# ICT INTEGRATION IN EDUCATION: THE GREEK AND SPAIN PERSPECTIVES AMIDST AN ECONOMIC CRISIS

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## Abstract

Information and Communication Technology (ICT) and its applications are becoming increasingly prevalent in European education systems thus attracting the interest of the European Union and individual governments. However, due to various recent developments, including rapid and intensive changes in digital learning technologies, innovation, disruption, cloud computing, and mobile learning but also unclear policies, and economic constraints, some European countries lack effective pedagogical integration of ICT in education. As a result, it is difficult to clearly identify current educational policies and trends in these EU countries. This paper focuses on the use of ICT in the educational systems and practices in Greece and Spain, aiming to highlight not only the barriers imposed under the pressures of the current economic crisis in both countries, but also the key drivers that can lead to the reconstruction of the educational system.

## Introduction

Information and communication technology (ICT) and its role as key enablers of innovation, creation and new opportunities are drawing more attention due to the economic constraint in the global level. As the benefits of ICT progressively materialize into real assets, and strengthening digital ecosystems becomes increasingly significant (Bilbao-Osorio et al., 2014).

"ICT in education" provides a variety of learning tools, authoring tools, editing tools, analytic tools, collaboration tools, scenarios and lesson plans that create opportunities for open and collaborative innovation practices, creativity and innovation in the classroom. These technologies and tools help the educational system empower individual teachers and learners to actively participate in the digital community and become creators of innovative processes (Balanskat et al., 2006; Abdullahi, 2014). On this front, most European countries have made significant progress over the years, but the level of progress is not the same for all countries.

The main aim of this research paper is to discuss the ICT integration in education in Greece and Spain. During the past around one decade, these two South-European countries have been seriously affected by the economic crisis. In both cases, education is primarily supported

by public funds and, therefore, the public cuts imposed by the crisis has impacted directly on the development, delivery and quality of education. Hence, although ICT-based education is a priority for both countries, it is questionable whether the investment required for ICT in education to develop in this direction may be realistically secured.

What follows is a summary of the main outcomes of research in the integration of ICT in European educational systems, carried out under the EU-funded Open Space Discovery project (2012-15), of which the authors of the present paper are members.

ODS is an open innovation and collaboration environment for K-12 teachers that facilitates educational content and tools for the creation, co-creation, use, re- use, sharing and retrieval based on OER as well as for networking and further collaboration among K-12 stakeholders (teachers, learners, parents, content and technology providers, and policy makers etc.).

The second and third sections present the project's study concerning school systems, key priorities, teacher education in ICT, monitoring and evaluation, in Greece and Spain respectively. The fourth section concludes with a discussion of the effects of the economic austerity on the future of ICT integration in education in these two countries.

## ICT in Greece

Digital literacy is a high priority objective in the agenda of the European Commission. Greek educational policies have adopted the entire ICT literacy objective, set by the EU (Eurydice, 2011). Existing ICT policies in the Greek school system cover the following areas:

- Learning theories and teaching methodologies to promote digital literacy by introducing both access to digital learning material in classroom and at home (e.g."Photodendro LOR" http://photodentro.edu.gr/lor/?locale=en) via web portals but also their use under pedagogical indicators in the classroom;
- Two levels of ICT Training for Primary and Secondary educators;
- Integration of e-portals, e-books and online resources in Primary and Secondary Education;
- Infrastructure and educational software for several special needs schools;
- Incentives to purchase notebooks for Secondary school 1st grade students ("Laptop for Students programme");
- Broadband in many schools through a school network (sch.gr), recognizing internet access as a basic right;
- ICT equipment in several schools that have the necessary infrastructure;
- Official policies to promote new learning environments under the vision of each political governmental scheme.

There are two main and imminent trends in education in Europe: i) the changing role of school teachers as a result of ICT influence, and ii) the impact of social media, such as Facebook and Twitter, which are already finding their way into classrooms (Johnson et al., 2014). According to a survey conducted by Korte and Husing (2006), many schools across the

EU countries already had internet access. In most countries the penetration rate falls just a little below of, or is at, 100%, in no country is under 90%, and the European average is 96%, although, the probability of school computers having internet access increases according to school level. The number of students in Greek schools without broadband is equal to the EU average (94%) in all educational grades but broadband speeds faster than 10Mbps is lower in Greece than the EU average (European Schoolnet, 2012). In Greece use of ICT by teachers is higher at all grades than the EU average (94.25%) (European Schoolnet, 2012).

In Greece, more than 23% of students choose to send emails to communicate daily, while 20% also browse the Internet during that time. Internet access and communication takes place through the official network "Hellenic School Net" (www.sch.gr), which also offers safety protection against spam, computer viruses, and other malware. However, there is largely a lack of expertise/ technical support to ensure e-safety, and the responsibility concerning, for example, reliability of information and other such issues falls mostly on the teachers. The technical support team of the Hellenic School Net is able to deal with some problems only when these occur in schools located in major city centres and their surrounding areas the situation. Consequently, in the majority of schools across the country most technical problems remain unresolved. The impact of the economic austerity is clear: insufficient existing infrastructure, very limited funds for its modernisation, as well as lack of investment in in-house technical support are insurmountable everyday problems for most schools.

According to report (OECD, 2001) a Greek primary school introduced ICT as part of an effort to improve students' skills and competencies. The deputy principal stated that "ICT utilization led to collaborative work among students, which then led to the teachers changing their ways of teaching so that students now work more autonomously, collaboratively and actively". Teachers did remark that "computer usage encouraged new ways of learning, that is, open learning approaches", but also argued that "it was not the computer use per se that encouraged these new learning situations. It was the teacher who aimed for such approaches, facilitated through by the computer use."

In 2000 in Greece more than 50 students aged 15 years old had to share one computer (Eurydice, 2004). Although in recent years this ratio has improved, the account above makes evident that too much relies on the responsibility and contribution of individual teachers, and thus there is clear need for a significant and systematic development.

### *Key challenges/priorities for education (general education priorities)*

According to the OECD report (2011), the future wellbeing of Greek society depend on the improvement of educational schemes to boost skills and competencies of the country's human resource capital by adopting more ICT developments in the existing educational curriculum. In Greece, the "Ministry of Culture, Education and Religious Affairs" http://www.minedu.gov.gr/english-main.html, is responsible for the educational and culture strategies and policy of the country. Education is compulsory by law for all children until the age of fifteen.

The challenges in a social and cultural context relate to many factors such as:

- Strong personal and family commitment to education, challenged however by the high costs of fees parents need to pay to support their children's learning especially in view of the university entry exams;
- The Greek Constitution's commitment to social equity and free, which, however, is not fully observed in all school environments (e.g. insufficient integration of children with special education needs);
- Several attempts to reform the education system, which are however politically motivated interests of the party or ministers that are in power thus resulting in unstable educational systems;
- Mistrust of governmental initiatives and serious concerns about corruption and misuse of public funds;
- Long tradition of highly centralised government and measures to ensure national cohesion and counter regionalism and corresponding lack of trust in private entities to serve public purposes in the education sector;
- Frustration and lack of teacher's motivation due to wage cuts, domination, assessment under controversial criteria, many of these being the direct or indirect effects of the current economic crisis.

## *Education reform/ current situation*

In order to address the key challenges identified above, an education reform is needed as:

- Decentralisation of the decision-making process and strategy implementation, to overcome instability and achieve systematic longer-term goals according to needs of different regions and local communities. This would be a more inclusive and sustainable model able to meet the challenges of 21$^{st}$ century;
- Promotion of social, critical and reflective pedagogies, fostering collaborative and problem-solving learning;
- Integration of Information Communication Technology (ICT) and Open Educational Resources (OER) to education for all, flexible enough to address and accommodate different needs, teaching and learning approaches, and non-cognitive or emotional aspects of learning;
- Decentralisation of budget control so that more efficient spending and strategic investment in infrastructure may be achieved by the local municipalities.

## *Cornerstones of policy/financial constraints*

In the State's Budget for 2012, the spending for the education was significantly reduced, the overall 16% reduction occurred during the period 2009-2011. These cuts represent not only a percentage of GDP (2.75% in funds allocated to education in 2012) but also of the regular budget (the lowest historical rate of 3.39% total costs when all previous was around 7-7.5% by 2009). In real terms, the budget for education in 2012 was €1.184 billion less than in year 2009. EU funding is also key in adding to the country's own resources: in 2000-06 EU provided €960 million matched by €420 million of Greek funding (Papazoglou, 2007). Further economic

austerity resulted in significant cuts in public funding spent on education: in 2009-2013 they reached 33% and an additional 14% cut will be implemented by 2016 with 5% cut already put in force in 2014. Greek is struggling to find the bailout money to avoid the default on its debts and bankruptcy which is one of the biggest uncertainties surrounding the global economy.

## Teacher education for ICT

A teacher's qualification is obtained via 4-year long studies at a Pedagogy Department of the University (Eurydice, 2011). Further education programs for teachers include induction seminars/workshops for newly appointed teachers and periodic CPD seminars for teachers with more extensive teaching experience. These programs, previously organised by the Organization for further Education for Teachers (OEPEK), are now organised by the Institute of Educational Politics (IEP) (Eurydice, 2011).

With regard to ICT training in particular, there are two specially designed programmes offered by the "Computer Technology Institute and Press- Diophatus" http://www.cti.gr/en/: i) ICT basic skills (phase 1) and ii) professional face-to-face and blended training programmes for the development in ICT integration in school practice (phase 2). The project "In-service training of teachers in the utilisation and application of ICTs in the teaching practice" of the Operational Program "Education and Lifelong Learning", NSRF (2007-2013), which is implemented with co-funding from the EU and the ESF concerns the training of a large number of educators in Greek primary and secondary schools, in the in-class utilization of Information and Communication Technologies for the teaching process. Although these courses are not compulsory more than 50% or, in absolute terms, 80,500 teachers out of 145,000 have already been certified for phase 1 (European Schoolnet, 2010). However, a case study (OECD, 2001), concluded that although the training was sufficient to familiarise teachers with ICT technology, it did not convince or encourage them to implement ICT in their teaching.

## Monitoring and evaluation – ICT skills' assessment

The European Commission asks countries to report on the assessment of ICT skills through theoretical and practical examinations or through project-based assessment. Greece uses only one form of a test at primary and secondary education. ICT teaching and evaluation in schools is delivered by, specialists in the field of "Computing"(Eurydice, 2011) but not by already trained teachers (from CTI- Diophantus) and teacher-specialists in the field of "ICT in Education" (Med, Dr). Not granting teaching approval for the "ICT in Education" to specialized teachers in the Greek education system is very problematic.

In Greece, private certificates for the assessment of the ICT skills are issued from the Institute of Educational Politics (IEP) and the Computer Technology Institute & Press Diophantus (CTI) (Eurydice, 2011). A combined evaluation schema of an automatic evaluation system (through a questionnaire via a e-platform) and a "free text" test (creation of an ICT Educational Scenario) is used for the evaluation of the trained teachers in "ICT in Education".

The Open Discovery Space (ODS) is also providing a self-assessment mechanism to some of the Greek schools to measure the impact.

## ICT in Spain

Since 2005, there have been several types of action programmes for the integration of technology in schools across all regions of Spain. Each Autonomous Community government is fully responsible for the educational policy in its region. The Spanish approach is based on a de-centralized model, rather than implementing a comprehensive nation-wide plan to implement new technologies in the Spanish educational system as a whole. Nevertheless, the Institute of Educational Technology of the Spanish Ministry of Education is responsible for the integration of ICT in non-university educational stages, coordinating these various programmes. It also maintains some initiatives at a national level in collaboration with Communities such as:

- "Proyecto Agrega" (Agrega, 2015): The building of a national repository for digital resources that integrates learning objects described using a Spanish application profile of the IEEE Learning Object Metadata standard, which has become a national norm;
- "Escuela 2.0" (Escuela 2.0, 2015): A nationwide ICT plan for schools launched in 2009, that integrates the developments already achieved in each region. The plan aims at generalizing access to hardware and digital content. All fifth-grade students are provided with a notebook, and their classrooms with IWB and wireless connections, while teacher training is implemented according to teachers' level of competence.

In the specific case of the Autonomous Community of Galicia, Proyecto Abalar (Abalar, 2015) deploys the strategy for the full integration of ICT in educational practice of Galicia, as one of the areas of intervention of the Galician Department of Education. Abalar includes and integrates all initiatives in education, joining efforts for the modernization and improvement of education as part of the strategy of the Galician government for the promotion of ICT in all sectors of activity.

Abalar collects, integrates and enhances through the espazo Abalar portal (Abalar, 2015) provide a comprehensive resources in response to the challenges of children education in the digital society.

Since academic year 2010/11 all schools in Spain have Internet access (99.8%), 92.0% with broadband connections (above 512 Kbps). 73.8% of schools have wireless (Wi-Fi) access, 51.5% in Galicia. In 2010/2011, the number of pupils per computer for teaching and learning was 3.5, 3.8 in Galicia.

About 70% of schools have a person responsible for coordinating ICT technical functions, teaching and, providing support services for students. Policies on the integration of ICT in the different regions vary in terms of emphasis and depth. Research in recent years has focused on analysing the impact of different policies had in different regions.

For example, in Galicia, research undertaken during 2004 concluded that ICT is used mostly for administration and management rather than for teaching, but since then a tremendous effort has been undertaken to introduce ICT in the teaching and learning process in primary and secondary education. Indeed, the Abalar project mentioned above aims at a qualitative and quantitative development of the Galician educational model, in order to improve the efficiency of the teaching and learning process through the integration of ICT in all education

Thus, the Abalar project strategy revolves around the concept of digital school. The digital school goes beyond the concept of traditional school, and tackles both human and educational resources as well as the infrastructure and services required for the daily use of technology by all actors in the educational community, in teaching, learning and administration.

## Cornerstones of policy

Technological advances have historically shaped and presently shape education. To get in sync with the habits and experiences of the new generations requires a thorough review of the classroom and educational space concepts, which is only possible within a holistic approach to the educational role of new technologies. The widespread incorporation of ICT in the educational system will personalize education and adapt it to the needs and pace of each student. On the one hand, they serve as reinforcement and support in cases of poor performance and, on the other, they will support the spreading of knowledge taught in the classroom without limitations. Motivated students can thus gain access to educational resources provided by many Spanish and international institutions according to their abilities. Furthermore, the responsible use of new learning technologies by students must be guided throughout the system. ICTs are also a key tool in teacher education and learning throughout life, enabling citizens to combine training with personal or work obligations

The Spanish Ministry of Education has established a minimum curriculum for every school which takes up 65% of the total curriculum time. In primary and secondary education, ICT is considered as a transversal competence and is covered in all subject areas in the curriculum. ICT as a subject is first encountered at the secondary school level. There, students can study ICT each year from 7th to 10th grade. ICT targets can be divided in those that are subject-related and the more generic ones, which coincide with the digital competence of the European key competences framework.

These digital competencies show how ICT can be used to serve two functions; namely, i) to transmit and to generate information and knowledge and ii) to identify and resolve problems on software and hardware while critically analysing the information obtained through collaborative work. The national curriculum is organized in subjects, with specific contents, goals, assessment criteria and their contribution to the European Key Competences Framework. ICT competence is expressed in greater detail in the assessment criteria. For example, in Natural Sciences in secondary school the following capacities are assessed: "the capacity of acquiring meaningful information from different sources, including information and communication technologies, and the ability to state conjectures about both naturally occurring as well as induced phenomena, in experiments or experiences, where the

consistency of the reasoning process should be valued over gett*ing the answer right. Special attention must be paid to the oral and written expression of the results, whether on paper or in digital format, which must be illustrated with images, tables, graphs, diagrams, summaries,* etc." Another example is Mathematics in which "the capacity of applying percentages and rates in order to solve everyday problems, as well as financial problems, where the ability of using a spreadsheet should be valued as a function of the quantity and complexity of the numbers used is assessed. This criterion is used to verify the capacity to apply percentages, rates, and percent increases and decreases to problems related with frequent financial situations and to value the capacity of using information technologies to carry out the operations when necessary".

In Galicia, these goals go beyond the established national objectives to also address an overall promotion of the digital culture through the adoption and cultural integration of ICT in all aspects of the educational process. With respect to teachers, this is being achieved by designing a specific training plan for enabling the use of ICT in teaching, and providing digital educational resources for use in different subjects across the curricula. With respect to families, it is being addressed by spreading the new online communication channels and audio-visual media.

The whole process is designed to drive the change from a traditional school's model to a new digital education model, promoting the transition from the computer room to the computerized classroom; from textbooks to e-books; from passive learning to collaborative learning, research-based learning, and active and interactive learning; and from teachers teaching informatics to teachers using informatics to teach.

Thus, the established goal is that all students, to complete their training, must have digital competence.

## *Teacher education for ICT*

ICT is compulsory in initial teacher education. Primary teachers must take at least a one-semester subject covering ICT in Education. Secondary school teachers must take a certification course, part of which covers the integration of ICT in the teaching of their subject of expertise. Initial teacher training tends to be a mixture of a theoretical and a hands-on approach that tries to enable future teachers to use ICT in their classrooms as well as to reflect upon and investigate them. Initial teacher training follows the universities' own methodologies, which usually includes a several months mentoring period with an in-service teacher.

ICT training for an in-service teacher is not compulsory. Nevertheless, there are some teachers' training initiatives at Autonomous Community level related to the implementation of the Escuela 2.0 plan. Teachers sign up for those courses offered by educational authorities (online or in person), according to their preferences and/or needs. In the case of Galicia, the Abalar project includes actions and content for in-service teacher training on ICT.

In addition to the formal online courses where teachers get certifications for their participation, one of the social networks (internetaula.ning.com) of teachers that the Ministry supports is organizes learning workshops in which an expert designs a short 'course' which includes a set of activities on a certain topic. The methodology tries to encourage peer-to-peer learning and registration is required (from 200 to 500 teachers register). They last only for a couple of weeks and no certification is provided. It also includes webinars in which an expert answers in a chat session questions from teachers (around 50) that register for the event. The subjects are chosen by the members and by groups with a common interest within the network in cooperation with ministry staff. Subjects are mostly focused on the use of ICT, particularly the presence of web 2.0 in school; they sometimes address the use of a particular tool (i.e. podcast in education, social networks in education, etc.).

In-service training courses are mainly taught by expert teachers and occasionally by university lecturers. Initial training at universities is taught by lecturers in this area of expertise whose academic interests include the role of ICT in education.

## Policy alignment and consistency

We may next try to outline how these policies align with other national priorities and policies, extending beyond education, to the economic, social, and media spheres:

The profound changes that the Spanish society faces today require a continuous and reflective alignment of the educational system to the emerging demands.

The introduction of new Information and Communication technologies provides for the first time in history to implement a really personalized and universal educational system. Never before education had such an opportunity to be a key factor of equity and social welfare. The educational system should take special care of those who drop out before they have the acquired knowledge and skills required by international quality standards, because those abandoning education in such disadvantageous conditions at the beginning of their professional life are doomed to unemployment or to jobs of limited value. These circumstances, in a more and more global economy that demands ICT trained workers and entrepreneurs, become a scourge that limits the possibilities for social mobility, and even leads to the generation of poverty.

## Monitoring and evaluation

There are periodic national and regional surveys that estimate how many teachers use ICTs and what they use them for (European Schoolnet 2012; 2013). All schools entering pilot plans are closely monitored and they have detailed evaluation plans (European Schoolnet, 2012; 2013).

The trend that has been widely identified during the past years is that online courses are gaining popularity among teachers. Online courses usually achieve the highest levels of satisfaction among participants (European Schoolnet, 2012; 2013).

There is no nationwide specific accreditation scheme for ICT teacher competence such as ECDL. Teachers are certified on a course-by-course basis, according to the credits (number of hours) devoted to them. Courses need to be certified by the regional authorities to be taken into account in the teachers' professional records and they are mainly taken outside school time and online. A teacher is required to take a minimum of number of hours (around 100) every six years in order to obtain a raise in her salary, but the courses do not have to be about ICT. Nevertheless, the provision of ICT courses (especially online), tends to outnumber non-ICT related courses.

## Comparison between the perspectives of Greece and Spain

In both Greece and Spain, there have been several initiatives with different types of action programmes for the integration of ICT in Education. Educational Institutes in both countries are responsible for the integration in ICT in Education (e.g. CTI & Press- Diophantus in Greece and Educational Technology Institute in Spain). One main difference between the two countries however, is that while in Spain different policies are followed in each of the reasons that respond to their specific educational needs and provisions, thus allowing continuity and development to be built on previous achievements (as illustrated by Galicia's case); in Greece, the same centralized policy applies to all regions.

Both Spain and Greece have constructed national repositories for OER, for example, "Proyecto Agrega" and "Photodendro", respectively, and have run pilot tests for the promotion of notebooks to students in specific grades (first-grade in Greece, fifth-grade in Spain). They operate under comparable "digital school" strategies, aiming at the full integration of OER and day-to-day use of technology in teaching, learning and administration by all members of the educational community.

In principle, all schools in Greece and Spain have internet access, but while In Spain about 70% of schools have a technical personnel responsible for coordinating ICT technical functions and dealing with related problems, this is not the case in Greece, where for the most part such responsibilities fall under the teacher. However, educational reform it is needed in both countries with regard to the content and the methods of the integration of ICT in Education able to meet the relevant challenges an education reform is needed (e.g. sustainability, the need for the adoption of critical- reflective perspectives, ICT and OER integration, financial allowances etc.). Such reform however, is seriously undermined by the significant reduction of public funds observed in recent years.

With regard to training, both in Spain and Greece teachers are trained at higher education level, during their undergraduate studies and further in- school programs that are organized as part of CPD. Most teachers receive face-to-face training, while others are trained through e-learning, and thus a less blended training process (e.g. 2nd Level "Blended Model" from CTI-Diophantus in Greece).

Computer-based assessment is not often used as it tends to be limited to "tests" that are not considered sufficient. Both European countries are fully conscious of the technological advances of a competitive education within the contemporary globalized world. A major challenge of the educational reform is the support and development of non-cognitive skills, critical reflection, and creativity through the implementation of ICT.

However, both Spain and Greece need to address problems of inclusivity and overcome the divide, much accentuated by the dire economic conditions evidenced in both countries, between privileged and challenged members of their respective population, in respect to access to ICT and education more generally.

## Discussion and conclusions

This paper makes the contribution to the understanding of the characteristics and strategies currently holding in Greece. In Greece, political turmoil and economic uncertainty have led to conditions and policies in education that are unstable. Therefore, this paper provides some valuable insight into the main drivers, funding mechanisms and actors that can influence the future development of ICT in Education. The existing policies aiming at the integration of ICT in all schools education, as well as the existing ICT training programs for proper pedagogical use of ICT tools through OER and learning scenarios, characterise a society that is strongly interesting in being an equally member of the EU community in this respect. There is certainly a lot of room for further changes, development, and improvement with great willingness from the educators, school leaders and agents for change to be trained on how to utilize ICT in education through ways that can make their teaching more interesting, creative and relevant to the real problems that the society faces. However, although the intention, willingness and policies are there, the schemes cannot be fully implemented due to the economic austerity and the challenges which presents both at an individual as well as at national level. Political stability as well as decentralisation of the decision-making process is essential in order to ensure national cohesion and sustainability in the long-term. ICT in the context of critical and constructivist Education is a key to the development of a society and economy that are in crisis. Additionally, the controlled involvement of the private sector in education, according to pedagogical criteria of quality of the provision and its value for the society, would be added value in a strongly competitive and rapidly-changing global environment.

In the case of Spain, ICT infrastructure is well deployed across the country, perhaps due to the country's decentralised educational system. Regional communities have been able to approach ICT from both the perspectives of integration in the curriculum and of hardware infrastructure. The main drawback in Spain is how these technical infrastructures are being implemented in the daily activities in schools. Most of the investment in ICT for education have been carried out before 2008. The effect of the budget restrictions was very clear also in this area. Further investments would have been required to cover: i) Appropriate teacher training covering the whole teaching population; ii) Tools and services exploiting the underlying hardware infrastructure and iii) Adaptation of the whole curricula to benefit from

the ICT potential in education. This should have included the design of proper learning activities at a higher level that could be adapted to the school level context. Unfortunately, the ICT integration in schools in Spain is in a stand-by state. Only 10% of staff retiring is replaced, which means that the teaching population is getting older and low motivated due to the increase in tasks and the reduction on salaries. The required investment in tools and services is not possible due to the budget cuts. Only those, still existing, highly motivated teachers, design their own learning activities making use of ICT tools. In many cases, these teachers use their personal developed spaces rather than those that could be provided by the Ministries.

Sadly, we do not foresee a promising future in the short term in these two countries. Even if the economic situation changes in the future, it would still be the case that the pre-crisis deployed infrastructures would then be obsolete and as, in the past, investment was geared towards hardware rather than service/training, Greece and Spain, will be facing serious difficulties in the foreseeable future. It is thus of paramount importance and urgency, as we hope this paper has shown, that significant changes be made to policy mechanisms, distribution of budget, and investment focusing on teachers/users training and how they could use ICT in order to promote innovative, creative and constructive education with the necessary skills to secure a stable position in the 21$^{st}$ century across Europe and globally.

Open Discovery Space (ODS) fits in with the Open Educational Resources (OERs) movement that aims to create and share educational resources that are freely available online for everyone at a global level. The ODS succeeded to extend the reach of OERs, learning, training and assessment tools opportunities to Greece and Spain. However, it is also important that these two countries need to get more benefit from the EU initiative and approaches such as Open Discovery Space (ODS) project and ensure the alignment, adapting and integration of innovative ICT model and training mechanism as part of the national education policy and system.

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