

APPLICATION OF PRINT SIMULATION TRAINING AT THE STUTTGART MEDIA UNIVERSITY

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Abstract

Since nearly 20 years simulation software for offset printing processes has been used at our university. The initial goal was to provide a type of “hands-on” training for the increasing number of students who had little or no experience in printing. But as educational graphics programs are being reduced by schools at both the vocational and post-secondary levels worldwide, few options remain to efficiently train students on a limited budget. The global print industry continues to grow (forecast of \$874 B in 2024), despite all challenges faced, and it desperately needs qualified young managers.

The simulation of print processes uses interactive software to mimic the operating conditions of complex printing presses that often cost several million euros. Students obtain experience in printing without the costs, dangers or extended training associated with learning on actual presses. A wide variety of printing and folding conditions/problems can be simulated in different languages on various presses with related costs and materials. Cloud based learning management systems now allow simulation exercises to be easily accessed by students everywhere and reviewed by a trainer in a different location.

Simulation software presents an excellent modality to enhance and improve both capacity and access to high quality printing skills training, alongside other learning domains.

Key words: *simulation, printing education, offset, training, e-learning*

Introduction

Offset printing is still the most widely used printing technique in the world. The global commercial printing market is expected to grow at a compound annual growth rate of around 2% from 2019 to 2024 and continues to be one of the largest industries worldwide. Because of its low printing price and the high quality of printed products, offset printing is used in the production of packaging, commercial printing, printing of labels, etc.

On the other hand, study courses for printing and printing related industries have greatly reduced in size over the last 15 years especially in higher education. Once dominant, well-known international universities for printing such as the Rochester Institute of Technology in New York, the former London College of Printing, Moscow State University of Printing Arts, Cal Poly in California or even our university here in Germany, have dramatically decreased the printing equipment available on campus. This is in response to a continually declining number of students interested in studying printing.

So how best to train future young professionals for this industry when faced with persistently dwindling numbers of students and reduced budgets? Not to mention Generation Y, a generation that prefers to work in groups with hands-on experiences, that does not particularly value reading, let alone listening to lectures. Today's students want learning to be creative, interactive and where possible, perhaps even fun! Jodie Eckleberry-Hunt stated 2011[2] that collaborative learning coupled with immediate feedback within a practical context, is instrumental for the Generation Y [2].

The simulation of print processes uses interactive, innovative software to mimic the operating conditions of complex printing presses. Universities can no longer afford very expensive printing presses and the therewith associated pre-press and finishing equipment. Not to mention the accompanying employees and maintenance required. Our university was confronted with this problem roughly twenty years ago. Before that nearly all students had basic if not specific knowledge of printing processes obtained through Germany's renowned trade programs. As more students attended university directly after school, this knowledge was absent. Additionally, interest in technical printing study programs began to decline.

By implementing simulation training, the tech-savvy Generation Y obtains experience in printing without the costs, dangers or extended training associated through learning on actual presses. The software can be used on all kinds of devices and students can easily work in groups or alone. A wide variety of printing and folding conditions/problems can be simulated in a slew of languages on various types of presses. The software can be used in different modes with hundreds of predefined exercises for all levels and run 24/7. Students enjoy working with software as an alternative to many courses with traditional lectures.

Presentation of Research Results (Analysis)

Companies throughout the printing industry are facing a common problem: A large percentage of employees are reaching retirement age. Where are they going to find replacements for these skilled workers? Many parents

and school counselors continue to associate printing with a dirty, old-fashioned, hands-on industry and hence discourage future students from studying in this area. All over the world, graphics programs are being dropped by school administrators.

Berthelsen referenced a 2018 industry survey that ranked top business challenges faced in the printing industry [1]:

1. Finding skilled sales personnel (65%)
2. Finding skilled production employees (42%)
3. Recruiting and retaining employees (38%)

Tiekstra suggest [8] that printers across Europe are open towards cooperating with academia. Here, simulation training could provide an interesting and cost effective method to train employees in new technologies. Exciting innovative software could also help to attract new, young employees. Printing companies are especially interested in training and short courses, but would also like to participate in collaborative research partnerships with academic institutions.

Vlachopoulos and Makri [9] found that on balance, results indicate that simulations in education have a positive impact on learning goals. During scenario-based training, the trainee acquires important skills, such as interpersonal communication, teamwork, management, decision-making, task prioritizing and stress management [3]. These skills are more important than ever in today's fast paced, team-focused business environments.

Rutten [6] concluded in 2012 that simulations are gaining a prominent position in classrooms by enhancing the educator's repertoire, either as an enhancement to traditional teaching methods or as a partial replacement of the curriculum. Nevertheless, they stated that the acquisition of laboratory skills cannot be entirely replaced via simulation training. At the Stuttgart Media University, the same observation has been made whilst teaching print simulation the last nearly 20 years. Simulation training can play a significant role in making lab activities more cost and time effective. One interesting possibility is to offer it as a kind of pre-lab training. However as labs diminish, it can still play a noteworthy role in gaining knowledge about technical processes.

Typical simulation systems for printing encompass learning on a variety of virtual presses. Included in the software is a monitoring and cost analysis which draws comparisons to preset values and correlates effective press utilization versus the theoretical cost on a true industry press. Data per user is compiled allowing the trainer insights into the trainee's progress (internet based learning management systems). Some simulation software for printing can be connected to a real press console, if preferred (more applicable to industry training).

Simulation and games training is expanding quickly worldwide. In the area of print, there is only one vendor who offers a full program applicable for education: Sinapse Print Simulators in France [7]. It is estimated that over 2000 print simulators are installed worldwide. Users include not only educational institutions (universities, technical/vocational schools, etc.) but printing companies and their suppliers as well. Many countries don't have trade programs and are reliant on expensive hands-on training on presses. Here simulation software can offer an inexpensive and effective alternative.

Statistics based on the Distributed Learning Management System (DLMS) from Sinapse Print Simulators [7] shows the number of hours of simulation within twelve months worldwide (courtesy of the software supplier), with the exception of China:

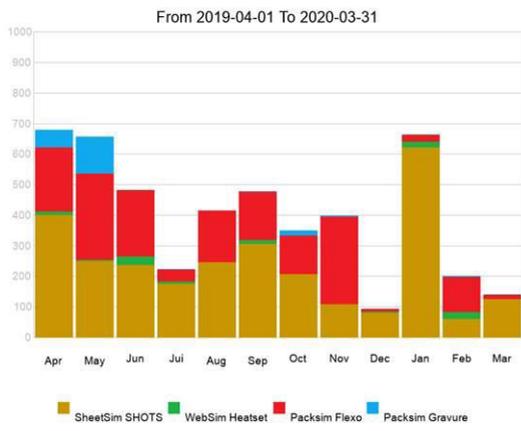


Fig 1. Print Simulation Software Usage Worldwide (without China) – Number of Hours

Sheetfed offset printing (SheetSim SHOTS) remains the most important learning tool with a share of 55%, followed closely by flexography for packaging (Packsim Flexo) which has seen a dramatic increase in usage the last few years and now has a stake of 35%. This concurs with industry changes and increased packaging worldwide. Gravure and web offset printing only represent a small fragment. Not included in the statistic is China, which has its own system:

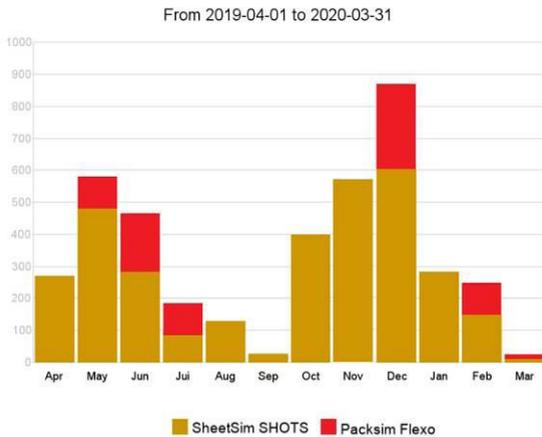


Fig 2. Print Simulation Software Usage in China – Number of Hours

Simulators from Sinapse Print Simulators are used alongside real presses for competitions such as the EuroSkills as well as WorldSkills International. Brittany Whitestone, two-time USA national champion in printing using simulation software, stated that students need to become more aware of printing. That many students don't know what the industry does, but when they understand what it's about, they think it is "really cool". At such championships, the male-female ratio is often about 50% each. This is encouraging, proving that the use of software in education is helping to increase the percentage of women interested in studying printing. A trend we've witnessed at our university in Germany as well. Unfortunately it is still quite a contrast to the number of female executives prevalent in the printing industry.

Conclusions

Why use print simulation training in higher education? The number of students with any type of technical training has been continually decreasing the last few years. The time and costs associated with hands-on training on printing machines has increased and/or because of tight budgets or insufficient access time, cannot be fully realized. Existing presses at universities are often old or do not reflect state of the art technologies. Additionally, there are often great disparities between existing technical knowledge amongst students.

Simulation software offers students who may have a certain “fear” to work on a printing machine, managing a printing company or understanding technical printing processes, the opportunity to explore all kinds of functions and build-up confidence. It also offers students the possibility to learn how processes can be optimized and the impact on costs. E-learning applications appear to motivate Generation Y students. Additional benefits are that different languages can be used, that the students can access the learning exercises 24/7 and monitor their own progress as well as the trainer.

Technological innovations are changing learning environments at a rapid pace and transforming traditional teaching methods. Educational simulation software has a massive potential worldwide. New software solutions must give educators the flexibility to teach their course as they wish, while providing students with appealing products designed to help them meet their learning requirements.

The Bill & Melinda Gates Foundation funds research study into the benefits and effectiveness of simulated learning, indicating the importance worldwide. Software simulation companies will be challenged with creating mechanisms that include more motivational elements and making the learning experience seem more fun and less like work. Virtual reality, artificial intelligence, storytelling, etc. will play larger roles in future educational simulation software.

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