

NEW E-LEARNING TOOLS AND THEIR USEFULNESS IN TEACHING PHOTOGRAMMETRY

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ABSTRACT:

Especially various social medias, virtual worlds and mirror worlds, are presented as concepts. They are evaluated based on different viewpoints. For example, the usefulness of the media in teaching photogrammetry, easiness to start to use them either as teacher or student. The pedagogical aspects are also emphasized. During last decade Internet has become a basic tool in teaching. Universities have selected their own learning managements systems and usually the teacher has only limited possibility to select it purely based on his/her own preferences. When we are talking of new e-learning trends, the teacher's usually are on their own to start to use them. However, which trend is worth to follow, is usually harder to decide. The generation gap is also existing. For example, the skills to utilize various social medias might vary a lot. Examples from the use of these new tools are given. Both from the photogrammetry and remote sensing courses of Helsinki University of Technology and from other universities. It presents ideas how the various e-learning methods are utilized currently and ideas how to use new e-learning tools. The paper is hoped to be a starting point for the discussion.

1. INTRODUCTION

The Internet and computer has become a part of our daily life. The way we share our lives via Internet with other people has changed a lot in the way we work and study and spend our freetime. The decision to write a paper relating to the new e-learning tools turn out to be a challenging one. The more I have been studying the subject, the less ready I am feeling to express myself. The viewpoint to the subject is not an expert in virtual worlds, but a teacher who have to consider whether to spend her and student's time with them. However, I have tried to explain the concepts and to evaluate which new e-learning tools could be worth trying in teaching photogrammetry.

At first, some concepts are explained. Next the current e-learning infrastructure at Helsinki University of Technology (TKK) is introduced as an example from current learning and teaching environment. Then some examples from the teaching of photogrammetry relating to the use of the new medias are given. A small case of exploring Second Life is presented. Last there is a discussion about various aspects - the possibilities and threats, the generations of the users etc.

The intention of this paper is to open discussion and to encourage to innovative trials with the new e-learning tools.

2. CONCEPTS

2.1 Learning Management System (LMS)

Most universities have nowadays some kind of Learning Manamement System in use. There are both Open Source Software and commercial software available. Usually the university has selected the supported system and individual teacher has to use the selected one or arrange the support by herself/himself. The systems have usually the same basic functionalities, but the user interface can be different and they

might have been built based on the different kind of learning processes in mind. Example of Open Source Softwares are, for example, OLAT (<http://www.olat.org>) or FLE (Future Learning Environment) (<http://fle3.uiah.fi/>). FLE is server software for computer supported collaborative learning.

Compared to plain web pages and use of traditional email for communication, these environments usually provide management tools especially for the teacher. It is easy to share the course material. Communication tools are usually emails, various electronic noteboards and chats. With these kinds of environments it is easy to control the accessibility of the course material and to restrict the visibility of the discussion, exercises and such to the specific target group. However, without training we might have only limited functionality in use.

2.2 Social medias

Social medias are probably more familiar for us from unofficial use than from work related tasks.

How to define Social medias shortly? Wikipedia is not considered as a proper academic source, but in this case I think it is justified to refer to the Wikipedia's definition where social media is defined as "content created by people using highly accessible and scalable publishing technologies" and "it is transforming people from content readers into publishers". The form, technologies and applications vary. http://en.wikipedia.org/wiki/Social_media). Social networking, sharing of photos, video, music and and blogging have become part of computer use of numerous people. Even if you are not personally using these systems, you can read news relating to the Facebook, Twitter, YouTube, Blogs, etc.

If we consider our daily lives within last week, some of these technologies have already become part of our lives. And they are definitely part of our students lives. Of course, one person do not probably use all them and some of these applications are

still familiar only to small group of people. There is also a lot of discussion about the reliability, security question and such things. Use of social media might have even been restricted from some work places.

Various kind of communities have sprang up in the Internet. It can combine the people who share the same interest or experience. Such communities are created within people who might not have ever known each other without Internet.

2.3 Serious virtual worlds

Virtual worlds - especially Second Life - have gained a lot of media attention lately. There is an excellent report prepared for the JISC e-Learning Programm by Sara de Freitas (2008) called "Serious Virtual Worlds – A scopying study".

"A virtual or immersive world is an interactive environment often although not exclusively in 3D or animated graphics."

The report presents following categories of serious virtual worlds:

1. Role play worlds
2. Social worlds
3. Working worlds
4. Training worlds
5. Mirror worlds

Role play worlds or multiplayer role play online games (well-known examples are World of Warcraft, Everquest, Guild Wars) are usually used for leisure purposes. The line between social worlds is in practice blurred. Social worlds or open-ended exploratory immersive worlds are numerous in the area of supporting social networks and social interaction. Examples from such are Active Worlds Educational Universe and Second Life. Some of these worlds are targeted especially for children, such as Habbo Hotel.

Working worlds are corporate and business 3D spaces and intranets. Large corporations like IBM and Sun Microsystems have developed their own virtual worlds for corporates internal use (for example, Project Wonderland, IBM's Metaverse). Training worlds like 3D training simulations and serious games are used specifically for training of particular professions. Earlier these were focused on military training, but they are increasingly used in medical education. Last category is Mirror worlds using geo-spatial databases and mapping services. These are worlds or 3D visualizations that mirror physical world. Examples in this category are, for example, Google Earth, Microsoft Virtual Earth, NASA World Wind and Unype. Planet Earth is an open source version belonging to this category.

In her report, Sara de Freitas has listed over 100 different softwares/environments. It is a challenging task for an individual teacher to guess which once will be in use after a while and which of them have the best potential for educational use in her/his own area of interest.

Mirror worlds have a close connection to Photogrammetry and Remote Sensing while being presentations of the physical world. Later in this paper I will present example of the use of one mirror world in teaching (see 4.1 Google Earth) In chapter 6 I will give a case study from the teacher's first experiences in Second Life. It is probably one of the most discussed social virtual world on the market currently.

The corporate internal virtual worlds will probably be our future working environments and therefore it is useful to gain experiences of studying within virtual world. Our future students will probably be experienced users of various leisure and social virtual worlds. As much as I'm aware of teens world, many of them have been users of Habbo Hotel or similar worlds or spent time in the role play worlds. Of course, it has to be kept in mind that there is no homogenous generation in this sense.

3. TKK – OFFICIALLY SUPPORTED SYSTEMS IN TEACHING

Helsinki University of Technology (TKK) has just finished so called eTKK-project. One of the subprojects was the creation of Noppa –portal. This portal unifies the information flows relating to the studying. Beside Noppa –portal there are two other teaching related computer systems in use. Oodi is the administrative program for data relating to the studies. Third system is Optima – which is elearning System selected by TKK. The teachers can share their course material through Noppa-pages or use Optima. However, in Noppa you have to define where the course material ilts available. In addition to these three systems the university offers a wiki.tkk.fi tool for our use. The goal has been to make a clear structure to the study related systems.

Our research group (Institute of Photogrammetry and Remote Sensing) is responsible for the teaching of Photogrammetry and Remote Sensing. We have had our own Internet server since 1995. Since that we have had our own course web pages for the students. Now we have adopted the new obligatory systems. WebOodi has replaced the earlier course administration system, Noppa-portal is the official course page portal and Optima is the official e-learning system offered by our university.

3.1 Weboodi

This is administrative course information system. System contains the curricula information and the students use it to sign for the courses and exams etc. Weboodi's databases are then used by the Noppa –portal.

3.2 Noppa –portal

Our newest system in teaching is the study and teaching portal Noppa (<https://noppa.tkk.fi/>) which works together with Weboodi system. Their roles are defined as follows: "from Noppa you can find things related to daily studies, whereas WebOodi is meant for more "official purposes, such as enrolment on courses". Noppa contains course web pages, personal start page with the latest news and upcoming events of the courses student is attending. The student can define his/her settings how the information is delivered. It is, for example, possible to order course news as RSS feed. The main advantage of Noppa is that it has unified the course pages at the University level and it has received the status of an official notice board in teaching related subjects.

3.3 Optima

Optima is the Learning Management System selected (and also supported) by our University. The users need to have an account granted by the University computer centre. The workspaces are normally created for the specific course. It has often replaced the delivery of course material in open web pages as we did earlier. It could and should be discussed, if the universities

should have their lecture material available for public. However, for keeping the returned exercises etc. in order or work as groups makes this kind of system excellent compared to the situation when the reports were returned by email and every tutor had their own system to organize them. It is also great to have a system accessible from everywhere (the reports are not at work computer when you want to see them from home) and it is easy to create an archive file after the season or copy the content for the next year. Maybe the Optima is not the easiest or best of the available LMSs but it is currently the one supported by the University.

Teachers who have attended the pedagogical training organized by the University teaching unit also have gained experience from the use of the system. It makes it easier to start using it with your own students.

3.4 TTK wiki service

In addition to these three study related systems we have a co-operation and publish tool also known as wiki.tkk.fi. It is available for everybody at Helsinki University of Technology, Helsinki School of Economics and University of Art and Design Helsinki (incoming Aalto University will be composed from these three universities). TTK wiki contains personal wiki spaces and collaboration wikis.

3.5 Other systems in use

Unofficially there are nowadays many systems in use beside these official systems. Newsgroups are still in use in some areas of interest. Various email lists can still be effective way to distribute or gain information. For example, student guild have its own list and it is often a great information source even for the teacher. New tools are becoming popular. For example, Doodle (www.doodle.com) seems to be a great tool to make appointments.

4. EXAMPLES OF TEACHING WITH NEW E-LEARNING TOOLS AT TTK

In this part of the paper I will give few examples of the ways we have used new tools in our teaching at Helsinki University of Technology.

4.1 Google Earth, example of Mirror world

From Virtual worlds most promising category for our teaching so far has been the mirror worlds.

We have used Google Earth in the Introduction to Photography, Photogrammetry and Remote Sensing course in study years 2006-2008. The course is intended for first year students of Surveying (both Geomatics and Real estate economics programmes).

In this exercise students use Google Earth (<http://earth.google.com/>) and Citizen's MapSite by Finnish National Land Survey where they had access to NLS topographic maps covering all Finnish regions. (<https://www.karttapaikka.fi/karttapaikka/default.asp?id=787>).

The aim of the exercise is that the students use Google Earth to familiarize themselves with various aerial and satellite imagery. They learn how the Earth looks when looked above. They also study how different objects can be distinguished from different images. They compare the Finnish topographic maps and aerial or satellite images in Finland. Finally they return a small report and also suggest their own candidate for the amazing or

interesting spot found from GoogleEarth. Example of these places can be found from the following page http://foto.hut.fi/~milka/opetus/harjoitukset/maa1010/2008/Google_Earth_kilpailu2008.htm.

We have plans to use Google Earth in another way in some other course. The possibility to publish 3D models in there might be a good way to present results from various modelling exercises. We believe that it would also be motivating for the students to do a modelling which result will be visible to bigger audience.

4.2 Geocaching

Geocaching has become popular hobby around the world. The official global GPS cache hunt site <http://www.geocaching.com> defines it as "a high-tech treasure hunting game played throughout the world by adventure seekers equipped with GPS devices". To our research group belongs an active geocacher and she has created two caches on behalf of our research group. These caches are so called mystery or puzzle caches.

The two caches so far are

Foto1: [Stereonäkö](#) by fotogrammetria (GC1AV6Q) Finland

Foto2: [Ilmakuvaus](#) by fotogrammetria (GC1R69W) Finland

The first one is relating to stereovision. The coordinates are hidden into a stereoisimage. Another is relating to aerial photogrammetry and contains a basic calculation exercise. The cache information is in Finnish and in English. This is a interesting way to get people aware of our profession and special area of interest. The geocaching is a popular hobby and within enthusiasts there are potential future students who might get their inspiration from this kind of exercise. Also our students seem to be happy to find such caches. Although not part of any official curricula this kind of caches can be nice promotion of our research group.

4.3 Innovation exercise and blog

Last spring we had first time so called innovation exercise. In this exercise the second year students were divided into groups of four. They visited a company where they gained information. The task was to create an innovation within the course. The group has a tutor from our research group available. The exercise had a structure and the groups wrote a wiki or blog from their process into Optima (LMS used in TTK). The final results were presented after six weeks. Some of the groups made really interesting innovations and generally every group made a good process.

5. EXAMPLES OF TEACHING WITH NEW E-LEARNING TOOLS IN OTHER UNIVERSITIES

The YouTube was a positive surprise for me. I have been watching the YouTube videos seldom - usually after some hints from the colleagues and usually fun ones. In Finland we have also sad examples of videos published in YouTube relating to school shootings. This has probably affect on my prejudice on YouTube. However, I have been aware that it is popular media and it is used to reach for promoting the profession for the possible future students- There are few nice videos relating to this. For example, "make your mum happy – study geomatics!"

http://www.youtube.com/watch?v=_h8ZWh3Qscc

However, when doing search with the keyword photogrammetry I found several nice examples, which have great potential in teaching of Photogrammetry or Remote Sensing. Because the content of YouTube is probably changing rapidly I will only mention few examples of interesting types. There are several videos created by the companies on this industry. Also the videos published by ASPRS relating to their 75th anniversary where very well done and I can see a lot of potential to integrate them to teaching. As an example, there are titles like “evolution of analog to digital mapping (<http://www.youtube.com/watch?v=SB1u6-DDwpU>), “the role of women in the history of photogrammetry” (<http://www.youtube.com/watch?v=KuJ32mUjYk4>) or “photogrammetry in space exploration” (<http://www.youtube.com/watch?v=4JDERWH38Y0>)

What made me really to understand the possibilities of the YouTube was when I found National Programme on Technology Enhanced Learning (programmes website <http://nptel.iitm.ac.in/>). The programme’s video lectures can be accessed in <http://www.youtube.com/iit> It is a good example how the material is organised as playlists and it is easy to see who has created the material and for what purpose. Example of an individual course is “The Civil – Surveying lectures by professor Bharat Lohani, Department of Civil Engineering, IIT Kanpur.”.

It has to be remembered that YouTube is a delivery channel. Usually it might not be so easy to find out who is behind the individual video or what purpose it is originally done. Therefore we have to remember that we are mostly teaching at the universities. For the professionals who have already some career it might be easier to judge the relevance of the material. You can probably evaluate what has been told and what has not been told in commercial material. You might even know the lecturer. The criticism of sources is something where our students should have help from the teachers and therefore it would be valuable to use this kind of material as a part of other teaching methods. The evaluation of the relevance and correctness of the material is needed. Of course, also the questions of the copyright and correct referencing have to be solved.

6. EXPERIENCES FROM SECOND LIFE

Second Life by Linden Lab (see <http://www.secondlife.com>) is probably one of the most used virtual worlds in educational use. Several Finnish educational institutes have region in Second Life called EduFinland. So far, Helsinki University of Technology does not have their own official place there.

From social worlds probably Second Life has had the most media attention relating to the teaching – at least in Finland. However, when discussing with my colleagues at Surveying Department it seems that those working with Facility management are most aware about it because it relates to their research with virtual working spaces.

I started my personal experience gathering project with Second Life in February-March 2009. I did it beside other teaching projects and did not use any official technical or other support for it. The installation of Second Life was easy. In my work computer even the graphic card was good enough to support the program. However, the regional handshake problem took over two months. Finally, one day in May it suddenly was over. My

wild guess is that the European Parliament election campaign solved the problem. One former researcher of our university was having his campaign event in Second Life. After that the system started to work. At home computer the program complained about the graphic card, but functions with reduced graphic quality. At home, I never have had the regional handshake problem which is probably related to firewall settings

When I was trying to solve the handshake problem I read a lot of guides written for Finnish polytechnic schools, but they seem to concentrate on the outlook of avatars. In Finland, so called Uni-Finland island(s) are bought from the Linden Lab. The area is further rented for Finnish educational bodies So far it is still quite much a play ground for the pedagogical units.

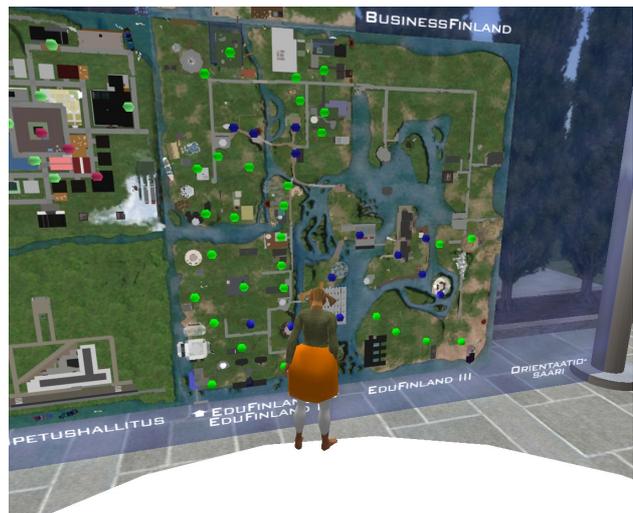


Figure 1. Author’s avatar studying map of EduFinland in Second Life

If you do not have a specific event arranged in Second Life the hanging around does not feel very improving. I would say that it would be easier to find information in traditional internet or library. However, I can imagine that if you have a headphone and microphone installed you can have really interesting discussions and events in Second Life. But I also noticed a surprising side that I felt myself very shy when going around in Second Life. That was probably due to the fact the rules of the environment were unclear for me. How to start conversation, what are the general habits, how to behave and so on, Personally I’m not experienced chat user. However, my short visit in the coffee table by Helsinki University teaching support unit was a nice experience of the possibilities in Second Life.

It would be interesting to make a real teaching experiment in Second Life. But before it, I would like to have some kind of training relating to the environment and I would like to have a support unit who could answer to the basic questions of the students relating to technical questions. I think that for delivery of the material the traditional LSM systems and Internet is much more faster and reasonable, but I look forward to see what it would be to have a real meeting or social event in Second Life. When the money to travel around is harder to get, it might offer a solution to meet colleagues and have interesting discussions.

7. STUDENTS AND TEACHERS

A good question relating to these new e-learning tools is who is the teacher and who is the student. What kind of learning experiences we want to achieve and who has the role to arrange those learning experiences. Do we have a similar control over the learning process as we have believed to have in traditional class environment. Do we need to learn new kind of teaching skills to teach in virtual worlds? Do we still need teachers?

“Generations” in the use of various environments are not necessary related to age or length of the working career. What is the personal experience of using computer games, environments, internet, social media etc. People might have strong skills within some kinds of environments, but be novice in another type of environment.

A good virtual community has some unwritten laws how to behave online. Compared to open anonymous discussion groups the closed communities with people having a certain identity are usually well-behaving. Sometimes there are discussions what is ok and what is not.

Teachers are not necessary more experienced than their students with the new environments. This is a challenge for the planning of learning process. What do we want to teach and to learn? How we can define the learning task and how we know what is the learning result? How we define the work load and objectives. How this all is converted to a certain degree?

One of the problems with all these new e-learning tools and possibilities is how to share your time. The real world restrictions are still existing - you still have only 24 hours in a day. Even if the virtual worlds are immersive, people do need to spend there time in real life, too. Therefore it is good to define a clear learning process and to use appropriate tools for it.

E-learning was earlier thought almost as an synonym for distance learning. Nowadays e-learning tools are not just a way to enable distance learning or self-learning. We have to realize that e-learning tools enable new ways to work together despite the distance. The global organizations have to start really working online. Due to climate-change and also for economical reasons it is better to work in virtual communities than to travel around. I do not believe it will replace the real meetings, but it will make it possible to work together more actively within meetings in real life. Traditional video conference tools etc. have been quite expensive to use. People have learn to use inexpensive tools like Skype, web-cams etc. in their private life. It is clear that such tools can be useful also in education.

In new student generations there are persons familiar with systems like World of Warcraft, Habbo Hotel, Sims3 etc. I have always had enough to do without trying these. However, I have started to use Facebook – even if I have my own personal rules how to use it. I’m not sending so many private emails than before. There are Twitter. How many of us is using blogs. There are anonymous blog vs. personalized blogs. Good blogs are interesting to follow. Writing a private blog might be an excellent way to study. We have to remember that it is possible to restrict who is allowed to see our text.

Equipment. Some environments like Second life needs specific graphic cards etc. It can be said that they are not accessible for everybody. To get full experience from the environment, you should also be able to use microphones, headphones etc. For

example, I have so far only used keyboard for communication in Internet.

It is easy to get lost. If you try to learn the environment just by learning without reading manuals, through trial and error, it will take time. At the moment there is no official support for using virtual environments. It is up to teacher’s own interest to start using these. However, it can be really interesting. It is still good to remember basics. Do we want our students and teacher to learn photogrammetry or to learn how to use and install the environment.

8. DISCUSSION

Like in the beginning of the use of Learning Management Systems – there are various brands and probably few standardized tools within new -e-learning tools. There are open-source systems which demand more skills to install. There are browser-based systems and stand alone systems. The requirements for the computer equipment are varying. How much computer skills are needed to start using the systems. In many universities there are centralized computer support units and you have to follow the general systems selected or you have to put the system up by yourself. How much time and effort an individual teacher has for keeping up-to-date with all new systems outside the own research area.

These new e-learning tools offer great possibilities for co-operation and new innovative ideas in teaching of photogrammetry. To get them into real use we need experiences from these new environments. These can be gained, for example, while using them together with teacher colleagues for sharing experiences from teaching.

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