba/saturs/digit_maclidz.shtml#lv_pam
  - Ministry of Education and Science offers website with online training exercises for educational purposes.
- http://miksike.lv
  - Miksike in Latvia offers different online collaborative learning events. It also offers contests like quizzes, Pranglimine, contests built on interctive exercises etc. and also educational content.

Estonia

- https://www.ekool.eu
  - E-school for the schools in Estonia, which shows grades, information and homework for students and parents.
- http://koolielu.ee/
  - Educational portal for the schools of Estonia, which includes learning material, information for schools etc.
- http://www.haridusportaal.ee/
  - Portal, which gives information for schools.
- https://www.hm.ee/et
  - Portal of the Estonian Ministry of Education and Research.
- http://miksike.ee
  - Miksike in Estonia offers different online collaborative learning events, contests (quizzes, Pranglimine, contests built on interctive exercises etc.) and also educational content.

Print and download
Journals, books and other relevant reading available offline

- Sandholtz, J. H. (1997). *Teaching with technology: Creating student-centered classrooms*. Teachers College Press, Teachers College, Columbia University, 1234 Amsterdam Ave., New York, NY 10027.
- Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational technology research and development, 53*(4), 25-39.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.
- Vannatta, R. A., & Nancy, F. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education, 36*(3), 253-271.
- McKenney, S. (2013). Designing and researching technology enhanced learning for the zone of proximal implementation. *Research in Learning Technology* Supplement 2013, 21: 17374.

Inspiring initiatives
Schools, projects and other real world examples of technology-rich innovation in schools

- http://gettingsmart.com/2014/11/100-schools-worth-visiting/
  - School visits are a great ways to learn and they are key to developing an innovatio mindest. This page lists 100 schools worth visiting. These are schools that create powerful learning experiences, often using innovative technology blends.
- http://www.policulturaexpo.it/world/pcem/
  - Politecnico di Milano organizes PoliCulturaExpoMilano2015, a digital storytelling competition for schools aimed at creating an engaging learning experience, based on modern technological techniques and methods, connected to the Universal Explosion in Milano 2015.

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Roadmap
The roadmap is a planning tool for schools in various stages of eMaturity

Stimulation
Awakening interest and identifying promising pathways

Trials
Seeking early lessons

Incubation
Steady, supportive development

Scenarios
From pilots to stable change

Acceleration
Becoming self-generative

Phase	Key ideas	Initial	Enabled	E-confident	E-mature
	Impact on teaching and learning of rapid growth of knowledge and information from a technological perspective	*General understanding of how technology can improve teaching and learning*	*Understanding methodologies of how ICT can be integrated into the curriculum*	*Understand how ICT can improve learning of the curriculum*	*Design methodologies for integration of technologies in learning*
Stimulation	Knowledge of global and local needs and challenges in terms of ICT use and familiarity	An initial map of the basic existing needs of the school is built addressing all the basic needs in terms of equipment, professional development, and its uptake in the institution learning environments.	Schools with already existing ICT infrastructure start designing the necessary professional development and implementation opportunities in the framework of the curricula.	ICT confident school will map the existing opportunities in the school community to engage in exchange projects and enhance learning experiences such as the use of real research in classroom.	Opportunities offered by OER and MOOCs are mapped and a vision for their integration in learning environment built. The school can rehearse innovative student centred models.

Trials	Scan the horizon to search for best practice examples	The map built in the first step is now populated with existing best practice examples in order to design the whole implementation process	Best practice examples are integrated in this phase and teacher will engage in actual implementation exercises	Exploration of research opportunities and engagement of students in real research projects is foreseen for this phase	Innovative experiences, based in existing best practice examples, or new creative opportunities are created in this phase involving students in cutting edge educational research experiences.
	Find innovative examples and partners	Partnership with other institutions that already started their change path towards a more ICT based development is advised at this stage	Interschool collaboration where teachers can implement already successfully tested examples in classroom should be implemented	School can participate for instance in real research campaigns with support of various institutions that promote such possibilities	Schools can design their own experiments and engage students in development of their own projects promoting entrepreneurship skills and ICT innovation.
	Involvement of the community	The school and local community play a major role in ensuring the feasibility of the roadmap designed in the first place. They are the facilitators and key players at stage.	School community is a perfect stage to exchange good examples between peers in the same subject area or for interchange and collaboration between different grade levels and subject areas	The local community can play a very important part in this phase, in particular when stakeholders can support the vision of the school for the uptake of innovative methods and solutions.	School and local communities can be drivers of change in this phase and could/should support the whole vision.
	Receptivity to new ideas	Schools should be opened to the use of ICT innovation for upgrading the teaching/learning process.	Schools should be aware of new ideas and new trends emerging in the field of ICT based education	New forms of learning environments are emerging and the ICT e-confident school should take advantage of cutting edge best practice examples in the field of education	e-mature schools are in a perfect position to pilot new ideas and to create change in the field of education.
	Finding effective communication channels	The whole school community have to be involved in the changes foreseen and continuously informed about the developments taking place	Communication from top-dow and vice-versa should take place at all stages when redesigning the use of existing facilities and roles played by the different stakeholders	e-confident schools can innovate faster and new solutions will pop-up in diverse areas. A proper communication channels has to be designed to ensure maximal uptake of good outcomes	e-mature schools can use modern channels to ensure instant communication between all teams fostering the innovative path in the school
Trials	School proficiency level related to	Teachers have general computer	Some experiences in using ICT tools	ICT confident school uses actively new	Teachers/school has extensive

	field trial	literacy but they do not use it in everyday classroom activities. No systematic teacher training and curriculum/eLearning development program and action plan. Limited access to electronic learning resources. ÒDrill & PracticeÓ learning/teaching method prevails in the classroom. Community (parents etc.) is not informed/involved in educational activities.	in the classroom. Teamwork and some active learning elements are used in the classroom. Growing confidence among teachers how to use new learning methods. Teachers are starting to share learning ideas with each other and inform parents.	pupil centered learning methodologies. Schools development program and action plan is followed. School participates in online learning events and is taking lead/coordination in more simple events. School is working actively to set up good relations with parents and community around the school	experiences in using new learning methodologies and ICT and they have participated in collaborative online learning events and research projects. Teachers have experiences and understanding about cultures (cultural differences) in countries involved with projects.
	The level of complexity of field trials	Designing elearning development plan and teacher training programme. Using simple electronic presentation and content in the classroom.	Participating in intra-school, intra-region learning events and contests (quizzes etc.). Making learning flexible in the classroom though using interactive / electronic content and programs	Filed trials, which engage pupils and teachers into more simple learning events internationally and more systematic collaborative project in own region / country. Starting to organize/coordinate learning events on their own.	Taking part in different online collaborative learning events, also the ones, which last months and involve synchronous communication and series of activities (like storytelling projects etc.) and often also travels.
	Organisational Òto-do listÓ	Preparing elearning development plan and teacher training programme in the school. Searching for contacts, teacher training opportunities. Upgrading school's ICT infrastructure. Involving/informing community (parents) into development plans of the school.	Starting to implement development plan, selecting filed trials, which require collaboration between classes and learning situations. Actively participating in teacher training events, networking events, information days.	Participating in different online learning events and trials. Coordinating events on regional level and simple events also multiculturally.	Maintaining and developing learning contacts in all levels. Coordinating learning events and participating in them. Functioning like a regional innovation centre and sharing experiences.
Incubation	Sustainability	Focus on short term	Focus on medium term	Focus on long term	Focus on organic community to auto-administer
	Active	Provide classical assessment method and limited feedback	Improve classical assessment methods and improve feedback	Provide a ground for self-assessment	Use digital resources for students to interact as peer and provide feedback

	Support	Get support from workshop organization	Get support from author of the resources	Get support from a community	Provides support to a community
	Localization	Use downloaded resources directly	Minor localization to downloaded resources	Major localization to downloaded resources	Contribute back to the community with a guide and support for successful localization
	Versatility	Use downloaded resources directly	Minor changes to downloaded resources	Major changes to downloaded resources	Contribute with own resources
Scenarios					
Acceleration	Dissemination and diffusion	Headmasters organize some basic presentations and workshops about ODS. They appoint an e-Learning ODS team.	The e-Learning ODS team develops e-Learning vision with the help of the headmaster.	E-learning vision is integraded into the school curriculum.	E-learning is implemented in classrooms. Both eachers and students use it.
	Motivation	Headmasters find funds for a couple of teachers who will be sent to some basic e-Learning trainings, seminars or academies.	The trained teachers train the interested groups of teachers in school.	All of the teachers are trained to use e-Learning systems.	The teachers implement e-Learning in their classrooms, prepare demonstration lessons and get points for professional development.

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About the authors

This booklet was produced as part of a large-scale European project that provides open access educational resources to schools across Europe: Open Discovery Space (ODS).

Since 2012, the ODS initiative has learned from the real world approaches of teachers, educational leaders and policymakers as they collaborate to realize technology-rich innovation prompted by the ODS work. The contents of this booklet are based on the model of innovation that underlies the ODS work. This model was initially conceived of to structure the ODS activities, and has evolved in light of lessons learned as the project unfolds. The model describes key phases of change (stimulating, trials, incubating, scenarios and accelerating) as well as implications for various key stakeholders.

Project coordination
Open discovery space is co-coordinated by Intrasoft

Related resources
Related resources are available on the ODS website

Previous versions
Previous versions of this booklet are available upon request

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The authors of this booklet have been working on various tasks within the ODS project. Their affiliations represent many of the 51 partners in the consortium.

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What is technology-rich innovation?
Considerations for educational leaders who are initiating and maintaining change in the 21st century

Key ideas
How do we look at change in education today? What is considered excellent technology use?

School-based innovation
How do learning technologies yesterday and today differ? How are these altering school-based innovation?

The knowledge economy
In modern society witnessing a revolution? Are traditional educational methods disappearing? Should they?

Themes and trends
What European initiatives are currently promoting teacher competence in ICT use?

Key ideas about change in education today

Learners central
All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill

Education - schooling
Education, as both process and outcome, is now seen as very different from schooling in structure and intent
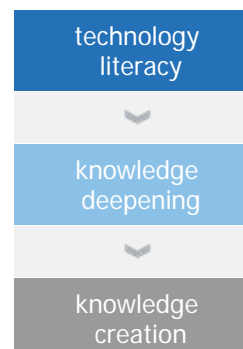
Knowledge creation
Knowledge creation is the ultimate goal in technology-rich innovation

Rapid changes
The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history

New priorities
Education is now shaped by critical factors that include: openness, adaptability, accessibility, innovation and learner-centric

technology literacy
⌄
knowledge deepening
⌄
knowledge creation

Three levels of excellence in teaching according to the UNESCO ICT Framework

School-based innovation: Learning technologies yesterday and today

All learning proceeds from the motivation of the learner, either in the context of curiosity about the external world or in the desire to acquire a valued skill. Educational methods and techniques have, however, historically developed in response not only to learnersÕ needs, but also to the needs of wider social, political and economic structures. TodayÕs advanced technologies environment is in many ways an issue as old as education itself. It is the link between what individuals need to know, do and learn at a time of profound change.

At their most basic, learning technologies focus on the tools, methods, techniques and operational modalities that envelop the learning and didactic process. Over the past few decades, a complete revolution has occurred regarding not only our approach to the understanding of educational theories, but also our ability to use new and innovative methods to design and deliver learning. This process has promoted a significant re-evaluation of the role and purpose of education and the most appropriate delivery methodologies to ensure optimum learner engagement. Education, as both process and outcome, is now seen as very different from schooling in structure and intent. This point was originally articulated by Ivan Illich in the 1970s (*De-schooling Society*). Today, learning technologies permit the acquisition of knowledge, skills and attitudes in many new and innovative ways.

> The fundamental intellectual activities of discovery and learning are being transformed by the rapid evolution of ICT. Although many technologies have transformed the course of human history, the pace and impact of digital information technology is unprecedented.
>
> *- J. Duderstadt, 2013*

In all teaching contexts, learning technologies are important. The emergence of standardized methods of instruction took on a radically new dimension during the Industrial Revolution. This marked growing synchronization of teaching methodologies with requirements for improved work performance and productivity. The knowledge explosion and information revolution of our own era is still deeply marked by the experiences, structures and expectations of the industrialization process. Knowledge acquisition is central to the ODS endeavour as well as its underlying model of innovation and reform. Knowledge creation is the core of a set of skills, values and attitudes that, in their structure and imparting to others, are the essence of culture.

The pace of learning and knowledge creation today is often portrayed as possibly the most rapid in human history. The mode of production and the distribution of knowledge have changed so radically that it is considered legitimate to speak of a new era. This is described as the information society. In this new paradigm, we see more production, distribution and use of knowledge than before.

The knowledge economy

The scale of growth in the knowledge economy is tied to complexity, change and technology. Increasingly, schools today are more complex. Talcott Parsons talked about social differentiation - as institutions grow in size and complexity the functions they have to perform become specialized and distinct subsystems. With the growth of these subsystems new distinct problems of coordination, hierarchy and social control emerge. While the pace and rate of change have been universally acknowledged, the scope and impact in recent times have been transformative. Technology has increased human mastery of nature - and altered human social relationships. In this profoundly different world, traditional education and learning patterns are challenged. New skills are required. New methods of acquiring skills are also required. Traditional schools often struggle to meet the new needs of learners. *Modern society is witnessing a revolution where traditional educational methods are not so much superseded by technology but altered and transformed in new and unexpected ways.*

Themes and trends

Whatever the technologies or methods, human learning remains driven by motivation, skill acquisition, improved understanding and tangible benefit. Educational institutions must respond to the paradigm shifts affecting society and relationships in the 21st century. Advanced technologies enable open learning to be a powerful tool in advancing learner competence. These technologies create new forms of delivery, assessment and research. At first unfamiliar, these can develop extraordinarily rich paths to improved learning, skill and knowledge. The key characteristics for the success of such technologies can be viewed through the evaluative framework outline by McManus and Lyne in their 1992 book on open learning in changing professions. They stress the importance of learning technologies to embody the following characteristics: accessible; available throughout a lifespan; responsive to individual life circumstances; able to cope with learner diversity; affordable; demonstrably effective.

Across Europe, many initiatives promote teacher competence and information and communications technology (ICT) usage. A few examples include: *Key Competences for Lifelong Learning* (2007); *Strategic Framework for Education and Training 2020* (2013); and the *Digital Agenda for Europe* (2010). The Key Competences document defines digital competence for all citizens, and identifies relevant knowledge, skills and attitudes to live and work in the 21st century. Inclusion of Digital Literacy as one of eight key competences indicates the importance attributed to ICT skills at European level. Combining ICT skills with emerging views in pedagogy, curriculum and school organization, the Standards reinforce professional development of teachers who use ICT skills and resources to improve their teaching, collaborate with colleagues and ultimately become innovation leaders themselves. As shown above, the UNESCO ICT Framework has three different levels of excellence in teaching:

technology literacy; knowledge deepening; knowledge creation.

The Open Discovery Space (ODS) approach is designed to recognize the profile of registered teachers and use it as an additional element to decide most appropriate learning objects. Instructional environments in some classrooms (including activities around preparation for paper-based state examinations) may not easily lend themselves to the development of and usage of e-learning environments. The local contextualization of innovations is therefore a critical concern that affects the uptake and use of new ideas. Various initiatives across Europe support tailoring and customization to specific settings.

For example, the Irish NCTE handbook - Planning and Implementing e-Learning in Your School: A Handbook for Principals and ICT Co-ordinating Teachers - recognises the important role of school leaders in promoting ICT in teaching and learning at school level. It provides a definition of e-learning, and outlines how schools can develop under five headings: leadership and planning, ICT in the curriculum, professional development, e-learning culture and ICT infrastructure. The handbook includes an e-Learning Roadmap which helps schools to plot their development reflected on a four-point rating scale of e-maturity: Initial; e-Enabled; e-Confident; e-Mature. The Irish roadmap facilitates planning and goal setting and targets at an individual school level.

Research has also consistently demonstrated that computer-based interventions and open education resources tend to be more effective when combined with constructivist approaches to teaching, rather than with more traditional approaches. Having identified trends and issues, the innovation model is challenging. However much has been achieved already. The obstacles and opportunities have been identified.

ICT in schools requires both leadership and vision. This helps it to move beyond a simply perceived technical skill to recognition of its critical role in shaping competence and learning innovation at a time of profound transformative and globalized change. The ODS model offers one clear, yet flexible vision for technology-rich innovation that can be tailored to meet the needs of specific learners, in particular schools, in varied contexts across Europe.

Technology-rich innovation in schools

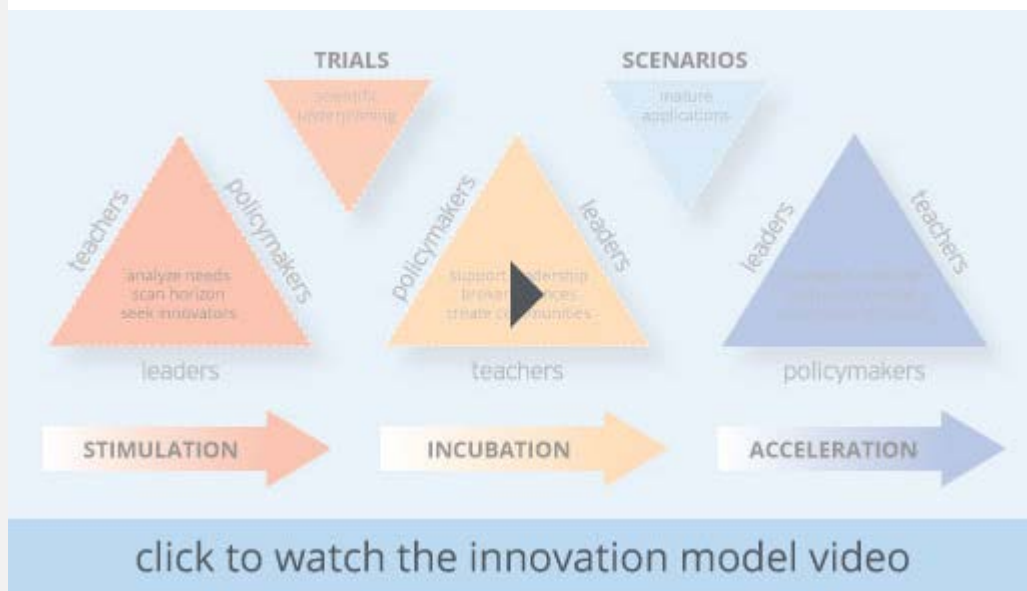powered by **OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Modelling innovation and reform

click to watch the innovation model video

Key ideas and origins
What are core considerations embodied in the ODS innovation model?

Innovation and reform
What is innovation? What is reform?

Innovation model
What does a visual representation of the innovation model look like?

Innovation and technology
What technolocy changes constitute innovation? What forces are at play?

Key ideas embodied in the model

Multiple forces
Top-down, bottom-up and side-side interactions shape the activities in this model of innovation.

Field work
Three main phases are strategically informed by field work and reflection on actual experiences.

Three key phases
Stimulating, incubating and accelerating are three main phases throughout the process, each with its own focus and concerns.

People are key
Individual and team development is central to the model, which also recognizes different and changing roles played by teachers, educational leaders and policymakers.

Context
Some factors in innovation settings can be manipulated, others are fixed Ð both powerfully affect the uptake and use of new ideas, at micro, meso and macro levels.

Model origins
The main objective of Open Discovery Space (ODS) is to mainstream eLearning in schools and national policies of the EU member states. ODS supports Action 68 of the Digital Agenda for Europe through an innovation, as it offers: A web-based resource giving teachers access to teaching and learning materials.

The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools. The model was originally conceived to *prescribe* ODS project activities. After the project was launched, the model has been updated to reflect the lessons learned based on real world experiences.
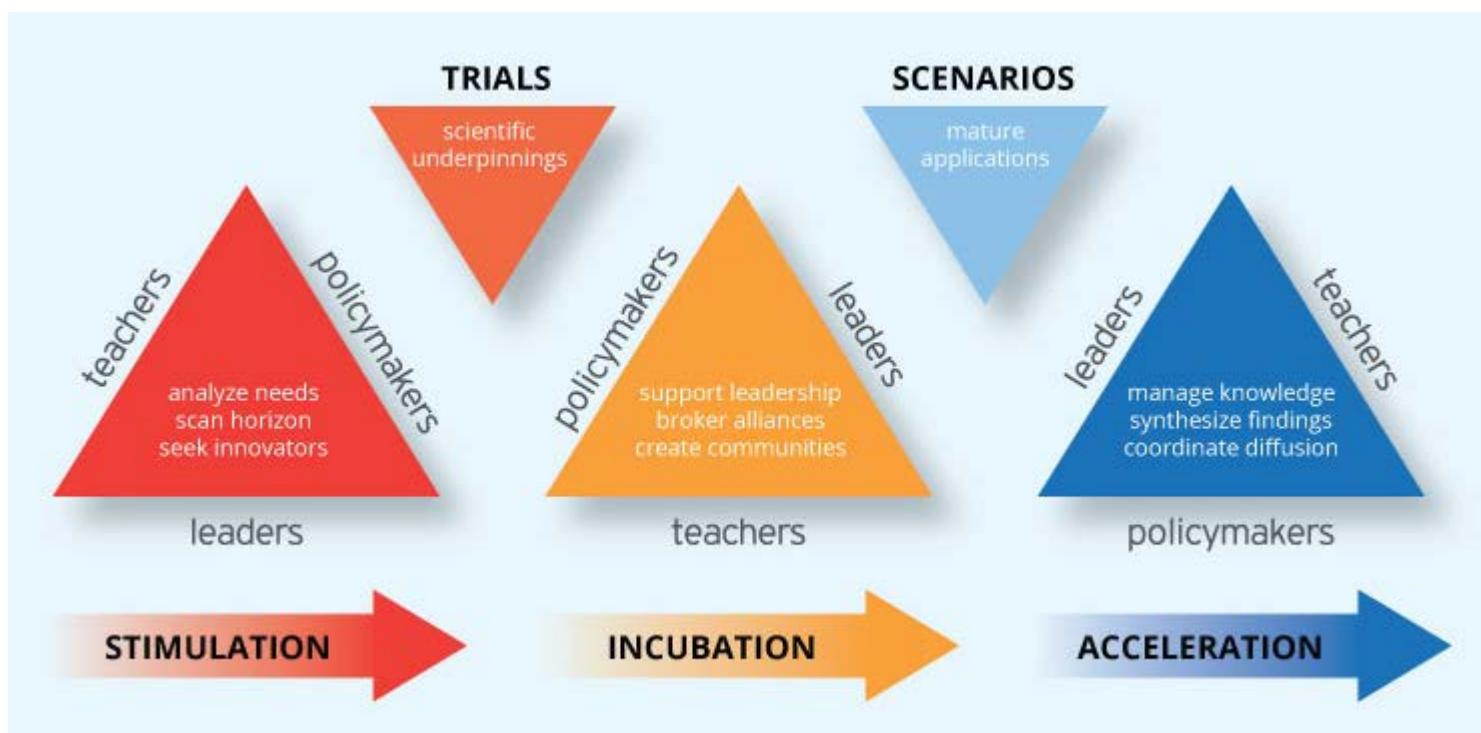
The model presented in this chapter *describes* how each element has been undertaken in the ODS project. The combination of authentic examples and clear guidelines make the ODS model presented here a clear and accessible resource for educational leaders.

What is innovation? What is reform?
Innovation is characterized as a bottom-up/grassroots approach, based on internal processes; whereas *reform* is characterized as a top-down approach, either system-wide or anchored within several different institutions, based on external processes. The ODS model incorporates aspects of both innovation and reform.

Three characteristics of ODS illustrate aspects of *innovation* that are present in the underlying approach. First, there is a strong emphasis on stimulating broad involvement embracing all stakeholders at all levels: local/regional, national and European. Second, there is a hands-on approach to working with actors of change to ensure successful transformation Ð empowering teachers, school managers, and learners. Third, the approach explicitly supports excellence (centres of expertise and clusters), encourages dissemination of success stories (virtual eLearning communities and information portals), as well as promotes enhanced cooperation and experimentation. Across ODS (and thus, embedded in its model) is the central appreciation for human capacity and the need to share that across all dimensions of work, from the ground up.

At the same time, the formal, externally-based facets of change are crucial to success, particularly for within-country initiation. Classic elements of *reform*, these include the top-down pressures and incentives that pose powerful levers for change, such as: new assessment policies, new funding mechanisms, and revised curricular frameworks. Because sustainable change requires sound alignment between policy and practice, the connection with external agents (e.g. policymakers) remains an integral part of the ongoing process.

The ODS model of innovation and reform
An experience-based approach to technology-rich innovation in European schools

5 key components in the ODS model of innovation and reform
The model for change that underlies the ODS work is relevant to other technology-rich efforts to achieve productive change in schools.

Stimulation
This phase features the awakening of interest and the identification of promising pathways to technology- rich innovation. Needs analysis helps understand stakeholder concerns. Inspiration is sought by scanning the horizon. And innovators that can lead the work (from program champions to team coaches) are identified.

Trials
Field trials are undertaken early in the process to (1) engage key stakeholders; as well as (2) to learn important lessons that can inform the rest of the project. Like mini-innovations themselves, field trials participation often prompt creative developments, and are especially helpful for studying localized adaptations.

Incubation
Incubation refers to the steady, supportive development of new learning, techniques or methods so that sustained development can occur. During this phase, innovation capacity is cultivated so that the change can become self-generative.

Scenarios
Whereas field trials fostered the development and testing of new ideas, scenarios portray the transition from small pilots to stable ways of working under regular teaching and learning circumstances. Scenarios are informed by the experiences to date, and lay the foundation for the final phase of acceleration.

Acceleration
Once technology-rich innovation is up and running in representative settings, attention is turned to issues of sustained

maintenance so that they can continue. This includes exploiting the knowledge available within the change setting and establishing routines for continuous quality assessment.

How do innovation and reform relate to changing technologies?

About changing technologies in schools

Technology-rich innovation is a term used often, in ODS and elsewhere. This is an umbrella term for teacher and school led change involving any kind of technology. But these days, most people think especially of electronic technologies (e.g. computers, mobile devices) as well as the use of specific applications for learners (e.g. simulations, communication tools) and/or teachers (e.g. electronic access to lessons plans or assessment rubrics). The rationale and goals of technology-rich innovation vary tremendously. The range includes: increasing equitable access to resources for remote schools; fostering EuropeÕs cultural pluralism; serving the educational needs of all students; and stimulating active learning.

Many people may be involved in technology-rich innovation, and of course each setting is unique. But across most innovations, attention is typically required for at least three core groups of actors: policymakers, teachers and educational leaders. *Policy makers* are those positioned to activate top-down interaction in some way. This includes (national, state or local) representatives of government, as well as representatives of teacher associations, funding bodies, curriculum agencies and assessment boards. Here, we use the term, *teachers*, broadly Ð to represent all educational practitioners who interact directly with pupils. In addition to regular classroom teachers, this includes classroom aids, therapists, remedial teachers, special subject teachers and counsellors. This group is positioned to initiate bottom-up interaction. *Educational leaders* are those able to lead side-side interaction. This group includes, but is not limited to: headmasters, superintendents, department heads and instructional coaches. Educational leaders play critical roles in implementing policy. They also support the work of teachers both directly (e.g. by ensuring that professional development opportunities are regularly available) and indirectly (e.g. by creating a healthy and stably organization).

What forces are at play during change?

Various *forces* come into play during change, and the inter-dependencies between actors are central to the different types of interaction: top-down; bottom-up; and side-side. It is well understood that sustaining change requires a balance of pressure and support. Key activities in earlier stages of *top-down* reform as well as *bottom-up* innovation therefore frequently require processes that seek or enable alignment of priorities and goals across the key stakeholder groups. By later stages, the driving forces have typically shifted hands. Whether initiated top down (e.g. by policy makers) or bottom-up (e.g. by teachers), the sustained maintenance of change is greatly dependent on the educational leadership present.

School-school interactions were major factors that contributed to the successful introduction of a new subject in Dutch secondary schools.

When schools saw how others handled the new curriculum they were both inspired to participate and reassured that doing so would be within their reach.
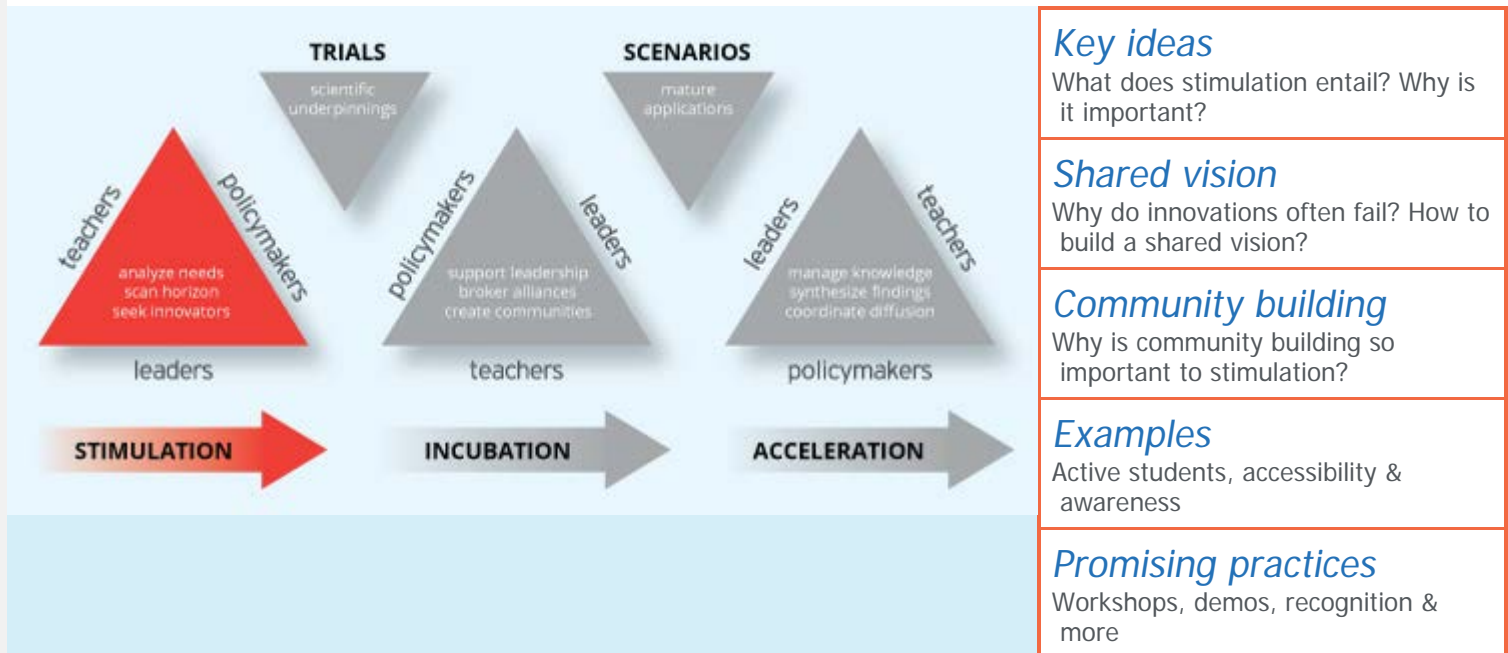

The importance of *side-side* interactions is comparatively less well documented as a force that helps initiate change, but is known to be especially important for developing change. Side-side interaction is therefore needed to enable schools to ascertain the degree to which a particular change is within their Ôzone of proximal implementationÕ (ZPI). McKenney (2013) refers to the ZPI as distance between what teachers and schools can implement independently and what they can implement through guidance or collaboration. The ODS model designs for the zone of proximal implementation by planning for implementation scaffolding (e.g. externally-led coaches, workshops or subsidies) to fade away in a timely fashion, while simultaneously developing the ownership and expertise among practitioners that will engender the desire and ability to locally sustain change.

Technology-rich innovation *in schools*

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Stimulation

Key ideas
What does stimulation entail? Why is it important?

Shared vision
Why do innovations often fail? How to build a shared vision?

Community building
Why is community building so important to stimulation?

Examples
Active students, accessibility & awareness

Promising practices
Workshops, demos, recognition & more

Stimulating: the first key phase in the model

Knowledge of global and local needs and challenges in terms of ICT use and familiarity is a very important step towards the construction of a feasible innovative plan.

Scan the horizon to search for best practice examples and optimum resources to support actions that address identified needs.

Find innovative examples and partners that can bring new opportunities to the school and change the institutional vision by embracing relevant and engaging new methods and practices.

Involvement of the community helps to foster leadership, democratization of opportunities collaboration, network and team building.

Receptivity to new ideas is increased by mutual openness among all parties, to collaboratively define and embrace new proposed strategies.

Effective communication channels are essential for ensuring proper exchange of ideas and outcomes.

The stimulation phase is one of the most important in terms of creating the community that will support the trials, pilot the implementation of scenarios, validate and evaluate the usefulness and impact of innovative proposals. Thus, it is important in this phase to involve all participants in the different foreseen activities. A sense of ownership is a crucial motivating element and a step towards the sustainability of the successful changes.

An effective stimulation phase must encompass a careful analysis of local needs, review goals given existing possibilities, identify innovative key players and ideas, encourage teambuilding and brainstorming activities to seek out creative options that can be implemented in relation to the identified needs and the capabilities of the team addressing these needs and proposing innovation.

The importance of developing a shared vision
Innovations that fail to take sufficient time in the stimulation phase risk plowing ahead of the interests and abilities of those who will eventually carry the change in the long term.

The vision of a school towards innovative approaches for teaching and learning processes can only be achieved if solutions are designed in a collaborative environment where all stakeholders actively participate. Stimulating the adoption of innovative ways to solve contemporary (yet often unexplored) emerging needs in schools is a key to success. The stimulus to adopt new or different strategies should follow a planned direction:

- Involve all stakeholders from the start, and acknowledge that the forms of involvement will evolve along with the project.
- Remember to include headmasters, students, teachers, administrative staff, parents and education authorities and policy framers.
- From the very start, consider how to use the following approaches: strengths/weaknesses/opportunities/threats (swot) analysis, needs analysis, solution generation, solution refinement, design and development, attending to factors enabling solutions, and evaluating results and impact even of initial pilot activities.

Innovative schools embrace the challenge to explore unknown and poorly studied new fields. Education and opportunities to learn are changing swiftly and new ways must be adopted in order to ensure schools continue to be key innovative players when preparing new generations for the world of work.

Community building is at the heart of stimulation

The involvement of the school and local community is very important in the stimulation phase. Stakeholders, as mentioned already, have to be part of the innovation from the very start. Promotion of brainstorming sessions can be very useful in fostering support from the community and implementation of good ideas. Holding discussion evenings, forum, social events, and Ôvillage hallÕ debates are excellent methods to initiate discussion of options.

Innovative solutions and best practice examples can be easily found and assessed nowadays with the support of platforms such as ODS. Community support for their adoption is critical in order to overcome any possible existing barriers Ð which are usually more related to worries and attitudes than they are to technologies themselves. It is of utmost importance that all participant stakeholders have autonomy and the means to research which are the best options and adopt/adapt them to the local identified needs. Potential solutions ideally meet stakeholder needs and also promote student centered methodologies, use freely available content, serve cross curricular connections, have some form of quality assessment, and can be tailored in order to meet specific local needs.

The design phase for stimulating innovative ICT uptake has to take into account needs but also psychological concerns. Most people experience hesitation when dealing with the unfamiliar. The stimulating phase enables stakeholders to gain familiarity with elements of the innovation that could cause concerns, such as tools, pedagogies, or collaborations. By involving stakeholders, familiarity and exposure can lead to trust, ownership and engagement in the whole process.

School participation in projects such as ODS opens up new possibilities for the innovative solution seekers. Support and examples from communities are a key to future implementations. This model and the ODS internet portal offer such ideas.

Learner benefit is the primary added value

We must bear in mind that we are preparing students for future careers that are changing and reshaping the world of work at the speed of light. Career and skill requirements are something that we cannot possibly imagine at this stage. The task of school leadership is to prepare students in the best manner possible to allow them to embrace unanticipated challenges and opportunities in a transformed world. They have to be able to work in inclusive environment, to be tolerant, to have problem solving skills, to be critical thinkers, to be creative and to embrace innovation. They will enter a world of work where they are learning and interacting all the time and will need to be connected anywhere at any time.

Learners only benefit if schools are supported

While the world is changing rapidly, most schools are not. Despite thriving opportunities and extraordinary potential, schools struggle. Teachers lack time to develop ICT skills, schools are poorly equipped, teaching is often limited by rigid and dense curricula, and exams fail to measure use of innovative approaches or acquired competences. Successful innovation attends realistically to the challenges in everyday schools.

While we seek for innovative projects, most important of all, we seek for innovative minds

In any learning environment, we need to identify innovative teachers, those eager to tackle new challenges and not afraid of emerging struggles and opportunities. It is important to provide freedom of choice, tools to adapt and localize their experience and opportunity to freely share their developments and creations.

> If you always do what you always did, you will always get what you always got.
>
> *- Albert Einstein*

The profile of such innovators is not rigid - it depends on specific needs and challenges of the target audience. Each school has its own characteristics, each classroom has its own personality and each student will have their own special need. Innovative teachers also have different levels of expertise and projects must seek out for those innovators, eager to adopt a new vision, and take on the mission of adapting existing successes to their own professional development.

Innovative design solutions are a free enterprise and the measures of success are defined for each case. The education revolution is upon us: MOOCs, OER, OCW are the new trends in education. Schools and local communities are adapting to this reality and restructuring accordingly. Pilot innovative teachers are thus key players in this process. Innovative projects encompass interdisciplinary approaches, contextualized teaching, student centered methodologies and involvement of school and local communities. Global citizenship awareness and entrepreneurship are the critical skills and must be in the backbone of any innovative solutions adopted by houses of education.

School innovators explore new ideas with support of others, sharing results, incorporating and remodeling existing knowledge and adapting/localizing and adopting best practices in the field of education.

It is a challenge to try to time-stamp an effective road map for stimulating schools on taking the road of elearning, integration of student centered methodologies in classroom daily practices and the graceful use of ICT as a supporting tool for knowledge delivery, exploration and construction. Many barriers have to be overcome starting with the psychological. It is necessary to ensure each interested party has a sense of ownership of the process. An example of a careful possible design might be by introducing the idea and brainstorming with participants in short workshops where the vision is presented, discussed and improved.

What might stimulation activities look like?

Three examples from the ODS experience

Many initiatives are producing good results on adoption of school elearning and community building. For example, existing ODS experiences have shown that creating thematic communities around specific elearning tools and resources is a very strong motivation factor. The effort promotes community building at a national level but also promotes local practitioner involvement. Schools have become associated in groups under the same school board of directors. Many of the teachers belonging to the same group don't know each other and never collaborated before.

The support of the community has proven key to ensuring sustainability. The Galileo Teacher Training Program is a good example where experts in astronomy train teachers on use of real research in the classroom. Trained teachers, after mastering the use of specific tools and resources, can then train other teachers in a very efficient and sustainable cascade effect. This includes a worldwide help desk that supports teachers 24 hours a day.

Active students

In Portugal, the theme selected to exploit the Open Discovery Space concept was the fight against light pollution. Light pollution is the direct or indirect introduction of artificial light into the environment. Light pollution competes with starlight in the night sky, interferes with astronomical observatories, disrupts ecosystems and has adverse health effects.

In the stimulating phase, a vision-building workshop was promoted around the topic and at a later stage teachers participated in a training workshop. A community was created in the ODS online portal where all materials were shared.

As an outcome of this activity, the initial workshop ideas evolved into several scenarios that were created and implemented in various schools in the region. One of the teachers invited another school to

collaborate in the project. As a result, students from the new school participated in the experience by creating their own ICT-based material to address the topic. The teacher from the second school presented the work of her students to the ODS international contest promoted by the Portuguese national coordination. Her student won the first prize with a movie asking the mayor of the municipality to change the illumination of the streets to a more user-friendly setting

The image here shows the student who won first prize, proudly receiving his certificate from the mayor. The chain of events that lead to his achievement was initiated by the initial activities during the stimulation phase.

Touch the night sky: Astronomy for visually imparied students

Context

In the framework of ODS pilot efforts, and in partnership with other projects (A Touch of the Universe by Astronomical Observatory of the University of Valencia), the project is envisioning a significant contribution towards the adoption of an inclusive approach where blind students work with their non-visually impaired peers and educators. In collaborative settings, they engage in the exploration of content knowledge and use of e-learning tools that can help understand topics that seem, at first, unreachable by students with visual impairment. In the framework of this project, a school in Moimenta da Beira (Portugal), organizer of one of the largest telescope gatherings in the country, promoted a special observing session for blind attendees.

Resources

The project uses materials that can be found in school environments and enrich the experience by the use of freely available ICT tools and an apparatus specially designed for students with special needs. For the observing session, it was necessary to use a thermal printer that reproduced the images that were being acquired by a regular telescope in real time, processed by an image software and printed in a special swelling paper and thermal printer.

Tools

Telescopes, computers, image processing tools, thermal printers.

Scaffolds

Participants where supported by the promoters of the event and the activity was embedded in a regular environment where usual night sky observing sessions take place.

Process

The site was specially chosen for the beauty of its night sky, where light pollution is not yet causing too much damage. Over 50 telescopes from all over the country were gathered at the event. A Òspecial telescopeÓ, devoted for this special public was assembled, connected to a computer and printing the tactile images acquired. Participants with visual impairment were then assisted by educators in order to fully understand the ÒobservedÓ object and thus having the same full experience that all others were having on site.

Impact
Alongside their non-visually impaired colleagues, they could experience on site and on Òreal timeÓ the astronomical images collected by the telescopes there present. In terms of innovative ways of reaching audiences that usually donÕt attend these events this activity has proven to be a success gathering visually impaired and sighted students in a fully inclusive experience in terms of physical, social and knowledge acquisitions.

Lessons learned
The main goal was fully and successfully achieved - to showcase the possibility to involve blind students in purely observational and sight based experiences, otherwise inaccessible to blind or visually impaired audiences. Promoting an environment of collaboration and exchange of knowledge between educators and among the students themselves, sustaining peer-to-peer exploration and support, all students explored the tactile images observed (whether by sight or touch).

Dark Skies Rangers: Building communities and creating awareness

Context
Policy towards school administration in Portugal has been changing drastically over the last few years. Schools in the same region are now aggregated in big groups with the school main headquarters being located in one of the schools, usually the most central one in terms of geographical importance. Most groups have now schools ranging from primary to secondary level. Teachers have now to teach in the various establishments of the group and facilities are now shared by a larger number of users. This has brought new challenges to school boards and now demands new dynamics in terms of a common vision, well-orchestrated mission, design and activity implementation. Many of the educators of the same group, even within the same subject area, donÕt know each other. In order to support the team building and community building in this new groups, ODS-Portugal engaged in supporting teachers in the mission of promoting interschool projects. The theme of choice was the fight against light pollution.

Resources
The project proposal uses existing light pollution audit tools, available at the ODS portal, planetary software and online tutorials for its use. Communities were created at the portal with members from different parts of the country.

Tools
Online communities, digital tools and resources for the implementation of the different projects. Social media for publicity of achievements and sharing experiences and results.

Scaffolds
Face-to-face and online training material made available to the participants.

Process
Pilot teachers received training on the use of the specific tools and resources and support to implement the project in their school settings. Teachers on the field trained their lower secondary students (7th to 9th grade) who acted as mentors to younger students. Pilot teachers involved and supported primary school teachers as well as involved colleagues working in science subject areas. The main outcome was the learning process for the older students involved and the entrepreneurship skills developed in the younger kids who have developed their own project towards innovative solutions for better illumination in their streets with efficient energy and proposals for new settings.

Impact

Teachers involved in the process, namely pilot and those working with them, were very enthusiastic about the results and the impact on their students that participated in the project. The local community (mostly parents) was involved in the process and was very pleased with the achievement of their children.

Lessons learned

This experience in Portugal set the tone for the next school year approach for ODS as a powerful tool to engage communities in collaborative work and the next step for these communities is to engage all the schools in the same group in further collaborative projects, exploring other field s of expertise supported by ODS and the existing tools. In one of the schools, the target audience was students from a specific group in a primary school. Most of the students in the class come from a gipsy community and their attitude towards science was not very positive. In this particular case, students of the 8th grade of a school in the same group were their tutors and with the support of the pilot teacher they brought the project to the children's school. As a result of this project all students (4th grade) that are now going to the school hosting ODS project pre-registered to be members of the science club and are now exhibiting great excitement towards science issues.

Promising practices in the stimulation phase

Each context offers its own opportunities and hosts unique constraints. While adjustments are required for all settings, the four practices described below have been tailored for use in multiple settings with both pleasant and productive outcomes.

Vision-building workshops

Several such events must take place in order to involve as many people as possible. Some initial participants will then participate in a pilot trial. The vision-building workshops are brainstorming sessions involving all the important stakeholders in the creative process.

Training workshops

Following the initial teaser, participants are invited to create their own learning scenarios, using OER and ICT for a particular topic they are interested in and/or to use already existing ones, already tested in other schools/classrooms. These sessions will promote a sense of support and community building will take place.

On site demos and awareness campaigns

Activities that involve the whole school and local community are promoted, though of course time intervals between all actions vary according to the objectives and concrete implementation phase of each project. In demos, students and teachers gain first-hand experiences with innovative tools. Also, school and local community is welcomed to get involved in the innovation process taking place at school.

Establish a recognition system

Endorsing the work implemented and the achieved results is advisable. The whole path should be carefully designed and participants can then have a sense of the overall mission they are committing to and can evaluate their own progress.
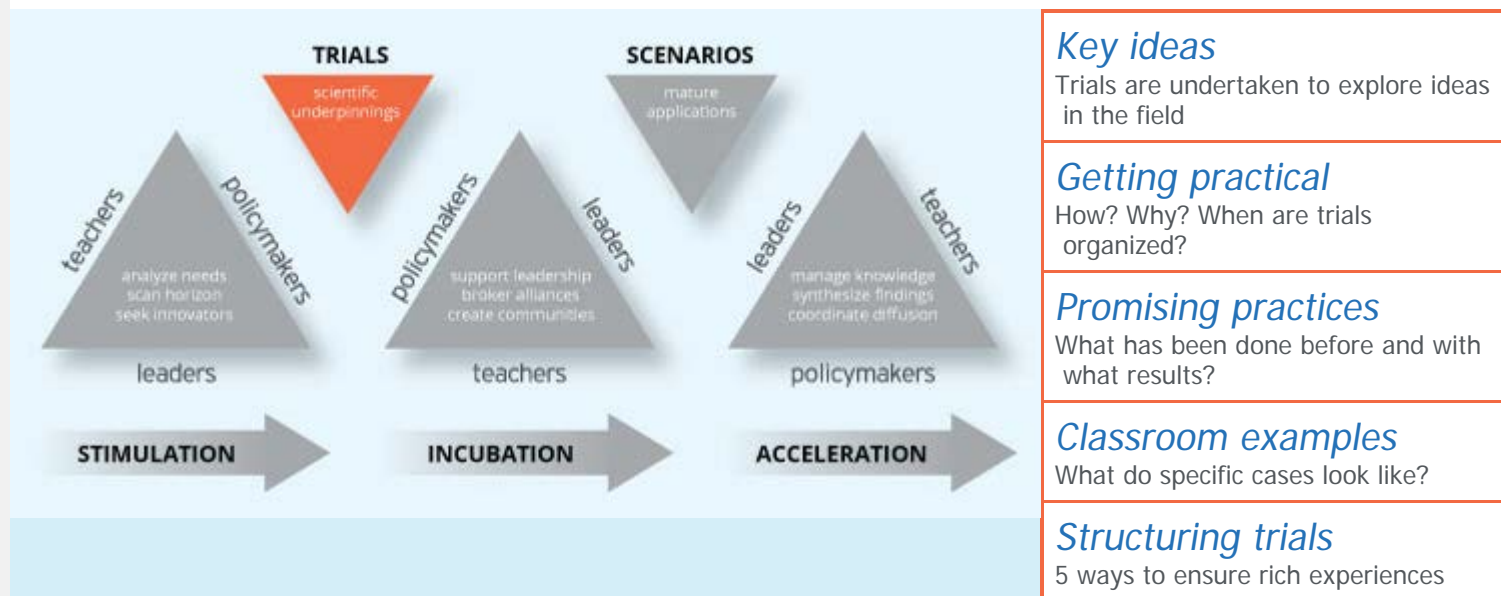
Technology-rich innovation *in schools*

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Trials

How are these new ideas related to our existing school plans? How can this be accomplished in our setting? Field trials give hands-on answers to questions posed by schools

Key ideas
Trials are undertaken to explore ideas in the field

Getting practical
How? Why? When are trials organized?

Promising practices
What has been done before and with what results?

Classroom examples
What do specific cases look like?

Structuring trials
5 ways to ensure rich experiences

Trials are undertaken early to exlore ideas in the field

Harness creativity
Field trials prompt innovators to creatively develop and try out new approaches to teaching, perspectives about learning, or resources.

Document events
Well-documented field trials have the power to share across time and settings, by recreating essential elements of the experiences and making them accessible to others.

Use science
Well-conceived trials are not only the products of inspiration or creative energy, but they are also underpinned by scientific research.

Popular or practical?
Trials do not have to include the use of popular, high-end materials or techniques Ð readily available tools are often easier for teachers to later integrate into their own environments.

Learning first, technology second
Educators care more about the benefits for their students than about the tools used Ð field trials offer a chance to experience new learning consequences first hand.

Trials are critical to piloting ideas, testing assumptions and exploring how users respond to initial changed and resources (human and material).

Field trials offer the opportunity for supporting and studying localized adaptation and commensurate results.

Field trials themselves can even be perceived as mini-innovations within a broader change agenda. As such, they provide interesting cases of creative adaptations and/or development of learning ecosystems.

The primary function of trials is to serve the development of the innovation and resources used to bring the change to life. The experiences of trials provide realistic inputs for subsequent development and the establishment of scenarios of use.

Trials not only help understand core change components. They also prompt linguistic and/or cultural considerations. Learning how to accommodate and respect the different views among geographical regions or cultural groups can also be part of the trial process.

Getting practical
What do trials entail? How are they organized? What are important features?

Trial events are organised to work out practical implementations of different educational scenarios in real learning situations. Often, trials are built around some learning event, which supports everyday learning in the classroom. As innovation champions speak about opening learning and widening borders of classrooms, collaborative learning events between different classrooms and regions and countries are encouraged.

Trials may be viewed as a set of experiments and observations undertaken to decide how and whether new learning methodologies and educational scenarios can be used regularly in everyday learning process at the school. During field trials schools get hands-on experience. Trials are excellent opportunities for adapting new learning solutions to school needs, especially when they feature commentary or feedback for the participating groups.

Field trials are performed in schools often during normal learning hours, but they still have an informal flavour in many cases. During field trials, teachers and pupils tend to be more free to experiment and try out different solutions. This enables the opportunity to see how new approaches or tools might better suit existing curricula. During field trials, schools may create opportunities to explain to parents and the local community how they are using new learning methodologies to help children get better education. During field trials, schools also gain valuable information for budgeting and investments.

Promising practices

This section offers sample field trial practices undertaken in ODS to facilitate elearning resources adoption in education. Each introduced participants to key concepts and uses of digital resources, while also engaging them in practical activities.

Summer schools

The first ODS Summer school took place in Crete. The Summer School activities were based on the exploitation and enrichment of two existing, open access repositories: Natural Europe and Discover the Cosmos. 81 European educators participated as trainees, attending 15 hours of lectures and demonstrations as well as 10 hours of hands-on workshops. Activities addressed three key-areas: inquiry-based science education; high energy physics and astronomy; and connections between formal and informal learning through museum visits. http://www.education.natural-europe.eu/natural_europe http://portal.discoverthecosmos.eu repositories

Webinars

Webinars are interactive conferences, online-workshops with a certain target group and goals. They give for schools new information, ideas and contacts. For example, ODS hosted a webinar entitled: How to build a strong Action Plan/European Development Plan for your school according to the Erasmus+ Framework. http://www.galileoteachers.org/live-ods-webinar/

Training academies

The ultimate goal of the ODS training academies is to nurture innovation leaders who will promote the uptake of eContent in schools. It delivers training programmes and online support specially targeted for a set of stakeholders key to the uptake of eContent. Four training activity themes are shown here. Each on addresses a different group of stakeholders.

Teacher training and ICT support academy

This programme assists teachers in acquiring and reinforcing the skills and knowledge they need to exploit the rich potential of eContent. They learn how to incorporate eLearning in their courses, to reuse and create eContent. It trains ICT support staff and administrators in schools to facilitate teachers and students working with eContent and to implement local eContent repositories, linking them to ODS.

Technology developer academy

This programme provides theoretical and practical training (e.g. in coding and interoperability) to developers in content use (packaging formats, access control, and licensing) and content discovery (metadata, vocabularies, protocols, and registries). Developers create learning resources and incorporate them in ODS immediately.

Content provider academy

This training offers guidelines and support to content providers to adopt learning technology specifications, standards, and tools in view of sharing their content with the eLearning community in general, and through ODS in particular.

eParents Academy

This is designed to inspire parents to become promoters in the uptake, sharing, and reuse of digital learning resources in schools. It also gives insight into eLearning and working with eContent that can support childrenÕs learning.

Contests & competitions

Different kind of contests can be organized online or face-to-face. Several kinds of competitions have shown to be motivating for schools and interesting for teachers and students. Here, two examples from the ODS project work are given

ODS contest: "Let's move teaching process to the limelight!"

The submission period lasted for two months. During this time, teachers from all over Europe were encouraged to create learning scenarios (reusable ideas, similar to lesson plans). This contest was exciting because it was open to teachers from all over Europe. Eligibility was based on three simple conditions, each of which contributed to the advancement of the ODS mission:

- the participating teacher had to be a registered ODS teacher
- the teacherÕs school that had to be a registered ODS school

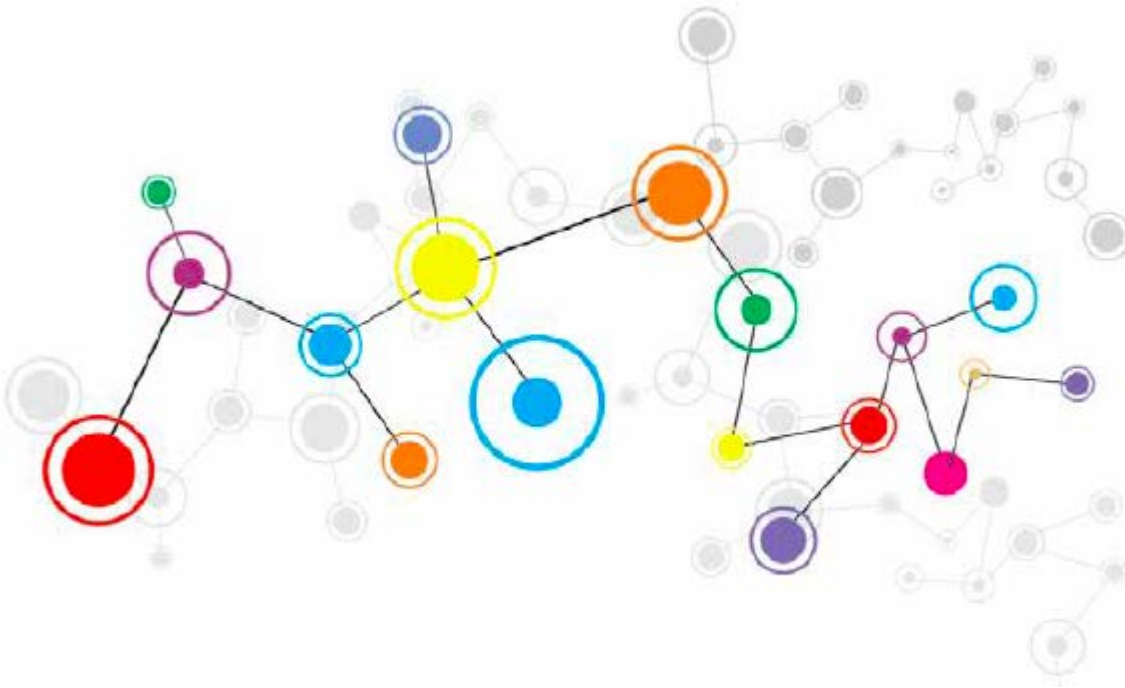- the learning scenario had to be created with ODS authoring tools

Multilingual international online contest

This competition featured and required automatic translation. The contest aimed to promote the use of automatic translation in regular schools. The contest was linked to the Organic.Lingua project, but was also connected with ODS. It Organic.Lingua project results. All together, 1846 participants from Estonia, Latvia and Crimea participated. Planning of the contest started months ahead. This included selecting student ages, identifying topics of interest to schools, and exploring tools and innovative solutions available to meet schools needs. It also featured discussions among teachers from different countries to select questions that should be included. Various schools and educational stakeholders were also involved. A few months later, the contest was ready to be translated and put online for all partners countries. After the contest was over, a finalizing phase took place. Teachers presented their experiences at a workshop in addition to their approaches to dissemination, promotion and feedback.

Informal teacher networking events

Informal mechanisms also foster teacher networking. For example, teachers can use eTwinning or participate in the Erasmus+ programme. Additional online collabrative learning events are being launched each day by various communities, universities, and development centres.

http://opendiscoveryspace.eu/eTwinning http://www.etwinning.net/

Masterclasses

The field trial can also take the form of a masterclass. This may, but does not necessarily, take place with support of local research facilities. Masterclasses are characterized by talks, given by a researcher or scientist, to teachers and students on specific topics. Following the presentation, debate usually takes place. Thereafter, the program follows with a hands-on session where students are introduced to a specific ICT hands-on tool with the purpose of exploring the subject in greater depth. The day may end with an event for the whole school and local community, for example, in the form of a science cafŽ.

This type of event can varied forms of impact. Here, three are mentioned in particular. First, it sparkles student interest for science. Second, it engages them in real research experiences via real, remote or virtual labs. And third, it promotes awareness among the overall community about the power of such approaches to influence the learning pathways of students.

Classroom examples
Masterclass example: The sky is my lab

Beginning

The day starts with a talk about modern trends in Astronomy. Researchers discuss recent discoveries and challenges. They are excited and detailed because they are speaking about their own fields of investigation. A hands-on session follows where students are introduced to specialized software. Stellarium, a powerful planetaria application, allows students to explore the night and day skies. This helps them to understand the most important phenomena related to celestial mechanics. This kind of

e-Confident

A more advanced session can take the work a step further, by engaging students in real research experiences. For example, students can participate in the regular campaigns for citizen science, promoted by robotic telescopes. In these events, citizens (including students) are invited to participate in observing the skies and following analysis of the results. Students

masterclass was viewed as very powerful to teach (in this case): moon phases, eclipses, seasons, and planetary motion.

can, for instance, begin to understand the life cycle of stars while observing different stages predicted for such phenomena.

Providing onlines tests for basic schools

Context

Online-tests are offered for teachers in Estonia by the Miksike Learning Environment. Miksike is a private institution in Estonia, which offers electronic learning content and services built on electronic content. Online-tests are part of the formal learning in Estonian schools, which are created to measure how well pupils have learned (skills and knowledge) relating to certain topics. Tests are done according to the curriculum and schools are using them as a part of their lessons. Grades are given according to the curriculum. Initial grading is done by Miksike's teacher assistant Ð an educational professional working on MiksikeÕs behalf who is supporting teachers in the classroom. A classroom teacher can change the grade, if she considers it necessary. In the 2013/2014 academic year much online testing took place: http://miksike.ee 445. There were many different online-tests and 76500 graded tests. In total, 428 teachers from 127 (nearly 1/3) Estonian schools benefited from this online testing service.

Resources

Miksike's teacher assistant coordinates the creation of questions and exercises in online tests. MiksikeÕs teacher assistant gets feedback from teachers communities and takes into consideration their wishes and suggestions. Questions are taken from electronic collections, which are also available freely though the ODS portal. When necessary, new questions are formulated and illustrations are obtained though images Miksike has the right to publish, open source libraries, commercial image services such as clipart.com.

Tools

Miksike's own e-learning platform is used for online tests, which was initially created in the Frames of Socrates/Minerva project. It is a platform for teachers and learners. In Estonia the addresses are: http://miksike.ee (for Estonian schools) and http://miksike.net (for Estonian Russian schools). The platform has different rights for different users (teachers have special rights and students have limited rights) to be able to work so that teachers see more information than students do.

Process

In the portal on the Minu Miksike (My Miksike) page there is an area called Online-tests. Taking a test is an easy process for the teacher and student. Teachers can easily connect tests with certain classes and make the tests public, the time they are needed. Pupils do not see the tests before the time assigned by the teacher. Results contains the list of tests taken, points for every test, and the grade (mark). If a test has been graded, users can view it once again; see mistakes and points earned for each question. Teachers can also see how successful his or her students were in tests, also teachers can see the student mistakes.

Impact

Miksike has offered online tests over 5 years and now, it can be considered more a mainstream service than an innovation. There are several factors, which keep schools using it. First, it saves teachers time. Now teacher evening hours can be spent confirming, not initially correcting, test results; this leavesmore time for organizing and planning creative things in the classroom. Second (and importance of this aspect is growing), online tests facilitate cooperation between schools, classes and teachers. Teachers like to discuss with their collegues how to measure learning and also compare results with other classes.

Lessons learned

Online testing services are suitable for eMature and eConfident schools as this requires good organizational skills on schools ICT personnel and teachers (enable whole class taking online tests same time etc.) and also some explanation needs to be done among parents and community as sometimes people outside of schools prefer to see classic paper tests when we speak about measuring pupils skills and knowledge. Teachers have to keep their eyes on security issues. It has sometimes happened that teachers forget their Ôteachers accountÕ password openly available and also primary grades are nowadays informed enough how to ÔbenefitÕ from this and cheating is possible.

Combining competition and learning
Context
V›istumiks is a set of learning activities offered for schools in Estonia by the Miksike Learning Environment. V›istumiks combines formal learning with elements of informal learning by using a contest/competition concept. Official grades are normally not given as a result of these events. V›istumiks helps learners to learn and repeat concepts, rules etc, which seem to be boring and difficult to remember. So this is just a small additional measure to help learners achieve learning goals set by the national curriculum. Learners learn in ways that they do not notice, because they are busy gaining as scores and points. V›istumiks is organized and coordinated by Miksike's teacher assistants Ð educational professionals working on MiksikeÕs behalf to support teachers in the classroom. V›istumiks is built up according to the teachers/schools needs and is community-centered. So, Miksike's teacher assistant`s task is to summarize and harmonize interests coming from schools. V›istumiks services started in the 2012/2013 study year and they continued 2013/2014. During 2013/2014, 20 V›istumiks learning events/contests were organized for the 1st - 9th grade students. 200-300 students normally participate in one V›istumiks event/contest.

Resources
Miksike's teacher assistant coordinates the creation of contests necessary for V›istumiks. Already existing exercises (over 8000 exercises) are used and if necessary, existing exercises are ÔclonedÕ and modified. Miksike's teacher assistant gets feedback from teacher communities and takes into consideration their wishes and suggestions. Contest exercises are often attended by schools teachers and they follow the national curriculum. Miksike's teacher assistant sets exercises up for the contest.

Tools
Miksike's own e-learning platforms subplatform is used for V›istumiks and it is available currently for schools in Estonia working in Estonian language http://miksike.ee and in Russian http://miksike.net. The platform has different rights for different users (teachers have teachers rights and students have usual rights) to be able to work so that teachers see more information than students do.

Process
In the portal on the Minu Miksike (My Miksike) page there is an area called āV›istumiksÒ. V›istumiks contains of 3 phases. First 2 phases are contests, which are built on interactive exercises. Contests are published for a certain time (1-3 weeks). Students are supposed to answer questions correctly, and as quickly as possible. Quicker responses earn more points. Incorrect answers of course deduct points. For one attempt, students are given a certain amount of time (normally 4 minutes, but this can vary according to organizers plans). After time is up, results are saved in a results table. Students can make unlimited attempts during the period contest is open. It is also allowed to participate after school hours. Result tables contain only the highest scores students have made. Result tables are visible to all contestants/learners. Results of these 2 phases are summarized. During the 3rd phase, students have to take a quiz, which is built on questions/themes of the interactive exercises. Results are summarized and winners announced, prizes distributed for individual students and also for teams/classes.

Impact
V›istumiks is a comparatively new service in Miksike (started 2012/2013 study year) but it is gaining popularity. Combining competition and learning is a powerful tool and additionally motivates learners to learn concepts, which are normally considered as ÔboringÕ ones. V›istumiks is suitable for eMature and eConfident schools and also to schools with less advanced eLearning practices. V›istumiks service is not explicitly aligned with the national curriculum.

Lessons learned
We need to find a good balance between learning and competition and keep in mind that the V›istumiks focus is on learning and not on figuring out who is the winner. Some pupils/teachers/schools get carried away so much by competition that the actualy learning is left in the background. Miksike strives to let much more contestants shine then just the ones gaining first places.

How to structure trials?
5 different ways to ensure both rich experiences for participants and collection of relevant insights to inform the innovation endeavor

Summer schools
Lectures and demonstrations and hands-on workshops combine to address three key-areas of substantive interest to teachers, while relevant outings and a pleasant atmosphere motivates participants.

Webinars
Like nteractive conferences, webinars are online workshops designed to speak to a certain target group and meat specific goals. They give for schools new information, ideas and contacts.

Training academies
These events nurture innovation leaders who will promote the uptake of change in schools. These deliver training programmes and online support specially target different sets of stakeholders.

Contests
Competitions have shown to be motivating for schools and interesting for teachers and students. An international dimension can also be stimulating.

Masterclasses

Specialist talks on specific topics are followed by active debate. This sets the stage for a hands-on session that engages participants directly with the issue at hand.
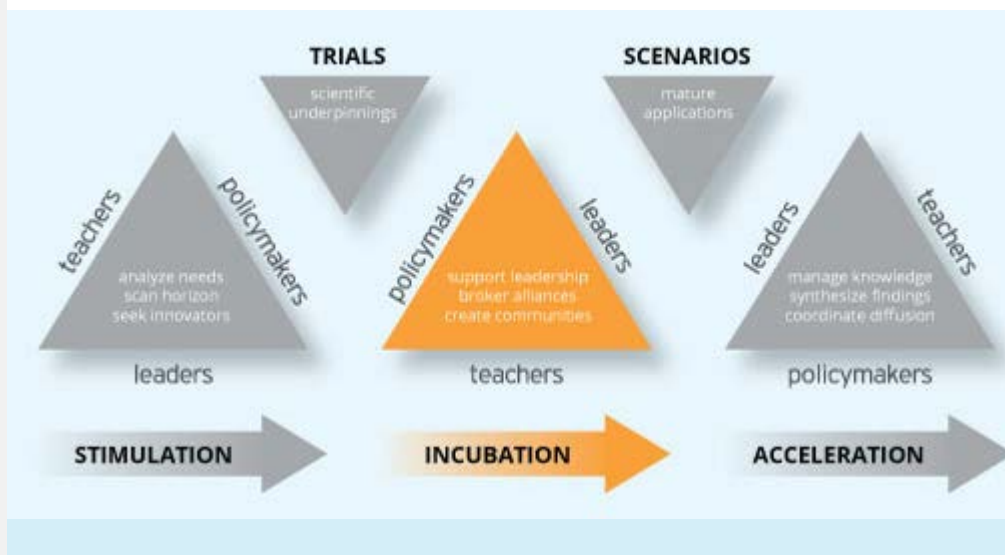
Technology-rich innovation in schools

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Incubation

Key ideas
How to obtain steady, supportive change over time?

Requirements
What supports, interventions and innovative applications develop self-generative change?

Examples
Gadget supported learning? Creative learning processes?

Tips
Which incubation practices have proven useful before?

Incubation means a steady and supportive development of new learning, techniques or methodologies so that sustained and independent development occurs.

Sustainable innovation takes time
There are different aspects that have to be taking into account when changing teaching: take your time to reflect in the incubation phase.

Be creative and active!
Educational experiences that explicitly have an assessment-focused and creative activity are not only more engaging, but they influence and incubate further educational practices.

Innovation needs support
The ODS portal does not only provide resources, but also communities that will interact to support teachers willing to innovate.

Innovation starts locally
Preliminary workshops showed innovative teacher the advantages of change. Now it is the time to think how to start in your local environment.

Digital resources are versatile
Open Educational Resources can be adapted to your needs and (usually) run in computers at school or home.

Incubation requires a range of supports, interventions and innovative applications to develop self-sustaining self-generative change

After the phase of stimulating the teaching-learning process, and the different trials to explore Resource Based Learning (RBL), teachers need time to re-visit their own perspectives and experiment in their own classrooms: Incubation is that phase. RBL is a powerful and versatile pedagogical approach that needs time to be successfully applied in classrooms.

Innovative educational practices are more fruitful when Òfocused aroundÓ digital resources (e.g. slides, social networks, mobile devices, robots). It is important to take into account the importance of considering the total cost of operation (TCO) of the experiences. Digital gadgets are usually made up hardware (the ÒobjectÓ) and software (the programs executed on the hardware, including the operating system and other dependencies needed for it to operate). The use of open-source software could significantly reduce the cost of the system. First, obviously, in license expenditures, but also in hardware amortization (as usually open source software need less hardware resources to run and does not have fall into planned obsolescence practices).

Digital artefacts are key in Incubation phase, to support relationships and alliances between schools, help localization of the success experiences, and understanding how structures, hierarchies, system operational modes and learning cultures will adopt the change.

Examples
Gadget-Supported Learning

Handing useful gadgets (in general sense: hardware gadgets or digital Ðvirtual- ones) out to teachers and students to support well-designed educational practices can foster their adoption, use and spread over other colleagues, so facilitating the incubation of educational innovations and communities of practice. Gadgets must not come alone in the learning experience, but they should be accompanied by RBL approaches with the design of the experience that describes the real focus of learning (gadgets might be only a pretext to engage in).

An example of gadgetsÕ involvement is a workshop on Scratch programming carried out as a practice and reflection workshop for teachers. The first part of the workshop utilized a visual programming environment installed on desktop computers, and the second part used Lego Education WeDo robots to teach the same concepts. The second part resulted more engaging for teachers than the first one. Nevertheless, the first one is more cost efficient, just needing a computer and simulation software, and not specific gadgets. Later, teachers can see programs to finance the purchase of the robots. Then, check a large Scratch repository of resources that are promising as long as they are readily available in RBL portals. The social and pedagogical aspects of the portal ease sharing ideas on the key aspects for successful adoption in the classroom. But, the teacher has to reflect on the organizational change and learning cycles for implementation. Finally the teacher should contribute back to his/her community (and any other interested audience) thought the portal, resulting in new collaboration and networking.

Above: During the ODS incubation phase in Spain, Scratch proved to be a nice tool for programming simple programs for a computer or Lego robots. It is also suitable to a wide range of ages.

Creative Learning Practices

Educational experiences must foster to search, reflect upon, and create things that can be eventually delivered out of the educational environment, exchanged and assessed with/by others. The outcome of previous educational experiences can incubate future ones derived from the originals. New techniques like gamification are welcome.

An example of engagement by means of assessment-focused, creative activities is the Erathostenes experiment. First, it relied on a community of schools all over the world, each of them had to find a school to match up (this is, on the same longitude). Then, the Equinox day, students annotated their measurements in a shared document. In this experiment they had autonomy and freedom, but also guidance and supervision from their teachers. After the experiment took place, schools and school members have the chance to compare and assess othersÕ measurements, so fostering collaboration and incubating future practices.

It is important to highlight the importance of a web portal in the success of technology-rich incubation. It supports the leadership of change, easing connection of the participants, engagement, visibility and supporting broker relationships and alliances. Additionally, other digital artifacts (Facebook page, Twitter feeds, etc) can help highlight the good practices more properly.

RESOURCES	COMMUNITIES	SCHOOLS	TEACHERS	ODS ACADEMIES
EXPLORE OUR TO USE IN THE CLASSROOM AND PLAN YOUR LESSONS	SHARE EDUCATIONAL CONTENT THROUGH COMMUNITIES OR START YOUR OWN	NAVIGATE THROUGH THE SCHOOLS OF ODS NETWORK	BEING CONNECTED WITH OUR TEACHERS FROM ALL OVER THE EUROPE	FOLLOW THE ODS ACADEMIES TO IMPROVE YOUR PROFESSIONAL EDUCATION
813764 RESOURCES	**627** COMMUNITIES	**3170** SCHOOLS	**8204** TEACHERS	**163** ACTIVITIES

NEWS >

Innovative science...
Thursday, April 16, 2015
Conference on innovation and dissemination in math /...

ITK ja MAOL 15-18.4.2015
Tuesday, April 07, 2015
Interaktiivinen tekniikka koulutuksessa, ITK 25-...

Η Φυσική των Ολυμπιακών...
Tuesday, April 07, 2015
Η Ελληνογερμανική Αγωγή και το Γραφείο Σχολικών Συμβούλων...

COMMUNITY EVENTS >

Game Design - CS First
Tuesday, April 21, 2015
Activitatea 4 din club

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

Συνδυάζοντας το Focusing...
Saturday, April 25, 2015
Συνδυάζοντας τη Focusing-δημιουργικότητα...

ODS THEMATIC PORTALS

Science & Technology

World of Enterpreneuship

Geospatial Thinking

Above: ODS webportal http://www.opendiscoveryspace.eu

Incubation tips

Social platforms can incubate educational innovations that teachers and schools construct. But incubation requires support: a sense of community; connections to the environment; feasible and sustainable use of resources; and creativity.

Create your community of practice
ODS portal is community oriented, so it is the right place to find other teacher wish common interests and create your community to support you all and get visibility.

Listen to your environment
Experiences shown in workshops proved to be successful in their environment. Every country, every school and every group of student have their own dynamics, interest and experiences have to be updated accordingly before adoption.

Infrastructure and cost
When using digital resource user must set a proper digital environment and check sustainability. Not every hardware (computer, table, smartphone) is suitable for any resource. This could increase the cost (if affordable) of the experience.

Be creative
Open Educational (digital) resources can be improved over and over again. So do not shy to be creative and try new adaption of both the resources and practices.

Contribute back to your community
Your experiences (whether they were successful or not) are interesting to other members of

Tell me and I forget, teach me and I may remember, involve me and I learn.

-Benjamin Franklin

your community. Please, take your time to reflect on the key aspects of your experience and contribute back to your colleagues.
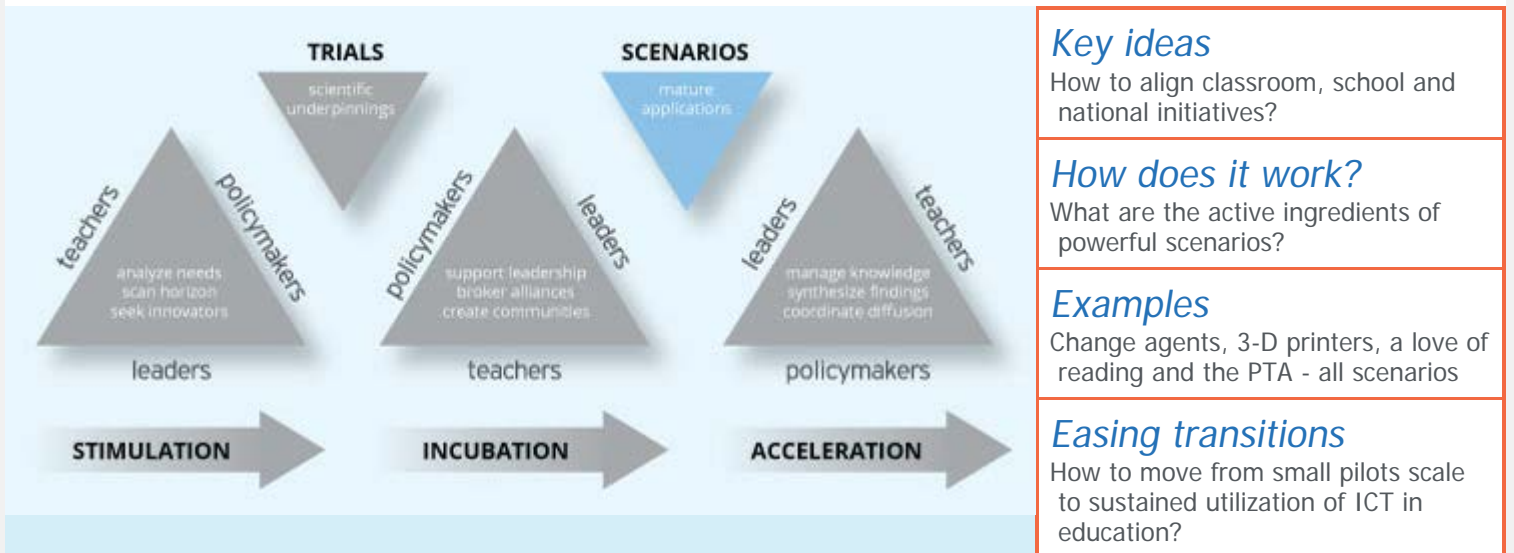
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Scenarios

Key ideas
How to align classroom, school and national initiatives?

How does it work?
What are the active ingredients of powerful scenarios?

Examples
Change agents, 3-D printers, a love of reading and the PTA - all scenarios

Easing transitions
How to move from small pilots scale to sustained utilization of ICT in education?

Scenarios exemplify, in scalable ways, how the intended outcomes can be achieved. Key elements for the scenarios are the contexts, the resources, the tools, the scaffolds, the impacts on school innovation and the lessons learned.

The triad: scenario in action, resource-based learning and school innovation
What is the interplay among them and how can research inform our efforts?

Classroom-wide scenario in action
The ÒCreating a model of Chirokitia Neolithic settlement using a 3D printerÓ scenario provides a roadmap from the creation of Communities of Practice to the exploitation of knowledge management techniques within participant teachers.

School-wide scenario in action
The scenario of a disadvantaged school becoming an innovation centre provides a roadmap from the invocation of the power to innovate to the acceleration of diffusion with national agencies.

National-wide scenario in action
A scenario in action related to the parentsÕ active involvement provides a roadmap from the support of the leadership of change to synthesis of evaluation and research.

How does it work?

What is it that will facilitate a large number of teachers, schools and learning communities to adopt resource-based learning in their everyday practices? What can we do about that?

Scenarios in action transition innovation work from the Incubation to the Acceleration phase. Scenarios are propelled by the change-agent teachers and supported by external agents (e.g. national coordinators). Both the people, and the innovation itself influence the ways in which scenarios unfold. In his classic work on diffusion, Rogers identified characteristics of innovations that determine their uptake and use. These characteristics are woven throughout an example of a change-agent scenario:

- Relative advantage: WhatÕs the added value?
- Compatibility: Will this change require other changes?
- Complexity: How detailed is the change?
- Trialability: Can I experiment with it before committing?
- Observability: Can I see it in action?

Real life examples

Change agent scenario

Mr. Alexandros Kofteros, Cyprus teacher in a disadvantaged school, managed to attract five other teachers from the same school to the ODS organisation and implementation process during scenarios in action. The participant teachers put a lot of hard work, while exemplifying many evidences of engagement and commitment. Finally, they decided to present their work to the national contest for the best ICT-infused scenario, organised by the Pedagogical Institute of Cyprus. During this process, the presentation skills of the participant teachers were greatly enhanced. The result was that two out of the five scenarios, presented by the participant teachers from the school of Mr. Kofteros, were rewarded in the final contest with prizes for innovation (Creating a model of Chirokitia Neolithic settlement using a 3D printer) and good practice (Learning about myself and others).

The hidden curriculum behind this scenario in action is related to how a disadvantaged school can become a school innovation center. Also, it exemplifies the importance of triggering the intrinsic motivation of the participant teachers in tandem with the courage and determination of the change-agent teacher. Another lesson learnt is related to the crucial role of the change agent teachers, provided that they have realised their roles, as well as, to how satisfying are reward systems and recognition for the hard working teachers (observability).

The change agent teacher of the disadvantaged school often quotes John Woods by saying: ÒThe player who makes the team great is more valuable than a great player. Losing yourself in the group, for the good of the group, thatÕs teamwork!Ó

Another enabler is the close relationship of the learning topics with topics of the curriculum: the participant teachers were challenged to use resources and tools in order to serve their learning goals, while gaining important ICT and presentation skills throughout this process (trialability). Taking into account their relationship with RBL and school innovation, scenarios in action might best be described using the structure of Hill & Hannafin (2001).

- Context, which includes a set of similar settings or learning situations in which the scenario in action can be applied successfully (like: combining formal with informal learning, enhance teacher motivation, foster self-regulating learning, use the affordances of learning analytics, provide community support mechanisms etc).
- Resources that are Òmedia, people, places or ideas that have the potential to support learningÓ
- Tools that Òaid individuals to engage and manipulate resources and ideasÓ
- Scaffolds through which Òindividuals are supported in identifying, interpreting, or otherwise using resourcesÓ
- Process description (data-->information--> knowledge-->meaning): how was this process established?
- Impact with regards to school innovation: how was school innovation fostered and/or sustained?
- Lessons learned (trialability): how can this scenario in action be generalized and transferred to other similar settings or learning situations? Which of the main actions included in the incubating phase trigger outcomes of the accelerating phase? And which outcomes are those?

Creating a model of Chirokitia Neolithic settlement using a 3D printer

Context
Based on an initiative to develop 3D printing, schools formed collaborations and worked in developing original content. Eventually, 3D models of the ancient Chirokitia settlement were created. Students from four different grades (aged 9-12 years) and educators that teach three different knowledge domains (history, technology and maths) participated. Participants engaged in a cross-disciplinary project with various forms of learning and multiple sources of information.

Resources
3D printing is an innovative teaching and learning practice. The ODS 3D printing @ Schools Community focuses on discussing and organising 3D printing actions, in order to address learning and teaching needs with poweful digital and physical representations while reusing existing infrastructure in a dynamic pedagogical context. Aim of this community is to raise teachers awareness on 3D printing, organise training events on design, use and deployment of design software and 3D printing infrastructures in schools and elsewhere, initiate cross discipline, augmented reality driven, projects between schools and other institutions using, mainly, 3D design and printing activities (relative advantage).

Tools
M obile devices, an easy-to-use 3D CAD tool for modelling 3D designs, history educational software and 3D printer.

Scaffolds
Students were supported by their educators (through dialogue and especially designed worksheets). The teachers were supported by the change-agent teacher (reduced complexity) and also they helped each other (reduced complexity, observability), since the project was a cross-disciplinary one.

Process description
An educational visit to the settlement in the context of the history course where data about the settlement were gathered (mobile learning, evidence-based learning); creation of a digital replication of the monument by modelling a 3D representation through a cross-disciplinary approach that combined mathematics (volume and area of 3D shapes, ratio and analogies) and technology education (3D modelling and 3D printing).

Impact
Regarding to school innovation, this scenario embraces project-based learning and mobile learning in conjunction with evidence-based learning (students are learning outdoors using mobile devices to collect evidences) while bridging informal with formal learning. Also, it embraces all kinds of collaboration (teacher-teacher, student-student and student-teacher). Finally, it has provided insights to the participant teachers about the affordances of mobile learning (Relative advantage). By the end of the project the participants had a holistic idea about life in the ancient Chirokitia Neolithic settlement.

Lessons learnt
RBL as a means of providing a) a protective environment to enable the collaboration and the exchange of knowledge between colleagues and b) an intriguing learning environment with lots of cognitive and social stimuli to enable peer learning between students. Also, unintended learning on behalf of the participant teachers in their effort to design an ICT-infused learning ÒecosystemÓ that would best serve the learning goals and the studentsÕ needs.

Read more
http://portal.opendiscoveryspace.eu/blog/alexandroskofteros/20130603-433
http://portal.opendiscoveryspace.eu/community/3d-printing-schools-community-270
https://tinkercad.com/

Love of reading: Learning about myself and others
Context
A common project between 4 schools (1 in Cyprus and 3 in Greece) based on the book ÒLit Book of the Great Psychological OppositesÓ (Oscar Brenifier). Schools came together through their participation in the ODS project. Even though material was developed (and shared) by the participating teachers, additional digital resources were used, saving time and effort for all involved in the project (relative advantage).

Resources
The idea was to change the attitudes of the students towards reading books - instill to them the love of reading- while they learn about themselves and others. Towards this end, a social constructivist approach was followed and an online community of interest was created (compatibility). The book ÒLit Book of the Great Psychological OppositesÓ was used as the basis for the creation of the digital resources, the forum was used to enable asynchronous communication, the webconferencing system and the chat were used for synchronous sessions, a digital glossary was shared among participants, online quizzes were generated for assessment purposes and, finally, a range of open-ended activities were created to serve the learning goals.

Tools
The open-source web conferencing system ÒBig Blue ButtonÓ a customised version of the ÒMoodleÓ open source Learning Management System,) other elearning services, like linoit, a free sticky and canvas service, and a projector

Scaffolds
ÒBookieÓ a pedagogical agent, integrated in the moodle e-course, designed by the participant teachers; its aim was to help students (conceptual and procedural scaffolds) while they were coping with the respective learning tasks and to foster self-regulating learning. Also, teachers literally undertook the role of the avatar ÒBookieÓ occasionally and facilitated the synchronous discussions in the chat. As already mentioned, the change agent teacher provided continuous support to the participant teachers throughout the scenario including their presentation in the contest. The change-agent teacher managed to reduce the complexity of the whole endeavour.

Process description
The students read the book, gained information about the 10 pairs of opposites unravelled in the book while wrapping their minds around abstract notions through the different types of activities (see section resources) and exercising their critical judgment.

Impact
The use of web 2.0 tools to foster an online community support mechanisms among participants (relative advantage). This scenario in action has:

- Bridged the gap between formal and informal learning (game-based activities were incorporated: hangman, crossword, wordsearch puzzle)
- Fostered collaborative learning and work within groups of students and teachers and across different schools,
- Motivated students to produce written word (through forum and chat), and
- Enhanced teachersÕ skills and motivation. In particular, pupils were highly motivated by thought-provoking collaborative activities: they could present their ideas, share the results of their assignments and participate in discussions in order to extend their conclusions.

Lessons learned

A significant enabler was collaboration across schools from different cultures and change management experiences because they facilitated lateral learning (Hargreaves, 2003) between schools. This new paradigm of social learning created new forms of interaction. One of the major features included in the transformed education system, whose contours are coming into view is the presence of Òrich, extended models of school organisation using networks and highly varied forms of learning to engage directly with wider communities and jointly produce the wider conditions under which successful educational attainment and learning take placeÓ (Hargreaves, 2003). This scenario in action is the manifestation of this feature.

Read more

http://meetings.ellak.gr/bigbluebutton/
http://mathisis.org/
http://en.linoit.com/

ParentsÕ engagement & involvement: Meeting Parent Teacher Association (PTA)

Context

Parents are always seeking ways to boost their childrenÕs interest in learning, however they donÕt always possess the knowledge to identify which content is suitable for them. During the school year, teachers might be able to point to certain content, but during school holidays a teacher is not always (physically) available. Various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families. Recognising the potential of parent inclusion in the development and use of ODS, a number of presentations took place in Cyprus with representatives of the Parent Teacher Association (PTA) Union, representing all PTAs in the country. Great interest was shown on the potential of the platform and its possible uses, and was agreed that prior to the completion of the project, during the next stage of implementation, a Cyprus PTA community will be developed in order to disseminate results to schools in Cyprus and their respective PTAs.

Resources

Open Discovery Space can be used to offer parents a viable, free and open solution for collaborating with teachers, not only from their school but from other schools as well, to discuss issues of interest with parents from other schools and other countries, and to easily locate and use educational content that might be suitable for their children. ODS can offer access to online quality content, access to discussion forums on topics of interest, communities of parents with similar anxieties and interests, parent academies with online events and seminars. Additionally, ODS can offer parents webinars that will help them improve their skills in helping their children, while giving them an active voice in the ongoing development of the platform and methodologies, through an active participation through feedback. As such, it is essential that parent teacher associations both on local levels (school) as well as national levels, are given adequate information on what ODS is and what are the benefits of its implementation for students and families, so that they can assume a more active role.

Tools

The ODS Community portal provides Open Educational Resources and communication tools to build online communities (forum, blogs, social bookmarking etc). Google hangout is an open and free digital environment that is being used to host webinars (web seminars).

Scaffolds

ODS is an educational as well as a social platform. It provides a central point where many opportunities for communication/collaboration are announced: online events, contests, schools, webinars, seminars, workshops, good practices, e-noticeboards etc. It also provides educational digital resources and pedagogical scenarios, accompanied by quality indicators either in the form of validation checks by official educational institutes or in the form of rankings by peers, or both.

Impact

School family collaboration has been found to be beneficial in improving learning outcomes and also in reducing other problems (i.e. problematic student behaviour). Online systems exist and are used in many countries, especially in Europe, the United States of America, Australia and Canada, which support family-school collaboration and communication. Research, especially in the area of Computer Mediated Communication, has shown that various solutions exist for communication with parents, including student information systems, web sites, email etc. In many cases, schools use blogs, Facebook and Twitter accounts or even forums and email to communicate with families

Lessons learned

The practices mentioned above aim at opening the school towards parents through a Parent Teacher Association. Broker alliances with PTAs may make parents feel confident in offering ideas and opportunities for community building, as well as, encouraging them to play a bigger part in the school life, as a whole.

http://www.google.com/+/learnmore/hangouts/

Eratosthenes Experiment

Context

The Eratosthenes Experiment is based on the very fundamental idea Eratosthenes had in order to measure the circumference of the Earth. Students have to proceed to uncomplicated measurements using uncomplicated equipment and to exchange their scientific evidence obtained with another school they have been matched up with. The match-up is affected by the longitude of the schools: the participating schools must share the same longitude for the success of the experiment. They provide their

latitude and longitude during the online registration process.

Resources
Teachers who are willing to conduct the Eratosthenes Experiment with their students can take advantage of the lesson plans offered on the Open Science Resources portal (OSR) - a repository hosting educational scenarios regarding science teaching for all grades. The material consists of full scenarios that assist the teachers to prepare their students for the experiment and they offer detailed description of the procedure and material for further discussion. They are based on the Inquiry Based Learning Model with educational objectives applied serving the educational interest. These resources are available in Greek and English. Teachers are encouraged to adjust the resources to their studentsÕ needs. Additionally to the lesson plans, eLearning tools are also suggested to be used. Participants are encouraged to use Stellarium and Google Maps in order to identify the local noon at their location and to measure the distance between their school and the school they have matched up with, accordingly (explained under Process Description).

Tools
Internet connection, computer/ tablet/ mobile device.

Scaffolds
Students are supported by their educators, (specially designed worksheets are included in the available lesson plans). And in consequence teachers are supported by the lesson plans offered and by the organisers who are accessible for online responding to questions before, during and after the conduction of the experiment.

Process description
For the need of this activity the students along with their teachers define the local noon at their location. They use a one-meter stick that they place vertically to the ground. At the time scheduled to conduct the experiment, students measure the length of the stickÕs shadow. They repeat the measurement 5 times and write their values down to submit them later. Students need to know the value for length of the third side of the triangle shaped or they can calculate it themselves by using the Pythagorean Theorem. Then, they calculate the distance using Google Maps between their school and the school they have matched up with. This year the experiment will take place on the 21st of March, on the equinox day. Students can now calculate the circumference of the Earth.

Impact
The Eratosthenes Experiment although it is actually a representation of an ancient and fundamental experiment succeeds in drawing the attraction of students of all ages. The lesson plans accompanying the experiment involves successfully project-based learning in combination with evidence-based learning; students are learning outdoors collecting evidence. Also, there is a dynamic fusion of informal with formal learning. Likewise, it comprises all types of collaboration (teacher-teacher, student-student and studentteacher).

Lessons learned
Carrying out the data analysis with the students in class helped them to identify issues and gave them immediate verbal and visual explanations. Many of the students were challenged with the spatial reasoning skills required to compute the distance, and to relate this with the circumference of the Earth. Working together with students and teachers from another country provided a concrete illustration of how students from different backgrounds and living in different countries can collaborate to solve scientific problems.

Read more
http://eratosthenes.ea.gr/en
http://www.osrportal.eu/en/node/94354
http://portal.opendiscoveryspace.eu/community/eratosthenes-experiment-667944

Scenarios in action from the ÒeLearning 2.0Ó project
Teachers and students from four schools in one virtual classroom
In the project titled ÒeLearning 2.0Ó, best practices are described in a similar way as scenarios in action are in the context of ODS. Their structure is: introduction, description, user profile and organisation of the community, technological aspects, outcomes, motivational aspects and impacts, results of the survey among participants, success factors and barriers, lessons learnt. In ODS, we identified the success factors and barriers with regards to the adoption of Resource-based learning and school innovation at the beginning of the project and we built upon them to create scenarios in action designed to provide roadmaps that alleviate the barriers and enable the success factors. A scenario in action from the elearning 2.0 project that may also have an added value for ODS is titled ÒLeMill (Calibrate) Ð A Web 2.0-enhanced Community for TeachersÓ (available online in http://ftp.jrc.es/EURdoc/ JRC53212_TN.pdf).

The Calibrate project promotes the idea of free and open learning resources and international transfer of online learning material, while LeMill develops a webservice for exchanging national learning materials within the Calibrate project. Among the lessons learned that particularly apply to ODS are those: a) multimedia and interactive content are requested by teachers and b) group functions of social communities can support learning resource exchange.

Scenarios: Easing transitions

Scenarios in action provide a roadmap for the incubation-to-acceleration phase, i.e. the transition from the small, pilot scale to the large scale utilization of ICT in education, school innovation and Resource-Based Learning

School example

Although there no known or safe ÔrecipesÕ on how to make your school an innovation centre, the cultivation of team spirit, the continuous support on ICT-related issues coming from the change-agent teacher and the rewarding systems (like contests), can play an important role in teachersÕ intrinsic motivation and, in turn, to their professional development.

Classroom example 1: 3D printing @ schools

Teachers are learning from each other during their co-ordinated efforts to design learning ÒecosystemsÓ that invite their students and other participants to discover history and the added value of technology and ICT tools. Teachers gain confidence, skills and knowledge while trying to meet the curriculum standards set out for this learning topic.

Classroom example 2: Love of reading

Teachers and students from four schools and two different European countries come together in one Virtual classroom. This scenario in action of social learning illustrates how new forms of interactions and joint intellectual student and teachers production can be facilitated effectively by technological means.

Emerging practice: engaging the parents

The Open Discovery Space approach to school education and school development recognises the important impact of studentsÕ families on successful education. ODS sets out to empower parents by providing them with: resources, social network tools and the eParents Training programme.

Scenarios in action from another project

The LeMill project promoted the idea of free and open learning resources and international transfer of online learning material. A series of best practices and lessons learnt were identified by the end of the project. The most relevant ones are mentioned in this section.

My educational institution is not a physical plant with classrooms and tress, but a ÔhubÕ of resources no longer constrained by time and place.
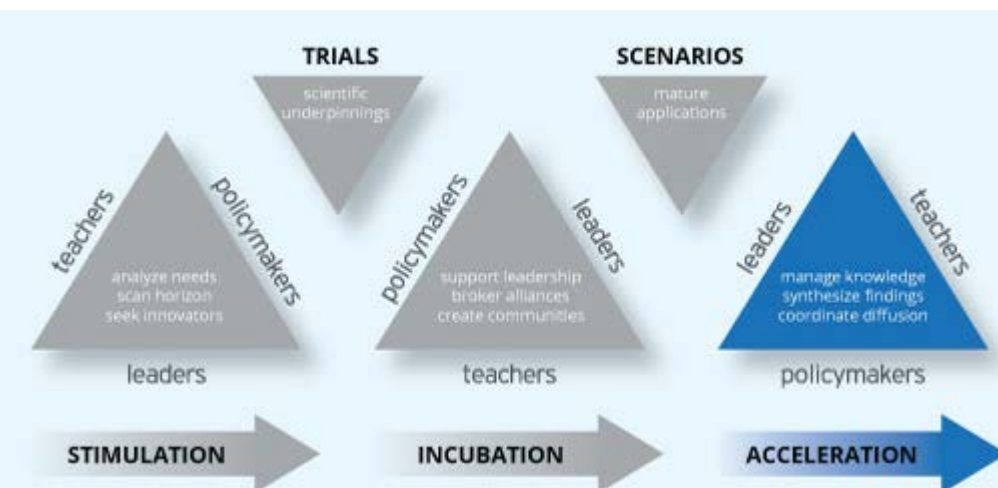
-Dillon & Granger

Scenarios

Technology-rich innovation in schools

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Acceleration

Key concepts
What does it mean to accellerate, through dissemination and diffusion?

How does it work?
How is acceleration powered through government reform, local initiatives or both?

Examples
Acceleration stories from the ODS activities in Greece

Recommendations
Key considerations for acceleration

The accelerating phase is the period where the educational change is expanded to significant portions of the student population, activities are taken up in representative schools, and knowledge management is used among partners

Key concepts

Accelerating
This phase aims to spreading the innovation. In a centralized educational system, this stands to be achieved through a governmental educational reform. In the decentralized systems, the district superintendents and school principals are likely to play significant roles.

Dissemination
One-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media.

Diffusion
Process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other.

How does acceleration work?
Accelerating through government reform, local initiatives, or both
Forces at play
Throughout this phase, attention is given to:

- exploiting knowledge management techniques (sharing what is known within ODS partners and participants);
- synthesizing evaluation and research (to inform efforts);
- accelerating diffusion with national agencies (to reach increased numbers of users on the ground).

There are two kinds of processes in this phase: dissemination and diffusion. School principals and headmasters play vital role in both of them (both directly and indirectly). Dissemination is a one-way process where information is offered or broadcast. In ODS, information about the innovation is shared, e.g. through presentations, workshops, webinars, training academies, meetings, websites or other media. Complementary to this, diffusion is the process through which interventions are pulled into practice from within. For example, practitioners exchange information, arrange demonstrations, or coach each other. It is not necessarily the scope of diffusion that measures an interventionÕs success, but its presence is one important indicator. It is a Òspread withinÓ which can be seen, for example, when reform principles or norms of social interaction become embedded in school policies and routines, or when teachers draw on those ideas and put them to use in other aspects of their practice, which were not explicitly addressed by the intervention.

Diffusion tends to be less common than dissemination; and innovators can sometimes be both delighted and overwhelmed when it starts to take place. In order to be successful, diffusion should be encouraged by the school management. Educational leaders can be very supportive in these processes. First of all, they can initiate dissemination activities. In order to motivate the teachers, ODS headmasters are offered a gamut of ODS presentations, workshops, webinars, training academies, meetings, etc. to choose from. They can decide on the actual school poliicy and in accordance with it use what ODS offeres. No other portal has been created with such meticulous attention only for education needs and teachers as its target audience. In the following passages there are some tips and practical ideas how headmasters can benefit from ODS in order to motivate teachers.

Headmasters, teachers, ODS Ð whatÕs the connection?

The most important task for headmasters is to motivate teachers (and learners) to use eLearning resources. That means:

- to provide reward (e.g. not directly by giving money but by offering professional development trips, professional advancement)
- to insist on implementing e-register and obligatory number of ICT lessons throughout the school year (this should be systematically done)
- to insist on teachers having electronic lesson plans, electronic portfolio and documentation
- to have teachers attend obligatory ICT seminars in order to develop their ICT competencies
- to have teachers categorized based on their ICT competencies in order to have motivational approach to teachers' development
- to embed successful projects (competitions) into the educational system and impose them on teachers as official
- to synchronize the needs of students with the instructional methods (not only by implementing ICT but also by involving creativity, task-based learning, challenge in learning)
- to implement e-learning carefully and cleverly: it could be at first for extra curricular classes, then to move on to regular teaching process

In order to overcome organizational and technical barriers, the following should be done:

- to educate constantly the school management and teaching stuff
- to provide positive examples from the teaching systems that managed to raise the quality of studentsÕ knowledge by means of e-learning
- to raise awareness with teachers that their private e-activity could also be used in teaching (Google account, one drive account, social networks)
- to provide education for teachers to use LMS / CMS (e.g. Moodle)
- to involve expert teachers into sharing-and-caring activities
- to engage school and regional coordinators for ICT implementation
- to participate in both international and national projects
- to provide a good personal example by having an

official headmasterÕs webpage/FB profile

Acceleration stories from ODS activities in Greece
Overview
ODS cases from Greece ODS has up-to-date (January 2015) achieved to engage 433 schools in Greece, whose participation is being coordinated and supported by Ellinogermaniki Agogi Research and Development Department. Other Greek partners are the University of Piraeus, the Technical University of Crete, the Greek Research and Technology Network, Agro-know Technologies, as well as CTI Diophantus and the Institute of Educational Policy, which are supervised by the Greek Ministry of Education. Out of these schools, 312 were recruited from January 2013 to December 2014 through various channels (ODS visionary and practice reflection workshops, conferences, presentations and other dissemination events, previous projects), while 122 schools were added in January 2015 after a general call that the Institute of Educational Policy addressed to all schools of the country. This formal call was in fact a significant step in the official adoption of Open Discovery Space by the National Educational Policy and the acknowledgement of its potential impact on the modernization of school practice and the promotion of innovation in Greek schools.

A variety of activities is suggested to schools by the Ellinogermaniki Agogi team and a series of respective ODS communities has been set-up to support their implementation. In terms of curriculum areas, these activities involve Science and High Energy Physics, Environmental Education, Music, Entrepreneurship, as well as teacher training on educational design and a focus on pupilsÕ transversal key competences. The schools are free to choose more than one of the supported activities and, although Ellinogermaniki Agogi provides them with tools and educational scenarios, they are also encouraged to adapt these resources to their own needs and specific contexts, using the ODS template for the schoolÕs action plan.

Below is a short description of three selected cases and implementation activities from Greek schools that share the following characteristics:

- Connection, community building and sharing of resources among remote schools through the ODS portal.
- Increase of access to resources for remote and Ðsubsequently- underprivileged schools through the ODS portal and tools.
- TeachersÕ increased familiarisation with digital educational design tools and implementation of innovative teaching methods, such as the inquiry-based model and project-based practices.
- SchoolsÕ collaboration through ODS with regional policy makers, universities, professional artists and other organisations and thus networking and opening-up of the school.

Connecting schools through music
Context
"Akriton Mousiki" was a live interactive performance audiovisual event combining Music and Digital Shadow Theatre. The performance was inspired by the Greek Acritan heritage and included the collaborative preparation, co-creation and realization of an online event between multiple distant ODS schools linked together via videoconference. During the "Linkcast" (webcasted videoconference) pupils from four remote schools presented a virtual-stage role-playing educational activity by moving digital figures (e-shadow platform) accompanied with shared live Music performance. The scenario included an advanced interaction between these five remote educational communities on the islands of Karpathos, Gavdos, Kastelorizo and Cyprus hosted by Athens.

Part of the dialogues arranged for the event was based upon the Byzantine epos of Digenis Akritas digitized by the University of Crete Anemi Database. The development of the "Akriton Mousiki" activity is the first attempt to produce advanced-interaction scenarios between 4 remote islands in Greece including Cyprus via live videoconference involving Music as a performance art.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Online mentoring, collaborative working with use of online resources.

Process
A new community was formed inspired by the "Akriton Mousiki" activity. ÒTravelling in the era of ErotokritosÓ is a community of teachers in Chania-Crete exploring educational aspects of Vincenzo KornaroÕs epos of ÒErotokritosÓ and other personalities of the post-Byzantine era such as the famous painter Domenikos Theotokopoulos and the composer Frangiskos Leontaritis. The community through its manager in Chania, took part in a group of the ÒLet Us Share The Music/Let Us Link The WorldÓ community along with community-members from Athens and Evros (Northern East of Greece) The group contributed in the preparation of an ODS scenario based on the above prominent Renaissance figures and their Art. After online training, provided by the parent community manager, the teacher in Chania recorded and edited digital audio files of her pupils narrating extracts of the poem she had prepared. Digital contributions were uploaded as extracts next to music excerpts from the same era, performed by professional musicians who granted the group with their permission to use their content for educational purposes. Original Digital Audio Workstation music was also arranged, composed and produced by the parent-community-manager to accompany the pupilsÕ narration. PupilsÕ paintings were uploaded as well.

Impact
The outputs of these activities leaded and with an aim to create a Virtual school on the theme of Music the ODS Teachers Training Academy ÒLive-Music EducationÓ has been developed in order to lead future members into advanced methods of exploring ICT in musical interactive scenarios http://portal.opendiscoveryspace.eu/topic-courses/live-music-education-academ.

Read more
http://portal.opendiscoveryspace.eu/community/moirastoyme-ti-moysiki-enosoyme-ton-kosmo-let-us-share-music-let-us-link-world-347.

Increased interest and greater interaction in Remote Tychero

Context
The High School and Senior High School of Tychero are located in a rural agricultural town of North-eastern Greece, near river Evros. The area, as all rural areas in Greece that are situated on the borders of the country, is defined as a remote one, with accessibility problems that the educational authorities officially recognize and attempt to address. The two schools are relatively small in terms of student population and face practical difficulties, such as inadequate number of teachers, frequently moving staff, poor infrastructure and accessibility issues due to their location. However, in the last few years the schools of Tychero have been having an increased interest participating in European networks, in collaborating with peers and other schools and

in searching for opportunities to improve their quality of teaching and developing the studentsÕ 21st century key- competences.

Tools
Digital tools and resources, online communities, sharing experiences and results.

Scaffolds
Face to face and online training material made available.

Process
Both schools entered ODS at the beginning of Pilot Phase 2 (September 2014) after being introduced to it in a Practice Reflection workshop organized by the regional school counsellor who collaborates with the Ellinogermaniki Agogi team. Regional school counsellors are appointed by the Ministry of Education and the experience of ODS in Greece has shown that their role can be significant in disseminating innovative projects, such as ODS, as well as in recruiting and motivating schools to participate. In addition, since they are working at local level they can act as mediators in identifying and supporting individual teachers that are already active and motivated. Mrs Stella Tryfonidou, Science and Technology teacher, is an example of this type of teachers, who, acting as a change agent, recruited in turn both of the schools of Tychero in ODS in order- as she identifies Ð to: a) enhance the access of her school to qualitative and innovative educational content from ODS, and especially the repositories of OSR and Discover the Cosmos, b) take opportunities for various educational activities, c) participate in teachersÕ professional development training. Within this framework, Mrs Tryfonidou designed four innovative educational scenarios that are based on the inquiry model and made use of resources from these repositories, as well as of the ODS authoring tool. The scenarios have been implemented in the schools of Tychero or are currently still in progress (January 2015) with the support of the Ellinogermaniki Agogi R&D Department.

The first scenario was implemented within the ICT Curriculum with First-graders (15 years old students) of the Senior High school of Tychero and was entitled ÒPacman with ScratchÓ. The idea of the scenario is the development of an application in an optical programming environment, such as Scratch. The students worked in groups, designed the application and implemented it through Scratch. They then tested and evaluated it and disseminated it to peers and the local community. The results of the work of Tychero were presented at the Panhellenic Student Festival of Digital Creativity, which is organized every year by the regional ICT school counsellors. The scenario has been uploaded onto the Greek community of educational Scratch programming of the ODS portal http://portal.opendiscoveryspace.eu/community/senaria-didaskalias-se-perivallonta-optikoy-programmatismoy-me-plakidia-668762

The second scenario was entitled ÒHow did Thales calculate the height of Pyramid of Cheops?Ó and was implemented at Tychero in the school year 2014-15. The scenario was based on the Project Based Learning approach and engaged the students (15-year-olds) to construct a simulacrum of the Pyramid and calculate its height, following the same method that Thales used in the 6th century B.C. Mrs Tryfonidou based her work on an original scenario that was already available on the OSR portal http://www.osrportal.eu/el/node/95028 that she then adapted.

The implementation of the third educational scenario was inspired and initiated by the Eratosthenes experiment http://eratosthenes.ea.gr/, an international activity, which was offered to ODS and ISE (Inspiring Science Education) schools in March 2014 attracting 350 schools from 37 countries. Here again, the activity implemented at Tychero with second-graders (16-year-old students) was based on an original scenario of the OSR portal http://www.osrportal.eu/el/node/94691 that Mrs Tryfonidou adapted to her school and studentsÕ needs.

Finally, the fourth scenario, that is currently being implemented in the High School of Tychero, is entitled ÒGood night to the starsÓ and its objective is to introduce the students (12 -15 year-olds) to basic concepts of Astronomy and prepare them for a virtual connection with the Faulkes robotic telescopes, that will be conducted with the support of the Ellinogermaniki Agogi R&D team. The scenario will also engage the students in constructing a model of the solar system and disseminating their final report onto a wiki environment.

Impact
The evaluation of the impact of these scenarios on pupilsÕ learning is still in progress, however some significant remarks made by the teacher include: increased interest on the part of students, greater satisfaction from hands-on learning compared to conventional teaching and thus accomplishment of affective educational objectives. There was also improvement in classroom time management and psychomotor objectives, such as the pupils working effectively in groups, taking initiatives and volunteering to work on these projects in their free time. The teacher herself also reported that the resources of ODS supported her in terms of Scientific expertise and motivated her to be more creative and inspired.

Lessons learned

In summary, the overall experience from the implementation of ODS in Greece has shown that the following practices can have a positive impact on schoolsÕ engagement to a project that promotes school innovation and on making the most of the opportunities it provides them:

- The ODS approach based on its innovation model, that considers the schools and the teachers as capable of innovating, can be unprecedented or even challenging for schools, especially in countries with centrally governed educational systems, like Greece. Providing individualized and personal support to is crucial in helping schools develop their own innovation strategy and convince them that they have the power to change and improve education.
- To the same end, engaging and collaborating with regional educational authorities and policy makers also helps in creating a safer environment for schools and teachers that seek change and innovation. - Opportunities for disseminating individual cases of innovating teachers and schools to their local or wider educational community (e.g. teachers presenting their own work in conferences or presentations through the press/ media) can have a very positive impact on schoolsÕ engagement: In this way individual efforts are rewarded and further encouraged, acting also as multipliers and sources of inspiration for other teachers and schools.
- Similarly, it is important to promote regular networking activities that bring together teachers from different school settings in order to build trust and a common vision that will encourage them to share their resources on a public platform, such as ODS.

Tips for accelerating

In order to motivate and inspire teachers, headmasters need to set up a personal example of lifelong learning and professional development. Their influence starts from their internal engagement on personal and professional development in order to provide good example and set up the atmosphere. Further steps include external influence which they make on teachers by creating the climate for ÒpullÓ approach (with the main aim to show Òfollow meÓ instead of Ògo aheadÓ). Finally, one of their external influences to motivate teachers is to nurturing life-long learning and professional development of teachers by providing (funding for) seminars, workshops, trainings, sometimes even their consent and approval for teachers to take a day off for development sessions.

As an example of a success story, there is a story about the headmaster from Technical School in Knjazevac, Serbia. Her name is Ljiljana Zikic and she was the first to introduce ICT into her school. She went to seminars and trainings, created lesson plans for teachersÕ competitions, etc. In the end, she became a good example to the teachers from her school. The result is that in 2013 at the competition ÒCreative SchoolÓ (organized by Microsoft Serbia and Institute for Improving Education) there were eleven teams, three teachers in each of them, from her school! She personally took part in three of them.

To accelerate the process, headmasters play an important role. They disseminate the information but they also make the diffusion phase more likely to happen when they create the positive atmosphere among teachers. It needs time, but it always ended successfully when headmasters were involved in the process.

Important factors
Acceleration is influenced by the innovation itself, the strategies used in implementation, the context and the actors Ð efforts muse be attuned accordingly.

Synthesize findings
Results from evaluation and research in this phase inform future work but can also provide justification for increased acceleration efforts.

Coordinate dissemination & diffusion
Across various push and pull activities, core ideas and goals help projects stay focused during this phase.

> ItÕs not about the tools, itÕs using the tools to facilitate learning.
>
> *- Andrew Churches*

Contents

Technology-rich innovation in schools

powered by OPEN DISCOVERY SPACE

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Mida see sisaldab?
Vajuta siia, et saaksid valida teisi keeli ja formaate.

Tutvustus
P›hij›ud

Mudel
Innovatsiooni jŠrkjŠrguline protsess

Edendamine
Huvi Šratamine ja v›imaliku koostšš identifitseerimine

Uuringud
Esimeste kogemuste otsimine

Areng
Stabiilne, toetav areng

Stsenaariumid
Katsetamisest stabiilse muutuseni

Protsessi kiirendamine
Muutumine isegenereeruvaks

Allika tutvustus

Hariduslik muutus on raske Ÿlesanne ning kui see sisaldab ka tehnoloogilist muutust, siis on see veel keerulisem. See brošŸŸr loodi selleks, et toetada haridusjuhte huvitavas ja raskes Ÿlesandes algatada koolides tehnoloogilist innovatsiooni.

See brošŸŸr on osa suuremahulisest Euroopa projekti seeriast, mis pakub avatud ligipŠŠsu Euroopa koolide haridustikele allikatele: Open Discovery Space (ODS). 2012. aastast alates on ODS projekt ›ppinud tegev›petajatelt ja haridusjuhtidelt seda, kuidas nad koolides ODS projekti poolt soovitatud tehnoloogilist innovatsiooni lŠbi viivad.

Selle brošŸŸri sisu p›hineb ODS projekti innovatsiooni mudelil. See mudel loodi algselt ODS projekti tegevuste struktuuri p›hjal. Mudel kirjeldab muutuste p›hifaase (edendamine, uuringud, areng, stsenaariumid ja protsessi kiirendamine) ning m›jusid. Selles brošŸŸris on vŠlja toodud arusaamad, mis on osaliselt seotud haridusjuhtidega. Need on vŠlja toodud selleks, et teised haridusjuhid saaksid uusi tehnoloogiaid kasutades vajalikke muudatusi ellu viia.

N›uanne: V›tmetegevused on koondatud tegevuskavasse, mida nŠeb siit ja igalt lehekŸljelt.

Teised keeled ja formaadid
M›ned selle allika osad on kŠttesaadavad jŠrgnevates keeltes:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- See brošŸŸr inglise keeles pdf-formaadis.
- Selle brošŸŸri lŸhike animeeritud video.

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Tunnustused
Mida direktorid Ÿtlevad selle allika kohta?

"Selge ja sidus vŠljaanne. Teksti, sisu, piltide, graafika poolest esteetiline. Kergesti loetav (online). Hea tasakaal teooria ja juhtumiuuringute vahel...See v›iks olla hea suvine kursus."

- Tom Roche, Ireland

"Minu meelest on brošŸŸr hŠsti koostatud dokument, milles on defineeritud raamistik. Algusest peale tŠhtsustas see muudatusi traditsioonilisest ›ppest digitaalsele ›ppele minekul. Selle muudatuse v›tmeelement on hŠsti illustreeritud."

- Robbie O'Leary, Ireland

"NŸŸd nŠen, mida QDS praktikas pŠriselt tŠhendab."

- Daithi O'Murchu, Ireland

"Ma arvan, et see dokument on suurepŠrane allikas, mis p›hineb teoorial ja loob raamistiku seotusest ODSiga."

- Fin Martin, Ireland

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Technology-rich innovation *in schools*

powered by **OPEN DISCOVERY SPACE**

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

ÀQuŽ hay dentro?

Haz click aqu' para otros idiomas y formatos

Introducci—n
Fuerzas clave en juego

Modelo
Un proceso gradual para la innovaci—n

Estimulaci—n
Despertar interŽs e identificar v'as prometedoras

Pruebas
Buscar primeras lecciones de experiencias en el campo

Incubaci—n
Constante desarrollo de apoyo

Escenarios
De pilotos a cambio estable

Aceleraci—n
Convertirse en auto-generativo

Sobre este recurso

El cambio educativo es extremadamente dif'cil en cualquier contexto, y cuando el cambio implica la tecnolog'a Ð como en la mayor'a de cambios que se hacen hoy en d'a Ð las complicaciones aumentan. Este booklet ha sido dise–ado para apoyar a los l'deres educativos en la apasionante aunque desalentadora tarea de iniciar y mantener la innovaci—n tecnol—gica en las escuelas.

Este booklet es parte de una serie producida por un proyecto europeo a gran escala que ofrece recursos educativos de libre acceso a las escuelas de toda Europa: Open Discovery Space (ODS). Desde 2012, la iniciativa ODS ha aprendido de los enfoques del mundo real de los profesores, los l'deres educativos y los responsables pol'ticos, ya que colaboran para alcanzar la innovaci—n tecnol—gica motivada por el trabajo de ODS.

El contenido de este booklet se basa en el modelo de innovaci—n que subyace en trabajo de ODS. Este modelo fue concebido inicialmente para estructurar las actividades de ODS, y ha evolucionado a la luz de las lecciones aprendidas durante el desarrollo del proyecto. El modelo describe las fases clave del cambio (estimulaci—n, pruebas, incubaci—n, escenarios y aceleraci—n), as' como las implicaciones para los principales interesados. Este booklet cosecha ideas que son particularmente relevantes para los l'deres educativos, y las pone a disposici—n para su uso en otras iniciativas para lograr cambios duraderos y significativos que impliquen el uso de las nuevas tecnolog'as.

Consejo: Las principales actividades se resumen en el roadmap, al cual se puede acceder desde aqu' o cualquier p‡gina.

Otros idiomas y formatos

Partes de este recurso est‡n disponibles en los siguientes idiomas:

Contents

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- Este booklet en inglŽs en formato pdf
- Key highlights in Estonian
- Key highlights in German
- Key highlights in Serbian
- VΊdeo animado de este booklet

Testimonios
QuŽ dicen los directores de centros escolares sobre este recurso

"A sharp coherent publication, very aesthetic with its good use of text, studies.contexts, images and graphics, easily read online, good balance of theory and digital case studies ... It would make a good summer course."

- Tom Roche, Ireland

"As a digital disciple I found the handbook a well laid out document with a very defined framework. From the very start it outlined the change from traditional to digital pedagogies. This key element of change is well illustrated."

- Robbie O'Leary, Ireland

"You can see what ODS actually means now in practice and not just theory."

- Daithi O'Murchu, Ireland

"I think that the document is an excellent production which is grounded in theory, sets out a framework for involvement with ODS."

- Fin Martin, Ireland

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a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Worum geht es?

Klicken Sie hier fŸr andere Sprachen und Formate

Einleitung
SchlŸsselaktivitŠten

Model
A phased process for innovation

Stimulierung
Gesteigertes Interesse und Erkennen von Mšglichkeiten

Versuch
Einstiegsstunden basierend auf bisherigen Erfahrungen

Inkubation
BestŠndige & unterstŸtzende Entwicklung

Szenarien
Vom Versuch zur stabilen €nderung

Beschleunigung
SelbstlŠufer werden

Zu dieser BroschŸre

Bildungswandel ist eine starke Herausforderung in jeder Lernumgebung. Wenn dieser Wandel aktuelle Technologien mit einschlie§t Ð wie es die meisten VerŠnderungen heutzutage machen Ð vergrš§ern sich die Schwierigkeiten. Mithilfe dieser BroschŸre wollen wir Bildungsverantwortliche wie Sie bei dieser aufregenden und zugleich herausfordernden Aufgabe technologienreiche Innovationen erfolgreich in Ihrer Schule einzubinden unterstŸtzen.

Diese BroschŸre ist Teil einer Reihe, welche von einem gro§ angelegten europŠischen Projekts, welches Schulen in ganz Europa Zugang zu open-access Bildungsressourcen bietet. Dieses Projekt nennt sich Open Discovery Space (ODS). Seit 2012, hat die ODS Initiative Erfahrungen mit europŠischen Lehrern, Bildungsverantwortlichen und Politikern gesammelt, die kollaborativ das von ODS entwickelte technische Innovationsmodel umgesetzt haben.

Dieses Model unterliegt der Arbeit der ODS Initiative und entwickelte sich durch die Erfahrungen und Zusammenarbeit mit den europŠischen Pilotschulen. Das Modell beschreibt SchlŸsselphasen Stimulierung , Versuch , Inkubation, Szenarien und Beschleunigung) sowie Implikationen fŸr verschiedene SchlŸssel-Akteure. Diese BroschŸre gewŠhrt wertvolle Einblicke, um mit modernen Technologien einen nachhaltigen Wandel als Bildungsverantwortlicher umsetzen zu kšnnen.

Tipp: SchlŸsselaktivitŠten sind in der †bersicht zusammengefasst, welche von hier und allen weiteren Seiten zugŠnglich ist.

Andere Sprachen und Formate

AusgewŠhlte Kapitel sind in folgenden Sprachen erhŠltlich:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- This brochure in English as pdf

Contents

Empfehlungen

Meinungen von Schulleitern zu dieser BroschŸre

"Eine prŠzise, stimmige Publikation, sehr Šsthetisch mit einem guten Texten, Studien, Bildern und Grafiken. Es ist einfach online zu lesen und hat eine gute Balance von Theorie und digitalen Fallstudien… Insgesamt wŸrde es einen guten Sommerkurs ergeben."

- Tom Roche, Ireland

"Als AnhŠnger der digitalen Innovation finde ich dieses Handbuch gut ausgearbeitet, es erlŠutert definierte Rahmenbedingungen. Von Anfang an, beleuchtet es den Wandel von traditioneller zu digitalen Formen der PŠdagogik. Die SchlŸsselelemente sind gut dargestellt."

- Robbie O'Leary, Ireland

"Man erkennt nun was ODS bedeutet nicht nur in der Theorie sondern auch in der Praxis."

- Daithi O'Murchu, Ireland

"Ich denke dass dieses Dokument ein exzellenter Beitrag ist welcher theoriebasiert die Rahmenbedingungen fŸr eine Beteiligung am ODS Projekt bietet."

- Fin Martin, Ireland

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Šta se nalazi u brošuri?

Kliknite ovde da izaberete drugi jezik ili format

Uvod
Ključni pojmovi

Model
Faze procesa za inovaciju

Stimulacija
Buđenje interesovanja i identifikacija putanje

Probe
Prve lekcije iz iskustva

Inkubacija
Steady, supportive development

Scenario
Od pilota do stabilne promene

Akceleracija
Postati samostalan

O ovom resursu

Obrazovne promene predstavljaju veliki izazov u svakom okruženju, a kada ta promena uključuje tehnologiju Đ kao što je mnoge promene uključuju u današnje vreme Đ nastaju komplikacije. Ova brošura je napisana da bi pomogla liderima u obrazovanju u ostvarivanju uzbudljivog a pomalo zastrašujućeg zadatka - uvođenja i ostvarivanja tehnološke inovacije u školama.

Brošura predstavlja deo serije nastale u velikom evropskom projektu koji omogućava otvoreni pristup obrazovnim resursima školama širom Evrope - Open Discovery Space (ODS). Od 2012. ODS je učio iz pristupa iz prakse nastavnika, lidera u obrazovanju i onih koji donose obrazovne propise kako bi realizovali inovaciju bogatu tehnologijama.

Sadržaj ove brošure se zasniva na inovacionom modelu koji je u osnovi ODS-a. Ovaj model je prvobitno zamišljen da izgradi ODS aktivnosti i evoluirao je u svetlu naučenih lekcija kako se projekat razvijao. Model opisuje ključne faze promena (stimulacije, probe, inkubacije, scenarija i akceleracije), kao i implikacije za različite ključne aktere. Ova brošura nudi uvide koji su posebno relevantani za obrazovne lidere i čini ih dostupnim za korišćenje u drugim inicijativama da se postignu trajne i sadržajne promene koje uključuju korišćenje savremenih tehnologija.

Savet: Ključne aktivnosti su sažete u putanji kojoj se može pristupiti ovde i sa bilo koje druge strane.

Drugi jezici i formati

Delovi ove brošure su dostupni na sledećim jezicima:

- Μεθοδολογία για την εισαγωγή της Καινοτομίας στη Σχολική Μονάδα
- This brochure in English as pdf
- Key highlights in Estonian

Contents

- Key highlights in Spanish
- Key highlights in German
- Key highlights in Serbian
- Short animated video of this brochure

Rekli su o brošuriÉ

Šta direktori škola kažu o ovoj brošuri

"Jasna i koherentna publikacija, estetski urađena sa dobrom upotrebom teksta, konteksta, slika i grafika, lako se čita onlajn, dobar balans između teorije i digitalnih studija slučaja. Bila bi dobar letnji kurs."

- Tom Roche,
iz Irske

"Kao digitalni učenik smatram da je brošura dobro postavljen document sa dobro definisanim okvirom. Od samog početka se naglašavaju razlike između tradicionalnih i digitalnih pedagogija. Ovaj ključni element promene je lepo ilustrovan."

- Robbie O'Leary,
iz Irske

"Sada možete videti šta je ODS u praksi a ne samo u teoriji."

- Daithi O'Murchu,
iz Irske

"Mislim da ovaj dokument kao izuzetan proizvod zasnovan na teoriji postavlja okvir za učešće u ODS-u."

- Fin Martin,
iz Irske

Technology-rich innovation in schools

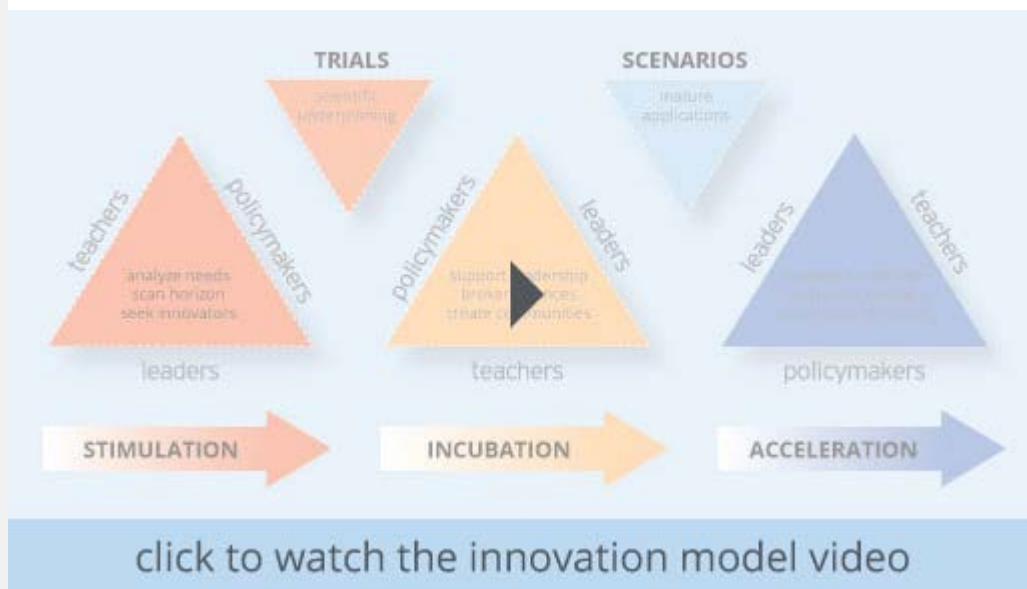powered by OPEN DISCOVERY SPACE

a resource to support educational leaders in initiating and maintaining technology-rich innovation in european schools

Innovatsiooni mudel ja reform

click to watch the innovation model video

V›tmeideed ja pŠritolu
Millele peaks ODS innovatsiooni mudelis tŠhelepanu pššrama?

Innovatsioon ja reform
Mis on innovatsioon? Mis on reform?

Innovatsiooni mudel
Milline nŠeb vŠlja visuaalne innovatsiooni mudeli esitlus?

Innovatsioon ja tehnoloogia
Millised tehnoloogilised muutused moodustavad innovatsiooni? Mis on p›hij›ud?

Mudeli v›tmeideed

P›hij›ud
†lalt alla, alt Ÿles ja kŸlg kŸlje k›rval olevad tegevuste seosed selles innovatsiooni mudelis.

Tegevus
Kolm p›hifaasi on strateegiliselt paika pandud vastavalt tšš sisule ning pŠriselus toimuvate kogemuste peegeldusele.

Kolm v›tmefaasi
Edendamine, areng ja protsessi kiirendamine on protsessi kolm p›hifaasi. IgaŸhel neist on oma keskendumispunkt ning mured.

Inimesed on v›tmeks
Individuaalne ja grupi areng on mudeli keskmeks. Selle kŠigus tunneb Šra ka erinevad ja muutuvad rollid, mida omavad ›petajad ja haridusjuhid.

Sisu
M›ned tegurid on innovatsiooni mudelis muutuvad ja m›ned muutumatud. K›iki tegureid m›jutavad uued ideed, mida suuremal v›i vŠhemal mŠŠral kasutusele v›etakse.

Mudeli pŠritolu

Open Discovery Space (ODS) p›hieesmŠrk on tŠhelepanu pššrata EL koolides toimuvale e-›ppele ning riiklikule poliitikale. ODS toetab Action 68 of the Digital Agenda for Europe lŠbi innovatsiooni ja pakub jŠrgnevat: Veebil p›hinev allikas, mis annab ›petajatele ligipŠŠsu ›petamise ja ›ppimise allikatele.

Muudatuste mudel, mis pššrab tŠhelepanu ODS tegevustele, mis on seotud tehnoloogiliste muudatuste toimumisega, et saavutada efektiivset muudatust koolides. Mudel loodi algselt selleks, et mŠŠrata ODS projekti tegevused. Kui projekt algas, siis uuendati ka mudelit vastavalt pŠriselus saadavatele kogemustele.

Selles peatŸkis presenteeritud mudel kirjeldab seda, kuidas on erinevad mudeli elemendid ODS projektiga seotud olnud. Autentsete nŠidete ja selgete juhtnššride kombinatsioon moodustab ODS mudeli, mida selgelt presenteeritakse haridusjuhtide jaoks.

Vajuta siia, et nŠha ODS YouTube`i kanalit, mis pakub ODS projekti taustainfot ja nŠiteid.

Mis on innovatsioon? Mis on reform?

Innovaatilist lŠhenemist on iseloomustatud rohujuuretasandil. See p›hineb sisemistel protsessidel, samal ajal kui reformi on iseloomustatud kui sŸsteemset v›i institutsioonidega seotud Ÿlalt alla lŠhenemist, mis p›hineb vŠlistel protsessidel. ODS mudel

sisaldab nii innovatsiooni kui ka reformi aspekte.

ODSi kolm iseloomustavat omadust illustreerivad *innovatsiooni* aspekte, mida presenteeritakse kŠesolevas lŠhenemisviisis. K›igepealt r›hutatakse tugevalt haridusjuhtide seotust k›ikide tasemetega: kohaliku/regionaalse, rahvusliku ja Euroopa tasemega. Teiseks on tŠhtis "kŠed kŸlge" lŠhenemisviis, et kindlustada edukat muutust Ð sidudes ›petajaid, koolijuhte ja ›ppijaid. Kolmandaks toetab lŠhenemisviis ekspertiiside keskusi jm, julgustab edulugude levikut (virtuaalsed e-›ppe kommuunid ja infoportaalid) ning edendab suurendatud koostŠŠd ning eksperimente. LŠbi ODSi (mudelis sisaldub) suureneb inimv›imekuse tunnustus ja vajadus seda lŠbi erinevate tšš dimensioonide jagada.

Samal ajal on formaalne, všlistel muutustel p›hinev edu saavutamiseks všga oluline, eriti riigisisese algatuse puhul. *Reformi* klassikalised elemendid sisaldavad Ÿlalt alla survet ja seisukohti, mis tekitavad v›imsaid muudatuste hoobasid, nagu nŠiteks: uued hindamise poliitikad, uued rahastamise mehhanismid ja lŠbi vaadatud ›ppekava raamistikud. JŠtkusuutlik muutus n›uab head lŠhenemist poliitika ja praktika vahel ning seost všliste inimestega.

ODS innovatsiooni mudel ja reform

Eksperimentidel p›hinev lŠhenemisviis, mis p›hineb Euroopa koolide tehnoloogilisel innovatsioonil.
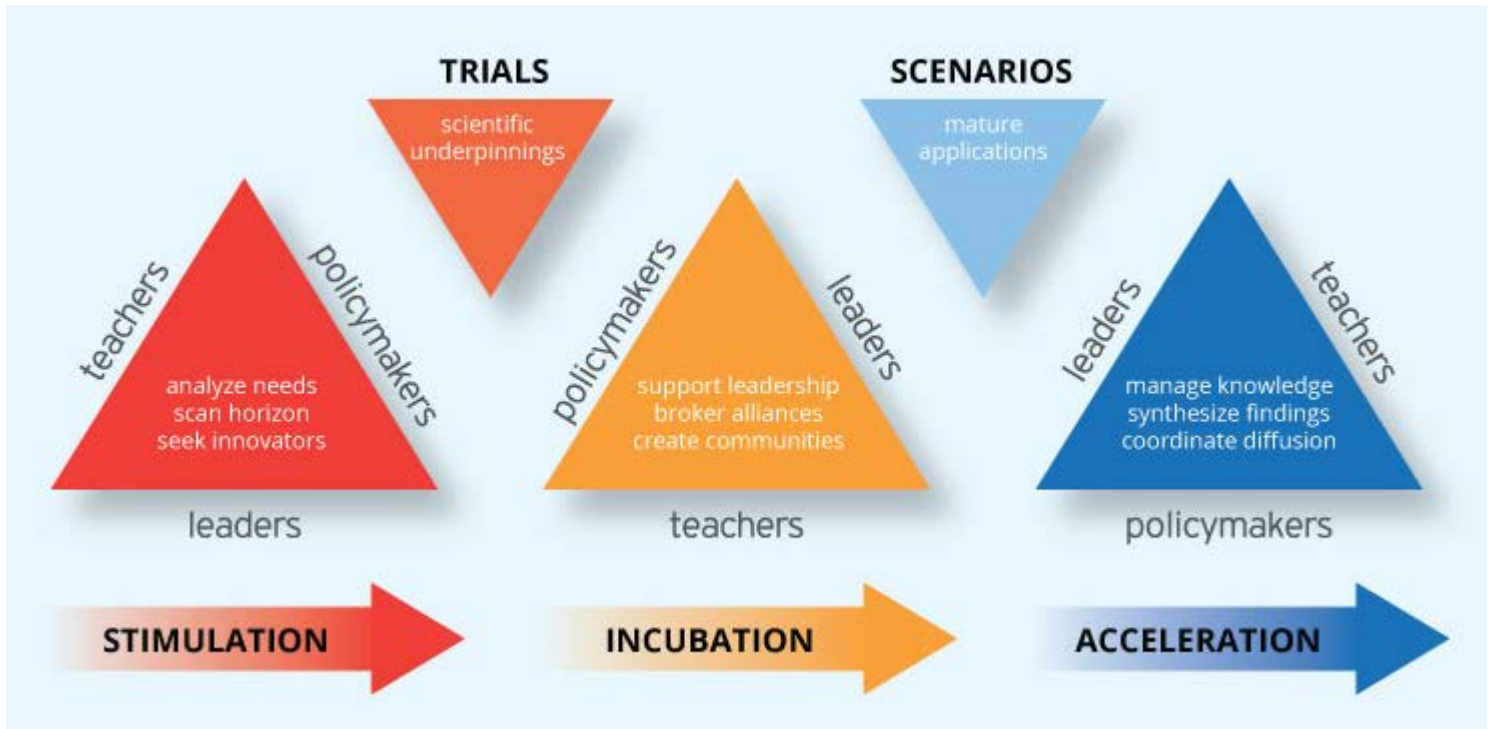
5 v›tmekomponenti ODS innovatsiooni mudelis ja reformis.

Muudatuse mudel, mis nŠitab, et ODS tegevus on seotud teiste tehnoloogiliste pŸŸetega muuta produktiivselt koolide tššd.

Edendamine
See faas t›stab esile algse huvi ja paljulubavate tehnoloogilise innovatsiooni suundade identifitseerimise. Vajaduste analŸŸs aitab m›ista sidusrŸhmade muresid. Niimoodi identifitseeritaksegi uuendajad, kes saavad tegevust juhtida.

Katsed
Juhtumiuuringutes alustatakse kohe alguses tegevusega, et (1) siduda sidusrŸhmasid (2) ›ppida ja sellest informeerida tervet projekti. Nii nagu všikesed innovatsioonid, pakuvad ka juhtumiuuringud tihti kiireid loomingulisi arenguid ja on eriti vajalikud kohalike muudatuste uurimisel.

Peiteaeg
Peiteaeg viitab stabiilsele, toetavale uutele ›ppimise, tehnikate ja meetodite arengule nii, et kestev areng saaks ilmneda. Selles faasis kultiveeritakse innovatsiooni v›imekust nii, et muutus saab muutuda ise toimivaks.

Stsenaariumid
Samal ajal kui juhtumiuuringud kiirendavad arengut ja uute ideede testimist, kujutavad stsenaariumid Ÿleminekut všikestelt katsetelt stabiilsete viiside všlja tšštamisele regulaarsete ›petamise ja ›ppimise tingimustes. Stsenaariumites kajastuvad eksperimentide ajad ja viimase faasi tulemused.

Protsessi kiirendamine
Kui tehnoloogiline innovatsioon juba toimub, siis pššrdub tŠhelepanu pŸsivatele tegevuse sŠilitamise kŸsimustele, et protsess saaks jŠtkuda. St nende teadmiste muutmist, mis on vajalikud seadete ja rutiinide toimimiseks. Niimoodi toimub jŠrjepidev

kvaliteedi hindamine.

Kuidas seostub innovatsioon ja reform muutuvate tehnoloogiatega?

Muutuste tehnoloogiad koolis

Tehnoloogiline innovatsioon on termin, mida tihti kasutatakse ODSis ja mujal. See on Ÿldm›iste ›petaja ja kooli jaoks, kes viivad lŠbi Ÿksk›ik millist tehnoloogilist muutust koolis. TšnapŠeval m›tleb enamik inimesi k›igepealt elektroonilistele tehnoloogiatele (nt arvutid, mobiilsed vahendid) ja erinevatele ›ppevahenditele (nt simulatsioonid, suhtlusvahendid) ja/v›i ›petajatele m›eldud vahenditele (nt elektrooniline ligipŠŠs tundide plaanidele v›i hindamise vahenditele). Tehnoloogilise innovatsiooni p›him›tted ja eesmŠrgid on vŠga palju varieeruvad. Varieerumise ulatus sisaldab jŠrgnevat: suurenev ›iglane ligipŠŠs kaugemate koolide allikatele, kultuurilise paljususe toetamine Euroopas, k›ikide ›pilaste hariduslikele vajadustele vastamine ja aktiivse ›ppe stimuleerimine.

Paljud inimesed v›ivad olla seotud tehnoloogilise innovatsiooniga ja muidugi on iga seadistamine unikaalne. Aga k›ikide innovatsioonide puhul on vajalik tŠhelepanu pššramine vŠhemalt kolmele tegevuses osalevale p›higrupile: seaduste loojad, ›petajad ja haridusjuhid. *Seaduste loojad* on need, kes saavad arendada vestlusi rahvuslikul, riiklikul v›i kohalikul tasemel (nt esindajad valitsuses ning ›petajate assotsiatsioonides, ›ppekava esindused ning hindamiskomisjonid. Siin kasutame terminit *›petajad*, Ÿldjoontes kuuluvad m›iste alla k›ik haridusega tegelevad inimesed, kes otseselt suhtlevad ›pilastega. Lisaks klassiruumis ›petavatele ›petajatele kuuluvad siia alla ka abistavad ›petajad, terapeudid, kindla aine ›petajad ja n›ustajad. *Haridusjuhid* on need, kes on v›imelised juhtima kŸlg kŸlje k›rval loodavat suhtlust. Sellesse gruppi kuuluvad direktorid, jŠrelevaatajad, osakondade juhid ja instruktorid. Haridusjuhid omavad olulist rolli seaduse vastuv›tmisel. Nad toetavad ›petajate tššd otseselt (nt kindlustades, et professionaalse arengu v›imalused on regulaarselt kŠttesaadavad) ja kaudselt (nt luues terve ja stabiilse organisatsiooni).

Millised on muutusi p›hjustavad j›ud protsessi keskel?

Erinevad *j›ud* tulevad mŠngu muudatuste jooksul ja vastastikune s›ltuvus osalejate vahel on keskne eri tŸŸpi suhtlemisel. JŠtkusuutlik muutus n›uab ka surve ja toetuse tasakaalu. Algstaadiumi v›tmetegevused reformivad innovatsiooni, mis omakorda n›uavad protsesse, mis otsivad v›i lubavad prioriteetide kohandamist ja eesmŠrke v›tmeisikute gruppides. Erinevate gruppide v›tmeisikute (nt seaduste tegijad) v›i (nt ›petajad) jŠtkusuutlik muutuse sŠilitamine s›ltub suurel mŠŠral kohalikust haridusjuhtkonnast.

> Koolidevaheline suhtlus oli vŠga tŠhtis selleks, et muutus saaks toimuda Hollandi keskkoolides.
>
> Kui koolid nŠgid seda, kuidas teised koolid kasutasid uut ›ppekava, olid nad innustunud osalema ning see veenis neid selles, et ka nemad on selleks tegevuseks suutelised.

KŸlg kŸlje k›rval olev suhtlus on vŠhem dokumenteeritud kui j›ud, mis aitab muutust algatada. Seda peetakse muutuse arengu koha pealt eriti tŠhtsaks. KŸlg kŸlje k›rval olevat suhtlust on vaja selleks, et v›imaldada koolidel kindlaks teha muutuse mŠŠr, milles konkreetne muutus on nende ÔlŠhiarengu tsoonisÕ (ZPI). McKenney (2013) viitab ZPI distantsile, milles ›petajad ja koolid saavad iseseisvalt v›i Ÿhiselt ning juhendamise teel areneda. ODSi mudel kavandab tegevuse raamistikku (nt vŠliselt juhtivad instruktorid, tšštoad ja tugi) ning arendab ekspertiisi praktikute hulgas, kes tekitavad soovi ja v›imet lokaalset muutust jŠtkusuutlikult arendada.