

Virtual Classroom Tour - VCT

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Name of Project: Acquiring knowledge and skills in biology and in geology with serious games, and progressing in a second language

Educator(s)	Jean-Pierre Gallerand
School	Theophane Venard college is located in Nantes , in France, and has about 300 pupils and 25 teachers. The students who have various levels of knowledge and are from a social mix can with a challenging and encouraging surrounding gradually achieve their personal project.
School Website	http://tvenard.loire-atlantique.e-lyco.fr/
Content/Subject Areas	Sciences : biology and geology
Age/Grade level	From 10 to 16 years old
Project Objectives	Acquiring knowledge and skills in biology with serious games, and progressing in a second language.

Project Description

Science usually motivates students but even more when they have to conduct experiments, but this is getting more and more difficult because of too many students, lack of equipment or time. The 60 virtual experiments I have realized since 30 years simulate many experiments and students take a great interest when they perform individually with a computer in a computer lab or collectively in my science lab with an IWB (Interactive White Board). They can also redo these virtual experiments at home, as my entire lesson is online. Some virtual experiments are serious games in which the students are in the shoes of a scientist and they must find and do the experiments led by this scientist in the historical context. My softwares cover the entire program for students from 10 to 16 years old. The work is planned by the teacher, but the students validate their work after each activity. Some of my softwares are also used for the competitive entrance examination needed to become a teacher in France. Since a few years some of my softwares are available in different foreign languages which allow my students to discover or progress in a foreign language such as English and also allow non-francophone students to use my softwares. My current research focuses on adapting my softwares to a format compatible with touchpads.

- The serious games: http://44.svt.free.fr/jpg/experience_fabre.htm
- Worksheet for the serious games: http://44.svt.free.fr/jpg/Histoire_des_sciences_1.pdf
- Website with all my softwares and serious games: <http://www.e-svt.fr>
- Educational website sharing pedagogical subjects in science: <http://44.svt.free.fr>
- Website for my 12 years old students: <http://sites.google.com/site/svttv6/>
- Website for my 15 years old students: <http://sites.google.com/site/svt4tv/>
- Facebook group to exchange: <https://www.facebook.com/groups/55504952390/>
- Collaborative blog : <http://collegien.blogspot.com/>

Design of the Learning Environment

In the serious game "in the shoes of a scientist", the students are very autonomous, if they wish they can use a worksheet that guides them, but this is not obligatory. Then within the framework of a scientific investigation reasoning, they are completely free to use all the documents, to realize one or several experiments, or even get help or not to find the answer. The software corrects the student's answers, tells the students whether their experience had an interest or not and also, all the mistakes during experiment are recorded.

At the end of the game, the student has an overview of his work with the number of mistakes. In this serious game, students might make mistakes, might not immediately find the answer ... At the end they can redo the game to have the pleasure to do it with no mistake at all.

Evidence of Learning

An example of my software : the serious game named « in the shoes of a scientist ».

I created serious games in Flash with the software Mediator of the software company Matchware:
<http://www.matchware.com/fr/products/mediator>

This game allows to work with a multidisciplinary teaching approach, a science teacher for inquiry-based science education, a French teacher for the study of texts and a history teacher to study the historical context. When the students are learning science through an investigative approach, they must be able to design an experiment in the historical context. They can refer to texts of that period and also be in the shoes of the scientist who was the trigger of the experiment. The students are very autonomous but they can find help in the software if needed. An assessment will be displayed at the end of the "game".

For the moment there are 2 softwares, one about J.H. Fabre and his discovery of how male moths are attracted by female moths (discovery of pheromones) and the other one is about the experiments designed by L.Spallanzani using frogs to understand reproduction.

Before creating these softwares I discussed with a scientist who advised me on serious games, then I worked with a colleague who had created a worksheet the students must fill in and allows the students to be autonomous.

Students work individually when they are in the computer lab or collectively when using an IWB in the science lab. As the game is on line, the students can also redo this activity at home.

The students find these playful softwares very interesting and learning while playing is more effective than learning with books only.

- This serious game is shared on my site SVT44: http://44.svt.free.fr/jpg/experience_fabre.htm
- Worksheet: http://44.svt.free.fr/jpg/Histoire_des_sciences_1.pdf
- The video: <http://youtu.be/BKoNiVcgeKY>

Knowledge Building & Critical Thinking

In the serious game "in the shoes of a scientist", the students are very autonomous, if they wish they can use a worksheet that guides them, but this is not obligatory. Then within the framework of a scientific investigation reasoning, they are completely free to use all the documents to realize one or several experiments, or even get help or not to find the answer. The softwares correct the students answers, tell the students whether their experience had an interest or not and all the mistakes during experiments are recorded.

At the end of the game, the student has an overview of his work with the number of mistakes. In these serious game, students might make mistakes, might not immediately find the answer ... At the end they can redo the game to have the pleasure to do it without any mistakes..

Extended Learning Beyond the Classroom

In the field of Environmental Education some of my softwares like "sewage" or " Measurement of concentration of oxygen in water" can be used after a school outing near a river or a visit of a water-processing plant..

Websites and short film realised a few years ago can be used when using some of my softwares,

Websites named : oil slick, waste, pollution, ...:

- <http://www.marenoire.com>
- <http://44.dechets.free.fr/>
- ...

Short film on waste sorting: <http://www.youtube.com/watch?v=WHoxf39Dc40>

Collaboration

It also created a blog for my students from 10 to 12 old so they can work with other students around the world :<http://collegien.blogspot.fr/>



Map of schools collaborating to the blog :

<https://maps.google.fr/maps/ms?msid=207111681902069196892.00043a946230be155a3c3&msa=0&ll=53.748711,68.90625&spn=86.599652,270.527344>

Cutting Edge Use of Technology for Learning

Nothing can be as good as real experiments done in the classroom when it is possible, but my virtual experiments make it possible for the students who haven't had enough time to finish in class or the ones that have missed the lesson to redo it at home.

Virtual experiments are of great interest when it is not possible to perform them in the science lab with the students for example because of legal reasons (avian flu, ...), lack of time, being too expensive, lack of equipment or not enough equipment for all the students, handling toxics, results too random, too difficult to implement, but also, unfortunately, too many students in the classes.

Virtual experiments are more stimulating and interesting for the students than experiments described or photographed (beginning/end of the experiment) in a book.

Educator as Innovator and Change Agent

ICT has really changed the way students will acquire knowledge.

Thanks to the online course, students will be able to redo at home or in school all the activities done in the classroom, (using softwares, photos, videos, ...), they can also check that the knowledge they have to acquire is correct and they can also do additional activities for those who want to,

Virtual experiments allow students to perform experiments that can't be done in the classroom for various reasons (lack of equipment, time, price, ...) and the students get really interested and motivated and at the end they acquire more knowledge.

ICT almost changed everything. My entire lessons are since 7 years online for my students, this means the knowledge but also all the activities, softwares, videos, photos, all the virtual experiments and links to other interesting resources. ICT also gave me the opportunity to share my work and create a network of colleagues around the world. ICT allows to perform experiments that cannot or no more be performed for various reasons and above all they motivate students to get interested in science, something that tends to get lost in recent years.

A few productions realized in 30 years, for my students:

1982 : Virtual experiments in basic.

1992 : Modeling greenhouse effect with a computer and several captors.

1995 : Slideshow showing toxic waste in the college:

<http://environnement.44.free.fr/environnement/bahutpropre/bahut97/sld001.htm>

1996 : Web magazine on food consumption and environment:

<http://environnement.44.free.fr/environnement/journal/page1.html>

1998 : Web pages on pollution: <http://environnement.44.free.fr/environnement/region/toxique.htm>

2000 : Websites named : oil slick, waste, pollution, ...: <http://www.marenoire.com> , ...

2002 : Virtual experiments : woodlouse, plants, ...: <http://www.e-svt.fr>

2003 : Short film on waste sorting: <http://www.youtube.com/watch?v=WHoxf39Dc40>

2007 : Software in 2 languages : arabic,english, ... : http://44.svt.free.fr/jpg/logiciels_svt_traduits.htm

2011 : Serious games : "In the shoes of a scientist", ...: http://44.svt.free.fr/jpg/experience_fabre.htm

2012 : Adaptation of my softwares for touchpads.

I share my work on SVT 44 that has been visited more than 1 million times in one year.