Innovative methods for knowledge transfer

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Abstract. At this time, learning takes place, either with classic books on paper support or using books scanned or drawn and further converted into PDF or PPT files that are printed on type support CD / DVD. The latter modern means of learning, the study adds live on the Internet using search engines and not least e-learning method, which allows the study of bibliographic related materials in PDF or PPT, stacked and grouped on the basis of a curriculum imposed which can be accessed on a website via a user name and password. Innovative methods come to successfully use other file types than those mentioned above. The graphics in teaching technical subjects such as descriptive geometry can be achieved using animated PowerPoint files, allowing for visualization of steps to be taken, in the case of solving by drawing a descriptive geometry. Another innovative method relies on the use of HTML files, inspired by related sites help design software packages that can be used when teaching descriptive geometry that the technical design. Through this work, the author has proposed to present a new innovative method, which is inspired by the methods listed above, but involves using AVI files to teaching of computer-assisted type graphics or info graphics. In general this new author’s method lends itself particularly well to the teaching of the use of software packages because the student actually see the place from where the delivered command is accessed and contextual options of right button of the mouse. These laboratory courses or mentoring can be freestanding cards support CD / DVD or can be posted on websites with restricted access based on user name and password. Practically paper presents the methodology of creating courses and tutorials in AVI format, and how to monitor the degree of accessing the website, on which there were posted mentioned teaching materials, using the tools offered by Google Analytics. The results consist of graphical work, about the degree of access to educational materials, made on the basis of various criteria, such as the: time of access, access location, age of those who accessed, chapters accessed, etc. Finally the author presents his findings on the benefits of this method.

1. Introduction
Current education is completely changed from that in the 80s-90s when a student was required to attend all course and laboratories to take notes further used for learning during examination sessions [1]. The entire bibliographic material was on paper support and the student could obtain it either from the library or by buying it from university libraries. There were, however, initiatives of non-conformist media such as sheets with formulas and demonstrations being made available to students, together with magnetic recording tapes that contained the texts. Together they formed an alternative to the classical method and the student used to listen to the explanation recorded on the magnetic tape and followed a logical mathematical demonstration on those sheets of paper. However, the most common method that has been perpetuated up to this day is the knowledge transfer on paper support. With the
In the entrance into the 21st century the students’ needs, generated by the century of speed and the new information technology, called for new modern methods of communication and learning on the educational market which subsequently experienced a strong expansion tendency. To this situation contributed the fact that the society we live in requires us to be active in as many directions as possible, even from different areas, to be able to reach that standard of life each of us wants. In this context the student, as an element of this modern society, is put under pressure from the society in which he lives and is forced to optimize his time dedicated to study so that he still has certain time resources to allow him to provide the desired living standard. In other words the student wishes to attend a university for a better future professional opening but he must keep his job as well, which often prevents him from being present at all the activities organized in the teaching process and leads him indirectly to poor results with adverse effects in the near future [2]. Given that there is extramural education it was introduced on larger scale the distance learning which is strongly supported [3] by the e-learning platforms method. These platforms have the incontestable advantage that are accessible 24/24 hours at any time of day or night, on a double condition, i.e. having an internet connection along with platform access data. Basically we succeeded in a very short time to move from the transfer of information from the paper support to electronic format. At this time almost all universities have educational platform for e-learning that contain information for all components of the teaching process, namely: lecture, seminars and laboratories [4]. In the last 15 years the author has been concerned about the ongoing upgrade of the teaching methods and transfer of information in the field of engineering education, focusing particularly on traditional formats of PDF, PPT with animation, or modern HTML and various video formats.

2. Innovative method’s description and main stages
Since 2006 the author [5] has focused on the achievement of AVI courses as for the graphic engineering disciplines that use diversified software they are much more suitable for the transfer of information because it makes use of pictures and sound. Compared with this method, teaching such subjects using classic books require laborious expressions and a large number of explanatory images for each order separately, for every setting allowed by the software in question. Often, the author’s method of expression in words, on paper, is not explicit enough so as to transmit to the student the entire procedure for implementing an order or instruction. Video format AVI / MPEG / FLV / SWF allow a more advanced explanation in graphic disciplines’ case of engineering field because, while the teacher sets out the manner of implementing the orders, the student has the opportunity to see dynamically and in real time the effect of the command explained.

![Figure 1. Setting format AVI and frame/sec.](image1)

![Figure 2. Setting the video codec.](image2)
The disciplines for which this method was applied: Infographic 2D/3D, Informatics systems of technological design, assisted graphic and parametric geometric modelling which are based on AutoCAD software, Solid Edge, Mechanical Desktop and NX Siemens. The method presented in this paper refers to the use of SWF files that are based on AVI and are finally posted on the internet in a certain logical sequence that follows a university curriculum.

For the management of the files SWF it is used [6] a Joomla platform. The generation method using Camtasia software [7], an AVI video file for WEB viewing, consists of the following steps:

A. Setting the recording parameters under Camtasia Recorder.
   a. Setting format AVI by imposing the number of frames/sec. and the video codec chosen (figure 1);
   b. Configuration of the video codec used to obtain maximum performance (figure 2);
   c. Setting the size of the recording area extracted from the entire surface of the screen in order to register and setting the audio parameters (figure 3);
   d. Setting the watermark type customization to ensure copyright

B. Generating the video file in format AVI with Camtasia Recorder.

C. Setting the parameters for transformation of AVI files SWF files with Camtasia Studio.
   a. Selection of AVI file generated to be further transformed into Flash file with SWF extension to be displayed on Internet.
   b. Preset Manager and select the project type: blog, CD, iPOD, WEB, Windows Media;
   c. Edit Production Preset (select the output file variant SWF/FLV/WMV/MOV/RM/CAMV/GIF animation);
   d. Setting Flash Template (Flash Options and Custom Size)
   e. Setting Video Options;
   f. Select a folder for the videos you are producing and Finish

D. Management and monitoring of information transfer through a JOOMLA platform.

Since the objective of the current work is to present an innovative method of knowledge transfer I shall present few windows associated to stage "C" which is made with Camtasia Studio. The file selection involves choosing the existing file in AVI format for which is desired the transformation by high-resolution rendering in SWF file. Specifically in the case presented it was selected the file
"Tutorial_gfile.avi" to transform by rendering. Finally we obtained an entire directory, viewed in figure 4, which contains a multitude of files among which it is found the "Tutorial_gfile.swf".

It should be noted that all these files are required for posting on the JOOMLA platform. The software Camtasia Studio recommends, out of all extension variants, to use Flash SWF because this variant offers the highest quality relative to the minimum size of the file and on the other hand the resulting file can be opened under the optimized version with any browser. There is a small disadvantage though, namely the vast majority of the movements on the screen must be done at a relatively low speed.

Figure 4. Directory with the resulting files.

At the stage visualized in figure 5, the author recommends the default setting on automatic variant and possibly preserve or increase the resolution after rendering to obtain a high quality image.

Figure 5. Setting Flash Template.

The main advantage of this method is given by the video file type that provides simultaneous sound and colour image at a resolution Full HD, while allowing real-time tracking of the dialogue mode with the PC in the explanation process of each instruction taught.
3. Monitoring results and knowledge transfer

By means of a JOOMLA platform, a site has been created at the address http://www.cursuriumiversitarebraila.ugal.ro where it has been posted since 2008 all the courses in video format graphics for technical engineering disciplines together with video recordings of the laboratory work. Also posted on the internet is the homework in all subjects with specific technical graphics. Monitoring the transfer of knowledge to students was performed on two distinct directions, namely: using JOOMLA capacity (figure 6) and indexing [8] website on Google Analytics (figure 7). Each of the methods of monitoring provides information complementary to that teacher who acts as administrator. Therefore Joomla platform provides information on whom of the students with access, entered the site to study and how long was connected, including in what time frame and what chapters he searched for.

![Figure 6. Monitoring by JOOMLA.](image)

![Figure 7. Monitoring by Google Analytics.](image)

Monitoring with Google Analytics provides complementary information to JOOMLA variant without having the ability to determine nominal site users but having the opportunity to show the degree of access to the site within a certain period of time, how many work session have been in a period of time, how many pages were visited on average in each session, which was the average length of time, how many visitors were there in a certain period, which is the geographical positioning of visitors per continents, countries and cities, what operating systems had visitors on personal devices.
computers, what resolutions have visitors’ monitors, what ISPs were using, what browser was used, the ratio of new users and those who returned to the site, etc. Graphical view of all this information can be done in hours, days, weeks or a month.

Figure 7 illustrates the degree of accessing the courses site from 19.12.2014 which is the beginning of the winter holiday until 02.20.2015 which is the last day of the first week of school after the holidays that followed the examination session. It can be seen easily that the two periods of vacations, winter holiday and after the winter session, the activity on the site is very low while in session, the degree of access increases significantly. It is also found that in the first week of school in February 2015, the degree of access to the site is slightly higher.

4. Conclusions
At the end of the paper it should be noted that the method presented has two types of monitoring, one made available by Joomla platform and one by indexing the site on Google Analytics. Due to the limited space of this paper, it could not be inserted all graphical representations resulting from the monitoring work, but I present in the conclusions:
- Monitoring by JOOMLA allows finding the last access made by a student or if he has never logged for study;
- Monitoring by indexing Google Analytics is more efficient in terms of who accesses the information, when accessed, where from access is made to the online courses
- Monitoring with Google Analytics is a perfect support consistent with the student psychology and behaviour in the sense that usually during vacation there is no study; during the semester there is a continuous increase of the study until the ninth week, then there is a slight decline due to both fatigue and lack of interest followed by sustained effort during the session.
- Monitoring with Google Analytics cannot distinguish between the visitors with user and password and those who stop at the moment of entering the access data
- The distribution of the degree of access by counties (Braila 76.44%, Bucuresti 5.46%, Galati 3.45%, Constanta 1.4% while the remaining districts have less than 1%) demonstrate that the site is intended almost exclusively to the students in Braila.
- The percentages related to the areas in Bucharest, Galati and Constanta is justified by the fact that students from Braila sent the access data to their friends in the university centers mentioned above.

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