

E-learning of Extreme Production Procedures

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Abstract. *Results obtained by application of e-learning can be analysed in various educational but also other types of institutions. This paper provides new contents within the e-learning system and a proposal of its introduction into institutions of higher education. Results of implementing the e-learning system so far, mostly refer to publication of curricula relating to particular courses or parts of lecture materials, interactive work on various forums, testing, sending various notifications, which is certainly a step forward. However, this paper's intention is to use the e-learning system in the area of individual studying based on multimedia as well.*

Individual studying of extreme production flows is conducted through video sequences/clips. A web-oriented text-book consists of short video-clips with pre-planned stop/play mechanisms which show the methods of machine operation, preparation of the production plant, and management of production. Application of e-learning in creation of a graphic product using a topic of the edge area in printing, i.e. creation of a security or documents which are commonly realized in a dozen of different techniques or several mechanical operations with analogue and digital, are highly motivating to students as such topics are unavailable to them at the level of production.

The subject of this paper is interactive video presentation accompanied with additional information, subtitles, interviews, and computer analysis. Since real production includes dozens of machines, the method of examination is a "quiz".

Keywords. E-learning, Graphic Reproduction, Video Modeling

1 Introduction

It is impossible to have a full course of studies on production equipment during regular studies. Practical experience is organized for students covering only a part of the necessary contents. We have applied video e-learning procedures in printing practice, training linked with graphic production equipment. The reasons for this are multiple. Independent segments: graphic prepress covers work linked with working on computers, producing printed forms, reproduction photography, test prints [2].

The second segment is printing that takes place today in some ten or so different technologies on some hundred or so different machines and in procedures that depend on defining the graphic product. Postpress production jobs may be carried out in several hundred different ways, on as many machines and on basis of as many methods that include a range from handmade parts to highly automated robot-performed procedures.

It is impossible to experience, and acquire all of this during study activities [3]. The proposal is to add video presentation to digital models that simulate production procedures. Numerical simulation may generate the wrong image of a real-life situation. Questions are asked on machine overall size, manner of starting them, paper flow, folding, gluing, and the reasons for choosing certain printing techniques. Visualization as the link to parts of numerical computer models provides exceptional refreshing of insight and gives answers in respect to doubts as to presenting production processes.

2 Experimental frame

We have filmed some hundred or so production situations, with their taking place in a certain period of time, recording of sound as a lecture and discussion in the plant. They have been compared with commercial presentations of machines in production received from certain organizations producing machines for the printing industry. Such films are of highly commercial character and are not suitable for continuous teaching purposes. They contain the irrelevant negative remarks in respect to competitive products and too much stress on new patents that have not been tested yet in real-life production. Therefore, our opinion is that we ourselves must write the script that will be satisfactory for students, teachers, production experts and calculation analysts. All this is covered by the instruction program. It is required that users state their opinion and about their reaction to the released video clips. The main targeted users are students.

Producing of video models linked with certain production chains may be done in printing works that specialize in different areas and have different machinery and equipment. Before making the video there must be a good script in order to be able to easily produce e-learning video clips in the video material composing phase.

The video e-learning material must be searchable through the relation database and must be acceptable for display through web technology. Therefore, an interactive system for modeling graphic production workflows called WebPoskok is used (Fig. 1), the authors of which are professors Vilko Žiljak and

Klaudio Pap from the Faculty of Graphics Art. At the same time this is an e-learning system where there is a large database of graphic machines and graphic operations.

In its essence WebPoskok represents a base containing contemporary knowledge on graphic reproduction that is constantly being supplemented and is constantly developing.

In order to make a model of some graphic product's workflow we must have the knowledge on all the necessary production phases. Such knowledge is acquired from a workflow database within a WebPoskok system [1]. At the same time it is the initial version of the script for filming video clips. The final script does not have to be a copy of all the phases acquired from WebPoskok because many of the phases may be grouped, some of them will be filmed subsequently, and some will be acquired from a printing plant from another continent. In order for video material to be useful it is not obligatory to have all phases completed. Some video clips describing certain production phases may be added later in order not to be in the way of the existing model and its life as e-learning material.

ID	OPIS	TIP	Sati	STATUS
1	STD 1 DV SW 64str 1/1 arak 2 od 2	tisak	1.32	Planiraj!
2	STD 1 DV SW 64str 1/1 arak 1 od 2	tisak	1.32	Planiraj!
3	STD 1 DV SW 16str 1/1 arak 1 od 1	tisak	1.37	Planiraj!
4	STD 2 JB 8str 1/1 arak 1 od 1	tisak	1.15	Planiraj!
5	STD 2 JB 4str 1/1 arak 1 od 1	tisak	1.05	Planiraj!
6	STD 2 Ć 4str 4/4 arak 1 od 1	tisak	2.11	Planiraj!
7	REZANJE 1, araka do 100 g.	dorada	0.01	Planiraj!
8	REZANJE 1, araka do 100 g.	dorada	0.01	Planiraj!
9	REZANJE 1, araka do 100 g.	dorada	0.01	Planiraj!
10	REZANJE 1, araka do 100 g.	dorada	0.01	Planiraj!
11	REZANJE 2, araka do 100 g.	dorada	0.01	Planiraj!
12	STROJNO SAVIJANJE ARAKA AB - 1, 4 pregiba, 70 - 100 g/m2, križno	dorada	0.58	Planiraj!
13	STROJNO SAVIJANJE ARAKA AB - 2, 3 pregiba, 70 - 100 g/m2, križno	dorada	0.37	Planiraj!
14	STROJNO SAVIJANJE ARAKA AB - 3, 2 pregiba, 70 - 100 g/m2, križno	dorada	0.30	Planiraj!
15	STROJNO SAVIJANJE ARAKA AB - 4, 1 pregib, 70 - 100 g/m2, paralelno	dorada	0.20	Planiraj!
16	REZANJE 1, araka 201 do 250 g.	dorada	0.03	Planiraj!
17	REZANJE 6, araka 201 do 250 g.	dorada	0.05	Planiraj!
18	PLASTIFIKACIJA 33 do 50 cm	dorada	0.41	Planiraj!
19	PAKIRANJE GOTOVIH PROIZVODA do AB - 4, natron	dorada	1.55	Planiraj!
20	LINIJA ZA UVEZ ŽICOM ARAK U ARAK 6 araka, sabiranje klamanje, 8 str ili kver format	dorada	0.56	Planiraj!

Ukupno trajanje: 15.22

Figure 1. Graphic production workflows

3 Experimental e-learning video modeling

The video clips are exceptionally short, supplemented by the teacher's comments. They are divided into three groups inside each graphic area.

The first group is the display of conventional procedures which are falling out of practice. The history of technical development is interesting because it explains continuity in advancements. Hand presses have been filmed, offset machines and relief printing. Database will be expanded with the intention that the hundred-year-old patents remain as data. The second group is linked with machines that we use in printing works today. The stress is on automation. With computer implementation the technique of all printing phases has altered. Expansion of each printing segment has taken place in multiple sequences so that the graphic product could be finished in one run. Computer application has made many different solutions possible, incredible linking of conventional and digital printing. That segment has been covered with video display from parts typical for today's production. It has been shown that that the phase of writing and theoretically organizing the script was the most important thing. Preparations for filming must be made carefully because it is done when expensive types of processes are carried out, such as newspaper web press production, eight-color both-side printing of book sheets, collecting and automatic packaging. There has been successful filming of several securities production phases, and this is something hidden both from the users and those who wish to use this in teaching purposes only.

The third group is linked with video films about new machines that may be observed in production at events and gatherings of people linked with the graphics production area. During the world exhibition this year in Düsseldorf, the so-called DRUPA, a group of printing plants have been filmed that are offered as the future printing environment. Attached to this paper are displays of informatics systems showing global linking of computers with printing through web technology. A hybrid configuration for printing production is shown in real-life work where one machine consists of some ten different technologies. The video clips present what is considered as impossible: linking the digital record, printed form production, several printing phases with different technologies, binding, and also packaging. Each of these phases has different requirements as to their execution speeds. Bringing the speeds into coordination is construed in the best way with addition of some new procedures; drying, rewinding, separation and bending. Maybe such hybrid machines will not be placed in the market in significant quantities, but it shows the development trends. It is our intention to inform the students of what will happen when they are included in real-life production.

4 E-learning Video modeling of digital book printing

The book is one of the most complex graphic products whether it is produced with the conventional (offset), digital or hybrid method consisting of the mentioned two methods. Graphic prepress and postpress phases are the same for all the three methods. We are displaying here the e-Learning video model of digital book printing on 135 g paper, assembling sheet on sheet and bound by gluing. The video model defined in video phases, i.e. sequences (clips) is shown in Figure 2.

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Graphic prepress1-1 -->book block digital printing2-1 --> book cover digital printing2-2  
-->book block assembling2-3 --> book block trimming2-4 -->binding by gluing2-5 -->  
trimming of bound books3-1
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Figure 2. The script for making the video of book digital printing

It was set in the script that the graphic prepress phase will not be filmed but will be described by narration. The *book cover digital printing* phase and *trimming of bound books* will not be filmed together with the phases typed in bold letters. Indexing has been introduced so that the first digit describes the video sequence number filmed in one and the same location. The second digit is the video clip number in the set video chain. The video clip titles, manner of storing into the database and key words for searching through the related database are set together with the titles and indexing. Video model defined in video phases (clips) is presented in Figure 3, 4, 5, and 6.



Figure 3. Video clip of book block digital printing



Figure 4. Video clip of book block assembling



Figure 5. Video clip of book block trimming



Figure 6. Video clip of binding by gluing

Some years will probably pass before we have a photo-book here in Croatia made on basis of the technique presented during DRUPA this year. Controlling the folding and layout is carried out with touch screen. The same thing goes for communication between the image data – designer. Searching, altering of images and graphic processing is carried out in an efficient manner motivating the designer to carry out more complex operations. Control is carried out from the same spot whether it is printing, binding, packaging or dispatch. Video clips are the «evidence» on the future. They inform students of today on the changes in the graphic industry, and on printing works where they will work after completing their studies. Video clips show our teachers how this new technology is controlled in far-away countries.

6 Conclusion

This paper provides new contents within the e-learning system and a proposal of its introduction into institutions of higher education. It is intention to use the e-learning system in the area of individual studying based on video modeling. Individual studying of extreme production flows is conducted through video sequences/clips.

A web-oriented text-book consists of short video-clips with pre-planned stop/play mechanisms which show the methods of machine operation, preparation of the production plant, and management of production.

Application of e-learning in creation of a graphic product using a topic of the edge area in printing, i.e. creation of a security or documents which are commonly realized in a dozen of different techniques or several mechanical operations with analogue and digital, are highly motivating to students as such topics are unavailable to them at the level of production.

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