

THE FUTURE OF CLOUD-BASED DIGITAL PRINTING TECHNOLOGY EDUCATION

Education is a foundation of printing industry sustainability!

PREFACE

In light of the recently concluded drupa2024 and the successful organization of the Worldwide Charity Cloud Printing Technology Competition, a significant influence has been made to initiate a new future-oriented education system for the printing and converting industries.

The printing industry is undergoing rapid changes, expanding into new technologies and materials for pharmaceutical and food packaging, functional printing, and more. The industry's focus has shifted, and there are increasing requirements for young, talented printing technology specialists. These specialists need to possess a broad knowledge of printing technology and be able to learn and specialize within the industry where they will build their careers, rather than focusing on a narrow spectrum such as the best "offset print operator". For efficiency and alignment with new sustainable development goals, the emphasis on material safety and recyclability remains unclear to the broader society.

In this respect, the role of printing technology engineers is crucial. They can improve awareness among brand owners, industry leaders, politicians, and the public about the importance of sustainable practices in the printing industry.

Keywords: printing technology engineer, printing and engineering education, European Qualification Framework, cross-border mobility, drupa2024.

INTRODUCTION AND BACKGROUND

The global trend shows that the printing industry must compete against various other professions that have used better tools and more money for marketing than we have. As a result, printing technology labs in vocational schools, universities of applied sciences, and universities are being closed, and equipment is being sold or reclaimed by donors. This is not because machine vendors do not want to donate, but rather due to the high fixed costs for educational institutions, low student enrolment, and the negative image of the profession in society.

Second, and even more important, is the aging society and the wide range of different attractions and high competition for new employees. The number of young printing technology engineers is declining year by year. Some background reasons include the lower value placed on hard skills during elementary or secondary education, especially in STEM subjects, and the negative image of the printing and packaging industry among politicians and the public, particularly concerning the environmental impact of packaging. This paper aims to initiate a new structure for printing technology education, using all theoretical and digital-practical tools available on the market to build a new education system. This system aims to make education accessible to young people and industry partners as stakeholders.

The digital transformation of education lays the foundation for listing printing technology occupations hierarchically in the International Standard Classification of Occupations (ISCO), providing a structured overview of occupations in the printing industry.

Moreover, the ongoing war in Ukraine, which began on February 24, 2022, has severely impacted international relationships, cooperation, and efforts towards a sustainable future, affecting IC members as well. Recent events, including high energy costs and increased inflation, have also significantly influenced career

opportunities for many people in the EU and globally, affecting the future prospects of young printing technology engineers within the IC.

METHODS

Based on the undersigned's earlier work from 2014, "Printing Industry Engineers' Education – Cross-Border Development Project" [1], and the latest work organizing the Worldwide Charity Cloud Printing Technology Competition [3], it has been demonstrated that a new Cloud-Based Education Institution is needed. This new initiative, starting with first-level educational studies, has proven that the industry urgently requires a reduction in the time employees need to adapt to the work environment. This is particularly important when they come to work "from the street" without any competencies or when talented students enter the workforce. The industry needs to evaluate new employees' real knowledge and competencies effectively.

As stated earlier, the situation has led to a point where most major printing machine manufacturers have opened their own Printing Academies, such as the Koenig & Bauer Academy, Windmüller & Hölscher Academy, Comexi, and BOBST, etc. These are great initiatives, but the focus of these Academies is mainly on supplying professional employees for their own manufacturing companies at the level of mechanics and electrical technicians training. They do not emphasize printing technology subjects unless specifically requested by the manufacturer's end customer.

Referring to the above and drupa2024 discussions, all important stakeholders today are recognizing the role of education in the printing industry and are willing to participate in the printing technology Skills Council to support proper curriculum design and keep it up-to-date throughout the lifecycle of the printing industry.

Therefore, in this paper, the major definitions of education vs. training have been explained, and the terminology adopted in the discussion [2]:

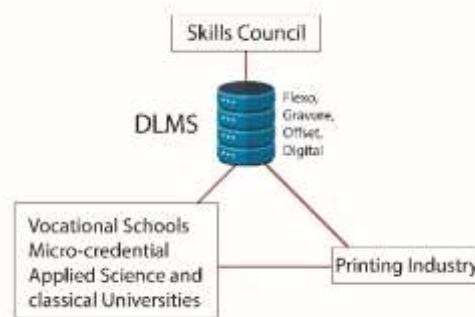
EDUCATION means structured learning advancement at a university or vocational education institution. Graduates will be awarded a degree according to the European Qualification Framework (EQF): MSc = EQF7 (minimum 300 ECTS), i.e., second level degree; BSc = EQF6 (minimum 180 ECTS), i.e., first level degree; or operator level EQF = 5 or 4, etc., after the successful defence of a relevant thesis and examinations. Such studies at universities and vocational learning institutions provide theoretical and practical education based on a didactic learning curve, progressing from elementary to advanced levels, supported by cross-disciplinary science, technology, engineering, and mathematics (STEM) subjects.

TRAINING means troubleshooting with one or a few competencies to be improved for the trainee. A certificate of participation, sometimes with a test of learnings, will follow the training.

SKILLS COUNCIL means the Cloud-Based Education Institution technical committee, where members are from industry stakeholders, material and machinery vendors, and representatives from educational institutions where printing technology is still taught.

The Cloud-Based Education Institution is designed to support global printing technology education in countries where education is absent or where vocational schools and universities exist but lack specialized printing labs. Therefore, our role at IC is to improve printing technology and engineering education to secure the future of sustainable printing and converting industries. Over the last six months, preparing for the Worldwide Charity Cloud Printing Technology Competition at the drupa2024 live finals has demonstrated strong interest from regions ranging from Japan to Latin America. This shows that education needs to change, and the new Cloud-Based Education Institution, with proper pedagogical and technological teams of specialists, is ready to make a commitment and launch the beta version in early 2025. We need to be agile in implementing new teaching and coaching methods and the digital transformation of printing technology and engineering education to engage more young talented people through innovation. The work here is based on implementing globally reachable virtual engineering curricula in the Cloud, where global Virtual Engineers mentor the studies of print operators. The aim is to provide access to all students worldwide who are interested in studying the basic

theories of printing technology. After completing their studies at the Cloud-Based Education Institution, students will undertake practical tasks at printing engineering universities within the IC network and through industry associations. The most important aspect is the mobility of students to fulfil practical tasks at IC member organizations or as apprentice engineers in the industry. This allows them to bring back field feedback to the Cloud-Based Education Institution's educational program, ensuring it meets the latest industry requirements.



The basic diagram of the new Cloud-Based Education Institution has been designed and will be introduced to industry stakeholders to gather feedback from those willing to contribute and participate in the institution's launch.

CONCLUSIONS

We need to involve a broad spectrum of partners, ranging from academia to industry, with our main customer being the latter. Change has occurred, and further change is already upon us. The drupa2024 and Worldwide Charity Cloud Printing Technology Competition have indicated the direction in which education needs to move and highlighted the relevance of updating printing technology curricula. The role of printing technology education and the number of engineers eager to apply scientific results to everyday manufacturing are growing daily.

The main objective of this new Cloud-Based Education Institution is to foster digital innovation and resilience among printing technology engineers through the acquisition of new competencies, including diverse skills, green competencies, and leadership characteristics. The focus is on the digital and green transformation of the printing industry and, above all, on engineering pedagogy. This aims to prepare future coaches for printing industry employees at both industry and Cloud-Based Education Institution network levels.

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Author's biography

EUR Ing. Enn Kerner is MSc printing technology engineers graduated 1987 Moscow State of Printing Arts University, updated competences in packaging and flexo technology at DFTA and HdM Stuttgart, educator and teaching diploma from Tallinn University and manufacturing leadership diploma from Tallinn University of Technology. Working closely with Aalto University researcher Prof. GANE team. Since 2021 EUR Ing. Enn Kerner is attributed with Certificate of EUROPEAN ENGINEER, issued by ENGINEERS EUROPE Association (former FEANI). Working closely with Graphic Technology Research Association of FOGRA as Process Standard Printing Partner and active implementer of printing standards at industrial level. Among professional activities EUR Ing. Enn Kerner actively working at voluntary sector like: Advisory Board member of IC, Executive Board Member of ENGINEERS EUROPE (EE) and the member of Strategic Working Group FUTURE ENGINEERS (EE), vice-president at ESTONIAIN ASSOCIATION OF ENGINEERS and ect.