



# How are digital games used in schools?

Main results of the study

Synthesis report



 Creativity  
and Innovation  
European Year 2009

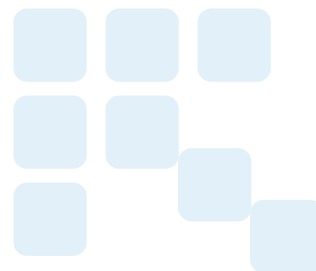
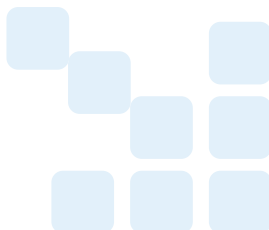


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A practical guide entitled *Digital games in schools: A handbook for teachers* has also been published in the framework of this project.



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# 1. Introduction

Teachers use electronic games in their classroom teaching. Why do they choose to do so? What types of games do they use? What do they do with them? How do they integrate them into the curriculum? What pedagogical objectives are they aiming for and what results do they obtain from their pupils? In other words, what can be the interest of this approach for an educational system? And what collaboration could be envisaged in this context between education and the games industry?

To answer these questions, the ISFE (Interactive Software Federation of Europe) entrusted European Schoolnet with the task of carrying out a first review of the situation at the European level. As the network of ministries responsible for education, and more especially for its modernisation using information and communication technologies, European Schoolnet could not fail to be interested in this subject.

The study extended over several months, from spring 2008 to spring 2009, without any preconceptions for, or against, the use of electronic games as teaching tools potentially usable in the classroom. The investigation was divided into several parts: a review of research, a survey of teachers, case studies, interviews with educational decision-makers, and a community of practice on the Internet.



Because this was the first study covering several European countries, priority was given to collecting as much information as possible about the experiments now going on. For this reason, the term 'electronic games' had to be taken in a broad sense, covering video games and on-line games, games that run on consoles, computers, or mobile phones, whether they be adventure games, role plays, strategy games, simulations, racing games or puzzles. Eight countries were particularly targeted: Austria, Denmark, France, Italy, Lithuania, the Netherlands, Spain (Catalonia) and the United Kingdom.



## Introduction

In each country, a national co-ordinator helped to identify and collect the relevant information at national level, following a content guide that was common for all countries. The opinions and practices of teachers in both primary and secondary schools were investigated.

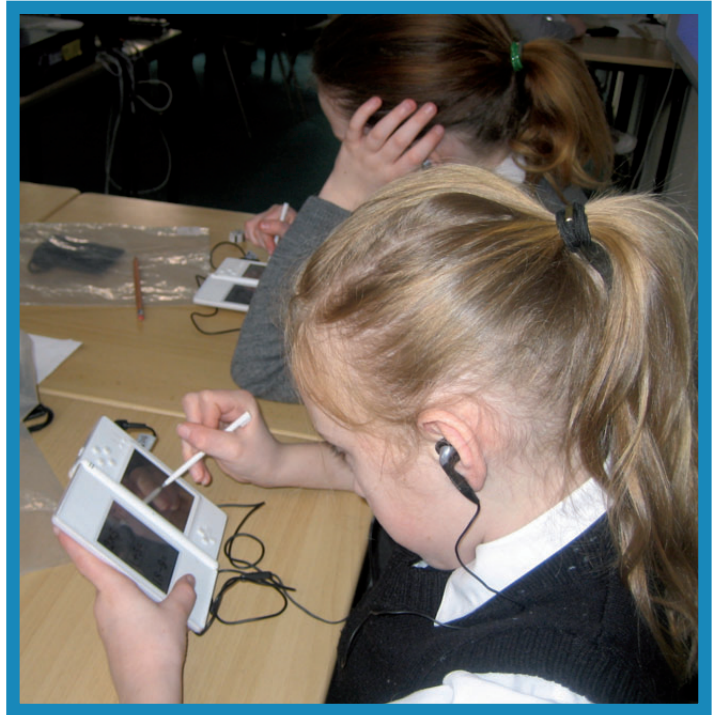
The questions asked were initially aimed at identifying the practices. They also belong to a wider framework of reflection which includes the challenges that education now faces: pupils who display a growing disaffection with an educational system that they perceive as remote from their everyday realities; the development of the cognitive sciences, which better understand the modes of learning that learners implement, and questions the efficacy of the pedagogical approaches generally until now. Educational systems themselves are evolving, increasingly placing the emphasis on defining competences to be attained, rather than content to be learned. Specific pedagogical tools are needed to support the development of these competences, which are now defined as 'key skills'. To what extent does the use of electronic games in the classroom make a new or useful contribution to meeting these challenges? That is the fundamental question underlying the work presented here.

## 2. Executive Summary

Between April 2008 and March 2009, more than 500 teachers were questioned and more than thirty political decision-makers and experts were interviewed. Six case studies and a review of the scientific literature were carried out. An online community of practice was launched to provide material for a manual for teachers.

The aim of these investigations was to address two main questions: What can electronic games bring to classroom teaching? What kind of co-operation can be envisaged in this precise context between educational systems and the games industry?

The survey of teachers reveals that – regardless of their gender, age, number of years in the profession, their familiarity with such games, the age of their pupils, or the subject they teach – teachers do indeed use electronic games in the classroom. Some teachers encounter difficulties in integrating games into the curriculum; and also because of a lack of equipment, and the reservations of parents and their colleagues about the use of electronic games. They use educational games, but also, and perhaps more often than might be supposed, they use commercial and leisure games. Whatever the type of games used, teachers expect them to increase their pupils' motivation and improve their skills. In practice, teachers observe these effects in renewed motivation and progress in certain skills (social, intellectual, spatio-temporal, etc.).

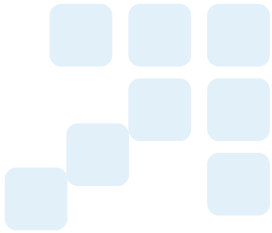
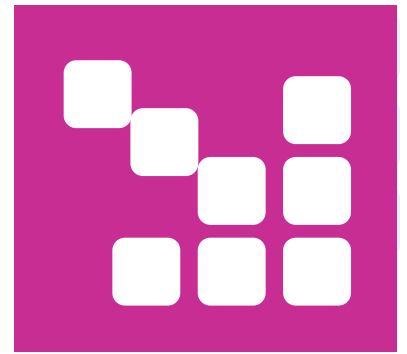
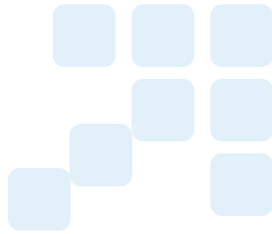
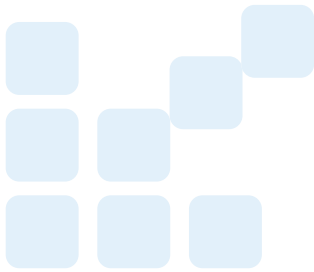


The case studies demonstrate the existence of practices in this area which remain small in number; but which sometimes have a certain magnitude in terms of the number of teachers and pupils concerned. The teachers who are involved in these practices leave nothing to improvisation in their pedagogical use of these games; on the contrary, they prepare them very carefully. Experiments in the classroom use of games are bringing teachers together in a community of practice, and associating the whole educational community and parents around the pupils' achievements. Practices centred on games rehabilitate more traditional teaching tools in the eyes of the pupils.

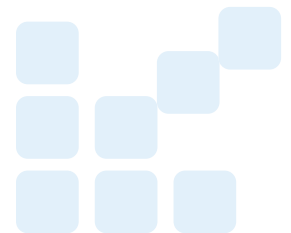
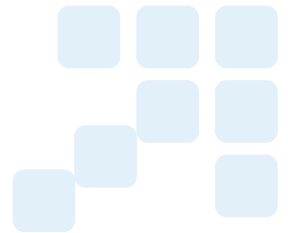
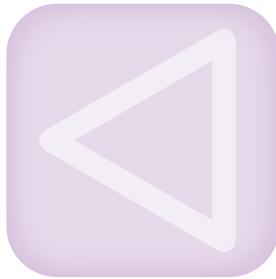
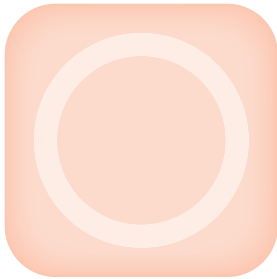
Comparison of the approaches to electronic games in different educational systems brings to light four conceptions: support for pupils in difficulty, modernisation of the system, the development of advanced skills, and the preparation of future citizens who will live in a society made up of virtual worlds.

The practices here analysed seem to confirm the positive impact of the classroom use of electronic games. They nevertheless remain small in number, and more in-depth analysis, including cases where the use of digital games did not match the teacher's expectations, would be required for a more precise evaluation. In order for this potential to be fully realised, several recommendations are put forward: develop the evaluation of practices, (re)consider games in the light of recent research on cognitive processes, make games eligible in the mechanisms for supporting the modernisation of educational systems, develop cooperation between the games industry and education around ambitious projects, and to envisage the European territory as an experimental laboratory.





Observations



## 3. Observations

The observations set out here are essentially drawn from analysis of the six case studies presented in section 5. Some of the observations are also based on the findings of the survey of teachers (section 6) and interviews with some of the decision-makers in the educational systems covered by the study.

### 3.1 A growing practice

#### ► More and more initiatives

The examples of teachers who use electronic games in their teaching are not so numerous when considered on the scale of an educational system as a whole. They are nonetheless growing in number, as we discovered when we started to prepare this study. The frequency of seminars, round tables and conferences, and the number of academic and other articles published on the subject, are increasing. Even more significantly, these developments are being organised in a framework which is directly addressed to teachers, or sometimes from the educational authorities themselves.

#### ► Medium and large scale experiments are being conducted

Several experiments analysed in this study are on a scale that goes far beyond that of a single teacher and his or her class. The DANT project in Italy brings together teachers, experts, and technicians to develop, test, and use educational games in teaching maths and the mother tongue. It involved a thousand teachers and more than 10,000 pupils aged 7 to 10. It was first deployed in the Trentino region and then expanded to cover almost the whole of Italy. The Scottish project, the Consolarium, tested the impact of several commercial electronic games, such as Dr. Kawashima's Brain Training or Nintendogs, on various pupil skills. It involved more than 500 teachers and over 30 local authorities. In the Netherlands, the Games Atelier project, after a pilot phase to develop a tool for 'mobile game-based learning', will be made available in 2009 to all secondary schools in the country. When it was launched, through a competition, in a few months more than 50 groups of pupils from a dozen schools took part.

#### ► Education authorities are becoming involved

Some experiments also benefit from the support of local, regional, or central education authorities. They provide financial or other backing for the whole project (DANT in Italy, Games Atelier in the Netherlands, the Consolarium



in Scotland); they purchase and distribute to schools the necessary licences and games (Zoo Tycoon in Austria, Højby School in Denmark). More specifically, in Scotland, a university research centre specializing in games-based learning which was recently transferred to the University of Abertay in Dundee has received a £3 million investment from the Scottish government. It has been operational since February 2009.

The involvement of education authorities generally remains limited and even very limited. Their support is more clearly seen in some countries – Denmark, the UK, and the Netherlands – than others.

## 3.2 A structured pedagogical framework

### ► The games and the conditions in which they are used are carefully selected

The six case studies presented below show that games, including commercial ones, are chosen by the teacher on the basis of their didactic qualities. They need to set the learning in a history and make it possible to develop new skills that build on what the pupil has previously learned. Teachers strongly prefer games which allow differentiation of learning (each pupil learns in his/her own way and rhythm) and enable the learner to see what progress has been made. These are, moreover, the precepts of classical pedagogy. When games are used with groups of pupils who are disaffected and detached from school, they are valued as teaching tools on account of their non-traumatising qualities ('soft' management of failure, rewards given for all achievements, etc.).

The way in which the game is used is also meticulously defined. It emerges clearly from the teachers' survey that games are used in the classroom in flexible ways, depending on the pedagogical objective. In the examples presented, the use may be collective (by the whole class, or in teams of two, and often more); and sometimes in tandem with a team of similar size in another class or school. Games can also be used individually, especially to give support to pupils in difficulty. In all cases, after the game session, discussions are organised with other pupils (about the strategies used, for example) and with the teacher (about the difficulties encountered and the ways to overcome them).

### ► Medium or long term experiments are being carried out

Several cases presented in this report make reference to experiments designed over a relatively long period. This long-term perspective is accompanied by meticulous preparation of the project for using electronic games in the classroom, particularly in terms of pedagogy. This approach also enables an evaluation of the project and measurement of its impact. It makes it possible to conduct the experiment in partnership with, ideally, a large number of teachers; and to involve the whole educational community, including parents. In some cases, university researchers have joined in the experiment.



## Observations

The DANT project extended over a period of four years. The Games Atelier pilot project is based on experiments initiated in 2005 (Frequency 1550) and itself extends over a three-year period, in cooperation with the universities of Amsterdam and Utrecht. The DANT and Consolarium projects were additionally conceived as tests to evaluate the impact of the use of electronic games on pupils' skills in the target subjects. They therefore implement research methodologies adapted to this aim (user groups and control groups, measurement of skills before and after use of games, statistical analyses of the results, etc.).

Although conducted over shorter periods, the experiments in the school in Højby, Denmark, and the school in Privas, France, are also based on a pedagogic plan carefully constructed before and during its implementation. Different phases are defined within a process whose objectives are clearly defined from the outset; the participants (pupils and/or teachers) evaluate the experiment at the end, etc.

### 3.3 A positive impact on motivation and various skills

#### ► Increased motivation of pupils

All the examples reported and the great majority of the teachers surveyed confirm that pupil motivation is significantly greater when computer games are integrated into the educational process. The pupils seem to appreciate the fact that this approach takes account of their everyday reality. They like the fact that it gives a concrete purpose to the work they are asked to do (for example, learn about a period of history so as to create a game scenario) and that it enables them to be active in their learning (as players). They also appreciate the 'play' element, but some of them are sceptical at first about bringing games into the classroom. Precisely because it is a matter of 'playing games', their image of school is challenged, inasmuch as it is associated in their minds with entirely 'serious' activities.

This increased motivation sometimes seems to be linked to the greater self-confidence that some pupils develop when using games in the classroom. Their previous knowledge of games (not necessarily of the game in question) gives them the opportunity to guide and help less experienced pupils. With or without previous experience of games, the best pupils also have the chance to help others, and they derive satisfaction from this. In addition, the ways in which mistakes and different learning rhythms are managed in a game take the drama out of learning. Such features are in any case mentioned by the teachers as giving new levels of confidence, especially to pupils defined as 'less good' by traditional educational criteria.



## ► Several types of skills are improved

Increased retention of information and knowledge by pupils is a recurrent theme among many teachers. The repetitions and identification that electronic games allow emerge as the two key factors explaining this outcome.

Because the games that teachers choose for classroom use are selected precisely for their pedagogical value, they generally give feedback to the pupil on the choices made and the strategies applied. This element is seen by teachers as particularly educative for pupils because it develops an understanding of their own way of learning. The fact that this feedback is an integral part of the game and not something separate (as in traditional teaching) is also seen as very positive by the teachers.

The teachers' survey highlights a significant improvement in several key skills – social, intellectual, spatio-temporal (reflexes) – and also in concentration. However, there is one type of competence for which the results of the use of games are less clear in the teachers' eyes, namely the knowledge and skills directly linked to the subject being taught. This question merits detailed research. It should simply be emphasized here that several of the projects presented in this study clearly demonstrate a gain in terms of the specific school subject. This is the case with mathematics (DANT and the Consolarium), the mother tongue (DANT), and history (Games Atelier). It should also be noted that these three projects employed a rigorous action-research methodology.

## 3.4 Interaction with traditional pedagogy

### ► Electronic games are combined with the classic teaching aids

The case studies show that electronic games in the classroom are regularly associated with more traditional teaching aids before the actual game-playing phase. Leisure games which are inspired by a famous character, or which lead the player into a period of ancient history, are very often introduced by the teacher after the pupils have read books related to the game theme. In this case, teachers often report that their pupils show increased, or unusually high motivation for reading – including of novels or other more technical or factual documents. Reference to these texts also enables the teacher to lead the pupil to compare the different modes of representation used in the respective novel and game. In other cases, this reading serves to create characters, settings, and actions for the scenario of the game itself (a game about the history of the colonies, for example). This interconnection between the game and traditional teaching tools generally produces better retention of the information learned by the pupil.



### ► Electronic games encourage pupils' production

During and/or after the use of a game, the pupils show real enthusiasm for writing texts, diaries, or editorial content for a website, or for making drawings and/or photographs, etc. They do so with little prompting and sometimes even spontaneously. They are motivated to keep a record of what they have done and learned through the game, and to communicate with other pupils or a wider environment about their whole project. Here too, the pupils' motivation to undertake such work, which is sometimes quite substantial, is seen by the teachers as being much stronger than in the traditional scholastic environment. These more traditional productions appear to them as a natural extension of the game introduced into the classroom.

## 3.5 Collaborative experiences

### ► Teachers are organising themselves into communities of practice

As a non-traditional teaching tool, games used in the classroom give rise to many interchanges between teachers about their practices. Teachers who are interested, but who do not yet use games, seek advice from those who have already tried them out. Those who already use them compare their experiences – in relation to the context, the pedagogical accompaniment, and the results they obtain. These comparisons are sometimes made within online communities. The DANT project in Italy, for example, illustrates the setting-up of a teachers' community of practice on a relatively large scale. First, a group of teachers who design educational games is set up, then other people with more technical expertise are brought in; then a larger community of teachers tests these games in their own classrooms to identify strengths and weaknesses and recommend or suggest improvements; and finally the improved games are made available online for a large group of teachers to use them in their everyday teaching.





Such experiments, on whatever scale, also foster cooperation between teachers and their other colleagues within the school – librarians, ICT coordinators, etc.

### ► The educational community and parents share the results

Several examples of the classroom use of electronic games are often accompanied by preliminary information given to parents, sometimes to the rest of the school community, and especially to the school management. This is particularly true in the case of the Højby school and the Zoo Tycoon project in Austria. Further information is provided throughout the duration of the experiment. The cautious, even negative attitudes of the general public towards electronic games, which are often identified with violent games, partially explain the need for these information campaigns. Once the information system is set up, parents and the rest of the school community are regularly briefed about how the games are being used, the objectives, the outcomes, and their evaluation. When the experimental use of the game has reached 'cruising speed', the productions of the pupils taking part are made available to the educational community and parents. The pupils, their parents and the school community in general, seem to particularly appreciate this moment of sharing.

## 3.6. Different approaches, depending on the educational system

The case studies, the teachers' survey, and above all the interviews with political decision-makers have made it possible to identify four different conceptions of the use of electronic games in teaching. These approaches do not necessarily each correspond to a particular national situation. Each educational system draws to some degree on all the various conceptions, while identifying predominantly with one of them.

### ► Support for pupils in difficulty

This approach sees electronic games as useful mainly for pupils who encounter difficulties in cognitive, methodological or social learning (slow learning, lack of organisation in work, resistance to rules and evaluation, etc.). The teacher resorts to electronic games preferentially outside normal lesson times, but still within the framework of the school. The teacher chooses electronic games because they reconcile the pupil with school learning, allow repetition, identify errors in a non-traumatising way, make the rules of the games easier to accept, help the pupil to understand his or her way of learning, etc.

The current situation of the French educational system as regards the use of electronic games in teaching is representative of this conception.



### ► A tool for modernising education

This approach views electronic games as an information and communication technology capable of modernising the teaching methods implemented by the educational system. It is concerned with the impact on all pupils, without distinction. The educational authorities more or less strongly support the use of games in the classroom, depending on the case. Research centres, including some close to education authorities, are developing a number of projects in this area, which feed into new teaching practices. Teachers are relatively open to the use of games in the classroom. They often share the idea that the world of school needs to come closer to pupils' everyday reality (in which such games figure prominently); and that the worlds of adults and young people should share references. There is also an awareness of the need to (re)motivate pupils in order for them to take in hand their own learning. A policy of informing parents accompanies the use of games in the classroom.

The Netherlands are fairly representative of this approach, as is the DANT project in the Trentino region of Italy. Denmark and the United Kingdom are also to some extent pursuing this approach, but each also has other objectives (see below). To a much lesser extent, at the level of the support given by the central and regional level authorities and also by teachers, experiments in Austria are looking at digital games as a tool to modernise the education system through personalisation of learning.

### ► A tool for innovation and the development of advanced skills

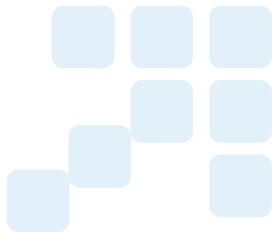
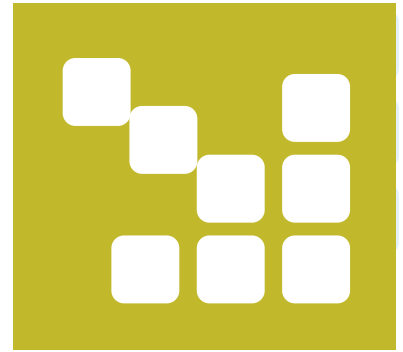
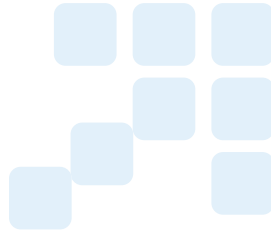
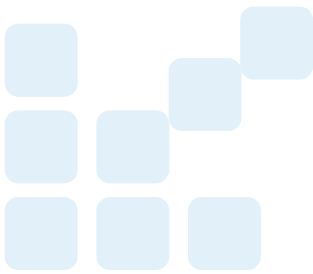
This conception is particularly strong in the United Kingdom. Like other information and communication technologies, electronic games should contribute to the development of advanced skills in creativity and innovation. They should develop self-confidence and social and intellectual skills – such as the ability to cooperate and explore, independence, responsibility, initiative and enterprise. Games are also used because they allow learning to be personalized.

Institutional support for the use of electronic games does not necessarily come from the ministry responsible for education, but rather the ministries responsible for the development of skills, enterprise, and innovation.

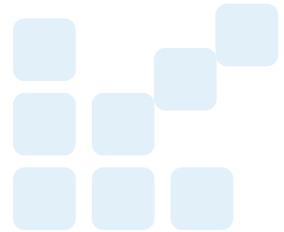
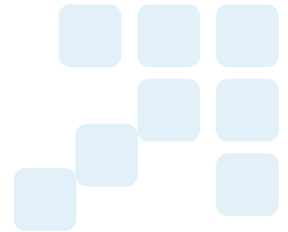
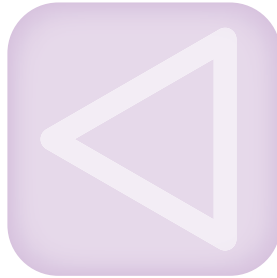
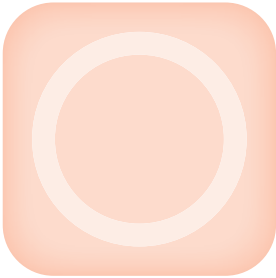
### ► A tool to prepare future citizens for the virtual worlds present in society

This more global approach is particularly evident in Denmark, as well as the Netherlands. The use of electronic games is associated with media education. The aim is to teach about games, i.e. to explore the different types and categories of games, and to compare them with other forms of expression (novels, pictures...). Another aim is to learn through games, which then serve as a gateway to the curriculum subjects, such as history, foreign languages, the mother tongue, etc. A final aim is to understand the world of electronic games, i.e. the target groups, the marketing strategies, the risks associated with over-use, games as artistic and cultural expressions, etc.





## Recommendations



## 4. Recommendations

All the observations made above indicate that the use of electronic games in the classroom has something to offer to educational systems. In order for this potential to be exploited and made more widely available, some recommendations are formulated here for the attention of political decision-makers, the games industry, and/or those involved in the educational world.

### 4.1 Evaluation of practices

Encouragement from the educational authorities, the academic world, and indeed the games industry itself, in favour of the development of evaluations of the impact of electronic games on pupils' learning would meet a real need expressed by teachers.

The teachers surveyed say that they would like to know more about the classroom use of electronic games, and have access to studies on the impact of such practices.

Evaluation studies are also seen by the teachers as a means of changing the opinion of parents, other teachers, and school management about the use of electronic games in the classroom.

Some studies and research projects are already being carried out. Three experiments which are also action-research projects (the Consolarium, Games Atelier and DANT) are presented as case studies in this synthesis report. A literature review has also been carried out in the framework of our study and is presented in the full report. However, a large part of the research carried out does not concern the use of games in the context of school teaching; and it is precisely at this level that teachers' needs are situated.

In order to be useful, these evaluation studies have to be rigorous and objective, and carried out by qualified research teams in which pedagogical expertise is represented. In addition, to move beyond the level of generalities, precise angles of analysis have to be investigated. For example, the following themes could be explored:

- ▶ What type of game impacts on which competences, and in what type of teaching context?
- ▶ What elements within the game itself lead to what impact on which competences?
- ▶ How can differing learning styles be managed through games in the classroom?
- ▶ What contribution can different games make to enhance skills in specific subjects?
- ▶ Which role should the teacher play to benefit fully from the potential of games in the teaching process?

## 4.2 Re-examination of the potential of digital games

A re-examination, or a discovery, by the educational authorities of the potential of digital games in the light of current knowledge about the functioning of the cognitive processes seems opportune.

The investigations that have been made show that electronic games favour a way of learning that is particularly in tune with the modes of learning now regarded as effective.

The table below summarizes several major principles of learning that are now known and recognized. It relates them to the characteristics of electronic games and the modes of use that they generate. The correspondences that emerge argue in favour of a ‘re-opening of the case’.

Knowledge of cognitive processes	Characteristics of electronic games and modes of use
Intelligence is diverse (logical, linguistic, spatial, etc.) and distinctive	Games can be a complement or an alternative to traditional teaching aids (books, etc.) according to learners’ individual preferences
Intelligence is dynamic and not divided into ‘disciplines’	Games often implement a pluridisciplinary approach demanding a wide range of skills from the player
The rhythm of learning varies from one individual to another	Games allow for personalised learning (as many repetitions as wanted, choice of tempo, etc.)
Awareness by the individual that strategies implemented may improve results (metacognition)	Giving feedback to the player lies at the heart of many games
A learner who is actively involved in learning obtains better results	The game gives the player an active role
Learning among pupils is beneficial to all participants	Games often readily lend themselves to collective use and interchanges between players

## Recommendations

In addition, curriculum objectives are increasingly being defined in terms of key skills. Among these are interpersonal, social and civic skills, enterprise, etc. The traditional pedagogic tools available to teachers (handbooks, set books, etc.) are not necessarily designed to develop such skills. The electronic games available which correspond to certain criteria endorsed by teachers may – in particular cases and given an appropriate pedagogic framework provided by the teacher – be an almost ‘ready to use’ solution.

### 4.3 Supporting experiments at grassroots level

The educational authorities regularly support specific initiatives for innovation and modernisation of educational systems with the aid of ICTs: pilot projects, multimedia product development funds, training programmes, online resource banks, digital work environment, etc. Explicitly opening these structures to electronic games, in the same way as to other pedagogical tools, would offer an appreciable support framework to teachers and others working in education.

Likewise, some educational systems organise training in change-management and innovation for teachers and school managers. This training relies on (generally modest) financial support given to concrete initiatives conceived at ‘grassroots’ level, and which enjoy a degree of freedom in the choice of projects undertaken. The development of initiatives in the area of electronic games could be encouraged.

Support for communities of practice in which teachers would be encouraged and helped to exchange tools, practices, and evaluations would also respond to the needs identified.

More general support from local, regional, or central education authorities for research, the launch of pilot projects, and the dissemination of information about practices and their results would be a useful complement to the support mechanisms already mentioned. Specific initiatives to increase the awareness and information of parents would be welcomed.



## 4.4 Developing interactions between education and the industry

Cooperating when necessary with researchers and experts, teachers take part in the development and testing of sometimes complex electronic games.

Some teachers who use electronic games in the classroom express precise expectations regarding the characteristics they look for in electronic games available on the market.

Significant educational issues can be identified in the area of protection of the environment, climate change, management of water resources, etc. These issues could be addressed with the development of educational tools that are attractive, meet the most demanding quality and technical standards, and are capable of giving support to an actively pluridisciplinary approach on the part of the learners.

These are three strong arguments in favour of cooperation between teachers and game publishers in the framework of more or less large-scale projects. This cooperation would also represent an opportunity to be seized by an industry often associated with less edifying games.



## 4.5 Envisaging the European territory as an experimental laboratory

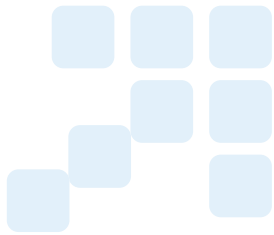
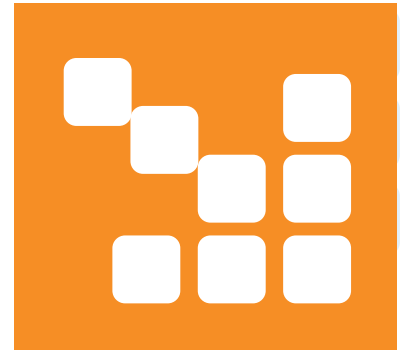
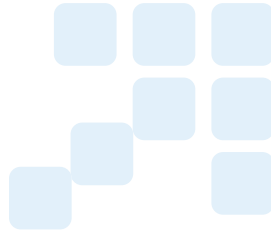
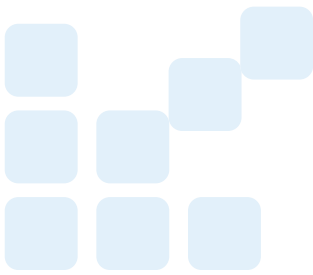


The use of electronic games in the classroom teaching process is not common practice in any country. Some educational systems are nonetheless witnessing the development of a larger number of projects and experiments in this area.

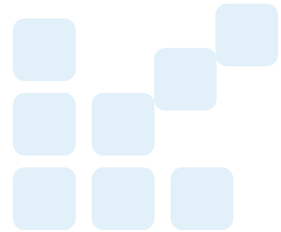
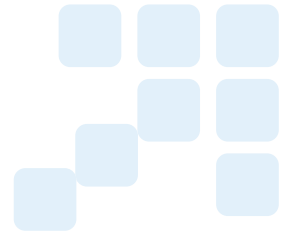
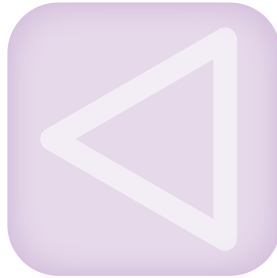
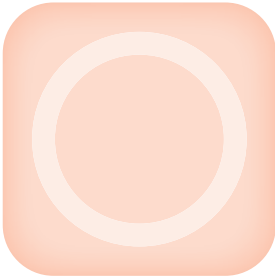
Moreover, conceptions of the role of electronic games in the educational process also vary considerably from one country to another

The development of a vast community of practice at the European level would make it possible to expand and enrich the range of experiments to which interested teachers, researchers, and decision-makers could have access, in terms of information, exchanges and even cooperation.

Such a community would also make it possible to develop large-scale projects with interested partners in the industry. The educational system and its main participants, the pupils and teachers, would thus become involved in making a substantial contribution to the challenges of tomorrow, in terms of multicultural education, innovation, and creativity.



## Case studies overview



## 5. Case studies overview

### 5.1 Højby School, Denmark

- **Leisure games at the service of the curriculum and teaching process**



Classroom teaching using computer games has been a feature of teaching at Højby School<sup>1</sup> since 2002, in conjunction with the school's participation in the state supported ITMF<sup>2</sup> (IT and Media Studies - Primary and Lower Secondary Level) development programme. At first, the coursework was experimental in nature, and computer games were looked down upon by many of the teachers. However, as it gradually became clear that there were positive elements to these games, the teaching staff were informed of the results from the test phase, and proposals for a course module were presented. The end result has been that classroom teaching using computer games is very much sought after by many teachers at all age levels in the school, and across a wide range of subjects, such as Danish, history, foreign languages, social studies, and the visual arts. Today, classroom work using computer games features as a leader-controlled, obligatory part of the teaching curriculum for the 6th class in all Højby schools. PC games are used on portable computers, with one computer per student. Classroom work

<sup>1</sup> Højby School is a municipal school (7 – 16 year-olds) with 400 pupils up to class 9. An element of this coursework is shared with Høng School at class 6 level, where pupils are 12-13 years old.

<sup>2</sup> ITMF, IT og Medier i Folkeskolen, 2001-2003. <http://itmf.dk/http://itmf.dk/>





is based on commercial games, as well as free games which can either be downloaded or played online. The teaching includes teaching *about* computer games (e.g. analysing the games played, and making comparisons with other genres), *with* computer games (using them as a starting point for subject-based learning), and *about their background* (e.g. making pupils aware of the issues concerning games production, the risks involved in excessive gaming, computer games as perceived by the media, and gaming as a cultural phenomenon).

One example of a simulation and strategy game used with 12 to 13 year-olds is *The Sims 2*, produced by Electronic Arts in 2004. Twenty-five copies of the game were given to the school by Multimedieforeningen<sup>3</sup> and the Danish Department of Electronic Arts. Course work during 25 lessons involved the analysis of the characterisation of various personalities, descriptions of the environment and ambience, and novel writing. The requirements set out in *Fælles Mål* (National Curriculum Requirements) for Danish were used as a starting point. The names of the most experienced players were written up on the board so that beginners could ask them for help, which brought the experienced players great satisfaction. Pupils were asked to describe their favourite character using text and images, giving an account of both outer and inner characterisation, and finally to write a mini-novel using a word processing programme. The evaluation questionnaire filled in by the pupils indicated that around half of them believed that the use of computer games had motivated them and helped them to understand the subject better. In the teacher's opinion, the most significant result was that the weaker pupils showed the greatest engagement. In many cases, it was the pupils from this group who knew the game already and were able to offer help and encouragement to their classmates.



The strategy game *Patrician III* produced by Atari has also been used with this age-group, in a multidisciplinary teaching scenario in relation to history, Danish and IT. Players play the role of a merchant in the Middle Ages. Twenty-five copies of *Patrician III* were given to the school by Multimedieforeningen and Atari. The aim was to help pupils to broaden their knowledge of the Middle Ages, and to understand the kind of living conditions and power relationships which prevailed during this period. Pupils were also required to make a PowerPoint presentation (IT) and use this as a basis for a verbal presentation

3 Multimedieforeningen <http://www.muf.dk/>; Danish Department of Electronic Arts: <http://www.eagames.co.uk/page/about-ea/>



## Case studies

(Danish). Each pair of pupils from Højby School was twinned with a pair from Høng School. As the course progressed, pupils sent their project productions to each other and received comments back. The results of the evaluation questionnaire indicated that many pupils felt that the game provided an authenticity which books on their own were unable to provide. Playing an active role was felt to be especially motivating. Harry Potter and the Prisoner of Azkaban is another game that has been used, but this time to teach genre awareness and media skills. The pupils read the book, watched the film, and played the game for the duration of two lessons. The course finished with a class discussion about computer game media and their influence on pupils' lives. Pupils concluded in the evaluation discussion that the use of this game was a suitable genre for teaching Danish.

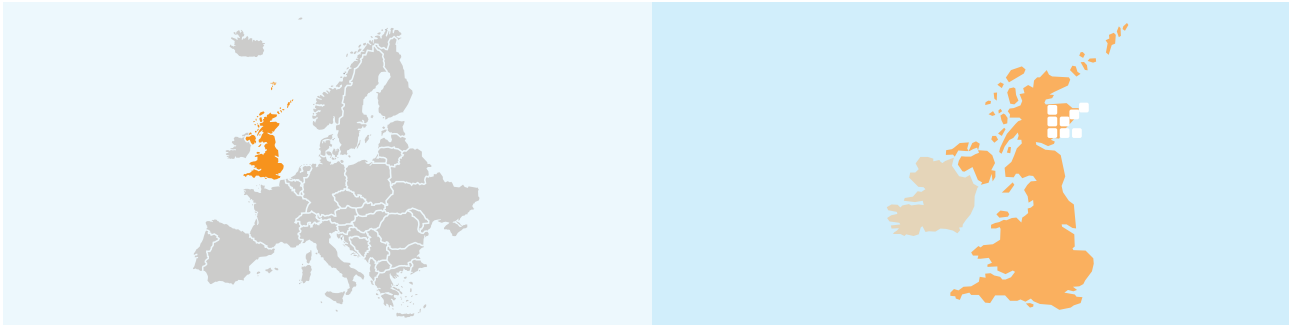
Even though increasing numbers of teachers are making requests for course material using games, there is still a need for a consciously targeted approach before these games can become an integral part of everyday teaching in schools. All such courses involve the school librarian and/or IT leader as the coordinator for preparation, development, and follow-up, and also as a technical adviser and support resource. A redefinition of the teacher's role is also required, so that it becomes acceptable for games to be used in the classroom, without the teacher necessarily being a games expert. Lastly, the positive and open approach of the school's management board, and the substantial support of parents, also made the use of games in these two schools possible.





## 5.2 The Consolarium, Scotland, United Kingdom

- **Leading the practical exploration of games-based learning in Scottish schools**



Learning and Teaching Scotland (LTS) is a public body sponsored by the Schools Directorate, which is one of the Scottish government's education and lifelong learning directorates. LTS has recently been exploring the benefits and practicalities of using computer games in schools. This has led to a number of innovative projects in schools in almost all of the 32 local authorities across Scotland, which have emanated from the games-based learning centre in Dundee – the Consolarium. This centre has been working with many Scottish teachers (roughly 500) to retro-fit commercial off-the-shelf games into the teaching and learning that happens in nursery, primary, and secondary classes. This means taking a game that was not originally designed for education and adapting its use so that it can be used to address educational needs and aspirations for learning. Two examples of games used for the Nintendo DS for this purpose are: Dr. Kawashima's Brain Training and Nintendogs.

Dr. Kawashima's Brain Training is based around a number of challenges that are embedded in numeracy and literacy – as well as memory. In April 2008 a randomised controlled trial (RCT) was carried out over a treatment period of nine weeks, involving 32 schools from four local authorities. The schools which took part were in the lowest quartile in terms of socio-economic status. The final sample size contained complete data for 634 children. The schools were randomly assigned to the experimental or control group. The experimental group played Dr. Kawashima's Brain Training for 20-25 minutes a day, five days a week, with one 'Brain Age' check on a Friday afternoon. The teachers in the control group did not use the game, and were asked not to change their normal routine. A training session was provided for the teachers in the experimental group, including a brief description of the trial's rationale and methodology, and a workshop on how to set up a player profile in the game and how to play. Before the trial



## Case studies

began, every school was visited and pre-measures of computation (accuracy and speed) and various self-measures (e.g. mathematics self-concept) were given to the children. Post-measures were taken using the same materials at the end of the trial. The results showed that the mean gain in accuracy (number correct) in the experimental group was approximately 50% greater than that of the control group. The mean improvement in speed of processing (time taken to complete number test) in the experimental group was more than twice that of the control group. In terms of accuracy in the written maths assessment, the results showed that the less competent children tended to improve more than the more able children. In terms of the improvements in the speed of completion of the written maths assessment, the results indicated that the majority of children in the middle of the ability range improved more than the children at the top and bottom. With regard to the qualitative data collected, teachers and pupils commented that the game nurtured a collegiate ethos in class. There was also a strong intrinsic motivational drive for continual self-improvement through pupils' individual profiles and their relationship with Dr. Kawashima. Metacognition was seen in action, as pupils developed an awareness of what they needed to improve and what strategies they would have to apply to achieve an improvement.

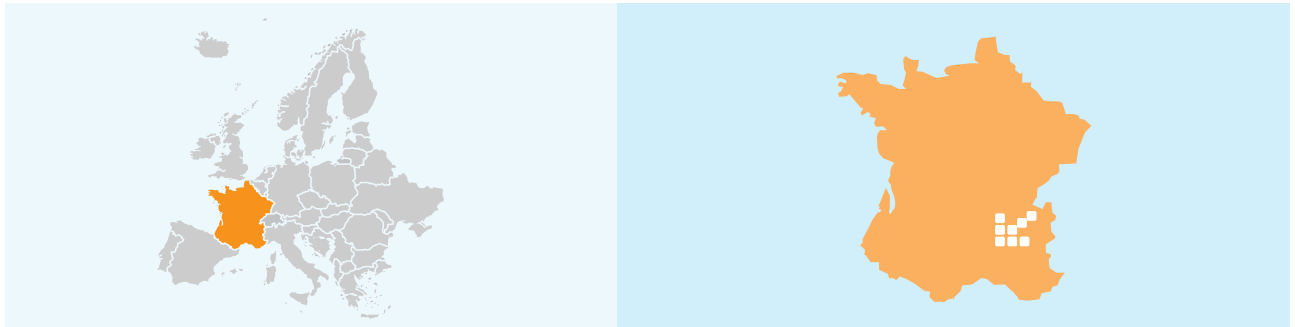


Nintendogs is another game for the Nintendo DS, and involves the player creating or 'giving birth' to a dog. The player is from then on responsible for their dog's wellbeing. The pupil needs to train their dog so that it can enter competitions which vary in complexity and provide the opportunity to win money, which can be spent on the dog in the virtual shop. Two non game-playing teachers from Elrick and Banchory primary schools in Aberdeenshire took part in the Consolarium's Nintendogs project. Both teachers used the game as the central focus of a cross-curricular project, making it the contextual hub that drove the learning. In order to do this, the children were put into groups of three so that they could work together and ensure the all-round well-being of their dog. In both classes, the pupils kept Doggy Diaries, where they voluntarily wrote about their dog's exploits in the game. Both teachers commented on the boys' increased levels of engagement in writing as a result of the motivation they gained from the game, as well as all pupils' eagerness to read and research more about dogs from various sources. To enhance their ICT skills, a blog was created in both classes so that pupils could communicate their learning in class to the wider community, who offered them supportive and formative feedback. The whole culture within this project focused and nurtured the active participation of learners in their own learning.



### 5.3. Farm Frenzy, France

- **Serious Games as a Remedial Strategy in a Secondary School in Privas, Ardèche**



This case study concerns a remedial programme based on ‘serious games’ and key skills carried out by a group of teachers in a rural secondary school of 700 pupils in Privas, Ardèche, in southern France. The teachers worked with a group of six pupils from different classes in the 11-year-old group. The aim was to offer support to pupils experiencing serious difficulty, both in their academic results and in their socialisation. The idea was to put together an eight-week training programme made up of several games, each targeting one of the child’s problem areas. The group kept a shared activity on one game; and each session ended with a debriefing. Several games were used, two per pupil. One game, the focal point of the experiment, was used by everyone – Farm Frenzy, produced by Big Fish. The other games were Nintendo’s Big Brain Academy, to connect with evaluation; My Word Coach, to expand the pupils’ lexical field and re-habituate them to progressive learning; and Text Express, to work on decision-making and vocabulary. Each of these games was used for ten minutes. All of the games generate strong emotional involvement and induce some anxiety (which is more or less strong depending on the state of the children). The pupils have the opportunity of managing their anxiety through the games. Farm Frenzy is a fun simulation game about managing a farm. There are 45 levels of increasing difficulty. Players must complete certain tasks to increase the capacity of their warehouse and improve the performance of their production facilities to reach the next level. The Flash version of the game, which can be played on the Internet, was used for the project. The game stimulates many discussions and calls on many of the skills mentioned in the ‘scientific and technical culture’ section of the common core (socle commun) of the curriculum. The game was considered to be of potential motivational interest for a digital generation who find it increasingly hard to concentrate on a task for



a sustained period, or persevere with repetitive revision exercises. The pupils chosen to participate in this experimental project all felt like failures and were weary and discouraged by the fruitlessness of their scholastic efforts – often leading to school phobia. Farm Frenzy was used as a non-traumatising remedial teaching tool, based on appreciation, rivalry, and discussion. The sessions for working with these games were scheduled outside normal teaching time.



The experiment proved very successful for the pupils involved, who considerably gained in confidence and improved a range of skills. The pupils raised their critical awareness, by learning to criticise their own approach; as well as accept the evaluations of their teachers as aids to progression rather than punishments for mistakes. Pupils also grew progressively more familiar with complex tasks and learned to differentiate actions from their consequences, and concepts from their manifestations. The social skills gained through playing the game are particularly noteworthy. Pupils had to observe certain rules and

conventions in order to play together and be successful. The result was that pupils felt more comfortable at school, were able to concentrate better and therefore learned better. It is difficult to say whether this outcome is directly linked to the use of games, or simply to the reduction of school phobia. The teachers attributed the success of the game to the following factors: its appealing and fun nature, clearly defined goals, increasing levels of difficulty, effective gameplay, a focus on giving credit rather than sanctioning failure, and the ranking of scores. However, persuading other teachers of the efficacy of the experiment was difficult at first. This problem was overcome by inviting the other teachers to take part in the sessions, and by offering them separate sessions outside teaching hours to get to grips with the material. These occasions were rich in interchange and learning, and in most cases ended with acceptance of the notion of 'teaching through games'. This way of teaching radically redefines the role of the teacher. He or she acts as a specialist in his or her subject in the phase of diagnosing the child's difficulties, and as an expert in pedagogy in selecting the games to be used and building them into the remedial programme. Week by week, the teacher has to be particularly attentive to the pupils' behaviour and performance so that he or she can constantly readjust the teaching. This approach entails a holistic vision of the situation and a dynamic conception of progress in learning. The pupil's active role in constructing knowledge is crucial. The dynamism manifested in the sessions, the autonomy of the pupils, and the impact on other school subjects definitely invite an exploration of the further potential use of computer games to increase pupils' chances of success.







## 5.4 The DANT/IPRASE Project, Italy

- **A 4-year “learning by playing” action-research project in the Trentino region**



DANT - “Didactics assisted by New Technologies”, is an experimental project developed by IPRASE (Provincial Institute for Educational Research, Training and Experimentation)<sup>1</sup> and is an operative programme of the province of Trento for the period 2000-2006, financed by the European Social Funds and private partners. It is concerned with the professionalisation of teachers and other education providers, in relation to the use of new ICT tools to support didactics and learning processes. The first phase of the DANT project, “Learning by Playing”, involved more than 600 teachers and their classes from primary and lower secondary schools in the province of Trento. In 2003 and 2004, DANT was extended to many more teachers and thousands of pupils in all of Italy’s regions (except Valle d’Aosta). In four years, more than 1000 teachers have joined the experimentation project, involving over 10,000 pupils in all. The driving factor for this experimental curricular project was the results of several previous evaluations which identified a significant group of pupils (around 20% in the Trentino region) who had an insufficient level of proficiency in mathematics and Italian at the end of compulsory education. This fact prompted pedagogical reflections, leading to the research question: does ICT offer something more than traditional tools, such as books, which is more relevant to pupils who reach low attainment levels with traditional didactics? Testing the impact of games on pupils’ attainment was the core aim of the project, together with developing a research community among teachers to exchange experience, good practices and materials. To this end, various educational games were specifically designed, tested by teachers, improved accordingly and then disseminated. All the

<sup>1</sup> IPRASE carries out studies and produces research and documentation in the pedagogical, methodological and training fields. Its main goal is supporting innovation and autonomy in schools and school networks and promoting school evaluation activities.



project's materials, including the educational software, were developed by a research group made up of IPRASE coordinators, teachers, technicians, and experts in ICT education. The project targeted primary and lower secondary schools and focused on how games could improve attainment and motivation in learning the key skills and knowledge of the core curriculum. 101 games for Mathematics, Italian, Geography, Music and Science were made available.<sup>2</sup> The games were free, PC-based, produced in Flash or HTML (allowing adaptation), and were made available on an auto-play CD-ROM, requiring very low level ICT skills.



To carry out the research, a set of integrated materials was provided: a curricular project pedagogically based on reflections about using ICT with pupils, educational games, simulations, handbooks, a diary (to collect feedback about the games and their impact on pupils' learning), exercises, a teacher's guide, and a set of tests and questionnaires (for teachers and pupils, to collect qualitative and quantitative data). Teachers involved in the project had to set up an experimental group with which to use the games, and a control group. Teachers were free to investigate different ways of using the games, taking into consideration their pupils' learning profiles,



capabilities and the teaching potential of each game. Pupils played in small groups or individually, in the schools' computer labs. Teachers' and pupils' evaluation comments were an essential part of the project since feedback on the materials tested provided input for the adaptation of existing games – and the development of new ones. An important point made by the research group was that playing a game frequently was essential to its effective impact on learning. In 2005/2006, an online community of practice of teachers and experts was set up, which played a strategic role in creating an innovative curricular proposal focused on the use of ICT, including games, in schools. At the end of the project, a final test was given to all pupils in both experimental and control groups, to assess the impact on quantitative learning outcomes. The results showed that pupils in the experimental groups who used games achieved higher attainment than those in the control groups that did not. The difference between the two groups was highly statistically significant in the mathematics and Italian tests for both age groups (7 to 8 year-olds and 9 to 10 year-olds). The questionnaires used to evaluate qualitative aspects found that teachers were impressed at how much the games sparked motivation in pupils through their interactive and engaging qualities. A typical pedagogical problem is how to deal with the different ability levels of pupils in the same class. Most of IPRASE's games allow teachers and pupils to modify a series of variables and gradually increase or decrease the level of difficulty. Despite the obstacles identified in the data collected via evaluation questionnaires and the online community of practice, including the lack of computers in schools and the inflexibility of traditional, scholastic modes of learning, the diffusion of IPRASE's 'Learning by playing' software has exponentially increased in Italy over the past years.

<sup>2</sup> The games can be downloaded free of charge at: [www.iprase.tn.it/prodotti/software\\_didattico/giochi/download/iprase\\_2006.zip](http://www.iprase.tn.it/prodotti/software_didattico/giochi/download/iprase_2006.zip)





## 5.5 The Games Atelier, The Netherlands

### ► A location-based mobile game platform



"Maatschappelijke Sectoren & ICT" (Society Sectors and ICT) is an action programme of the Dutch Ministry of Economics which launched a call for proposals to fund ICT-related projects starting at the end of 2006. Twenty-three projects were funded from the education sector, and seven of these were focused on electronic games.<sup>1</sup> One of the winning proposals was Waag Society's Games Atelier project, which started at the end of 2006 and will terminate in July 2009.

The Games Atelier is a new location-based mobile game platform developed by the Waag Society, in collaboration with five local secondary schools in Amsterdam and the Amsterdam City Department for Social Development, allowing students to make and play their own games in an authentic context. It uses a learner-centred approach, and encourages self-motivation, as students create their own game according to their personal context and environment. It is supported by a mobile and web-based tool-set, and a technology platform tailored to location-based projects called 7Scenes.<sup>2</sup>

The Games Atelier gives students the opportunity to use mobile telephones, GPS, and Internet to make, play, share, and review their own games. To make the game, students have to think of an initial concept and game narrative, before developing rules and filling in the format of the game. In this first creative phase of making the game, in order

1 For a list of all the education projects funded under this call for proposals from the Ministry of Economics, see: [http://www.m-ict.nl/index.php?option=com\\_content&task=category&sectionid=27&id=55&Itemid=212](http://www.m-ict.nl/index.php?option=com_content&task=category&sectionid=27&id=55&Itemid=212)

2 See: [www.7scences.com](http://www.7scences.com)



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to come up with a relevant game narrative, students must fully familiarize themselves with the learning content of the subject. At the same time, to develop rules and fill in the game format, they also have to learn about the principles of game design. The next stage is for the students to play the game in their own living environment. Playing the game involves using mobile phones and GPS to navigate their way around their surroundings to carry out assignments and search for clues. Sharing the game means getting other students to play the game they have made, and then to exchange their experiences. The final and crucial stage of the Games Atelier learning process is reviewing the games played.

The Games Atelier has been developed in collaboration with teachers and students for teachers and students, and has specifically been designed to be used as a tool to enhance the teaching of the existing Dutch national curriculum. It allows for maximum flexibility in terms of how it is used as a learning resource in the school context. Firstly, it can be used in any location to enhance the teaching of any subject. It can also be used with small or large groups, during lessons, or as a wider school activity. In order to suit different school timetable constraints, Games Atelier has been designed so that it can be used in small, medium, or large sessions. The problem-based approach on which the game is built



requires students to collaborate with one another in order to be successful. From the 1st of April 2009, Games Atelier will be available for all schools to buy from the national online software distributor for secondary education.<sup>3</sup>

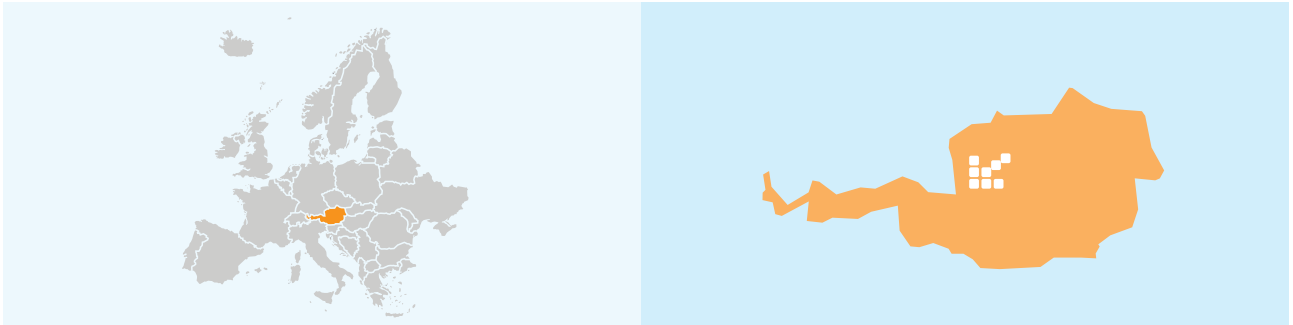
Buying the Games Atelier licence package also includes free training for teachers from Waag Society staff, both on the school premises and at the Waag Society. Initially, it will be up to schools to use their own budget to invest in buying the Games Atelier licence. However, in the future, public bodies such as the Ministry of Education, Culture and Science or national cultural organizations may choose to purchase the licence and make it widely available to all schools.

<sup>3</sup> See [www.slbdiensten.nl](http://www.slbdiensten.nl)



## 5.6 Zoo Tycoon 2, Austria

- **The use of a commercial simulation computer game at BG/BRG Zell am See school in Pinzgau, Salzburg**



In 2008, the Austrian Federal Ministry for Education, Arts and Culture (BMUKK) invited secondary and vocational schools all over Austria to participate in the project 'Educational Scenarios for Digital Game-Based Learning' (Didaktische Szenarien des Digital Game Based Learning). The Ministry financed this pilot project, which was supervised by the Danube University Krems and the University of Vienna, to test the possibilities of using commercial computer games in the classroom. The aim of the project was to explore the potential of digital game-based learning in the everyday school context – and to investigate the direct connection between the school and media environments of young people. During the project the following factors were taken into consideration: time constraints of teachers and pupils, agreement of parents, schools' technical equipment, and the resources available for purchasing computer game licences. One of the first Austrian schools to participate in the project was BG/BRG Zell am See school,<sup>1</sup> where 25 pupils, mostly aged 12 from class 2b, used Zoo Tycoon 2 in the classroom. Zoo Tycoon 2 is a commercial simulation computer game created by Microsoft Games Studio. The game can be ordered online<sup>2</sup> and costs approximately 20 euros. The game was provided to the class by the Ministry of Education, Culture and Science in Austria. It enables pupils to create their own zoo and manage it,

1 BG/BRG Zell am See school is an advanced secondary school providing general education for 11-18 year-olds, situated in the heart of the countryside in Pinzgau, Salzburg, Austria.

2 See <http://www.amazon.de/Microsoft-Zoo-Tycoon-2/dp/B00009P51N>



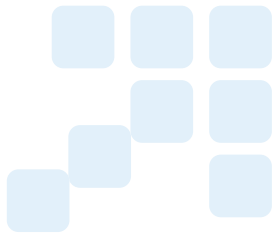
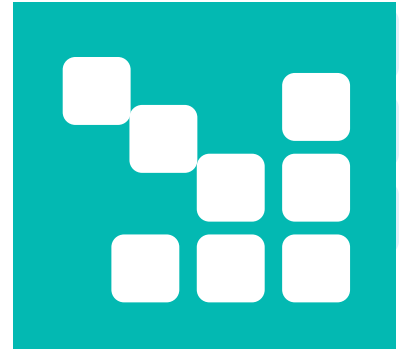
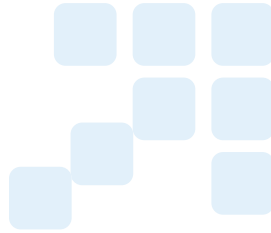
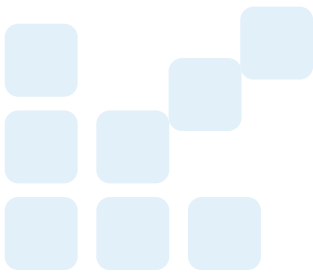
## Case studies

with all the tasks and responsibilities this entails. The game offers multiple construction possibilities and challenging management tasks.

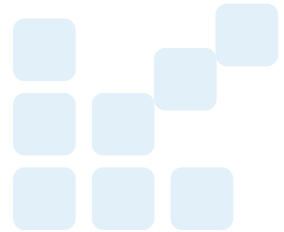
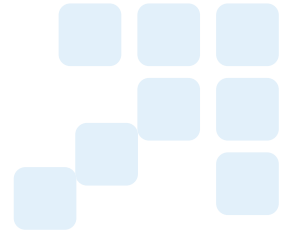
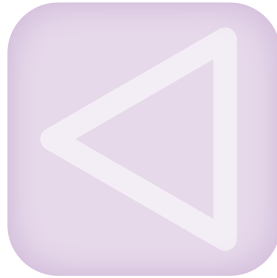
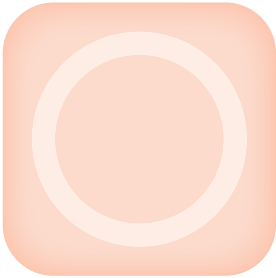
Zoo Tycoon 2 was firstly used in German lessons as a stimulus to encourage the learning of language skills, either by using the game content to initiate debates on the issues raised (such as the rarity of certain animal species), or by acting as an inspiration for written assignments. After playing the game, pupils were asked to use the content of the game and their experiences to fill in project diaries, write blog entries, interviews and letters. Once teachers and pupils were familiarized with the game and felt more confident, the original English edition of the game was also used in English lessons. The English version of the game proved particularly useful for enlarging pupils' vocabulary and assisted in the acquisition of linguistic skills. In both lessons, through the game, pupils acquired knowledge about the animals they encountered, their habitats and needs, and how to protect their environment. They also learned important skills such as how to plan in advance – as well as developing their economic competences.



Pupils played the game in small teams of two or three in the school's computer lab rather than the ordinary classroom. Zoo Tycoon 2 was specifically used with the intention of developing pupils' teamwork skills, and so emphasis was put on the importance of pupils collaborating with one another during the game and afterwards – for reflection purposes and to produce follow-up work. The teachers involved in this project found that playing the game in small groups facilitated the learning of social and communication skills. The project was deemed to be so successful by the two German and English teachers who initially took part, that as a result, the biology and art teachers in the school also decided to integrate Zoo Tycoon 2 into their lessons. In biology lessons, the game was used to teach about animals and their habitats, and in art lessons pupils were asked to draw pictures of the animals they had encountered while playing the game. All teachers concluded that the commercial computer game Zoo Tycoon 2 could be successfully used to teach the existing curriculum in the classroom, and that it perfectly combined learning with fun.



# Teachers' survey overview



## 6. Teachers' survey overview

The majority of the teachers who responded want to know more about using games as classroom teaching tools. Whatever their gender, age, years of experience, degree of familiarity with such games, the level of their school, or the subject they teach, teachers are already using digital games in the classroom. The main obstacles for using games in the classroom are related to the difficulty involved in integrating games into the curriculum, the lack of equipment, and parents' and other teachers' reservations. Teachers use every kind of game and more use is being made of commercial, 'off the shelf' games in the classroom than might be supposed. Teachers expect the use of games not only to enhance their pupils' motivation but also to improve their skills. They are convinced that these effects are obtained in terms of motivation – and also of certain skills (social, intellectual, spatio-temporal skills, etc.). Teachers are not so sure about the development of the critical faculty or the benefits for the specific subject being taught.

### 6.1 An online survey in several European countries

This analysis is based on 528 responses to a questionnaire in nine languages, available online between October 2008 and February 2009. The questionnaire consisted mainly of closed questions (boxes to check from a list of possible responses); there were a few open questions (free text to be written by the respondent).

The teachers were invited to respond to this questionnaire mainly through the newsletters and websites of European Schoolnet and of ministries of education and/or agencies responsible for education at national or regional level – or more precisely for the use of information and communication technologies in education (ICTE).

Moreover, the profile of teachers who responded to the survey reflects a general familiarity with ICTE. Some 70% rate themselves as “good” or “moderate” in ICT skills, and 23% consider themselves to be “expert” users. About half of the respondents say they use ICT most days of the week in the classroom; another quarter about once a week.

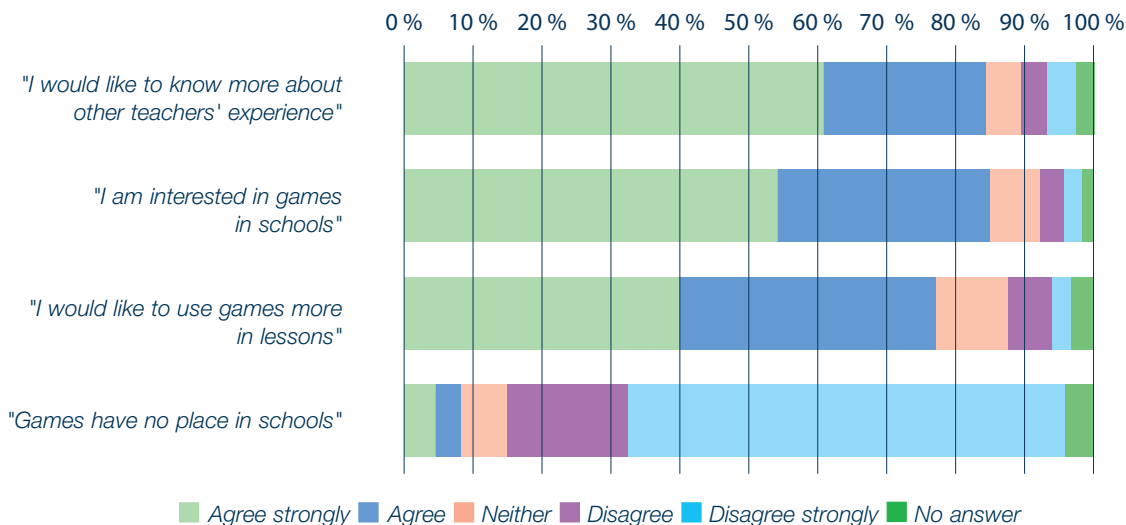
The newsletters and websites that announced the survey are not particularly “digital games oriented” and are not aimed at those already convinced of the value of such games. One of the aims of the survey was to reach teachers who already use digital games in their teaching, but also teachers who do not, and to ask them why.

## 6.2 Teachers interested in the potential of digital games

Whether or not they use digital games in their teaching, the teachers surveyed expressed a real interest in the potential: 80% want to know more. Almost the same percentage of teachers already using games say they are interested in making greater use of them. Some 50% of the teachers who have not yet used them say they would be interested in testing them.

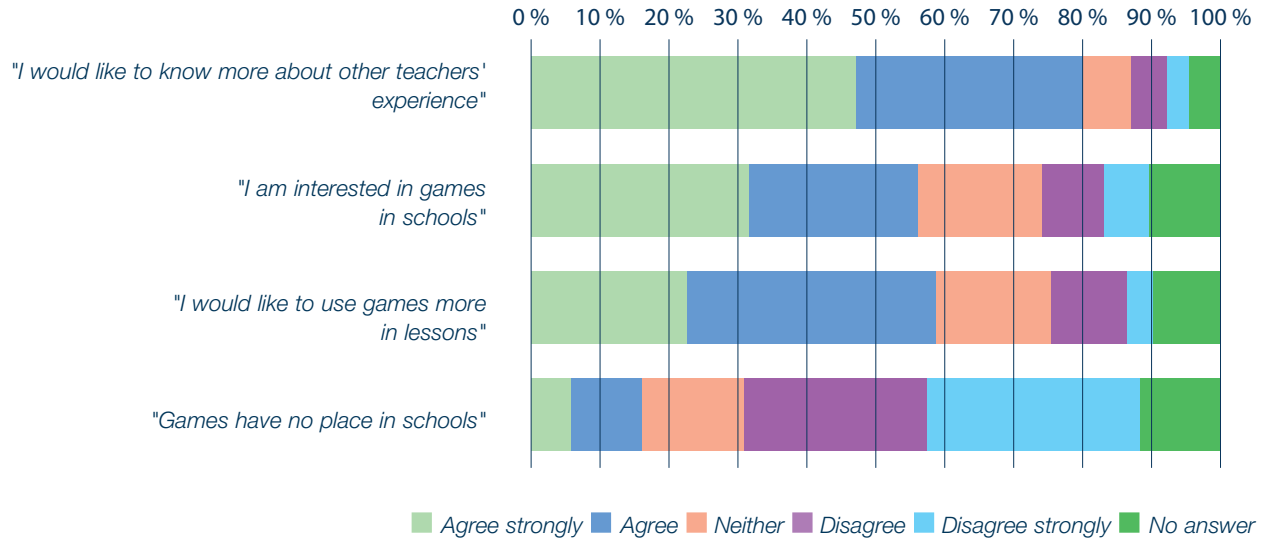
More than 370 respondents – 70% of the sample – say they use these games. Of these, over 80% said that digital games have a place in schools, and would like to know more. Almost the same percentage say they would like to make more use of digital games.

### Opinion of teachers using games in schools (N=373)



155 of the respondents say they do not use digital games. Of these, 15% consider that digital games have no place in schools. More than 50% say they are interested and would like to use them. Taken together with the fact that 80% say they would like to know more, this shows that there is scope for increased classroom use of these games, even among teachers who do not yet use them.

Opinion of teachers not using games in schools (N=155)



### 6.3 Profile of teachers using games in their lessons

Among the survey respondents, male and female teachers of all ages use digital games in their lessons. How long they have been teaching is not a decisive factor, except among those who have been teaching for more than thirty years, very few of whom say they use digital games in their lessons. Both primary and secondary teachers use these games. It is not necessary to be a games expert to use them in the classroom: 85% of the teachers who use them say they are have “moderate” games skills (57%); or even those of a “beginner” (28%).



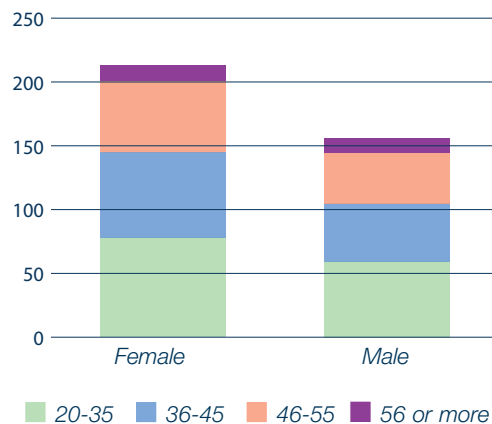
373 teachers among those surveyed – 70% of the total – use digital games in their teaching. Some 58% are women.

The 20-35 age group is the largest, for both men and women (about 37% overall) The age groups 36-45 and 46-55 make up 30% and 26% respectively, without significant difference between the sexes.

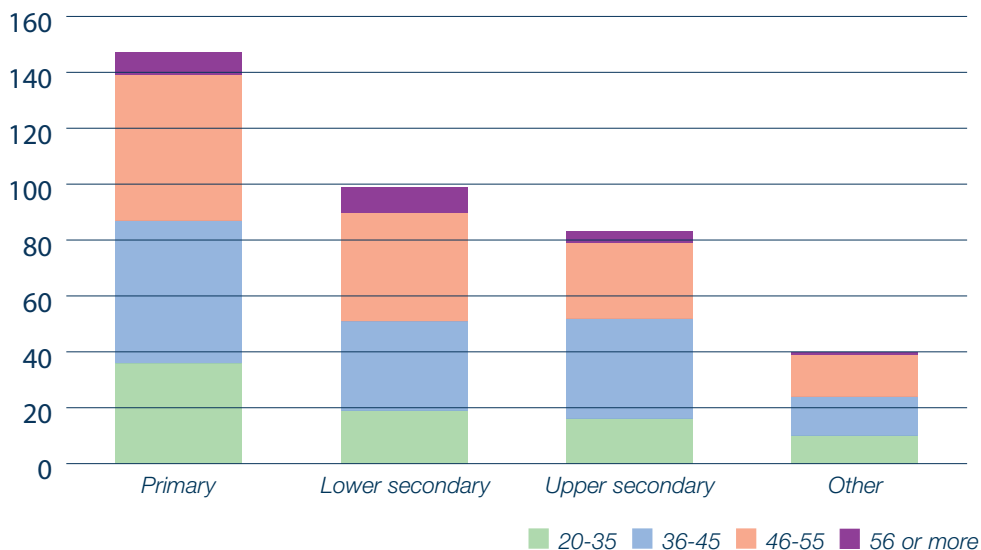
Primary school teachers accounted for 40% of the responses, and almost half came from teachers in secondary schools; fairly evenly distributed between lower and upper secondary education.

Teachers who have been teaching for less than five years are not the only ones using games; those who have taught for six to 15 years or 15 to 30 years also use them. Only those who have taught for more than thirty years make little use of them.

Distribution by age and gender (N=369)

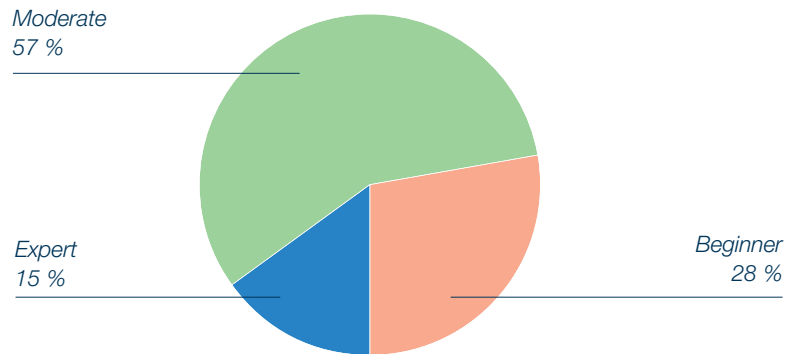


Distribution by years of teaching and predominant student group



The teachers in the survey who use digital games are not necessarily games experts: only 15% of them claim to be experts, while the majority (57%) say their level is “moderate” and almost 30% that of a beginner.

**Game skills level (N = 220)**



## 6.4 Why and how are digital games used in the classroom?

The teachers questioned most often expect these games to motivate their pupils, while contributing to the educational goals in terms of content, skills (especially social skills) and values. Their “ideal” game can be used in a flexible way, contains valid content and information, is easy to use and understand, and didactically well structured.

More specifically, teachers say, for example, that they use digital games to increase pupils’ autonomy in learning, and to personalize, and sometimes reward, learning.

Language lessons (both mother tongue and foreign languages) are the subjects most often selected for digital games. History, geography and maths are also often mentioned. In addition, games are more often used to develop teamwork and intellectual skills. Only 13% of the teachers surveyed use games to teach specific groups of pupils.

The obstacles that teachers encounter in integrating games into the teaching process are varied, and their relative importance depends on the context. Difficulty in matching the game to the syllabus, lack of available computers, the organisation of teaching time, the attitude of the school and parents towards games, and the cost of games and licences are often cited. The lack of studies of the impact of games on the educational process is clearly regretted.

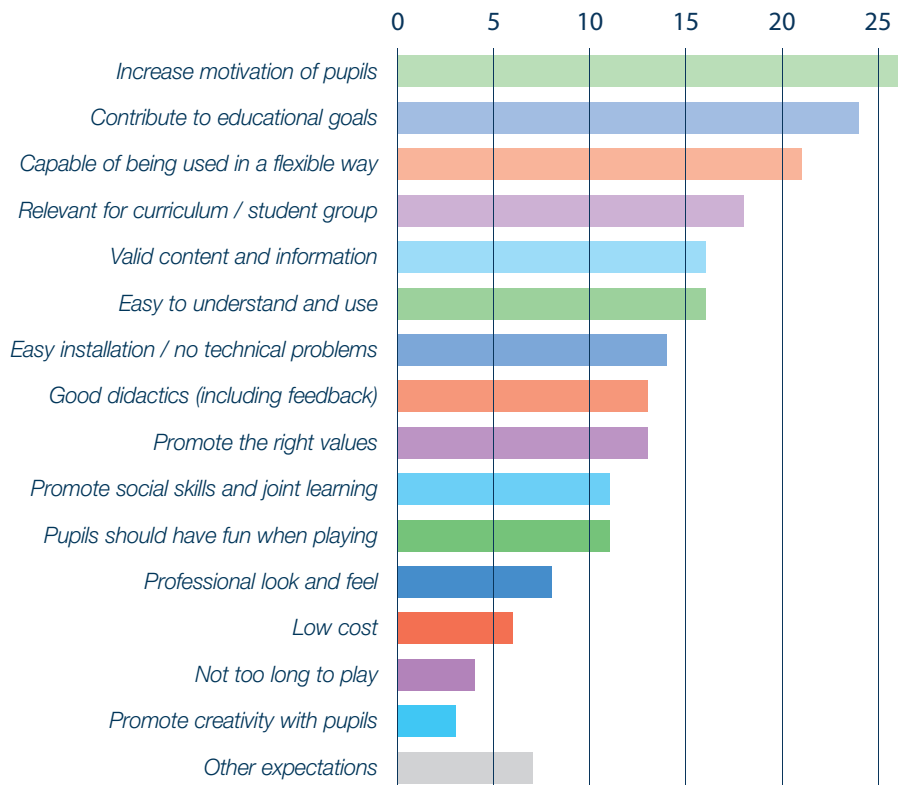
## ► Expectations of games used in the educational process

The expectations expressed by the teachers questioned are varied, and concern the educational goals to which games might contribute, and the features expected of the games themselves.

As regards educational goals, the teachers most often say that they expect digital games to increase their pupils' motivation, and, almost as emphatically, that they should make an overall contribution to educational goals. Next, teachers expect games to be relevant to the curriculum and to the learners, to promote positive values, develop social skills and teamwork, be 'fun' to play, and – but only for a few respondents – promote creativity.

As regards the intrinsic features of the games, teachers most often want them to offer flexibility of use, valid content and information (i.e. without factual errors), be easy to understand and use, and provide feedback to pupils. Some teachers also expect games to have a 'professional look and feel' (appealing graphics, technical sophistication), be accessible in terms of cost, and not take too long to play.

Expectations from games (N = ± 120)





### ► The motivations of teachers who use digital games in schools

As well as assisting learning of certain subjects and developing certain skills, teachers say they use digital games to promote pupils' motivation, increase their interest, and take account of their everyday environment outside school – in which games have an important place – and to make learning more fun. The central argument is to use games as a way to attract pupils' attention for particular subjects and motivate them to learn. The teachers also mention other specific aims:

- ▶ tests, repetition, revision, etc. of topics taught at school;
- ▶ take account of different speeds in learning;
- ▶ reward students and ensure their active participation in lessons;

### ► The subjects, skills, and profiles of the pupils targeted

Foreign-languages and the mother tongue are the subjects for which the teachers most often say they use digital games (about 25% of teachers). Then come geography, maths and history, followed by science and business studies.

As regards skills, teamwork and mental and intellectual skills are most often mentioned. Technological and motor skills are also cited.

Only 13% of the teachers said that they used digital games with specific groups of students: special needs children, weaker or demotivated pupils; but also, and especially, boys and competitive pupils. Yet several teachers indicated that, appropriately used, digital games are suitable for all types of learners.

### ► The obstacles encountered

When asked to rank a series of obstacles, the teachers who use games in the classroom highlighted cost and licencing problems, timetabling, and the lack of suitable games.

The other obstacles noted, less often and all of roughly equal importance, are: the attitudes of other teachers, the lack of training and support, inappropriate content, worries about negative consequences, insufficient evidence of the value of games in the educational process, and finally, the constraints imposed by assessment (tests, exams, etc.).

The survey also contained an open question on the same theme, which all teachers, both users and non-users of games, were invited to answer.

Analysis of the responses to this question suggests that the ranking of obstacles shown above should be interpreted with some care. The most important obstacle mentioned in response to the open question was the difficulty of integrating games into the curriculum. This was followed by a lack of computer equipment, followed by the fear of negative attitudes to games. The problem of costs and licencing has relatively less importance.

Main obstacles to using games in teaching	
1	Cost and licencing
2	Timetable of the school
3	Finding suitable games
4	Attitudes of other teachers
5	Training and support
6	Inappropriate content
7	Worries about negative aspects
8	Insufficient evidence of value
9	Examinations

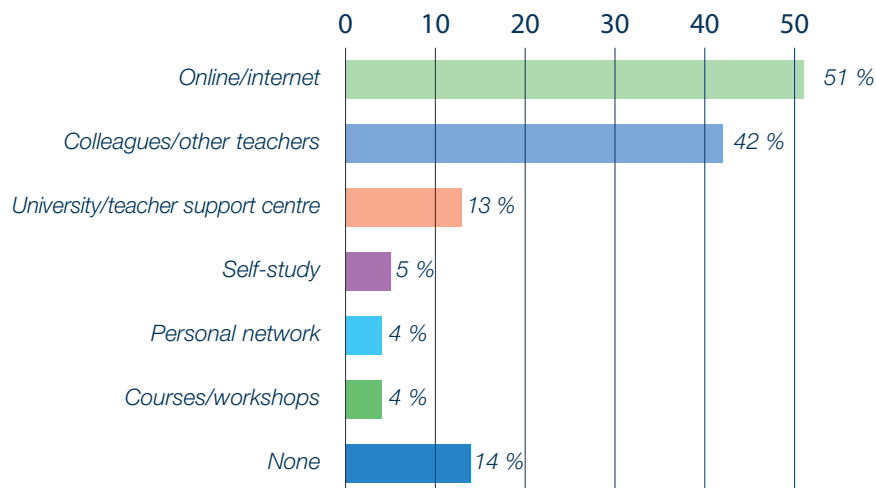
It also becomes clearer why the obstacles so far mentioned make it difficult to use games in the classroom:

- ▶ the problem of integrating digital games into the curriculum is mentioned because of the level of skill required and the specific terminology of the games, which do not correspond to the aims or structure of the course; the cross-disciplinary approach of the games is not compatible with the division between different subjects in secondary schools; several teachers mention the absence of games for the subjects they teach, others mention unsuitable content;
- ▶ the attitudes of colleagues, the school management, and parents are often related to the lack of information about games, and especially the lack of studies evaluating the impact of their use in lessons; the lack of observation and evaluation of benefits in the educational process – especially in relation to the costs in time (spent in identifying games, preparing, setting them up, informing parents and the school, etc.) is also highlighted;
- ▶ the organisation of timetables is mentioned – teachers do not have time to identify appropriate games and prepare to use them in lessons, there is not enough time in the lessons themselves, and the game sessions may last longer than the time allowed for a lesson.



## ► Pedagogical support available to teachers

### Pedagogical support to integrate games in teaching (N=202)



The survey asked about the pedagogical (as opposed to technical) support available to teachers who want to use digital games in their lessons.

The teachers' responses showed that they most often obtained this support from the Internet and from their teaching or non-teaching colleagues.

## 6.6 Impact of the use of games in schools: enhanced motivation and skills

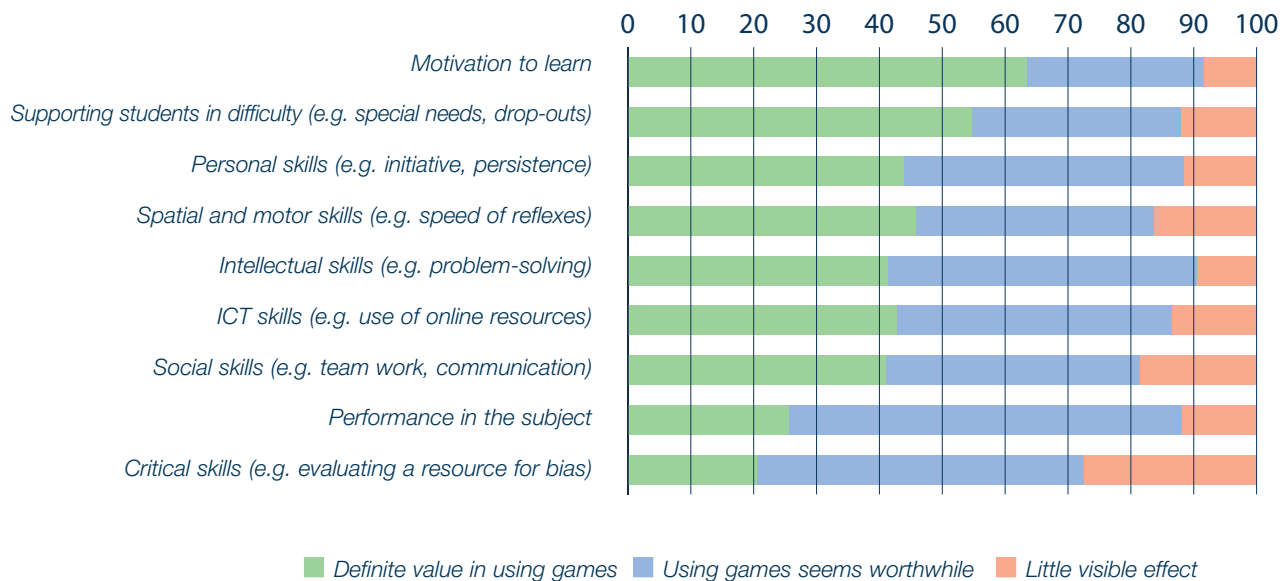
Teachers in the survey expressed a positive view of games in terms of the motivation of students and the development of a wide range of skills. They are less persuaded of their impact on critical skills and performance in the specific subject taught.

Overall, teachers who use games have a positive, and even very positive, opinion of the impact of games on their pupils' learning. First comes the effect on pupils' motivation to learn, closely followed by the support given to pupils with difficulties (not as a group with which the games are specifically used, but as individuals in any class).

## Teachers' survey

The positive impact on a wide range of skills is also emphasized: personal skills, spatial and motor skills, intellectual, technical and social skills; the effect on the development of critical thinking is seen as less clear. Indeed, on this point, and on the effect on performance in the actual subject taught, fewer than 25% of the respondents are deeply convinced of the substantial contribution made by the use of digital games.

### Opinion on educational impact of using games (N = ± 200)





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Do digital games have a role to play in teaching? What is more crucial: their impact on pupils' motivation, or their potential to support personalised learning? What impact do they have on developing collaborative skills? What do teachers who use these games in their teaching think? What practices are already in place in the classroom? Do education systems within Europe approach these questions the same way?

This synthesis report presents the main results of the study entitled *How are digital games used in schools?* which approaches these questions from a balanced and neutral perspective. The study analyses the situation in eight countries: Austria, Denmark, France, Italy, Lithuania, the Netherlands, Spain and the UK. The study was launched in 2008 and is made up of several components: a literature review, a teachers' survey, case studies, interviews with education policy makers, and an online community of practice.

**European Schoolnet** (EUN - [www.europeanschoolnet.org](http://www.europeanschoolnet.org)) is a network of 31 Ministries of Education in Europe and beyond. EUN was created more than 10 years ago to bring about innovation in teaching and learning for its key stakeholders: Ministries of Education, schools, teachers and researchers.

**The Interactive Software Federation of Europe** (ISFE – [www.isfe-eu.org](http://www.isfe-eu.org)) was established in 1998 to represent the interests of the interactive software sector vis-à-vis the EU and international institutions. Thirteen major publishers of interactive software and thirteen interactive software trade associations throughout Europe have joined ISFE.