EU4Dual

2024 ANNUAL CONFERENCE

10-11 April, MCAST Paola,

SHAPING THE FUTURE OF EUROPEAN DUAL HIGHER EDUCATION

Abstract Booklet

Co-funded by the Erasmus+ Programme of the European Union

TABLE OF CONTENTS

INTRODUCTION

The European Universities Alliance for Dual Higher Education, EU4DUAL, (the European Dual Studies University), was chosen by the European Commission as one of the four European projects to develop the European Universities initiative in 2022. The EU4DUAL Alliance is composed of nine European universities all active in dual education – Mondragon University (Basque Region in Spain), Duale Hochschule Baden-Württemberg (Germany), FH JOANNEUM Gesellschaft mbH (Austria), Savonia UAS (Finland), ESTIA Institute of Technology (Basque Region in France), Neumann János Egyetem (Hungary), PAR University College (Croatia), Malta College of Arts, Science and Technology (Malta) and Koszalin University of Technology (Poland) and is co-funded by the European Union ERASMUS+ programme. The aim is to launch the world's largest integrated dual higher education institution where education and the industry are seamlessly integrated.

The official EU4DUAL kick-off took place at Savonia University of Applied Sciences, Finland, in February 2023. Since then the strategic themes for each work package were identified and the work plans for 2024 were concluded. In addition, work on the three Grand Challenges was initiated. This will lead to the development and launch of Joint Dual-Master's degrees and PhD.

As one of the milestones for 2024, the first European Dual Studies Conference is being organised on the 10th and 11th April 2024 at the Malta College of Arts, Science and technology in Malta. The aim of this conference is to bring academics, policymakers and businesses together to share knowledge on the first grand challenge being tackled, the Future of Work, while also discussing important transversal elements concerning dual higher education. Fifty-two research papers were submitted by different academics and researchers on dual higher education and the future of work that will be shared with the audience during the conference. The abstracts of these research papers are included in this booklet.

We wish you success in this conference.

The EU4DUAL Congress Organising Committee.

PROGRAMME OUTLINE

Wednesday 10th April 2024

08:30 - 08:55	**Registration and Welcome Coffee**
09:00 – 10:00	**Opening Remarks** **MCAST Video** **Prof Joachim James Calleja** *Principal & CEO, MCAST, Malta* **Mr Evarist Bartolo** *Former Minister for Education, Employment, Foreign and European Affairs* **Ms Iliana Ivanova** *European Commissioner of Innovation, Research, Culture, Education and Youth* **EU4DUAL Video** **Prof Jon Altuna** *Chairman for EU4DUAL and Academic Vice-Rector at Mondragon University* **Dr Norah McRae** *WACE, World Association for Co-operative & Work-integrated Education*
10:00 – 11:00 **SESSION 1**	***Theme 1 - Dual Higher Education*** *Research Presentations* Designing ESP (English for Special Purposes) Courses in Dual Higher Education ***Joanna Stankiewicz-Majkowska*** Enhancing Dual Education Through Comprehensive Career Support: A Case Study Of The Academy of Technical Applied Studies in Belgrade ***Mirjana Nešić, Dušan Marković, Jelena Pavlović, Goran Stankov*** International Mobility of Higher Education Apprentices – Challenges And Opportunities ***Tatjana Marinkovic, Marina Stamenovic, Gabrijela Grujic, Predrag Maksic, Nebojsa Curcic***

	Win-Win-Win, or The Real Benefits And Opportunities of Dual Training ***Zoltán Valentinyi, Adrienn Boldizsár, Erika Török***
	<u>Theme 2: Track 1 - Future of Work -Skills for the Future Workplace</u> *Research Presentations* Demographic Perspectives as a Challenge for Local European Labor Markets: Analysis of the Aging Process of Communities and Innovative Solutions in the Social Care System ***Patrycjusz Zarębski, Dominik Katarzyński*** Tackling the Burnout Crisis in Female Dominant Industries. Case: Promoting Workplace Wellbeing of Pink-Collar Workers in Finland ***Merja Ala-Kotila, Paola Rosales Suazo De Kontro, Antti Kotimaa*** A Gamified Mobile Solution to Improve Drug Calculation Skills in Healthcare Education ***Antti Kotimaa, Mikko Myllymäki*** Skills for the Future Workplace in Industry 5.0 ***Szilvia Varga***
11:00 - 11:30	**Coffee Break**
11:30 - 12:45 **SESSION 2**	***<u>Theme 1 - Dual Higher Education</u>*** *Research Presentations* Finnish Universities Of Applied Sciences – Strongly Work Life Oriented ***Virpi Laukkanen, Pia Viklund, Minna Kaarakainen*** A Comprehensive Analysis Of Dual University Education In Spain ***Jon Altuna, Vicent Climent, Josu Galarza and Iraia Urquia*** How To Teach Circular Economy To Young Designers And Engineers? Examples of Dual Education Initiatives between Estia Engineering Institute and Decathlon Sports Company ***Jérémy Legardeur, Nicole Rohsig Lopez*** Dual Programs in Higher Education: A Review ***Ainara Imaz Agirre, Paula Alvarez, Iñaki Larrea*** Adapting A Dual Higher Education System: D-Ual Talent Program at University of Almeria ***Mª del Pilar Casado Belmonte, Juan García García, Fernando Carvajal Ramírez***

	Theme 2: Track 1 - Future of Work - Skills for the Future Workplace *Research Presentations* The HEIs of Armenia Embrace the Principles of Industry 5.0 ***Lilit Sargsyan*** Arts Education and its Measured, Positive Impact in the Marketplace ***Christine Matovich*** Skilling for the Future: Enhancing Vocational Learning and Workplace Productivity with Creative AI Tools ***Daren Scerri*** Ambiguous Integrity and Thoughts on Good Future Work among Higher Education International Students ***Pia Viklund*** Case Study in the Textile Sector to Assess Resistance to Change and the Skills Needed to Implement Industry 5.0 ***Amanda Da Mota Bernar, Jérémy Legardeur, Hélène Chanal***
12:45 – 14:15	**Lunch**
14:15 - 14:35	**Keynote Speech** **Dr Markus Tomaschitz** *Industry Stakeholder Council - FH Johanneum, Austria*
14:35 - 15:20	**Table Discussion** *Theme : Dual Higher Education* Participants: Michael Seifert (ICC), Guy Haug (AB), Norah McRae WACE/CHE, Urko Retegui / Dávid Kamasz / Mark Kovacs (SC)
15:20 - 15:40	**Coffee Break**
15:40 - 16:55 **SESSION 3**	***Theme 1 - Dual Higher Education*** *Research Presentations* Towards Dual Education and Professional and Personal Skills at the Technical University Of Valencia ***Sara Blanc Clavero, Marival Segarra Oña*** Perspectives of The Micro-Qualifications Development in Dual Higher Education ***Martina Jurković***

	Vocational and Dual Education for Operational Oceanography ***Aldo Drago*** The Role and Competencies of University Mentors in Dual Education ***Amaia Lersundi, Arantza Ozaeta*** Developing Dual Higher Education in Romania: Regulations and Infrastructures, Limitations and Perspectives ***Otilia Cramariuc, Mihai Dimian, Costel Mironeasa, Carmen Nastase, Cornel Turcu, Valentin Popa***
	Theme 2: Track 1 - Future of Work - Skills for the Future Workplace *Research Presentations* Universities as a Place for Developing the Competences of the Future ***Edyta Halista-Telus*** Industry 5.0: Towards a More Sustainable Human-Centric Factory of the future ***Puviyarasu.S.A , Christophe Merlo*** Designing: from Work-Based Learning to Workplace Learning! ***Chris Witteveen, Sophia Janssen, Nina Spithost*** Methodology to Adapt Learning Scenarios to an Industry 5.0 Perspective ***Unai Ziarsolo, Aitor Sotil, Miguel Altuna, Alexios Papacharalampopoulos, Panagiotis Stavropoulos, Christine Lichem-Herzog*** The Importance of Participation in the Implementation of New Technologies in the Health and Social Sector at the Workplace ***Johanna Muckenhuber***
16:55 – 17:00	**Wrap up and Announcements**

Thursday 11th April 2024

08:30 - 08:55	**Registration and Welcome Coffee**
09:00 – 09:40	**Opening Remarks** **Dr John Edwards** *Secretary General – EURASHE* **Dr Oonagh M.T. McGirr** *FRSA Education Foundation*
09:45 – 10:45 **SESSION 4**	***Theme 1 - Dual Higher Education*** *Research Presentations* Overview Of Dual Education at the Academy of Applied Technical Studies Belgrade ***Dominik Brkić, Vladan Radivojevic, Zeljko Zdravkovic, Nenad Djordjevic*** Intersections of Academia and Industry: Dual Model of Higher Education Studies - Case Study in Serbia ***Ana Popovic, Aleksandra Bozic, Goran Zajic, Predrag Drobnjak*** Dual Higher Education at FH Joanneum in Austria – Its Challenges and Developments ***Maja Dragan, Hagen H. Hochrinner, Heidemarie Köllinger, Elmar Krainz, Christine Wöls*** Understanding the Employment Needs of Full-Time Vocational Students at ICS: Exploring the Impact of Employment on Student Performance ***James Carabott, Shirley Ann Gauci***
	Theme 2: Track 2 - Future of Work - Changing Dynamics of Remote Work *Research Presentations* The Future Workplace: Boosting Human Connectivity in a Rapidly Transforming Work Environment ***Doris Kiendl, Sabrina Sorko, Helene Stainer*** Collaborative Learning Factory to Enable the Future of Work ***Klaus-Dieter Rupp, Liher Errasti, Unai Ziarsolo***

	Digital Partner – A Future Oriented Leadership Style Targeting Digital Natives ***Klaus Seybold, Verena Thaler, Sabrina Sorko*** Detecting Home Office Potential - A Model for Identifying Home Office Workplaces in Manufacturing Companies ***Lichem-Herzog Christine, Steinberger Anja, Sorko Sabrina Romina, Seybold Klaus***
10:45 - 11:15	**Coffee Break**
11:15 - 12:00 **SESSION 5**	***Theme 1 - Dual Higher Education*** *Research Presentations* Industry Synergy in a Multidisciplinary Design Thinking Course: Enhancing Future-Ready Skills ***Iryna Odrekhivska, Anna Halas*** SME Routes in Higher Professional Education in the Netherlands ***N. Spithost, B. van Don*** Future of Work for Early Career Researchers in an Age of Uncertainty ***Marko Turk, Maja Tadić Vujčić***
11:15 - 12:30 **SESSION 5**	***Theme 2: Track 3 - Future of Work – Technological Disruption*** *Research Presentations* Virtual Technology in the Development of Working Life and Training in SMEs in Finland ***Kimmo Pakarine, Ville Heiskanen, Anssi Mähönen*** Digital Humanities and Digital Skills for Local Needs ***Krzysztof Wasilewski, Tomasz Królikowski*** Digital Transformation & Cooperativism: The Case of Mondragon Corporation ***Mónica Gago, Sara Segura And Igor Sáez*** Establishing Start-Up Companies in the Eu4Dual Countries: The Role of Institutions ***Ákos Tóth, István Pesti*** Linking Innovative Drone Technologies with Novel Educational Frameworks ***Holger Friehmelt, Gernot Paulus***
12:30 – 14:00	**Lunch**

14:05 - 15:05 **SESSION 6**	***Theme 1 - Dual Higher Education*** *Research Presentations* Generation Z in Dual Education and at the Workplace ***Norberta Sági*** Bachelor's Thteses in he Dual System. Knowledge Treasure for Open Questions and Topical Solutions ***Jörg Mielebacher, Dirk Saller,*** An Overview of Dual Education in a French Engineering School: Common Framework and Specificities ***Amélie Hacala-Perret, Christophe Merlo*** From Theory to Practice: Dual Study Programs Redefining Higher Education in Serbia ***Vesna Alivojvodic, Filip Krivokapic, Aleksandra Nastasic***
	Theme 2: Track 3 - Future of Work - Technological Disruption *Research Presentations* Developing Attraction in Elderly Care - A Self-Assessment Tool for Organizations ***Satu Pirskanen, Heli Kekäläinen*** *Future of Work among Nursing Professionals – Flexibility and Psychological Contracts* ***Kaarakainen Minna, Ring Marjo, Hult Marja*** Learning Workplaces - An Innovative Paradigm for the Future of Work ***Rupert Beinhauer, Waltraud Jelinek-Krickl*** *Working Life Related Virtual Learning and Familiarization Environments in Higher Education in Finland* ***Anssi Mähöne, Kimmo Pakarinen***
15:05 - 15:25	**Coffee Break**
15:25 - 16:05	**Table Discussion** *Theme : Dual Higher Education* Participants: *Nicholas Kast / Letizia Mifsud (SC), Roswitha Wiedenhofer-Bornemann (EU4DUAL), Zvonimir Galić (University of Zagreb), Evarist Bartolo (AB)*
16:05 - 16:15	**Announcement of next Congress Venue and Theme**
16:15 – 16:30	**Concluding Remarks**

Co-funded by the Erasmus+ Programme of the European Union

Abstracts

Co-funded by the Erasmus+ Programme of the European Union

Theme 1

Dual Higher Education

DESIGNING ESP (ENGLISH FOR SPECIFIC PURPOSES) COURSES IN DUAL HIGHER EDUCATION

Joanna Stankiewicz-Majkowska

Department of Foreign Languages, Koszalin University of Technology, Kwiatkowskiego 6E, Koszalin, Poland
Corresponding author Email: joanna.stankiewicz-majkowska@tu.koszalin.pl

Keywords: *1, ESP courses 2, EU4Dual 3, students' needs analysis 4, employers' needs analysis 5. experts' insight*

1. Introduction

The purpose of the paper is to discuss what language teachers should take into account when designing a customized course to equip students with language skills they need in the early stages of their career and to compare the design of English for Specific Purposes (ESP) at EU4Dual partner universities. Language for specific purposes has always been conditioned by knowledge and industry but the term ESP was coined in the 1960s with the growth of English as a commercial lingua franca.
This paper attempts to give a brief overview of ESP courses in Bachelor's programs (1st cycle) focusing on
1. The hypothesis if it is relevant to carry out needs analysis of students and employers when preparing a customized ESP course.
2. What the present state of ESP courses' design at EU4Dual institutions is.

2. Methodology

1.1 The qualitative report included the case study analysis with assumptions proposed by Hutchinson and Waters [1] when preparing a course for 3rd year Logistics students on a Bachelor degree program based on a coursebook [2] prepared within the EU project 'Politechnika Koszalińska - Accessible University' to investigate whether the script was fit for purpose. According to Hutchinson, Waters [1], Dudley-Evans, St John [3], Basturkmen [4] the key aspect that should be taken into account when designing an ESP course is identifying the learners' needs. The focus group of 42 students responded to the survey answering both standardized and open questions.

Helen Basturkmen (2022) points out the necessity to include local settings in ESP. That is why a survey was conducted through semi-structured interviews among 6 potential local employers about their language requirements when recruiting staff. Consulting Professor Jerzy Korczak - former Dean of Economic Science Department at KUT was the last step before the material was published.

2.1 The further study concerned EU4Dual alliance. The online semi-structured survey was completed by 5 respondents from partner institutions answering questions about ESP language courses offered and whether it is relevant to take into account all stakeholders' needs when designing ESP courses.

3. Results & Discussion

1.2 Thanks to job placements or work experience, students could share their comments on the language they needed at work naming e.g.:
'Knowledge of basic logistics terms, SAP'; 'Logistics abbreviations'; 'Technical vocabulary';
The employers prioritized language communicativeness (100%) along with knowledge of vocational English (66%) which they verify during job interviews.

2.2 The 5 EU4Dual partner institutions, which took part in the survey, offer ESP courses in Bachelor's programs but the number of terms and hours varies significantly (30-60 classroom hours per 1-2 terms). As neither students' nor employers' needs analysis is a requirement of the curriculum, the willingness of carrying out such analysis seems to be the only causative factor. Despite this discretion, such analysis and cooperation with field experts take place (Table 1). 80% of the respondents confirmed the relevance of taking all stakeholders' needs into account in ESP courses design.

Table 1. *Needs Analysis' Application at EU4Dual institutions*

Institution	Students' needs analysis	Experts' insight	Employers' needs analysis
ESTIA	Always	Always	Never
FH JOANNEUM	Sometimes	Sometimes	Sometimes
John von Neumann University	Always	Never	Never
KUT	Often	Often	Sometimes
Savonia	Sometimes	Often	Hardly ever

4. Conclusions & Recommendations

Despite the limited scope of the study, it has been confirmed that it is relevant to take all stakeholders' needs into account when preparing a customized ESP course. Presumably, this may foster closer cooperation between academia, industry and regions. However, implementing needs of employers, students and experts' insight will require:

- openness, flexibility and resourcefulness from teachers to work not only with the assigned book but to customize the course content

- openness from employers and disciplinary experts to start close cooperation with language teachers
- students' awareness of themselves as learners and job seekers.

References

[1] T.Hutchinson, A. Walters. English for Specific Purposes. In Cambridge Language Teaching Library. Cambridge University Press, 1987.
[2] J.Stankiewicz-Majkowska. Logistics. In Koszalin University Digital Library, 2023.
[3] T. Dudley-Evans, M.J. St John. Developments in English for specific purposes: a multi-disciplinary approach. In Cambridge, Cambridge University Press, 1998.
[4] H.Basturkmen. Current trends in ESP research in the Asia Pacific region. In World Englishes, 41, 512–522. 2022.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

ENHANCING DUAL EDUCATION THROUGH COMPREHENSIVE CAREER SUPPORT: A CASE STUDY OF THE ACADEMY OF TECHNICAL APPLIED STUDIES IN BELGRADE

Mirjana Nešić[1*] Dušan Marković[2]
Jelena Pavlović[3] Goran Stankov[4]

[1] The Academy of Technical Applied Studies, Belgrade, Serbia
[*]mnesic@atssb.edu.rs
[2] The Academy of Technical Applied Studies, Belgrade, Serbia
[3] The Academy of Technical Applied Studies, Belgrade, Serbia
[4] The Academy of Technical Applied Studies, Belgrade, Serbia

Keywords: *Dual education, Career support, Skills development, Dual Model Study, Career Center*

1. Introduction

This presentation delves into the innovative approach adopted by the Academy of Technical Applied Studies in Belgrade through the establishment of a dedicated Career Center. Aligned with the dual education model, the Career Center serves as a pivotal organizational unit, facilitating the integration of academic learning with real-world employment opportunities. The center focuses on nurturing students' knowledge and skills to better prepare them for the dynamic 21st-century workplace.

2. Methodology

The Career Center's multifaceted role encompasses activities such as information dissemination, counseling, and collaboration with both academic and business communities. Employing a holistic career counseling program, the center aids students in dual study models by offering tailored support in areas like planning, counseling, and skill development. Moreover, it actively engages with secondary schools and employers, ensuring a symbiotic relationship that benefits all stakeholders involved in the Dual Model Study (DMS).

Specifically, the center plays a crucial role in assisting newly enrolled students, guiding them to identify suitable companies, preparing for interviews, and enhancing their employability through CV and motivation letter preparation. As students embark on paid apprenticeships in the dual model study, the Career Center actively participates in negotiating work placements, ensuring a seamless transition for students into the workforce.

Throughout the program implementation, the Career Center monitors satisfaction and motivation levels, offering additional soft skills education if required. Post-program completion, the center continues its support by aiding students in negotiating permanent positions within the company or guiding them towards alternative employment opportunities through the provision of relevant labor market information.

Importantly, the scope of the Career Center extends beyond student support to cater to the needs of employers. By collaborating with the Council of Employers at the Academy, the center facilitates the selection of well-prepared students, negotiates contracts, and contributes to the development of crucial soft skills.

3. Results & Discussion

This comprehensive approach not only benefits students but also ensures that employers receive a workforce equipped with the necessary skills and professionalism required for success in today's competitive landscape. The presentation will delve into the specific strategies, outcomes, and lessons learned from the implementation of this holistic career support model at the Academy of Technical Applied Studies in Belgrade.

4. Conclusions

The Center's activities contribute to making good career decisions, enable good preparation for it, information and training, as well as an effective transition to the labor market.

INTERNATIONAL MOBILITY OF HIGHER EDUCATION APPRENTICES – CHALLENGES AND OPPORTUNITIES

Tatjana Marinkovic[1], Marina Stamenovic[1], Gabrijela Grujic[2], Predrag Maksic[1], Nebojsa Curcic[1]

[1]Academy of technical applied studies Belgrade, Belgrade, Serbia
* Corresponding author Email: tmarinkovic@atssb.edu.rs

[2] The Office for Dual Education and National Qualification Framework of Serbia, Belgrade, Serbia

Keywords: *Learning mobility, Higher education apprenticeship, Dual education legislative*

1. Introduction

Learning mobility is an opportunity for students to develop their professional, social and intercultural skills, as well as enhancing their employability. From a mobility experience abroad students are gaining transferrable skills, such as problem-solving, the ability to work as part of a team and curiosity.

The European Commission adopted the proposal for a Council Recommendation 'Europe on the Move' – learning mobility opportunities for everyone, including three new EU-level targets by 2030:

- at least 25% of graduates in higher education should have a learning mobility experience,
- at least 15% of vocational learners in vocational education and training (VET), should benefit from a learning mobility abroad,
- at least 20% of all learners benefiting from learning mobility abroad - in all education and training, and youth and sport systems – should be people with fewer opportunities

Having in mind a nature of higher education (HE) dual study programs, which offer the participant the opportunity to complete a degree program at a higher education institution whilst simultaneously receiving a certification of practical vocational training or work experience in a company, it is clear that higher education apprentice mobility addresses all three EU-level mobility targets [1], [2].

European industry reports a shortage of skilled workers and lack of apprenticeship beginners. Work-based learning help companies to overcome the lack of skilled workers, to improve the quality of workforce, easier recruitment and cost-effectiveness. Additionally, growing trend of geographic relocation of industrial plants according to market needs made that foreign language and intercultural skills of workers become increasingly important.

2. Case Presentation

Academy of technical applied studies Belgrade (ATSSB), Serbia, was successful in organizing apprentice mobilities for 2 months in the field of mechanical engineering and electrotechnics and telecommunication. Students enrolled in ATSSB in dual model study, spent 2 months in companies from Slovenia and Bulgaria. Mobilities were implemented through Erasmus+ KA131 funding scheme.

3. Results & Discussion

Implemented apprenitice mobilities showed a strong impact on students involved. International experience widened their perspectives in term of further career development. However, international HE apprentices mobility largely differs from widely established regular student learning mobility. Dual higher education has to support the needs of the triangle: student-HE institution-world of work, fulfilling the legal requirements of both higher education and labor legislative. Thus, negotiation on student mobility was more complicated when students from dual study programs are involved.

Several questions and challenges rise when considering HE apprentices mobility in the “classical” mobility framework such is Erasmus+ program. For instance, there are questions regarding of eligibility for participation, citizenship and visa issues, working status and insurance during placement period abroad.

To further add to the complexity of the process, European countries developed different apprenticeship schemes with variety of legislation procedures, particularly regarding the apprentice working status and payment. In contrast to the other forms of work-based learning or internships that consider student as a final beneficiary, in dual higher education the apprentice is paid for the work with defined social security status. Thus, in addition to the question which costs occur if apprentices go for a placement period abroad, there is a substantial question who pays for what. Recognition of the apprentice mobility benefits for sending and receiving company might be the challenge during placement negotiation. It is necessary that sending company recognize that international experience of apprentice will, after return of the student, lead to the workforce quality improvement. However, it is not reasonable to expect sending company to pay for the apprentice work during mobility placement. On the other hand, the receiving company may be reluctant to train and pay the apprentice that will eventually go back to the other company. Therefore, either the existence of collaboration between sending and receiving companies or funding programs such are Erasmus+ or different national fundings are required to support HE apprentices mobility.

Furthermore, there is a question concerning the requirements for the mobility recognition at the level of the higher education institution. As well there are issues regarding the academic achievements, concerning that student will not attend classes during mobility period. One of the possible solutions might be development of the hybrid programs that combine studying and apprenticeship mobility.

4. Conclusions & Recommendations

Clearly, still more needs to be done to offer learning mobility opportunities for everyone, as per Council Recommendation “Youth on Move”, particularly in the area of work-based learning. This includes development of a specific strategy for international relations in higher education institutions that offer dual study models as a part of their educational offer. The elements of this strategy are to develop mobility and improve the quality of mobility for all, but also to strengthen the integration of internationalization into the organization and integrate international in all aspects and day-to-day practices.

References

[1] T. Davey and B. Orazbayeva, “Dual Study programmes: An effective symbiosis of theory and practice,” p. 16, 2017, [Online]. Available: https://www.ub-cooperation.eu/pdf/cases/W_Case_Study_Duales_Studium.pdf

[2] S. Chatzichristou, D. Ulicna, I. Murphy, and A. Curth, “DUAL EDUCATION: A BRIDGE OVERTROUBLED WATERS?,” 2014.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

WIN-WIN-WIN,OR THE REAL BENEFITS AND OPPORTUNITIES OF DUAL EDUCATION

Z. Valentinyi* and A Bold izsár and E. Török

[1]John von Neumann University. 6000. Kecskemét, Izsáki út 10., Hungary
* Corresponding author Email: valentinyi.zoltan@nje.hu

Keywords: *Dual education, education efficiency, logistics lab, partnership in dual education*

1. Introduction

The effectiveness of dual training can be assessed according to a number of criterias and indicators, for example by examining students' non-cognitive skills, labour market expectations, students' self-reflection, student satisfaction, student motivation, student drop-out [1].

Above all, employers expect new entrants to become experts in their field, in addition to possessing a range of competences [2]. This also means that the challenge exists and it’s useful to check from time to time the actual requirements of the interested parties and the efficiency of our university education.

Indeed, dual education is a strategic partnership where 3 partners work together for many years. University, student, company and it should be a real win-win-win opportunity.

But how can we achive this target and what is the real target recently?

John von Neumann University will launch a new logistics laboratory in 2024, with the aim to respond to the needs of our dual education programme members and to the challenges of the 21st century.

Our study presents the background of this project and the way how requirements were maped and targeted to be met.

2. Methodology

The following scientific methods have been used in the research process:

- vocational higher education have been investigated by using the method of theoretical analysis of scientific literature;
- the method of a systematic approach has been used to map
  - the different science fields of logistics which are necessary to teach in theoretical but more specifically in practical education,
  - the physical and digital means could be used in practical education within laboratory circumstances,

- personal interviews were conducted with existing partner companies' leaders to understand their needs in terms of knowledge content of freshly graduated logistics engineers.

3. Results & Discussion

It was clearly confirmed by the 8 interviewed company leaders that they want to employ young engineers who are able to function from they 1., as professional leaders and that provides their motivation to invest in dual education programme during the education periods of the students.

This also confirms that the theoretical education is not enough to achieve this target and therefore lab solution is not just a nice to have supplement, but a clear requirement.

Scientific literature also confirms the necessity of labs at Universities:

- Ebbinhaus' forgetting curve [3] clearly shows that people forget things fast, as shown in Figure 1.
- On the other hand, the learning pyramid [4] shows us the direction to improve students' retention rate significantly (Figure 2.). It's important that in the functional labs students must practice doing certain exercises with which we can achieve 75% retention rate. We can increase the rate further by asking students to do teaching and on that way the retention rate could go up to even 90%, but that is not always realistic, for instance due to the – sometimes – high number of students.

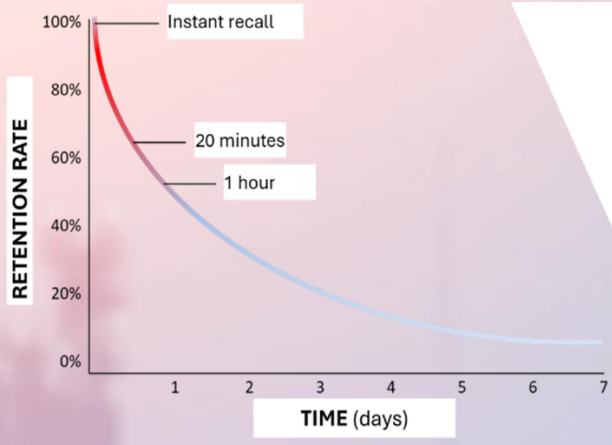


Figure 1. *Ebbinghaus' forgetting curve*

Figure 2. *Learning Pyramid*

4. Conclusions

Conclusion is that in order to increase the efficiency of our education and to meet companies' expectations, we need lab activities parallel and as complementary to the theoretical education and by not only demonstrating how means and processes

work in real life circumstances, but by also to let the students practice through simulation exercises.

By doing this, we also plan to use

- supply chain and process optimizations by using different cloud-based applications,
- robot-based design and implementation,
- advanced IT solutions by creating digital twins as spectacular and efficient process optimizing solution.

We also believe that using advanced IT solutions and apps, learning by doing in a digital environment is the clear demand of this times, but students also must know, practice and learn the traditional equipments and basic processes.

Therefore our lab slogan is: See, Practice, Learn!

Considering the 3rd party in this relationship, concretely the students, we can say that lab activities and exercises are more interesting for students and they certainly learn more efficiently and achieve higher retention rate.

At the end all 3 parties benefit and win. universities' education becomes more efficient, students' will be ready to add value to their work from day 1, while employers will experience the difference and value the freshly graduated engineers as real professionals.

It goes without even saying that universities' reputation will be spreaded quickly and we can expect that nr of students will also increase, potentially.

References

[1] E. Török, E. Angeli, Gné. Noel: Measurement and comparison of student learning outcome results in a dual-nondual relation. Gradus Vol 7, No 3., 117-122 ISSN 2064-8014, 2020
[2] Ahmad Tasnim Siddiqui M. A. – Masud M.: A System Framework for Smart Class System toBoost Education and Management, In International Journal of Advanced Computer Science and Applications,Vol. 7, No. 10, 2016102
[3] D. Barnard: Overcoming the Ebbinghaus Forgetting Curve with Virtual Reality (2018), https://virtualspeech.com/blog/overcoming-ebbinghaus-forgetting-curve-virtual-reality, downloaded: October, 2023
[4] https://time.ly/blog/the-learning-pyramid-explained-for-training-providers/, downloaded: October, 2023

FINNISH UNIVERSITIES OF APPLIED SCIENCES – STRONGLY WORK LIFE ORIENTED

V. Laukkanen[1*], P. Viklund[1] and M. Kaarakainen[1]

[1]Savonia University of Applied Sciences, International Unit, Microkatu 1, 70210 Kuopio, Finland
[*] Corresponding author Email: virpi.laukkanen@savonia.fi

Keywords: *Higher education; universities of applied sciences; work life relevance; workplace pedagogy*

1. Introduction

This study explores Finnish universities of applied sciences (UAS), examining the work life-oriented higher education model and considering how the European Dual Higher Education model could enhance students' employability by establishing a deeper connection to work life. Savonia UAS case study illustrates work-life pedagogy, academia-industry collaboration, and practical skill integration, stressing employability skills in higher education for the labor market. [5] Employability, work life orientation, and workplace pedagogy are key concepts shaping students for professional integration. This paper interchangeably demonstrates how higher education and workplaces collaborate as learning environments, emphasizing holistic development for successful workforce integration

Workplace pedagogy, defined variably, leverages collaborative networks to blend theory with practice, integrating work life relevance through joint educational planning, addressing workforce needs, and competence development. [2] In UAS, three development models—specialist, integrative, and advanced networked culture—prioritize work life alignment in curriculum design. [3] Future directions emphasize forecasting competence demands, co-creating curricula with industry, aiding students in applying skills, and acknowledging the necessity for ongoing career development. [5]

2. Case presentation

The Finnish higher education system includes 13 universities and 10 UAS, overseen by the Ministry of Education and Culture. While universities focus on scientific research and education, UAS provide practical education aligned with workforce demands and regional development. In Finland, the definition of Dual Higher Education (Dual HE) does not exist. However, the apprenticeship model exists in Vocational Colleges, not in higher education. Nevertheless, UAS integrate work life orientation extensively, from curriculum development to education implementation.

Finnish UAS favor work life connections, integrating work life skills development across all educational functions. [3] UAS bachelor's degrees feature internships (30 to 120 ECTS), offering practical experience and professional growth. Finnish Ministry of Education prioritizes workplace-oriented learning, aiming for faster graduation and employment. [9]

UAS Master's studies offer practice-oriented, need-based competence at EQF level 7, completed alongside work for strong employability, with 95% immediate workforce entry. Emphasizing future needs, programs foster individual competence, work community building, networking, and collaborative knowledge creation. [1]

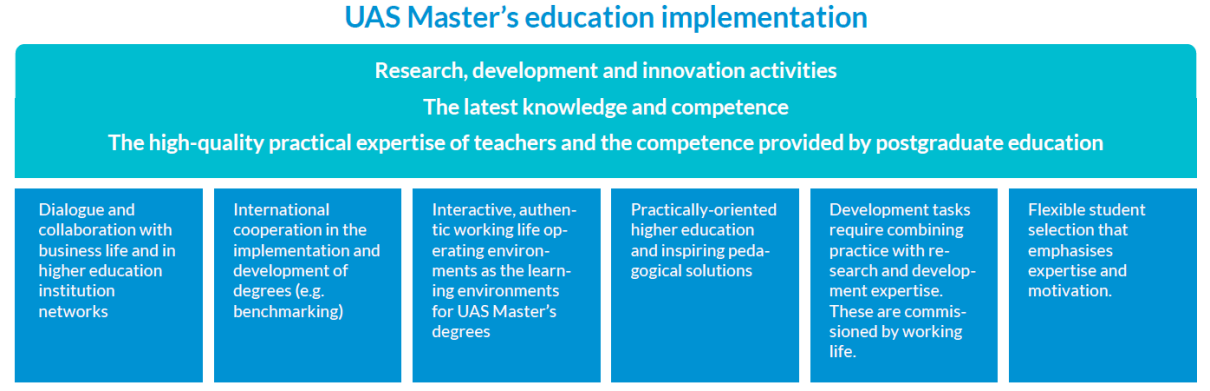


Figure 1. *Work life connection in UAS Master's education [1]*

3. Results & Discussion

At Savonia, workplace pedagogy and work life relevance can largely be seen as a model of networked co-operation culture. Work life representatives are involved in curriculum planning, and work life-oriented learning takes place both in workplaces and as part of degree education. All bachelor's degree students have at least 30 ECTS internships as part of their curriculum. In health care studies the amount of practical training is significantly larger, e.g., in Registered Nurse -study program the scope of internship is 85 ECTS. Another significant implementation model for work-life cooperation is the satellite degree. Since 2014, these degrees have been conducted in 17 different cities covering various fields.

A 2022–2023 Savonia survey on bachelor's degrees revealed diverse implementation of workplace pedagogy. It aimed to explore work life orientation and pedagogical approaches across all degrees, involving teachers and students in documenting collaborations and activities. Students, surveyed at their studies' start and end, reported their initial expectations were surpassed, with agrology students expressing the highest satisfaction with work life orientation. The survey revealed variations in work life collaboration practices and quantities across different degrees. Integration of work life elements into UAS degree education was extensive, encompassing over 270 company representatives (such as lectures, cases, etc.), over 100 company visits, 160 distinct work life-oriented projects and exercises, and various other individual work life-oriented activities. [4]

The Finnish Government's Decree on UAS (1129/2014) mandates work life experience for senior and principal lecturers, emphasizing their pivotal role in bridging academia and industry. These lecturers guide students, facilitate university-company collaboration, and adopt work-life oriented teaching methods. Savonia supports this collaboration by allocating time for lecturers' competence development and offering flexible career paths, including part-time and entrepreneurial options, to enrich educational and professional ecosystems.

4. Conclusions & Recommendations

In this article we have presented the Finnish UAS model focusing to Savonia. In Finland, the Dual Higher Education is not nationally recognized by its traditional meaning and there is no apprenticeship study model in higher education. Savonia UAS aims to enhance company involvement in student learning paths, emphasizing the importance of recognizing students' work-based learning effectively. Collaborating with European work life-oriented institutions is crucial for mutual learning and improvement.

The Finnish Ministry of Education and Culture has no plans for a third higher education model (Dual HE) but acknowledges the strong autonomy of Finnish universities and UAS. This autonomy allows for innovative pedagogical methods that enhance work-life collaboration and the integration of workplace learning into student studies.

References

[1] Arene: Master's degree studies in Universities of Applied Sciences as a reformer of expertise and an educational innovation. Report by Rectors' Conference of Finnish Universities of Applied Sciences Arene Ry, 2017.

[2] S. Billett. Toward a workplace pedagogy: Guidance, participation, and engagement. Adult education quarterly, 53 (1), 27–43, 2002. DOI:10.1177/0741713022372

[3] P. Jääskelä, P. Nykänen, S. and P. Tynjälä. Models for the development of generic skills in Finnish higher education. Journal of Further and Higher Education, 42(1), 130–142, 2018. DOI: 0.1080/0309877X.2016.1206858

[4] Savonia University of Applied Science: Internal Survey on Working Life-oriented Implementation Concepts within bachelor's degree years 2022-2023. 2023

[5] R. Scandurra, D. Kelly, S. Fusaro, R. Cefalo and K. Hermannson. Do employability programs in higher education improve skills and labor market outcomes? A systematic review of academic literature. Studies in Higher Education, 2023. DOI: 10.1080/03075079.2023.2265425

A COMPREHENSIVE ANALYSIS OF UNIVERSITY DUAL EDUCATION IN SPAIN

Jon Altuna[1*], Vicent Climent-Ferrando[2], Josu Galarza[1] and Iraia Urquia[1]

[1]Mondragon University, Spain
* Corresponding author Email: jaltuna@mondragon.edu

[2]Fundación Bertelsmann, Spain

Keywords: *Dual University Education, DUE, Spain, work-based learning*

1. Introduction

This paper summarises a collaborative study between Fundación Bertelsmann in Spain, the Conference of Social Councils of Spanish Universities, and Mondragon University on Dual University Education (DUE) in Spain. It analyses the evolution, regulatory framework, and challenges of DUE, offering a comprehensive overview of historical development, current status, and a detailed analysis of national and regional regulations. The study also focuses on the perception of the universities on their needs, challenges, and emerging issues on DUE. It is the first study of this sort on DUE in Spain.

2. Methodology

This study employed a multimethod approach, starting with a quantitative questionnaire distributed to all universities belonging to the Conference of Social Councils (CSC) of Spanish universities (56), as well as other private universities (7), with a total of 61 universities. The response rate of the CSC universities was remarkably high (94% of CSC universities). Of the 61 universities that responded, 47 are public universities and 14 are private. Additionally, two focus groups were conducted to gain a more comprehensive understanding of the rationale and the strategies Spanish universities are following in the development of DUE.

3. Results & Discussion

The results of the survey highlight a strong interest in the development of DUE by Spanish universities: 87% of universities have either incorporated DUE in their programmes or have the intention of doing so over the next academic year, which shows the powerful momentum of DUE in Spain.

There are, however, a series of challenges for effective DUE implementation: unawareness by companies and universities alike on how to develop DUE, the need for more information on the different aspects of DUE and the need for more awareness raising to all stakeholders involved, including students, companies and university professors. Therefore, it is essential to launch a targeted awareness campaign to educate people about the many benefits of DUE, including enhanced employability and professional advancement.

The study also shows regional discrepancies in the implementation of DUE, with notable variations observed among autonomous communities. The Basque Country and Andalucia, in particular, have emerged as leaders, with a higher concentration of implemented DUE programmes.

HOW TO TEACH CIRCULAR ECONOMY TO YOUNG DESIGNERS AND ENGINEERS? EXAMPLES OF DUAL EDUCATION INITIATIVES BETWEEN ESTIA ENGINEERING INSTITUTE AND A SPORTS COMPANY

Jérémy Legardeur[1*] and Nicole Sofia Rohsig Lopez[1]

[1] ESTIA Institute of Technology, Univ of Bordeaux, F-64210 Bidart, France
[*] Corresponding author Email: j.legardeur@estia.fr

Keywords: *Circularity, workshop, dual-education, learning by doing*

1. Introduction

Today, with the environmental challenges, the circular economy is one of the promising paradigms that need to change the mindset and organisation of companies and challenge the individual and collective industrial practices in all departments (design, production, sales, aftersale…) Improving the creativity and eco-innovation skills [1] of students is a key point for any academic school or university organization. These soft skills can also be one of the most requested by the companies when they are hiring new young collaborators. It is well known that entrepreneurs and innovators have commonly certain attitudes and characteristics that lead them to success, i.e., curiosity, passion and never giving up attitudes.

However, it is a big challenge for most educational institutions to propose multiskilled environments to develop these kinds of soft skills for their students. During their teaching program, it's not easy to immerse students in the circular economy, to experiment and practice the different strategies of circularity (like the 10-R: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle and Recover). Indeed, most of the time, young people are separated from the professional world and they are in different schools or universities with specific teaching programs according to their orientation for engineering, design, marketing, sales, administrative.

2. Methodology

This paper aims to explore different pedagogic initiatives based on academic and enterprise collaboration between Ecole Supérieure des Technologies Industrielles Avancées (ESTIA), a French engineering higher education institution, and Decathlon, a worldwide company working in sports product design and retail. Through an analysis of the history of different formats of collaboration, beginning in 2008, our intention is to understand how bringing the industrial problem-based activities inspired by real situations faced by the company can impact the learning process of future engineers. We explain how this collaboration started by promoting interaction between enterprise and students during classrooms, especially through the participation of the 24h of innovation (hackathon), different workshops in school or organised inside the company during one week, and led also to the creation of a

research program with the Chair BALI dedicated to promoting the circularity in the company and more generally in the textile sector.

3. Results & Discussion

Our presentation will be structured as follows: in the first section, we present the history of the different collaborations between ESTIA and Decathlon since 2008 to highlight the different solutions and forms of interactions between the students and the company to promote dual education.

In the second section, we will present our initiative “The 24h of innovation” [2] which has been developed to promote interaction between companies, and students. This hackathon-like format has been developed since 2007 and we organised 100 editions in 5 different continents. This operation is interesting to start new collaborations with companies and involve students coming from different schools.

In the third section, we will present the results of different workshops involving students and companies. This work is mainly based on a design methodology to stimulate and teach circular economy concepts to engineering students. Students are invited to explore circular strategy solutions to improve different current products designed by the company (for example diving masks and swimming goggles, paddles for standup or canoes…). For example, they have to imagine the reuse of the material for recycling or recuperating spare parts for repair strategies… During these workshops, we propose to follow the methodology based on the Double Diamond diagram for innovation, starting from a general problem to get to a specific solution. Deliverables include machinery and tool prototypes, as well as service design.

During these workshops, the different designers and engineers of the company are involved in proposing problems to solve and giving feedback to the different solutions proposed by the students. The teachers are also participating but the role is different from traditional courses as they are involved in the learning process as coaches and the objective is to help the students to solve complex problems proposed by the company. During the design process of the workshops, they have to take the opportunity of problems situations, and questions from the students to teach in real time some technical, methodological, or organisational knowledge.

At the end of the workshop, students are invited to present their work in teams. They have to produce a short pitch in a few minutes to develop skills for the presentation of technical solutions in a limited time. This exercise helps them also to develop communication aptitudes to structure their oral presentation in front of a professional jury composed of different experts of the company. Finally, students evaluated the course, presenting promising results regarding support materials, interest in the course, and comprehension of the circular economy.

4. Conclusions

Our main objective with this contribution is to show how these “short experiences of dual education collaborations” are useful to stimulate real skills learning [3] by the students who will face complex professional situations with the growth of the circular economy in industrial companies. We think that these soft skills like creativity are here encouraged to prepare the next generation of designers and engineers to find innovative and transdisciplinary solutions (based on technical, economic, organisational…) to promote circular business models in different industrial sectors.

References

[1] Tyl B., Legardeur J., Millet D., Vallet F., " Stimulate creative ideas generation for eco-innovation: an experimentation to compare eco-design and creativity tools ", IDMME-Virtual Concept 2010, Bordeaux, 2010.

[2] Legardeur J., Masson D., Gardoni M, Pimapunsri K. The paradox of diversity's influence on the creative teams. Lessons learned from the analysis of 14 editions of "The 24h of innovation" hackathon, ISPIM Innovation Conference, Bangkok, Thailand, March 2020

[3] Subrahmanian E., Westerber A., Talukdar S., Garrett J., Jacobson A., Paredis C., Amon C. "Integrating Social Aspects and Group Work Aspects in Engineering Design Education", in the proceedings of the Workshop on Social Dimensions of Engineering Design, pp. 117-126, 17-19 May. 2001

DUAL PROGRAMS IN HIGHER EDUCATION: A REVIEW

Paula Alvarez, Ainara Imaz Agirre and Iñaki Larrea

Faculty of Humanities and Education, Mondragon University
Corresponding author Email: aimaz@mondragon.edu

Keywords: *Dual education, apprenticeship, work-based learning, systematic review*

1. Introduction

Dual education combines academic learning at a higher education institution with practical vocational training in an institution. This approach also recognized as apprenticeships or work-integrated learning, requires an integration of theoretical education with real-world work experience. This educational model aims to equip learners with the necessary skills to adapt to the current labor market.

2. Methodology

A literature review was conducted between October and December 2023 using Web of Science for all English-language studies that were published since 2014 and discussed dual education, apprenticeship, and work-based learning. Studies that were not in English or whose full text was inaccessible were excluded. The initial search yielded 975 studies. After the initial screening, a total of 29 studies were reviewed. The studies that were reviewed were framed in higher education and the results were categorized in terms of advantages, challenges, and quality criteria of dual education.

3. Results

This review aimed to explore the multifaceted realm of dual education, shedding light on diverse terminologies, advantages, challenges, quality criteria, and avenues for future research. The analysis revealed the varied terminology employed across different educational systems and regions. The review also delved into the advantages of dual education, emphasizing its potential to foster skill development, enhance employability, and bridge the gap between academia and industry. Exploring the current challenges of dual education brings attention to questions related to insufficient knowledge on integrating academic and vocational learning or to the potential perpetuation of socioeconomic disparities. Quality criteria for effective dual education programs are synthesized from existing literature, providing a framework for evaluating program success and overall educational impact.

Furthermore, this review identified gaps in current research, paving the way for future investigations in dual education. Areas for potential research expansion include the exploration of innovative pedagogical approaches, the impact of digitalization on dual education, and the intersectionality of dual education with social, economic, and cultural factors. By addressing these gaps, researchers can contribute to a more nuanced understanding of dual education, informing policy and practice to optimize its outcomes.

4. Conclusion

In conclusion, this literature review offers insights into dual education terminology, advantages, challenges, quality criteria, and potential avenues for further research. As dual education continues to evolve in response to societal and technological changes, this synthesis of existing knowledge provides a foundation for informed discourse and future exploration in the dynamic field of dual education.

EU4Dual The European Dual Studies University
EUROPEAN UNIVERSITIES Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

ADAPTING A DUAL HIGHER EDUCATION SYSTEM: D-UAL TALENT PROGRAM AT UNIVERSITY OF ALMERIA

M.Pilar Casado-Belmonte[1*], Juan García-García[2] and Fernando Carvajal-Ramírez[3]

[1] Economics and Business Department/Vice-Chancelor's Office for Postgraduate Studies and Institutional Relations
[*] Corresponding author Email: mbelmont@ual.

[2] Psychology Department

[3] Engineering Department/Vice-Chancelor's Office for Postgraduate Studies and Institutional Relations, University of Almería, Carretera de Sacramento s/n, 04120 La Cañana de San Urbano, Almería, Spain

Keywords: *dual higher education, employability, labour skills, higher education institutions*

1. Introduction

One of the most important roles of higher education institutions (HEIs) is to prepare students for the labour market [1].Therefore, HEIs need to understand the demands of the labour market and adapt their curricula to the skills required by the economy [2]. In such a context, and combined with the fact that the economy is developing rapidly, a valuable cooperation between HEIs and the labour market is required to enable graduates entering the labour market to have the appropriate knowledge, skills and abilities [1, 3].

In such a context, Programs of traineeship or internships, for instance, help students to increase their employability and support their education-to-work transition since they are period of work practice, including a learning and/or a training component. One alternative to combine work practice and learning is the dual education. Dual higher education is based on the alternation of learning between the academic and the professional environment in a coordinated way for the acquisition of skills. According to Baethge and Wolter [4], the purpose of dual education is to support cooperation between HEIs and employers, enabling students to develop theoretical and practical knowledge and skilled.

2. D-Ual Talent Program: University of Almeria

The current program called D-Ual Talent, launched in 2015. This yearly program was form by two different paid internship periods. The first semester is a curricula internship where the student received their training in the firm based on the skills and competences required by their courses of the second semester of the curricula of fourth course bachelor degree, with a maximum of 30 credits. The second semester is an internship, which is outside the curricula, giving the student work experience in their professional field.

In Figure 1, the evolution of the positions offered and students selected in the D-Ual Talent program are shown. As can be seen, the program is moving onward and

upward. Moreover, the program has been applied to 25 different bachelor degrees and 10 master degrees, including degrees with low labour market insertion rate.

Regarding the core of the dual higher education, that is increasing the employability of the students, a survey conducted in 2022 let us get to know the labour market insertion rate of students participating in D-Ual Talent program. The results show a high rate, near 80% (Table 1).

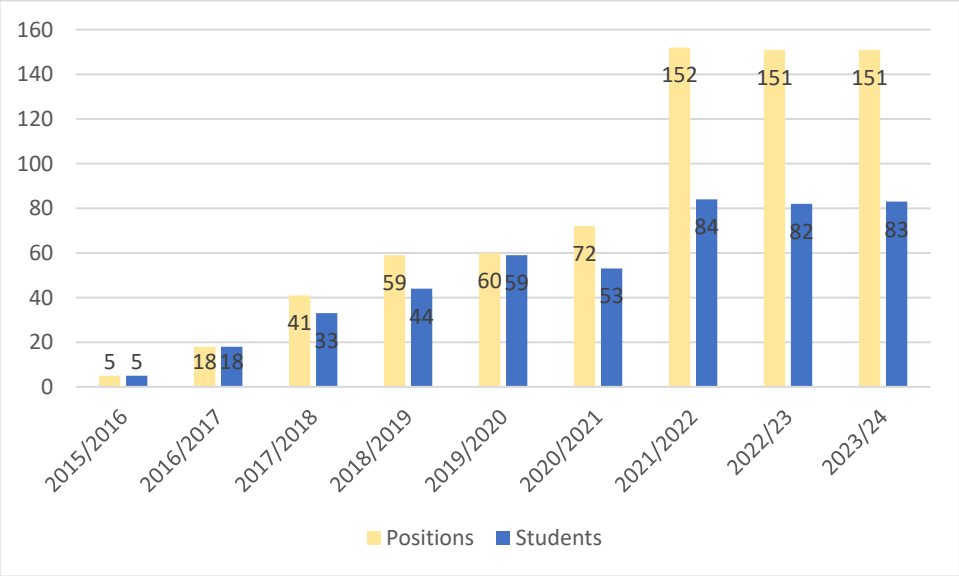


Figure 1. *Evolution of the D-Ual Talent Program.*

Table 1. *Labour market insertion rate*

	2017/18	2018/19	2019/20	2020/21
Labour market Insertion rate in the host firm	52%	40%	29%	65%
Labour market Insertion rate in other firm	40%	43%	46%	20%
Non-insertion rate and continuity of studies	8%	18%	25%	15%

3. Conclusion & Future Challenges

The dual formation benefits all the partners involved. Firstly, students could improve their competences and skills, as well as their employability. Secondly, host firms or entities may benefit from talented workforce and the opportunity to train students for a longer time. Specially, SMEs might avoid their labour problems of difficulties in finding talented workers. Finally, HEIs are connected to economy agents, updating the new requirements of knowledge and skills demanded by the labour market.

Nevertheless, many challenges appears in the adoption of the new requirements to Dual Mention, such as the difficulties in the verification procedures in the external agencies, the lack of flexibility in the incorporation of new host firms or the low support in the public administration for the work-linked training contract.

References

[1] Z. Kocsis and G. Pusztai. A double road to success? Impact of dual education on effectiveness. *Research in Post-Compulsory Education*, 26 (2): 164-18, 2021.

[2] G Elliot. Introduction to the special issue on 'Learning for Work'. *Research in Post-Compulsory Education*, 22 (1): 1-6, 2017.

[3] O. Kivinen and J. Nurmi. Unifying Higher Education for Different Kinds of Europeans. Higher Education and Work: A Comparison of Ten Countries. *Comparative Education*, 39 (1), 2003.

[4] M. Baethge and A. Wolter. 2015. The German Skill Formation Model in Transition: From Dual System of VET to Higher Education?. *Journal for Labour Market Research,* 48 (2): 97–112, 2015.

TOWARDS DUAL EDUCATION AND PROFESSIONAL AND PERSONAL SKILLS AT THE TECHNICAL UNIVERSITY OF VALENCIA

Sara Blanc Clavero [1] and Marival Segarra Oña [2]

[1]Computer Engineering Department, Universitat Politècnica de València, Studies Office.
Corresponding author Email: sablacla@upv.es

[2] Management Department, Universitat Politècnica de València, Vice-Rector for Organization of Studies, Quality, Accreditation and Languages.
Corresponding author Email: maseo@upv.edu.es
Cami de Vera s/n, 46022, Spain

Keywords: *Dual Education, Interpersonal & Professional skills, Key Comptences, TLO (Transversal Learning Outcomes).*

1. Introduction

Higher education should facilitate the active, engaged, and responsible learning of its students, providing a quick and flexible response to professional and social demands. In this sense, the Universitat Politècnica de València (UPV) led a project on transversal skills in the 2014-2015 academic year which encompassed the behaviors, attitudes, motivations, values, and knowledge necessary for individuals to succeed in a dynamic professional context. This effort has helped UPV graduates acquire the knowledge and skills specific to their degree, as well as the necessary abilities to succeed as professionals.

A review of the UPV framework was done in 2022. The new version aims to be clearer about the objectives and learning outcomes that students should achieve. Besides, it should bring the framework closer to current quality standards as well as on democratic principles and the Sustainable Development Goals. This framework provides students with a competitive advantage by strengthening the nexus between academia and labor market with an ecosystem that facilitates collaboration, communication, and cooperation.

This paper presents the new Transversal Learning Outcomes (TLO) framework as an advantage to prepare students for Dual Education. This overall perspective underscores the transformative potential of dual education, creating new synergies with companies for a university with workforce programs, and high qualified graduates.

2. Case Presentation

The new UPV TLO framework is an integral model. It has been designed top to bottom, from five general dimensions to the practical activities carried out in classroom. Figure 1 shows the top-bottom approach.

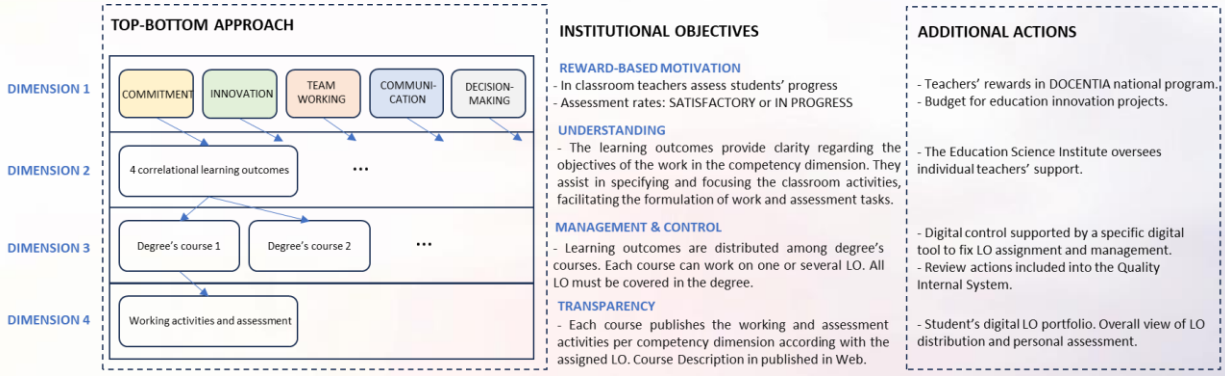


Figure 1. *Transversal Learning Outcomes Framework top-bottom approach.*

REWARD-BASED MOTIVATION: Key competencies are developed as integrated skills across different courses in the degree program. Students receive a personalized assessment of their progress, indicating whether it has been satisfactory or if it is still considered a work in progress. Additionally, we consider TLO as a field of educational research.

UNDERSTANDING: The second dimension provides clarity by specifing working objectives. It's of great assistance to the faculty in designing course syllabus. Moreover, UPV establishes TLO for all undergraduate and master's degrees without exception. Therefore, given that UPV has more than 5,000 faculty members, it is important to provide personalized advice.

MANAGEMENT AND CONTROL: The framework is centrally controlled by the vice-rectorate for studies. However, annual management is distributed among the schools and departments. Therefore, the framework is supported by technology: a digital tool has been designed for this purpose. It promotes a blended administrative insight, highly adaptable to emerging trends.

TRANSPARENCY: 1) To society through the media; 2) to the central government, through the inclusion of key competences and outcomes in the official programs' documentation; 3) to the university governance, as it was approved by its collegiate bodies; 4) to the faculty, as the framework is integrated into the annual course design tools and electronic assessment records; 5) to the students through a web tool called *the student portfolio*, where the learning path and subject-wise assessment are visualized; 6) to prospective students through easily accessible information on the degree and master's program webpages; 7) to society through educational innovation programs and general dissemination efforts.

3. Results & Discussion

Figure 2 shows how TLO is still integrated within dual education syllabus. Academic training should be clearly linked to the student's training received in the company to facilitate student's adaptation period. Thus, in addition to the TLO, it's essential a clear connection between the courses taught at the university and the learning outcomes developed in the company.

TLO framework reduces students' uncertainty or fear of facing professional challenges.

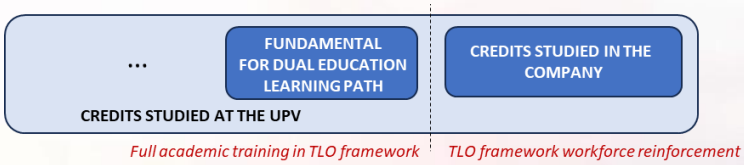


Figure 2. *Dual Education: overall structure*

UPV forms an advisory board per degree with interested companies in offering employment to the program's students. They assists for designing the degree's program to determine the necessary contents to adequately prepare students before their training into the company. The objective is that companies will offer contracts for high level positions, corresponding with a graduate or master's level, rather than a undergraduate level. Moreover, these companies sign an agreement with UPV where they commit to offering a certain number of annual positions. In this way, the commitment is reciprocal: for both training and hiring purposes. Moreover, it reduces business competition among degrees but ensuring that each program conforms a value partnership.

4. Conclusions & Recommendations

This paper discusses about dual education at the Universitat Politècnica de València (UPV) in Spain, focusing on the development of interpersonal and professional skills. With the introduction of dual education in curricula, the UPV aims to create a full integrative learning environment by aligning academic training with the practical experience in the company, ensuring a smooth transition from academia to the workforce. Drawing upon years of accumulated experience in company internships, the TLO will also be crucial for developing interpersonal and professional skills driven by essential content and knowledge for company offered positions.

PERSPECTIVES OF THE MICRO-QUALIFICATIONS DEVELOPMENT IN DUAL HIGHER EDUCATION

M. Jurkovic[1]

[1] PAR University of Aplied Sciences, Academic department, Trg Riječke rezolucije 4, Croatia
Corresponding author Email: mjurkovic@par.hr

Keywords: *Micro-credentials, micro-qualifications, dual higher education, verification, development*

1. Introduction

The development and implementation of micro-credentials and/or micro-qualifications in the context of dual higher education poses new challenges to HEIs in the EU. The European Commission (EC), on the basis of a number of different influences and requirements of the labor market of the European Economic Area in 2021, proposed the first definition which describes micro-credentials as records of learning outcomes that a student acquires after a small amount of learning, and all acquired learning outcomes are evaluated according to transparent and clearly defined standards.

The possibilities of developing shorter educational programs at HEI levels have been recognized by the HEIs and organizations that care about the labor market, economic development and social trends. In June 2022, the Council of the European Union (EU) adopted a Recommendation on a European approach to micro-credentials for lifelong learning and employability [1] with the aim of setting prerequisites for their development not only by HEIs, but also by institutions for adult education, secondary schools, other institutions and employers that can provide informal forms of education for different target groups.

This paper will present perspectives on the development of micro-qualifications in Croatia in relation to the development of dual higher education in accordance with existing legislation. Special emphasis is placed on micro-qualifications in higher education that HEI in Croatia can develop as formal and informal programs.

2. PERSPECTIVES OF HEIs IN PROCESS OF MICRO-QUALIFICATIONS DEVELOPMENT

2.1. Croatian HEIs in process of micro-qualifications development

The challenges of HEIs primarily arise from the obligation to develop the entire process of development of educational programs, verification by authorities responsible for HEI, harmonization of work with the guidelines of the EC and national legislation, and the development of new acts at the HEI level that will regulate the aforementioned procedures, prior learning recognition procedures, harmonizing existing programs with a new approach based on the acquisition of specific learning outcomes and competencies required for a specific part of the qualification.

A qualification is the formal outcome of the process of assessment and evaluation of an individual to whom the competent authority or institution confirms with a public document that it has achieved learning outcomes in accordance with the set standards, at a certain level of the EQF. Micro-qualification is a sub-unit of a qualification mapped or not mapped with EQF or national qualification form. Micro-credential as a sub-unit of a credential or

credentials, documented statement that confirms learning outcomes achievements can be accumulated into a larger credentials frame or be a part of micro-qualification.
Each EU country or the HEI prescribe their own procedures for the development and verification of micro-credentials(qualifications). In the official translation, Croatia equates the terminology, but the national regulation for development, both at the level of adult education and at the level of HEI, mandates the development of more complex, content-integrated micro-qualifications that are officially evaluated and verified by the Agency for Science and Higher Education.

According to the Croatian Qualification Framework (CQF), the Agency for Science and Higher Education requires that programs are primarily based on sets of learning outcomes within certain qualification standards. Therefore, micro-qualifications represent one or more sets of learning outcomes that form a certain, thematically and content-related whole, upon completion of which students will acquire specific knowledge and skills. The key information that constitutes a micro-qualification is a set of learning outcomes within a specific qualification standard, which contains the following information [2]: name of the set of learning outcomes, EQF and CQF level, name of the educational sector, scientific area, ECTS points of the set, conditions for accessing the set of learning outcomes, material and personnel conditions for acquiring a set of learning outcomes, material and personnel conditions for evaluating a set of learning outcomes, guidelines for the procedure and examples of evaluation, and most importantly, the learning outcomes that, combined, form a specific set of learning outcomes. According that, all programs harmonized with the Croatian Qualification Framework are evaluated and approved by the Agency are formal.

HEIs in Croatia have an option of developing informal micro-qualifications, i.e. developing programs at the institution level in accordance with internal acts. Regardless of the approach, the development of micro-qualifications in HEI requires the parallel development of a system to ensure the quality of programs, and the development of dual higher education necessary for the acquisition of practical, professional skills and knowledge.

Obligation to give each pearson possibility to learn and achieve specific professional competences made the basis for development of micro-credential/qualification framework in Croatia as a EU contury and gave HEIs an obligation to empower dual higher education.

2.2. Perspectives of dual higher education development based on micro-qualifications

Dual higher education is an approach which combines different methods and forms of teaching based on a practical work on real examples from practice, in and with companies, with the aim of acquiring competencies aligned with the labor market and the needs of employers. It has positive effects on all stakeholders of the educational process, primarily students who enter the labor market prepared with the necessary practical knowledge.
By continuously improving the teaching process and acquiring practical knowledge, HEIs build the image of a high-quality, socially conscious institution, improve the quality of work and build partnership relations with new companies, thus creating business partners and a systematic approach to the development of teaching bases. It primarily directs students to acquire practical knowledge in certain business segments and empower opportunities for students' employment during their studies.

That cooperation can influence the reduction of the lack of qualified workers through a systematic approach to dual education and the development of micro-qualifications. It has a motivating effect on students, encourages cooperation, research and development, projects, and the development of educational programs for partners and students who are ready for active participation at working environment.

Within the European educational area, dual education represents an important link between the education system and the labor market. In Croatia, dual education is primarily recognized at the level of secondary vocational education. Dual higher education has not yet reached the level where it can contribute to social and technological changes, as well as global economic and market trends. It is focused on the connection between business entities and job seekers through work in a real working environment, which enables students to get to know different working conditions and employment opportunities.

The implementation of dual education in Croatian higher education and the related legislation will lay permanent foundations for cooperation between the stakeholders of the higher education system and the stakeholders of the labor market. Therefore, micro-qualifications in higher education, based on the paradigm of dual education, provide the possibility of developing shorter programs with the aim of acquiring specific knowledge and skills in a shorter period of time and ensure the prerequisites for stable economic development.

References

[1] COUNCIL RECOMMENDATION of 16 June 2022 on a European approach to micro-credentials for lifelong learning and employability (2022/C, 243/02), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627(02)
[2] Croatian Qualification Framework, https://hko.srce.hr/registar/standardi

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

VOCATIONAL & DUAL EDUCATION IN OPERATIONAL OCEANOGRAPHY

A. Drago[1*]

[1]Institute of Engineering and Transport, Malta College of Arts, Science & Technology, Triq Kordin, Paola, Malta PLA9032, Malta

[*] Corresponding author Email: aldo.drago@mcast.edu.mt

Keywords: *Vocational education, dual education, operational oceanography, marine observations, human resources*

1. Introduction

In our knowledge-driven and digitally transformed era, data has emerged as a new age oil, pivotal for innovation, economic growth, and informed decision-making. This is particularly true in the realm of marine data, serving not only for sea-based research, climate studies, the monitoring of the state of health of the sea, and the management of its resources. Indeed, the marine data value chain in the evolving information age, targets new avenues, reaching out to industry and fuelling innovative applications that can raise economic levels to new heights that perhaps we cannot yet fully grasp. Operational Oceanography (OO) is a main source for marine data provided routinely and delivered in real-time to serve different user categories that exploit this data into added value products and smart applications. OO relies on a range of jobs at scientific, technical, engineering and managerial levels, requiring a competent workforce that combines academic and practical skills. Basing on the New Skills Agenda for Europe, expounded in the EU communication on working together to strengthen human capital, employability and competitiveness [1], the case is here presented on benefits from Vocational Education and Training in OO, combined with motivations for Dual Education.

2. Case Presentation

OO embraces a complex set of processes delivering an interoperable, fully integrated multiplatform observing and forecasting system, with systematic and long-term routine measurements of the seas, oceans and atmosphere at the local, regional and global scales, comprising the rapid interpretation and dissemination of information with the production of dedicated data services, supporting the conservation of biodiversity, forecasting and management of risks and emergencies at the coast and at sea [2] [3]. The data generation phase comprises remote and in situ observations and numerical models, data clustering from multiple sources, data quality control and elaboration over a range of spatial and temporal scales [4]. Data is then delivered with added value through integrated information downstream services over different platforms, in both real time and delayed mode, and reaching out to a multiple range of users, tapping and merging different data layers. This chain of processes in OO engages different capacities by scientists, engineers, technical staff, numerical modellers, IT experts and software developers. On the receiving end,

the spectrum of users includes managers, policy makers, private enterprise and the general public; in some cases, intermediate users further develop applications, fitting to multiple needs, experiences and responsibilities, generating higher levels of knowledge and intelligence, adding value to data streams and exploiting existing services to enhance their own endeavours and those of dependent users. Hence, OO thrives on a competent and versatile workforce that matches different and complementary job categories. While specialising in the respective components, each category in the process must have a background on the overall integrated aspects composing the OO chain. On the applicative side we need OO receivers to apprehend the content and value of the OO production lines for the use in smart, effective and innovative exploitation.

3. Discussion

OO offers a variety of job opportunities ranging from academic and scientific roles to more technical, operational and applicative tasks. The demand for OO professionals and technical staff across the board is expected to soar as the ocean-based economies worldwide, including Europe, is expected to leap to unparalleled levels in this decade [5]. In all these instances, dedicated skills and expertise in the practice and application of OO are important elements in staff profiles and recruitment portfolios. Vocational and professional training is here a natural option, combining knowledge acquisition with hands-on and on-the-job practice, creating the essential ingredients in formative courses, and supplementing the more academic-oriented deliveries with depth and relevance. The courses on offer need to cover a range of educational setups: foundation and diploma courses leading to introductory and basic level knowledge and skills applied over a broad range of aspects in OO; certification courses in specialised areas of OO delivered in conjunction with industry partners to achieve fit-for-purpose and on-the-job skill development approaches to train the workforce for specific jobs; more advanced courses at tertiary level and beyond, dealing with more complex skills that are needed to drive research, creativity and innovation.

4. Conclusions & Recommendations

In their different versions, dual course programs are perceived to offer multidisciplinary and dedicated specialisations by the combination of at least two matching areas of study such as marine policy with marine biology, environmental management with oceanography, or ocean engineering with IT, and other such combinations that merge expertise needed for specific job roles and applications. Options of modular courses provide versatility in skills and the broad and holistic approach needed in OO jobs. In this sense, these kind of courses provide learners with essential overarching skills that can furthermore serve employability in other sectors, supporting their personal development and boosting capacities in parallel endeavours like enterprise performance, competitiveness, research and innovation. The ultimate aim is to limit the effort in the transit from educational performance to job proficiency, coupling course programmes to job demands, favouring individual lifelong personal development to achieve higher educational and skill profiles in gradual steps or at later stages in life, building and capitalising on previous academic and job experiences, creating a dedicated human resource supply where and when

it is needed, fitting the rapidly changing and evolving scenarios dictated by disruptive technology and societal demands.

References

[1] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness. COM/2016/0381
[2] E. Dombrowsky et. al., GODAE systems in operation, Oceanography 22(3):80–95, 2009. https://doi.org/10.5670/oceanog.2009.68
[3] European Global Ocean Observing System, http://eurogoos.eu
[4] F. Davidson et. al, Synergies in operational oceanography: the intrinsic need for sustained ocean observations. Front Mar Sci 6:450, 2019.
[5] OECD, The Ocean Economy in 2030, OECD Publishing, Paris, 2016
[6] https://doi.org/10.1787/9789264251724-en.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

THE ROLE AND COMPETENCIES OF UNIVERSITY MENTORS IN DUAL EDUCATION

Amaia Lersundi[1*] and Arantza Ozaeta[2]

[1]Faculty of Humanities and Education Sciences, Department of Education, Mondragon Unibertsitatea, Aranburuzabala Kalea, 20540 Eskoriatza, Gipuzkoa, Spain
[*] Corresponding author Email: alersundi@mondragon.edu

[2]Faculty of Humanities and Education Sciences, Department of Education, Mondragon Unibertsitatea, Aranburuzabala Kalea, 20540 Eskoriatza, Gipuzkoa, Spain

Keywords: *Mentoring, Mentor Training, Dual Education*

Abstract

Teachers are considered one of the key axes of change in the education system [2] [7]. As a result, teacher training, both initial and in-service, has undergone a significant transformation in recent decades in terms of strategies, methods, and objectives in order to improve schools and education systems, and dual university training in the field of education is gaining popularity. Currently, there is a growing scientific recognition of the value of workplace learning, since work is understood as more than a mere "place", but an "object" in itself for teacher education [8]. It is through dual training that situations, challenges, and professional practices will come into closer contact with more theoretical university training. Dual education can have multiple forms of implementation depending on the mission of the institutions, the organisational culture and the pedagogical approach [1]. Regardless of how it is implemented, the combination of training in two contexts leads to the enhanced development of professional competences in real-life settings as well as the development of teacher training within the profession [6]. Mentoring plays a crucial role in articulating the two training contexts with the trainee. However, the meaning of mentoring is still little established and consensual [5] [9] and coexists with other terms such as tutoring, counseling, facilitation and even coaching [4]. The definition of a mentor includes a versatile role that emphasises various dimensions and, above all, the learning of the mentee [3].

In order to better define the role of the mentor and thus identify the training objectives of the mentors, the present study aims to explore how mentors of students enrolled in dual Infant Education, Primary Education and Secondary Education Master's degree describe their role as a mentor and what competences they require to perform these roles. We are also interested in what training needs emerge in teachers' discourse and in which contexts these are or can be developed.

To reach the research aim, two focus group discussions were conducted. In the first focus group, four mentors from the fourth year of the Infant and Primary Education program participated, and four mentors from the Secondary Education Master's program participated in the second focus group. The focus groups were carried out by two researchers and a guide was created with questions to be answered by the

participants. Both focus groups were audio recorded, transcribed and analysed using the MAXQDA software. An inductive method was used to analyse the corpus.

Preliminary results show that mentors, regardless of the educational stage at which they teach, are required to play a variety of roles throughout the academic year, such as making effective connections between theory and practice, managing groups and fostering team building, and creating bridges between the university and the school. It can also be seen that to do this, mentors are expected to possess specific transversal competences, including the ability to adapt to the demands and challenges of the team, the ability to encourage reflection on their own practice and the competence to work as a team with other mentors. Furthermore, all mentors emphasise that training is necessary and that they receive this training both within the university and in the school itself. On the other hand, in the Infant and Primary Education degrees, students work within learning communities, which helps to systematize various ways of doing and thus facilitate coordination. Furthermore, both Secondary Education Master's and Infant and Primary Education Degree teachers consider it necessary to receive training together with school mentors.

This study concludes that the role of the mentor is multi-faceted, and that each mentor must have a variety of competencies to adapt to the complexities of the scenarios they face. We can also conclude that participants from different educational stages face similar challenges. It should be noted, however, that the training should be customized according to the characteristics and needs of the group of mentors, i.e. the training model should be co-designed together with the mentors.

To finish with, theoretical and pedagogical implications can be drawn from the present study. The roles and functions of mentors have not yet been consolidated and various authors argue that the role of the mentor needs to be analysed as it directly influences the role of the mentee [5]. Therefore, knowledge should be further developed by analysing and exploring real-life situations and experiences. This study also contributes to the facilitation of mentor training.

References

[1] Coiduras, Jordi, Enrique Correa, Mehdi Boudjaoui, y Anreu Curto (2017). Formación dual en el Grado de Educación. *QURRICULUM - Revista De Teoría, Investigación Y Práctica Educativa*, (30), 81-02.
[2] Hargreaves, A. & O'Connor, M. (2020). *Profesionalismo colaborativo. Cuando enseñar juntos supone el aprendizaje de todos*. Morata.
[3] Hennissen, Paul, Frank Crasborn, Niels Brouwer y Fred Korthagen (2019). En busca del "factor M" en los diálogos de supervisión entre profesores-mentores y profesores en formación. Cuadernos de pedagogía, (502), 57-67.
[4] Instituto Tecnológico y de Estudios Superiores de Monterrey (2017). EduTrends: Mentoring. Observatorio de Innovación Educativa del Tecnológico de Monterrey.
[5] Merket, Monika (2022). An analysis of mentor and mentee roles in a preservice teacher education program: a Norwegian perspective on the future mentor role.

Mentoring & Tutoring: Partnership in Learning, 30(5), 524-550. DOI: 10.1080/13611267.2022.2127261

[6] Nóvoa, Antonio (2009). Para una formación de profesores construida dentro de la profesión. *Revista de Educación*, *350*, 203-218.

[7] Perez-Lizarralde, Karmele, Agurtzane Azpeitia-Eizagirre, y Arantza Ozaeta (2021). *Irakasleen prestakuntza gogoetatsua, hezkuntza berritzeko giltza*. Mondragon Unibertsitatea. Humanitate eta Hezkuntza Zientzien Fakultatea.

[8] Plazaola, Itziar, Kristina Elosegi, Uri Ruiz Bikandi, Ana Arregi y Nerea Badiola (2013). Irakasle hasiberriaren esperientzia. *Ikastaria,* 19, 139-169.

[9] Stephens, Simon, Oran Doherty, Billy Bennett y Michael Margey (2014). The challenge of work based learning: a role for academic mentors?. International *Journal of Mentoring and Coaching in Education, 3*(2), 15-170.

DEVELOPING DUAL HIGHER EDUCATION IN ROMANIA: REGULATIONS AND INFRASTRUCTURES, LIMITATIONS AND PERSPECTIVES

Otilia CRAMARIUC, Mihai DIMIAN, Costel MIRONEASA, Carmen NASTASE, Cornel TURCU, Valentin POPA, Gabriel CRAMARIUC
Affiliation: Stefan cel Mare University of Suceava
Corresponding author Email: dimian@usm.ro

Keywords: *Dual higher education, work-based learning, workforce*

Abstract

The paper aims to investigate the dual higher education status in Romania: dual education context, legal framework that regulates this form of education, infrastructure development projects, identified limitations in terms of Dual Higher Education, potential solutions, and perspectives. It also delineates the distinction between dual education and dual higher education in Romania, highlighting policy gaps and proposing various ways to bridge these gaps.

Dual education is a form of vocational education that combines learning in an educational institution with practical learning within a business entity or at the workplace. While pre-university dual education focuses on developing basic skills acquired in real-life business scenarios, dual university education emphasizes soft skills such as: cooperative skills, critical thinking, synthesizing different knowledge contexts, applied problem-solving and adapting to a specific work culture. The main purpose is to significantly increase employment opportunities for young individuals and enable them to acquire the necessary skills to perform their jobs efficiently, innovatively, independently, and collaboratively with others, thereby meeting the demands of the labour market.

The need for Romanian dual education arises from various factors related to the crisis of workforce such as: high school dropout rate, high unemployment rate and inability to reintegrate to the labor market, challenges in labor market, the connection still very weak between the educational environment and companies, the exodus of the skilled workers to other countries. At the level of North East Region, the least developed region in the country , several potential development opportunities have been identified such as: advancements in science and artificial intelligence solutions; increasing the use of digital technologies in the economic environment, in the post-pandemic context; collaboration between public administration, employers and educational environment to contribute to the development of educational programs that align with the specific needs of different branches in industry /services, in accordance with the technical and organizational developments in businesses. In Romania, the legislative framework for dual education has recently been modified. Law no. 198/4.07.2023 now regulates pre-university dual education, while university dual education is regulated by Law no. 199/6.07.2023. If, in terms of dual education at pre-university level, the methodological norms of application are regulated by Ministerial Order no 3613/31.01.2023, in terms of university education, the

methodological norms of application have not yet been published, which creates syncope in the implementation of any approach in this direction. At strategic level, the dual education in Romania is promoted and financially supported by The National Recovery and Resilience Plan 2021-2027 through Investment 6: Developing at least 10 regional consortiums and developing and equipping at least 10 Integrated professional campuses. Within this program, dual regional consortiums submitted applications and the winning projects have currently started their implementation. One successful example is *Performance in vocational training through partnership with the economic environment for developing the complete dual education route at USV (DUAL USV)*, the project and consortium coordinated by Stefan cel Mare University of Suceava, which involves representatives of the educational environment, the private sector and public sector. This consortium aims at developing an integrated dual campus in the North East Region of Romania to serve both pre-university and university technological education, in mechanical, automotive, robotics, electric, electronical, automation and computer science areas. That implies building an adequate infrastructure and developing dual study programs, that are tailored to meet market demands. Given the prospects of the labor market and the training needs in Suceava county and neighboring counties, specific training areas were established. The investment it is also highly relevant since it addresses the least developed region of Romania, and the third least developed in the EU, with one of the highest rates of school dropout and unemployment.

While the pre-university dual education system in Romania has shown promise and has a methodological structure, its extension to higher education levels remains unaddressed within the regulatory framework. The absence of explicit provisions for dual higher education in Romanian's regulatory framework suggests the necessity for strategic considerations in educational policy. Policymakers, educators, and stakeholders should propose research-based recommendations to bridge this gap. This approach could foster a more integrated and responsive educational system that aligns with academic rigor and industry applicability.

References

[1] M. Turk, *Dual higher education in Croatia: a long way to go*, Gradus, vol. 10, no. 2, pp. 1-6 (2023)
[2] Law no. 198/4.07.2023
[3] Law no. 199/6.07.2023
[4] Ministerial Order no 3613/31.01.2023
[5] Applicant Guide for Pilot program for the development of regional consortia for dual education, modified by Ministerial Order no. 3071/2023
[6] https://op.europa.eu/webpub/eac/education-and-training-monitor-2023/en/country-reports/romania.html
[7] National reforms in vocational education and training and adult learning https://eurydice.eacea.ec.europa.eu/national-education-systems/romania/national-reforms-vocational-education-and-training-and-adult
[8] https://www.europeandualsystem.eu/

[9] https://www.erasmustrainingcourses.com/dual-education-and-work-based-learning.html
[10] Šćepanović, V., & Martín Artiles, A. (2020). Dual training in Europe: a policy fad or a policy turn? *Transfer: European Review of Labour and Research*, *26*(1), 15-26.
[11] Maier, T. Advanced further training or dual higher education study: a choice experiment on the influence of employers' preferences on career advancement. *J Labour Market Res* **56**, 4 (2022).
[12] https://labourmarketresearch.springeropen.com/articles/10.1186/s12651-022-00309-4#citeas

OVERVIEW OF DUAL EDUCATION AT THE ACADEMY OF APPLIED TECHNICAL STUDIES BELGRADE

Dominik Brkić, Vladan Radivojević[1], Željko Zdravković[1], Nenad Đorđević[1]

[1]Academy of technical applied studies Belgrade, Belgrade, Serbia
* Corresponding author Email: dbrkic@atssb.edu.rs

Keywords: *Work-based learning, Higher education policies in dual education, ATSSB*

1. Introduction

Work-based learning at the level of higher education in Serbia represents a model of cooperation between higher education institutions and industry, business, entrepreneurs, and other companies that brings benefit to all parties. Higher education institutions benefit from the opportunity to develop flexible and responsive curricula focused for acquiring current labor market-related skills applying dual model of study. In particular, this holds true for the engineering and applied sciences higher education institutions. On the other hand, companies and entrepreneurships with the capacity to join higher education process benefit from the inclusion of students into their working processes. Work-based learning help companies to overcome the lack of skilled workers, to improve the quality of workforce, easier recruitment and cost-effectiveness. Through the cooperation with HEI, companies affect the formation of the curriculum adding the desirable knowledges and skills. Still, the major beneficiary are the students, which are gaining modern and desirable engineering theoretical and practical knowledge combined with the real-life work experience, that will provide them with the highest level of employability and competence on labor market.

2. Case presentation

The Academy of Applied Technical Studies Belgrade is a state higher education institution with many study programs in the technical, technological, artistic, social, humanistic, and medical fields. In the current academic year at the Academy of Technical Vocational Studies in Belgrade (ATSSB), classes are being held for 50 different study programs, 18 of which have a dual module. Starting from the next academic year, the implementation of two new study programs will begin, both of which have a dual module. [1]

3. Results & Discussion

All study programs at ATSSB, including those with dual modules, have received accreditation from the National Accreditation Body of the National Council for Higher Education of the Republic of Serbia. This means that these study programs meet all standards for accrediting higher education study programs at the National qualification framework NQF6 and NQF7 levels, and ATTSB has the permission to conduct them. Learning outcomes are aligned with education descriptors (knowledge, skills, abilities, and attitudes) for the appropriate qualification framework. Qualification descriptions for the mentioned profiles are defined by qualification descriptors, and the development of qualification standards at the level

of the Republic of Serbia is currently underway, which will be in line with EU standards. [2]

ATSSB has rich experience in implementing study programs with a dual module. It is of significant importance to emphasize that the first study program with a dual module in the Republic of Serbia was accredited in 2021. The name of the first accredited study program is "Energy Efficiency and Clean Energy," and it was created by ATSSB.

The relationship between HIE, students and partner companies is defined by the Law on the Dual Model of Studies in Higher Education in the Republic of Serbia. This law regulates the content and method of realizing the dual model of studies in higher education, mutual rights and obligations of students, higher education institutions and employers, material and financial security of students, as well as other issues important for the realization of studies according to the dual model. In addition to the above, this law defines learning through work at the employer, the placement of students at employers, the role of career guidance and matchmaking centres. [3]

For all study program with dual module, theoretical and practical teaching in the premises of ATSSB takes place in parallel with the implementation of learning through work at employers. The student is trained at ATSSB through theoretical and practical lectures in professional subjects, and during the same week he/she has the opportunity to apply the acquired knowledge within the framework of learning through work at the employer. Based on training at the employer, the student develops skills and competencies.

The structure of the learning through work module is adaptable to students, so it is expected that all students successfully master the training and acquire the appropriate skills and competencies. The process of acquiring knowledge, skills and building attitudes takes place gradually. The content of the dual study programs are at some extent adjustable to the specific requirements of the partner companies, in order to adapt the results of professional training of students through work to the needs of employers.

4. Conclusions & Recommendations

In this overview, we intended to cover the main features of dual education at ATSSB by reviewing the main three parties - students, companies and HEIs. The model of dual studies represents a fairly new experience in Serbian higher education. We are now in the third year of implementation of dual education, the first two years of application at ATSSB brought the expected results for all mentioned parties. In the upcoming period, ATSSB will continue to develop new study programs with a dual module in various fields of study.

References

[1] Official website of the Academy of Applied Technical Studies Belgrade. Available: https://atssb.edu.rs/en/

[2] Report on referencing National Qualifications Framework of the Republic of Serbia to the European Qualifications Framework for Lifelong Learning and the Qualifications Framework of the European Higher Education Area, Available: ttps://azk.gov.rs/Biblioteka/Centri/RKiPSV/EOK/Serbia%20Referencing%20Report_0.pdf

[3] ("Official Gazette of RS", No. 66/2019, Available: https://www.pravno-informacioni-sistem.rs/SlGlasnikPortal/eli/rep/sgrs/skupstina/zakon/2019/66/1/reg/

INTERSECTIONS OF ACADEMIA AND INDUSTRY: DUAL MODEL OF HIGHER EDUCATION STUDIES – CASE STUDY IN SERBIA

Ana Popovic, Aleksandra Bozic, Goran Zajic, Predrag Drobnjak

The Academy of Applied Technical Studies Belgrade

The dual education system allows for better harmonization between educational offerings and the needs of the economy, as it ensures a more efficient response of the education system to the requirements of the economy and the labor market. A robust system should take into account technological changes and the need for new competencies, knowledge, skills and abilities in an ever-changing landscape. This model implies the direct involvement of employers in organizing and implementing learning through working in a real work environment. Ideally, it indirectly ensures employment growth and lower risk of the young professionals' outflow. Therefore, all actors involved have a considerable benefit from a quality dual education model.

In Serbia, the opportunities of dual model of higher education are recognized in recent years. The Law on the Dual Model of Studies in Higher Education was adopted in September 2019 by the National Assembly of the Republic of the Serbia (Official Gazette No. 66/2019). It regulates the dual model of studies in higher education and the implementation of curriculum in higher education study programs through active teaching at higher education institutions, coupled with the practical training at the employer's place of work, which represents learning through work, thereby acquiring knowledge, skills and abilities, in harmony with the study program and the standard of qualification. The Office for Dual Education and the National Qualifications Framework is founded in 2022 on the basis of a regulation adopted by the Government of the Republic of Serbia. The Office, constituting a unit of the Government, is established in order to ensure the performance of professional and technical tasks of common interest of the Government and other state administration bodies.

The Academy of Applied Technical Studies Belgrade (ATSSB) is a frontrunner in Serbia when it comes to the development and accreditation of higher education studies with dual modules. The Academy organizes and conducts applied studies that equip students for the application of knowledge and skills necessary for direct involvement in the work process. At the moment, 17 accredited bachelor applied and master applied studies contain a dual studies module, in addition to over 30 studies having classic study modules at ATSSB. Generally, the theoretical framework is taught in the educational center, while practical experience occurs in a real company, providing students with effective workplace learning.

In order to further strengthen the development of the dual model of higher-education studies in Serbia, ATSSB is applying for financial support in implementing dual programs of higher education studies of Mechatronics and Industry 4.0. The specific goal of the initiative is to establish and equip a sustainable training center (Training Center for Mechatronics and Industry 4.0) for the student training in the field of mechatronics and the concept of Industry 4.0 within the framework of the dual study model of Academy students, as well as to offer practical classes for other Academy

students, including the short cycle programs for reskilling and upskilling of employees.

Key partners of the ATSSB`s initiative are the 10 established companies in Serbia ready to participate in the dual model of higher education studies in the fields of Mechatronics and Industry 4.0. Work-based learning at higher education level is emerging as a win-win model of collaboration between higher education institutions and the industry. The aim is to educate, train and support students to be highly qualified and highly specialized workforce in their respective fields right from the start of their career. The advantages of dual study would significantly increase students' employability, as employers need to invest less in on-job training, and students already bring with them valuable and needed skills. Work-based learning helps companies to overcome the lack of skilled workers, to improve the quality of workforce, enables easier recruitment and ensures cost-effectiveness.

Finally, the proposed activities are contributing to the overall reform and shaping of education for the future, by increasing the relevance of higher education, employing graduates, as well as modernizing the teaching process through direct cooperation with the industry while utilizing modern technological achievements.

DUAL HIGHER EDUCATION AT FH JOANNEUM IN AUSTRIA – ITS CHALLENGES AND DEVELOPMENTS

M. Dragan[1*], H. Hochrinner[1], E. Krainz[2], H. Köllinger[2] and C. Wöls[1]

[1]Institute Applied Production Sciences, Department Engineering, FH JOANNEUM, Eggenberger Allee 11, Graz, Austria
* Corresponding author Email : maja.dragan@fh-joanneum.at

[2]Institute Software Design and Security, Department of Applied Computer Sciences, FH JOANNEUM, Werk-VI-Strasse 46, Kapfenberg, Austria

Keywords: *Dual Education, Coop, PTO, Higher Education*

1. Introduction

The educational landscape is on the brink of transformation, as institutions of Higher Education face the reality that their teaching and graduates no longer align with the demands of the labour market. Employers seek experienced and well-educated employees, a need traditional Higher Education struggles to meet.

Recent developments highlight a decline in industry contributions to applied R&D, both in Austria and across Europe. Research organizations and universities struggle to engage SMEs, crucial for innovation and employment. To address this, integrating Higher Education with industrial work via "Work Integrated Learning," "Cooperative Education," or "Dual Education" has emerged as a potential strategy.

2. Case Presentation

The Dual Education model, pioneered by Dean Herman Schneider at the University of Cincinnati in 1906, blends on-the-job and classroom training. This approach, prevalent originally in apprentices in Austria, Germany, and Switzerland, offers a pathway to combine academic learning with practical experience in industry, enriching students' education. In Austria, Dual Education introduced firstly in 2002 in Higher Education integrates academic learning with practical experience in companies. The model, defined by the Agency for Quality Assurance and Accreditation Austria (AQ Austria) and Federal Ministry of Education, Science and Research (BMBWF), integrates university and company learning experiences, offering a jointly designed education at the university level and work integral to Dual Study programs.[2] The university and training company are equal learning environments, with theory and practice interlinked in the respective curricula. Practical phases exceed standard work placements, enhancing content and quality. Theory and practice are intertwined, with essential content taught at both locations. Students have contracts with both institutions, often employed by the company from the third semester. Companies are equal partners, contributing to organizational development and integrating practical training with academic learning. [1]
The definition of Dual Study programs was co-defined by the Dual Studies Platform DuStÖ (www.dualstudieren.at) in 2016. According to this, degree programs may only be designated as dual if the learning locations (at least the university and the

company) are systematically interlinked in terms of content, organization, and contract. [1]

2.1. Development of Dual study programs since 2011

In 2002 the first Dual Study program in Austria of PTO (Production, Technology and Organisation) at the University of Applied Sciences FH JOANNEUM started as a Diploma program. Since then, the number of Dual Study programs has grown, driven by demand for skilled workers, especially in engineering and IT.

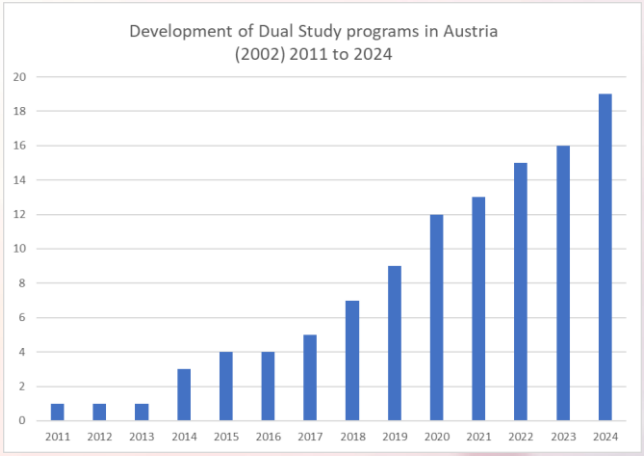


***Diagram 1**: Development of Dual Study programs in Austria listed by year.*

3. Results & Discussion

Internationally, definitions of Dual Education vary, highlighting the need for clarity. In Austria, Dual Education encompasses internships, apprenticeships, and Dual HE study programs, emphasizing the integration of theory and practice. Success hinges on effective collaboration between universities and companies, with tutors playing pivotal roles in student guidance.

4. Conclusions & Recommendations

The Dual Higher Education model aims to bridge the gap between academia and business, recognizing that companies are valuable spaces for generating new knowledge. This model combines the often-contrasting logic of knowledge transmission from universities and knowledge production within companies. It emphasizes that integration is not simply a matter of alternating theory and practice but requires a systematic and mutually beneficial relationship between higher education institutions and companies [3]. With encouragement from BMBWF, Dual Study programs are expanding beyond engineering to other fields. As the landscape of Higher Education evolves, Dual Education presents a unique opportunity for universities to align with industry needs.

References

[1] Plattform Duales Studium Österreich, “Definition Duales Studium,” *Plattform Duales Studium Österreich*, 2023. [online]. Available: https://www.dualstudieren.at. [Accessed: Mar. 1, 2023]

[2] S. Nickel, et al, *Dual study programs: Implementation models and development needs*, Centrum für Hochschulentwicklung, 2022. p. 9 [E-book] [Available: che.de]

[3] ERASMUS+, Cooperative and Work Integrated Higher Education. *A handbook for implementing the Co-op education model*. https://cwihe.com/multimedia/documentation/, 2017.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

UNDERSTANDING THE EMPLOYMENT NEEDS OF FULL-TIME VOCATIONAL STUDENTS AT ICS: EXPLORING THE IMPACT OF EMPLOYMENT ON STUDENT PERFORMANCE

Shirley Ann Gauci[1*] and James Carabott[2]

[1]Institute of Community Services, Early Years, MCAST, Main Campus Paola, Malta
[*] Corresponding author Email: shirley.ann.gauci@mcast.edu.mt

[2] Institute of Community Services, Social Care, MCAST, Main Campus Paola, Malta

Keywords: *Vocational students, employment needs, student performance, Malta, higher education*

1. Introduction

1.1 Background

Most undergraduate students pay for tuition and registration fees [1]. In the US, tuition and lodging fees can amount to 40,000 EUR annually, while European universities generally impose minimal or no tuition fees. However, students in Europe often face significant expenses related to travel and accommodation, necessitating part-time employment. Both EU and non-EU students are permitted to work while studying in Europe. Eurostat data from 2016 indicates that 46% of young people in the EU were employed while pursuing their highest educational qualification, whereas over the past 25 years, 70% of US college students have worked while attending school.

In Malta, most tertiary undergraduate students do not pay for registration and tuition fees, while 19,000 receive maintenance grants. Most students live with their parents until approximately the age of 30, thus avoiding renting costs. Gozitan students who must travel and live in Malta to pursue their studies are supported by further grants to compensate for renting and travelling costs. However, these costs still pose challenges, leading some students to drop out of undergrad courses [2].

Emerging trends of youths moving to cohabitate and those forced to leave home due to familial difficulties must also be acknowledged. Employment became mandatory for these students, as they bear the brunt of living costs, that can vary between 1360 to 2530 euro per month; depending upon lodging expenses. This is not only a local phenomenon. The British National Student Money Survey 2023 indicates that in 2022 cost challenges went up to 1,150 euro per month, including food, living arrangements, travelling costs and tuition fees.

International literature suggests contrasting views. Full-time employment can negatively affect academic performance, [3] Limited sleep from work commitments leads to decreased concentration during lectures, further harming academic achievement. [4]. However, other research shows how despite doing study-related part-time work for a few hours weekly, students can still excel academically. Studies

indicate that part-time employment, approximately eight hours weekly, does not hinder academic performance.

1.2 Rationale

International studies were mostly carried out among university students, leaving tertiary vocational students under-researched, especially in the local context. The researchers who are both academics at the Institute of Community Services [ICS] at MCAST want to address this lacuna and contribute to advancing knowledge in this area by investigating the employment needs of full-time vocational students and their impact on academic performance. Therefore, the research question is:

What are the employment needs of full-time vocational students and their impact on academic performance?

Accordingly, the objectives are:

1. Conduct needs analysis to investigate the employment needs of full-time vocational students;
2. Explore the impact of employment on students' performance; and
3. Identify any improvements and adaptations in students' support.

2. Methodology

This research focuses on studying a phenomenon at a particular time in a particular context that is experienced by a particular group of people. Thus, an interpretivist paradigm with a phenomenological approach is adopted. A cross-sectional case study is selected as research design and a mixed-method approach is implemented as strategy. Qualitatively, the primary data is collected in two phases. First, a focus group with Key Informants at ICS (Deputy Directors, Institute Coordinators and Mentors), which will provide an informed contextual understanding to build a comprehensive needs assessment. The second phase comprises the application of an employment needs analysis with students. Ten students pursuing MQF Level 6 in Health and Social Care and Early Years will participate in one-to-one face-to-face semi-structured interviews. These interviews aim to provide researchers with a significant opportunity to gather comprehensive accounts and gain insight into the participants' realities. Meanwhile, data for the quantitative part of the research will be a Likert-scale questionnaire, also built on the informants' feedback and Literature Review. The researchers will distribute the questionnaire amongst all full-time Level 6 students in the said courses. Analysis of data is to be carried out utilizing thematic and descriptive analysis. A one-phase triangulation will corroborate the data collected qualitatively and quantitatively. Ethical clearance and considerations will all be respected and rigorously observed.

3. Results & Discussion

Data collection is currently being conducted.

References

[1] European Commission. “Working while studying - Your Europe.” Your Europe. 2021. https://europa.eu/youreurope/citizens/education/university/working-while-studying/index_en.htm (accessed: Mar. 05, 2024).

[2] E. Torou, S. Borg, and T. Chircop. Dropping Out From Post-Secondary Vocational Education: A Case Study in Malta. *MCAST Journal of Applied Research & Practice*, 6(1): 208-231, 2022.

[3] M. H. T. Nhi. Research on the effects of part-time jobs on university students regarding learning process as well as daily life. CEMJP, 30(3),1-7, 2022.

[4] C. S. Fenech and M. Raykov, “Studying and working-hurdle or springboard? Widening access to Higher Education for working students in Malta” in European Higher Education Area: The Impact of Past and Future Policies, A. Curaj, L. Deca and R. Pricopie Eds. Cham: Springer Open, 2018, pp. 237-258.

[5] D. M. Yanbarisova. The effects of student employment on academic performance in Tatarstan higher education institutions. Russian Education & Society, 57(6), 459-482, 2015.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

INDUSTRY SYNERGY IN A MULTIDISCIPLINARY DESIGN THINKING COURSE: ENHANCING FUTURE-READY SKILLS

Anna Halas[1*] and Iryna Odrekhivska[2*]

[1] Center for Academic and Cross-cultural Communication,
Ivan Franko National University of Lviv,
Universytetska Str. 1, 79000, Ukraine
[*] anna.halas@lnu.edu.ua

[2] Center for Academic and Cross-cultural Communication,
Ivan Franko National University of Lviv,
Universytetska Str. 1, 79000, Ukraine
[*] iryna.odrekhivska@lnu.edu.ua

Keywords: *Dual education, design thinking, higher education, industry, gradual transition.*

1. Introduction

The present conference paper aims to explore the necessity for higher education to undergo transformation in line with the principles of Society 5.0, where systems operate throughout society in an integrated fashion [1], by focusing on the incorporation of interdisciplinary courses implemented to advance the dual mode of study. Such approach not only addresses the contemporary demand for interdisciplinary learning but also underscores the importance of practical application of knowledge. Acknowledging the difficulties linked to promptly instituting comprehensive dual education, the paper proposes *a gradual transition* achieved through the integration of such interdisciplinary courses. The paper showcases the potential of courses like *Design Thinking*, emphasizing their capacity to provide opportunities for skill development, such as creativity and problem-solving, and foster meaningful collaboration with industry partners.

2. Methodology

An example of educational innovation chosen for this conference presentation is a field experiment in an Ecuadorian University in which students, irrespective of their field of study, registered for the class *Analysis and Problem Solving* (alternatively, *Design Thinking* course) [2]. The mandatory class sought to foster students' creativity and problem-solving abilities through the application of design thinking to real-life problems.

Throughout 14 weeks, students worked in cooperative teams to address real problems presented by Ecuadorian organisations, referred to as “sponsors”. The course adopted a design thinking approach, combining the models of the Hasso Plattner Institute of Design at Stanford University [3] and the “Double Diamond” model [4]. The facilitators sought real problems from NGOs or small businesses.

Design Thinking, characterised as a dynamic framework, generally operates through an iterative procedure encompassing five stages: 1) Empathise, 2) Define, 3) Ideate, 4) Prototype, and 5) Test. The focus lies on tackling and resolving "wicked problems,"

which presents a challenge when approached with linear thinking or the application of isolated tools and perspectives from a single discipline. These problems are multisided and complex, defying unambiguous definition or solution.

3. Results & Discussion

Students collaboratively tackled their assigned problems, applying methods and instruments at each phase of the design thinking process under facilitator guidance. The course structure facilitated active and dynamic class sessions with ample time for practical application and discussion. The first section focused on comprehending the problem context, stakeholders, and reframing the problem, while the second part involved ideation, prototyping, and validation. The course culminated in final presentations attended by sponsors, showcasing the teams' problem-solving journeys and the adequacy of their solutions. The researchers' conclusion, drawn from the experiment, highlights positive outcomes observed across various dimensions involving students, facilitators, and stakeholders.

4. Conclusions

Our study supports the conclusion that *Design Thinking*, originally utilised in traditional design disciplines to generate innovative products or services, has surpassed its initial applications and has become an effective methodology across various fields [5] to enhance creativity and innovative potential. This *Design Thinking* course could be classified as an instance of open platform due to its significant focus on both exploring and leveraging external knowledge resources. The experiment described in the presentation solicits our key argument about the validity of integrating courses similar to *Design Thinking* in the transition stage to dual mode of studies, underscoring its capacity to effectively form essential skills for the evolving demands of Society 5.0. In broad terms, the introduction of the Design Thinking course into a multidisciplinary classroom, featuring real-life tasks from external stakeholders, is positioned as a timely and efficient educational innovation in this context.

References

[1] Deguchi, A., Hirai, C., Matsuoka, H., Nakano, T., Oshima, K., Tai, M., & Tani, S. What is society 5.0. Society, 5(0), 1-24, 2020.

[2] Guaman-Quintanilla, S., Everaert, P., Chiluiza, K., and Valcke, M. Impact of design thinking in higher education: a multi-actor perspective on problem solving and creativity. *International Journal of Technology and Design Education*, 33(1), pp. 217-240, 2023.

[3] Auernhammer, J., and Roth, B. The origin and evolution of Stanford University's design thinking: From product design to design thinking in innovation management. *Journal of Product Innovation Management*, 38(6), pp. 623-644, 2021.

[4] Kochanowska, M., and Gagliardi, W. R. The double diamond model: In pursuit of simplicity and flexibility. *Perspectives on Design II: Research, Education and Practice*, pp. 19-32, 2022.

[5] Meinel, C. and Krohn, T. Design Thinking – Enabling Digital Engineering Students to be Creative and Innovate. In *Design Thinking in Education*, Switzerland: Springer International Publishing AG, pp. 9–23, 2022.

SME ROUTES IN HIGHER EDUCATION IN THE NETHERLANDS

N. Spithost[1] and B.van Don[2*]

[1]NHL Stenden, University of Applied Sciences, Rengerslaan 8/10, 8917DD Leeuwarden, The Netherlands.

[2]Platform Talent for Technology (PTvT), Oranjebuitensingel 6, 2511 VE The Haque, The Netherlands
Corresponding author Email: b.vandon@ptvt.nl

Keywords: *Work-based learning, dual learning, tripartite agreement, associate degree.*

1. Introduction

The demand from SMEs for highly skilled personnel equipped with new knowledge and skills for the evolving labor market is substantial. Conversely, the tightness in the labor market creates a demand for employees who can be quickly deployed. Attracting and retaining well-skilled personnel is more crucial than ever given the tightness in the labor market.

2. Case presentation

During the period 2021-2023, the program 'SME Route in Higher Professional Education' was implemented in the Netherlands and funding by the Ministry of Economic Affairs. Program partners included the Ministry of Economic Affairs, the Ministry of Education, Culture and Science, Royal Association SME-Netherlands, and the Association of Universities of Applied Sciences. The execution/coordination of activities were delegated to the Platform Talent for Technology.

The main objective: to further develop, strengthen and expand SME routes aiming to establish them as a well-known and well-stablished form of education.

An SME route is defined as:

- A degree in higher professional education.
- In which learning and working take place simultaneously and are interconnected.
- Most of the learning takes place on the job.
- The student receives a salary.
- Formalization of work-based learning through a tripartite agreement among the student, the university of applied science, and the SME.

To achieve this goal, the following activities were undertaken:

1) Further development of the existing pilot SME routes to 20 SME routes across various sectors.
2) Providing tailor-made support for existing and new routes.

3) Establishing a learning network/community.
4) Research regarding target groups and dual learning.
5) Identifying and managing promising political movements and current/future policies.
6) Communication efforts on both national and regional levels.

3. Results & Discussion

The number of SME routes connected to the network has been substantially increased, from 7 SME routes in 2020 to 23 SME routes in 2023. There is a significant diversity among SME routes in terms of sectors, size, and vision/approach. The existing and new routes have obtained general and tailor-made support. For example, guidelines for universities of applied sciences, for SMEs and for student communication have been developed.

A robust national learning community/network has been established (universities of applied sciences, SMEs, and trade associations). Thanks to this strong network, the SME routes are easily able to connect with each other, facilitating mutual learning. This is also achieved through interactive and in-depth knowledge-sharing sessions.

The regional/national recognition and acknowledgment of the SME routes have been increased due to the communication tools (toolkit, portraits, persona's, websites, guidelines etc.) developed within the program. As a part of the program, we are actively engaged in regional and national discussions concerning policy development related to work-based learning, duale learning etc.

An exemplary implementation: NHL Stenden University of Applied Sciences began its partnership in SME routes in 2020. Currently, NHL Stenden has 11 SME routes and an expansion with 3 or 4 more routes in the pipeline. With over 20 years of experience in dual higher education, NHL Stenden has a larger dual portfolio than other Universities of Applied Sciences in the Netherlands. Dual higher education at NHL Stenden is continuously (further) developed in partnership with the world of work (employers and employer associations) under the motto: "together we make good education". The accumulated expertise in dual higher education leads to very positive reactions from both employers and (working) students.

Under the guidance of the national program, NHL Stenden offers a high-quality and (almost) sector-wide covering portfolio of SME routes. This enables the university to make a direct contribution to (knowledge, training, and development) issues on the labor market and thus also to the regional economy (which rests to a large extent on the shoulders of SMEs). In a committed partnership with employers, NHL Stenden successfully works on the professionalization and further development of (prospective) employees in SMEs.

For NHL Stenden, participation in the program is not only important from a social and economic perspective (workforce development). It is especially important to increase awareness of dual degree programs: bachelors (EQF6) and particularly the Associate degrees, 2-year degree (EQF5) among employers and potential employees/students.

4. Conclusions & Further Development

The SME routes are now established as a better-known and more refined form of education in the Netherlands. A follow-up program aims to build upon this foundation by reinforcing existing routes and developing new routes. The target group will be expanded to students not employed by an SME.

FUTURE OF WORK FOR EARLY CAREER RESEARCHERS IN AN AGE OF UNCERTAINTY

Marko Turk[1*] and Maja Tadić Vujčić[2]

[1]PAR University of Applied Sciences, Trg Riječke rezolucije 4, Rijeka, Croatia
[*] Corresponding author Email: marko.turk@par.hr

[2]Institute of Social Sciences "Ivo Pilar", Trg Marka Marulića 19, Zagreb, Croatia

Keywords: *Early career researchers, well-being, mental health, literature review.*

1. Introduction

This paper explores findings related to early-career researchers' well-being and mental health (ECRs) as a preliminary stage for further longitudinal studies.

In the last two decades, discussions driven by changes that have taken place in the international higher education area have intensified. Scholars (O'Brien & Guiney, 2018; Teichler; 2021) particularly emphasise internationalisation, reconsidering higher education's societal role, industrial sector pressures, increased competitiveness and precariat (especially among ECRs), and academic managerialism and consumerism. Under the influence of contemporary socio-political tendencies and due to the change in the role of science and technology in society, the academic profession has departed significantly from its initial roles, especially in conditions and practical aspects of academic performance (Musselin, 2006).

While discussing conditions in the academic profession, Boyer, Altbach & Whitelaw (1994) point out that the academic profession is evolving into a "profession under pressure," while Enders (1999) warns that higher education systems in most highly developed countries are in a complex process of change. Giroux (2002) pointed to the increased casualisation of academic staff, which simultaneously maximises managerial control over faculty and the educational process. Anderson (2006) found that academics often work “more than 50-60 hours (per week)”, with many working “nights and on weekends and reporting levels of exhaustion and burnout”. Langford (2010) reported increasing stress levels “worse than observed in many other industries” due to a lack of funding, overload, poor leadership, and job insecurity. Gill (2014) alerts that academics may be becoming “one of the most surveilled occupational groups in history”, while Orr&Orr (2016) discuss the so-called “death of Socrates” that academics now often face, supported by the management philosophy that focuses on workflows. Authors (Hargreaves et al., 2014; Levecque et al., 2017; Jackman et al., 2021) detect ECRs as the most vulnerable group in such a challenging setting.

2. Case Presentation

Analysis implies that ECRs face numerous academic obstacles. Attrition rates amongst doctoral aspirants have ranged from 30% to 50%, depending on the

discipline and country (Golde, 2005), and distress experienced by doctoral candidates may be high (Toews et al., 1997). Moreover, research results indicate that the life of ECRs might be described as a “doctoral mania or doctoral depression” (Brajdić-Vuković & Vignjević, 2017) due to the non-stimulating research environment, non-supportive institutional culture or non-effective academic mentors and no work-life balance. Considering such results, Karen Barry stated, "Mental health risks in research training can no longer be ignored" in 2018 (Barry et al., 2018). However, we can witness worrying results in this area five years later.

3. Results & Discussion

Recent research shows alarming mental health risks and declining well-being among ECRs (Kismihók et al., 2022; Mayev et al., 2021). The authors also showed that the relative risk of psychological distress and mental health issues in ECRs is significantly higher than in highly educated general population, highly educated employees, and higher education students and that work conditions and organisational circumstances have a significant role in the ECRs’ mental health issues occurrence (Levecque et al., 2017). In a study among 1600 doctoral candidates in the Netherlands, Mattijssen et al (2021) found that almost half of them were at risk of developing a psychiatric disorder, while 39% of them showed severe symptoms of burnout and 40% reported consistently high or very high workload. Furthermore, a survey among over 6300 doctoral candidates from all over the world showed that 36% of doctoral candidates had sought help for anxiety or depression related to their doctoral degree pursuit (Woolston, 2019). A recent meta-analysis demonstrated that ECRs have up to three times higher risk for depression and anxiety symptoms compared to the general population (Satinsky, et al., 2021). Also, ECRs describe the period of their professional socialisation as a period in which they were “abandoned to themselves” or “thrown into the fire” (Turk, 2020, p. 1) without adequate mentorship or institutional support. Moreover, according to the OECD report *Reducing the Precarity of Academic Research Careers* (2021), the postdoctoral "apprenticeship" stage has become more prolonged and more arduous, as "the bottleneck between non-permanent and permanent positions has become tighter".

4. Conclusions & Recommendations

In conclusion, the findings underscore the alarming mental health risks early-career researchers (ECRs) face, reflecting a systemic issue within academia. With ECRs experiencing significant distress and burnout, urgent interventions are imperative. Recommendations include enhancing institutional support, fostering mentorship programs, and addressing the precarity of academic careers. Longitudinal studies are crucial to track progress and ensure sustainable improvements.

Acknowledgements: This material results from the scientific project *“Well-Being And Mental Health of Early Career Researcher in Croatia: a Longitudinal Study”* (IP-2022-10), financed by the Croatian Science Foundation.

References

[1] T. O'Brien and D. Guiney. Staff wellbeing in higher education. Education Support Partnership, Retrieved from https://www.educationsupportpartnership. org. uk/resources/research-reports/staffwellbeing-higher-education, 2018.
[2] U. Teichler. Are Academics Driven by Managerialism? Governance and the Changing Role of Academics on the Way Towards a Knowledge Society. Acta Paedagogica Vilnensia, 46, 13-26, 2021.
[3] C. Musselin, C. The transformation of academic work: Facts and analysis. Presented at the UNESCO Forum: Europe and North America Scientific Committee on The Changing Role of the Academic Profession and its Interface with Management, Kassel, Germany, 5–6 September, 2006.
[4] E. L. Boyer, P. G. Altbach, M. J. Whitelaw. The academic profession: An international perspective, Princeton, N. J.: Carnegie Foundation for the Advancement of Teaching, 1994.
[5] J. Enders. Crisis? What Crisis? The Academic Professions in the 'Knowledge' Society. Higher Education, 38, 1, 71-81, 1999.
[6] H. Giroux. Neoliberalism, corporate culture, and the promise of higher education: The university as a democratic public sphere. Harvard educational review, 72(4), 425-464, 2002
[7] R. Gill. Academics, cultural workers and critical labour studies. Journal of Cultural Economy, 7(1), 12-30. doi: 10.1080/17530350.2013.861763, 2014.
[8] Y. Orr and R. Orr. The death of Socrates. Australian Universities' Review, 58(2), 15-25, 2016.
[9] C. E. Hargreaves, J. P. De Wilde, B. Juniper and E. Walsh. Re-evaluating doctoral researchers' well-being: what has changed in five years? Graduate School Imperial College London Http://Www.Imperial.Ac.Uk/Media/Imperial-College/Study/Graduate-School/Public/Well-Being/Wellbeing-for-GS.Pdf, (Imperial College London), 2014
[10] P. C. Jackman, R. Sanderson and L. Jacobs. Developing inductions to support mental health and wellbeing in doctoral researchers: Findings from a qualitative co-design study with doctoral researchers and university stakeholders. European Journal of Higher Education. https://doi.org/10.1080/21568235.2021.1992293, 2021
[11] C. M. Golde. The role of the department and discipline in doctoral student attrition: Lessons from four departments. The Journal of Higher Education, 76(6), 669-700, 2005.
[12] J. A. Toews, J. M. Lockyer, D. J. Dobson, E. Simpson, A. K. W. Brownell, F. Brenneis, G. S. Cohen. Analysis of stress levels among medical students, resident, and graduate students at four Canadian schools of medicine. Academic Medicine. 72(11), 997-1002, 1997.
[13] Barry, K. (2018, June 25). Mental health risks in research training can no longer be ignored. LSE Impact Blog. https://blogs.lse.ac.uk/impactofsocialsciences/2018/06/25/mental-health-risks-in-research-training-can-no-longer-be-ignored/
[14] M. Turk. "Abandoned to ourselves": Challenges and experiences of professional socialization of junior researchers into teaching at universities in Croatia // ALL ABOUT PEOPLE: RELEVANCE OF SCIENCE AND

EDUCATION / Mertik, Matej (ur.). Maribor: Alma Mater Europaea, 340-341, 2020.

[15] Reducing the precarity of academic research careers. OECD Science, Technology and Industry Policy Papers, 2021.

GENERATION Z IN DUAL EDUCATION AND AT THE WORKPLACE

Norberta Sági

John von Neumann University,
10 Izsáki Rd., Kecskemét, Hungary
sagi.norberta@nje.hu

Keywords: *Generation Z, workplace, selection, expectations, skills*

1. Introduction

Human resource management constantly faces challenges. The appreciation of practical knowledge over theoretical knowledge, the acceleration of the industrial revolution and digitalization, the generational change in the labor market, the challenges of the economic environment and global health problems are just some of the conditions in which HR professionals today have to manage the organization's workforce related tasks. [1]

Seeing the possibilities inherent in dual training, I have chosen a segment of the integration of generation Z into the labor market as my scope of research: I am examining the expectations of companies towards young people, dual students, and at the same time the knowledge about the companies' expectations among the students. [2,3]

2. Methodology

To examine the topic, I planned questionnaire surveys among dual students (239 persons) and companies (58 companies) participating in dual training. Before the questionnaire survey, I conducted an exploratory conversation with HR managers of companies who recruit and employ dual students. The partner companies of John von Neumann University (JvNU) were contacted in the period January-March 2023. Most partner companies select dual students usually in January, so the companies' HR and selection staff were able to participate in filling out the questionnaires with up-to-date knowledge.

The other half of the research was conducted among full-time, undergraduate, dual students studying IT, economics and engineering with active student status at the JvNU. All dual students participated in the survey, regardless of the semester they were in.

3. Results & Discussion

As far as companies are concerned, *good task and problem-solving skills* (average 6.96) and the tendency to *fit in and work in groups* (7.21) were considered very important (on the Likert scale 1-8). *Asking questions* (7.04), *text comprehension* (7.25), *clarity* (7.25) are outstanding in oral communication, and among human qualities, *politeness* (7.0) and *sense of responsibility* (6.96) received the highest average values, while among the motivational tools *recognition of work* (7.0), *working*

conditions (6.96) and *the possibility of advancement* (7.08) proved to be the most effective.

Good task and problem-solving ability (7.2), *text comprehension* (7.27), and *clarity* (7.4) are considered by large companies to be above average important, and overall it can be concluded that for all the expectations mentioned above, they are the highest in large companies. Regarding the expectations of large companies, *the Hungarian results* received the lowest average score (3.73), which suggests that they do not see a connection between the level of reading comprehension and other communication skills and the Hungarian results in secondary school.

Good language skills (an average of 5.38) is the least expected in medium-sized companies (3.86), and the expectation is above average in large companies (6.13). *Stress tolerance* (5.58 on average) is not emphasized, dual students are probably not exposed to a lot of stress. Expectations for *load capacity* and *good endurance* have also turned out to be relatively low. (5.58 on average, 4.0 for small companies). Dual students believe that the *ability to work in groups and fit in* (6.97) and *good task and problem-solving skills* (6.91) are the most important factors during selection. Within this, group work seems to be the most important for computer science engineers (7.44), while good task-solving ability was evaluated with the highest score by those studying economics (7.08). In third place is *knowledge and practicality*, which achieved an average value of around 6.22 points in all training areas.

Concerning communication skills, all training areas marked *clarity* as the most important (7.31 on average), followed by *professionalism* (7.29) and *good oral expression* (7.07).

Good appearance received a rather low average score for companies (5.83), the students rated it at 6.69, but this can be explained by the fact that good appearance for Generation Z presumably does not mean the same thing as it does for employers. We see the highest average score for *the sense of responsibility* (7.34), which reached an outstanding value of 7.75 points in the IT field.

According to the results, the *possibility of advancement* (7.31) and the *possibility of self-training* (7.27) are the most significant in motivating dual students at work, and here the average score of all training areas is around the average. This is followed by *good working conditions* (7.0), which is the most important for IT engineers (7.56). In addition to the *possibility of advancement* and *self-education*, *recognition of their work* is most important for students studying in the field of economics.

4. Conclusions

Examining the results and significance values by training area, we see that there are significant differences between student and company responses in Technical programs: prior practical experience, IT knowledge, good endurance, load capacity, good practical skills in the case of sense and good manual dexterity. In Economics training area, only good endurance and load capacity were not sufficiently known to the students. In IT training, there was no significant difference between company and student responses.

In the current labor market, we can meet representatives of several generations who have different expectations of their employers. Members of Generation Z (born after 1995), who are just before or at the beginning of their professional careers, are a particularly noteworthy group. The future employers have to prepare for the workplace needs and work-related expectations of this generation, to develop appropriate human resources strategies for their successful workplace integration.[4,5]

References

[1] T. Aharon: Generation Z: Characteristics and challenges to entering the world of work. Cross-Cultural Management Journal Volume XXIII, Issue 1/2021.pp 107-115. 2021.
[2] M. Bartczak – A. Szymankowska: Self–Assessment of the Usefulness for Work of Young People from Generation Z and Their Opinion on the Expectations of Employers. pp.107-129. 2021.
[3] T.N. Ngoc – M.V. Dung – C.Rowley – M. Peji´c Bach: Generation Z job seekers'
[4] expectations and their job pursuit intention: Evidence from transition and emerging economy. In: International Journal of Engineering Business Management Volume 14: pp 1–13. DOI: 10.1177/18479790221112548, 2022.
[5] H.Schroth: Are You Ready for Gen Z in the Workplace? In: California Management Review Vol. 61(3) pp. 5–18. DOI: 10.1177/0008125619841006, 2019.
[6] Bohdziewicz, P. (2016): Career Anchors of Representatives of Generation Z: Some Conclusions for Managing the Younger Generation of Employees. HRM(ZZL)_2016_6(113) pp.57-74. 2016.

BACHELOR THESES IN THE DUAL SYSTEM. A KNOWLEDGE TREASURE FOR OPEN QUESTIONS AND TOPICAL SOLUTIONS

Joerg Mielebacher[1*] and Dirk Saller[2]

[1, 2]Cooperative State University Baden-Wuerttemberg, Mosbach, Germany
[*] Corresponding author Email: joerg.mielebacher@mosbach.dhbw.de

Keywords: *Text mining, Data mining, Trend analysis, Theory & Practice combination*

1. Introduction

Effectively combining theory and practice is crucial for dual study programs [1]. Cooperative State University Baden-Wuerttemberg offers dual study programs together with approx. 9.000 partner companies. Understanding market trends and identifying necessary competences are essentials steps in adapting theoretical education to the current and future needs of partner companies. Previous work [2] showed that systematic analysis of bachelor theses in dual study programs indicate the partner companies' fields of interest and their need for competences. While initial approaches aimed at a proof-of-concept based on string-based pattern matching, further data mining and text mining tools are now investigated, in order to gain further insights into needs and characteristics of partners and students.

2. Methodology

In [2], a total of 119.374 topics of bachelor theses has been merged into a dataset that covers 36 courses and 12 sites between 2009 and 2022. Metadata has been added, including study program, branch and location, student's age and sex, as well as partner company and its size group. Various measures have been implemented to comply with data protection regulation and confidentiality requirements.

Current research is based on natural language processing (NLP) to identify topics of interest for every thesis. The pre-processing pipeline has been built by using Python-based NLP module spaCy [3]. Pre-processing of thesis titles involves language detection, splitting titles into words, and storing them in a relational database (MariaDB). This kind of pre-processing normalizes all inflected forms of a word into a normalized representation (lemmatization). Afterwards, each thesis title is represented by a sequence of lemmas that is combined with the corresponding metadata.

Afterwards frequencies of single lemmas and combinations of lemmas are calculated in order to identify correlations between lemma frequency and metadata (e.g. time, course, gender), and to assess similarity of topics. Additional linguistic features (e.g. position, type) are being used for more specific filtering (e.g. nouns or named entities).

3. Results & Discussion

The automatic pre-processing takes up less than 10 minutes on a common computer. Analysis focusses on German language, because only 4% of all theses have been tagged to be written in English. However, we see a high variability between the courses, e.g. up to 29% in Computer Science and 21% in Aerospace Technology.

Titles of bachelor theses include approx. 12 words. The length of titles differs between courses, with Aerospace Technology having shorter titles (8 words), while Social Economy uses two times longer titles (17 words). Therefore, titles offer a limited amount of information, which is mainly based on nouns and named entities (approx. 47% of all lemmas). Titles obviously comprise a combination of methodological lemmas as well as lemmas referring to objects.

Frequencies have been calculated along various dimensions. This has shown that the NLP-based approach is superior to basic pattern matching, because it is more robust. However, current pre-processing does not reliably recognize named entities, which needs to be improved by further training data.

The most frequent lemmas differ significantly between courses. E.g., in Computer Science and Economics, they mainly refer to a methodological context (e.g. development, analysis), while in Social Work they refer to objects (e.g. child, disability), instead of methods.Calculating lemma frequencies per year allows for identification of trends as well as constantly relevant topics (Figure 1). This is similar to approaches like Google Trends or Stackoverflow Insights. Trends could also be linked to companies or clusters of companies.

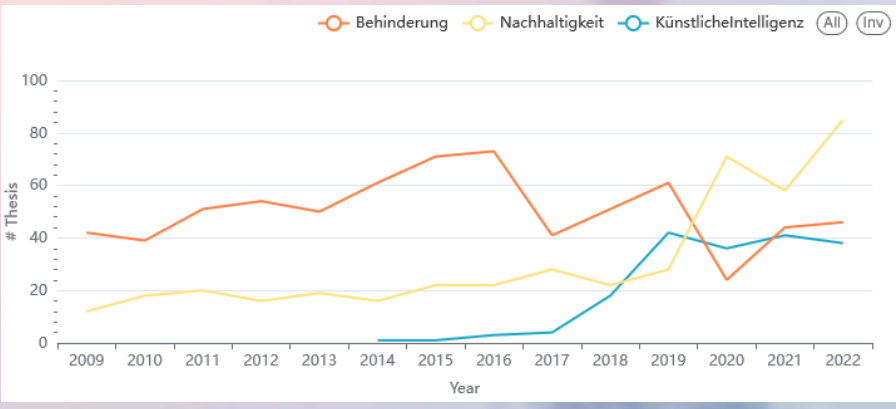


Figure 1. *Occurrence of 3 lemmas (disability, sustainability, artificial intelligence) between 2009 and 2022*

Courses differ significantly in their ratio of male and female students. We could expect the topics to be assigned to male and female students following the course-specific ratio. However, there was evidence that some kinds of topics were assigned to male or to female students more frequently.

4. Conclusions & Outlook

Recent work has provided strong evidence that systematic analysis of bachelor theses is a powerful tool for gaining insights into market trends, required competences, and effectiveness of theoretical education. However, the high variability of topics requires a high number of theses to be analysed. The number of documents could be further increased by including other written project work. Organizational and technical measures are needed to comply with data protection regulation and with confidentiality requirements. This becomes inevitable, if analysis is extended to processing abstracts and full-texts, which is a consequent next step. An important barrier is imposed by companies wanting to protect their IP, thus restricting access to theses and other project work. Therefore, it is important to actively communicate the obvious benefits that can be achieved.

References

[1] V. Gerstung und E. Deuer, „Theorie-Praxis-Verzahnung im dualen Studium: Ein konzeptioneller Forschungsbeitrag," Zeitschrift für Hochschulentwicklung, Bd. 16, Nr. 02, pp. 195-213, 2021.

[2] R. Martschiske, S. Quade, D. Saller und J. Thietke, „Praxisintegrierte Studienabschlussarbeiten. Ein Wissensschatz.," Duales Studium, Nr. 2, pp. 27-39, 2023.

[3] M. Honnibal, I. Montani, S. Van Landeghem und A. Boyd, spaCy: Industrial-strength Natural Language Processing in Python, 2020.

AN OVERVIEW OF DUAL EDUCATION IN A FRENCH ENGINEERING SCHOOL: COMMON FRAMEWORK AND SPECIFICITIES

Amélie HACALA-PERRET[1*] and Christophe MERLO[2]

[1]ESTIA Institute of Technology, University of Bordeaux, France
[*] Corresponding author Email: a.hacala@estia.fr

Keywords: *Dual Higher Education, Dual Teaching and Learning, Engineering*

1. Introduction

Training engineers requires a deep understanding of international market and companies' needs as technologies are constantly evolving in a complex world. Companies do not necessarily have the competence to integrate new tools, processes or technologies and graduates with the appropriate knowledge are a big asset when it comes to support the company growth.

In this changing world, how can engineering schools can ensure that their graduates have competencies that match industry needs? How does an 'engineering school', as a French High Education Institutions delivering eq. Master grades, can maintain strong and multiple links with companies to offer appropriate programs?

French regulations for dual training represent a very structured and strong framework for high education institutions that implement dual programs. They define the roles of each stakeholder, HEI, companies, learners, as well as the financial and educational rules that govern the construction, the implementation and the exploitation of a dual program.

2. Case Presentation

Regarding engineering schools, the CTI (Commission des titres d'ingénieurs) gives the general framework avery school has to follow e.g. number of training weeks; indicators to satisfy, number of teachers coming from industry, part of ECTS credits related to industrial training. By doing so, CTI fosters employment and competence validation by industrial companies. Within this framework, schools such as ESTIA ((Ecole Supérieure des Technologies Industrielles Avancées - Bidart) can offer a large variety of of activities to the students.

ESTIA is a perfect example of how a program can be created from companies' needs. The very first idea of creating an engineering school in the Basque Country came from the Chamber of Commerce of Bayonne Basque Country. The purpose of this organization was to support the economic development of the area as in the 1980's, industrial companies were struggling to recruit high skilled employees. The decision was made to create an engineering school, focusing on the topics where local companies were expecting to recruit.

By multiplying interactions between ESTIA and industry, it becomes easier to identify the needs. Specific events such as 24h of Innovation, job forums and company visits during internships or apprenticeships are a way to gather information. Moreover, the support of an industrial Foundation is a way to get industrial input. The challenge is then to qualify the information and decide whether it should be included in a program. Organizing a program can be seen as maintaining an equilibrium between certification constraints, academic requirements, industrial inputs and also administrative and logistical limitations. Characterizing a program by 'targeted competences/skills' was the approach chosen to guarantee the coherency between academic and industrial world.

If apprenticeship and internship is the most common and straightforward form of Dual Education, multiple forms of Dual Education have been implemented in ESTIA over the years. Several examples can be given, e.g. the creation of specific modules called expertise. The objective is to co-design a module answering a company need on a specific topic and associating an academic to provide the knowledge. This is a win-win situation where all stakeholders increase mutually their knowledge and initiate fruitful collaborations:

- Technology providers or users directly train students and may engage future relationships with some of them, for future jobs or internships.
- Academics teach associate theoretical knowledge so that students deeply understand the fundamentals.

3. Results & Discussion

When working in companies, students acquire new hard and soft skills [1,2] that we measure. The evaluation of a skill is based on the definition of [3] which implies that the acquisition is directly linked to the working situation of the learner.All companies are required to measure the skills of their apprentices or interns using three axes:

- Individual skills: they address the organizational, personal and cultural dimension of the ESTIA learners, in their ability to integrate themselves into an organization (communication, know-how, search the right information…), in an international context, as well as in their personal ability to self-evaluate, to evolve and make professional choices.
- Company skills: they highlight adaptation to the specific requirements of the company. The ESTIA learner must know how to take into account the strategy and constraints of the company, such as economic, societal or human issues, and to manage projects.
- Scientific and technical skills: they directly relate to the technological disciplines necessary for the ESTIA learner. Covering broad engineering fields, they determine its capacities for analysis, synthesis, characterization or implementation of modeling and problem-solving methods for developing products or improving complex systems.

Asking the company to evaluate skills opens a valuable discussion over what is expected and enables to give the right orientation to the training.

4. Conclusions & Recommendations

In France, dual higher education is completely integrated in the education system, with strong regulations that define the 'rules' for HEI as well for companies. It is a tremendous opportunity for a student to immerse himself within a real industrial environment long before the end of his program. Nevertheless, it also come with considerable constraints that make it difficult for HEI to organize programs and for students to experience other activities such as academic mobility.

References

[1] Robles, M. M., Executive Perceptions of the Top 10 Soft Skills Needed in Today's Workplace, *Business Communication Quarterly*, 2012, Vol. 75, No. 4, pp. 453-465, DOI: 10.1177/1080569912460400P.
[2] WEF, The Future of Jobs, *Report 2020*, 2020, https://www.weforum.org/publications/the-future-of-jobs-report-2020/
[3] Le Boterf, G., Développer et mettre en oeuvre la compétence : Comment investir dans le professionnalisme et les compétences, *Editions Eyrolles*, 2018

FROM THEORY TO PRACTICE: DUAL STUDY PROGRAMS REDEFINING HIGHER EDUCATION IN SERBIA

Vesna Alivojvodic*, Filip Krivokapic and Aleksandra Nastasic

The Academy of Applied Technical Studies Belgrade, Belgrade, Serbia
* valivojvodic@atssb.edu.rs

Keywords: *Dual model of studies, higher education, Serbia*

1. Introduction

Rapid technological progress presents numerous challenges in various fields, including education. However, the key to overcoming these challenges is to devise productive approaches to address them and adapt to new circumstances. The alignment of education with technological and economic development allows young individuals, by acquiring high-quality education, to build a foundation for a successful career in the future. However, it can also represent a strong potential for developing a country's economy. For the Republic of Serbia, the dual study model for higher education represents an innovative approach that provides students with a unique opportunity to improve their competitiveness in the labour market while providing the economy with a qualified workforce.

2. Case Presentation

There are four types of higher education institutions (HEIs) in Serbia: universities, Colleges of Academic Studies, Colleges of Applied Studies, and Academies of Applied Studies (which integrate multiple vocational colleges).

The Law on the Dual Model of Studies in Higher Education (hereafter: 'Law') was adopted by the National Assembly of the Republic of Serbia in 2019 (Official Gazette No. 66/2019) [1]. This Law aims to increase the relevance of higher education and improve graduates' employability by modernizing the education process in cooperation with the economy and using modern technological advancements. By development of curriculums in higher education study programs, some of the main objectives of the Law are outlined: providing conditions for the acquisition, improvement, and development of students' competencies by the needs of the labour market; contributing to strengthening the competitiveness of the economy of the Republic of Serbia; to provide conditions for more accessible employment after completing higher education, as well the conditions for further education and lifelong learning [1]. Higher education institutions (HEIs) can organize study programs with a dual education model in two ways: through academic or vocational studies. This model allows students to acquire, enhance, and develop their knowledge, skills, abilities, and attitudes through active teaching at the HEIs and practical training with an employer. The Law mandates that students sign an employment-based learning contract with the employer. The student work is not considered typical work but is a form of learning through work, where they acquire skills needed to improve their competencies.

The employer decides whether to hire a student based on their job performance and matching profession. Students can choose between dual education or traditional study programs before college enrollment. The institution of higher education allows students to switch between a dual education model and traditional studying. This educational approach demands significant effort and rigour but provides young individuals with invaluable practical skills and competencies.

3. Results & Discussion

Developing essential skills can significantly increase students likelihood of success in the workplace. This type of education allows active participation in developing future personnel, reducing long-term costs associated with the search for qualified staff.

In 2022, The Office for Dual Education and the National Framework of Qualifications ("Official Gazette of RS", No. 124/22) was established as the office in service of the Government with the mission to ensure the quality of education, further implementation of the dual model, and improvement of the national framework qualifications, by developing standards that assure quality in the process of obtaining qualifications, as well as their comparability and recognition with qualifications acquired in other countries [2]. Continuous and high-quality intersectoral cooperation and institutional partnership at various national, regional, and local levels are essential for successfully implementing the National Model of Dual Education [3]. The office aims to make dual education a personal choice for young people by 2030 by developing a platform that will guarantee a secure career.

Since the introduction of the Law, three Universities, eight Academies of Applied Studies, and one College of Applied Studies have accredited programs with a dual study module. In total, 46 study programs are active, with two academic and 34 applied study programs at the bachelor's level (currently, eight applied bachelor's level programs are in the accreditation process). At the master's level, the accreditation process passed two academic and eight applied study programs [4]. One academy of applied studies stands out: The Academy of Applied Technical Studies Belgrade has accredited alone 22 study programs with a dual education model (of which eight are master's programs).

Companies that recognize the significance of this type of education are indispensable partners in implementing dual profiles for the dual study model. By providing significant support in developing new dual-education study programs, they contribute to the future workforce's growth by welcoming new entrants and employees.

4. Conclusion

Rapid technological progress is accompanied by challenges, especially in the education sector. The solution lies in proactive approaches, such as the approach given by the innovative dual studies model in Serbia in 2019. The adopted model aligns higher education outcomes with real economic needs and technological progress, combining academic learning with practical training. This approach creates

conditions for the production of a qualified workforce, ready to support the further development of the Serbian economy. The results achieved in developing new dual study profiles in higher education support the set goals.

References

[1] Zakon o dualnom modelu studija u visokom obrazovanju, Official Gazette of the Republic of Serbia, No 66/2019, http://nsvo.gov.rs/wp-content/uploads/2020/02/Zakon-o-dualnom-modelu-studija-u-visokom-obrazovanju_-66_2019-3.pdf?script=lat

[2] The Office for Dual Education and the National Framework of Qualifications, *The national qualifications framework*, https://dualnok.gov.rs/en/about-nqfs/ (accessed on February 2024)

[3] G. Grujić, Dual Education in the Republic of Serbia, Chinese Business Review, 20(4), 140-147, 2021. doi: 10.17265/1537-1506/2020.04.003

[4] The Office for Dual Education and the National Framework of Qualifications, *National database of dual profiles for dual study model*. https://dualnok.gov.rs/visoko-obrazovanje/ (accessed on February 2024)

Theme 2:
Track 1

Future of Work – Skills for the Future Workplace

DEMOGRAPHIC PERSPECTIVES AS A CHALLENGE FOR LOCAL EUROPEAN LABOUR MARKETS: ANALYSIS OF THE AGING PROCESS OF COMMUNITIES AND INNOVATIVE SOLUTIONS IN THE SOCIAL CARE SYSTEM

Patrycjusz Zarębski[1] and Dominik Katarzyński[1*]

[1]Faculty of Economics Sciences, Koszalin University of Technology,
Eugeniusza Kwiatkowskiego 6e, 75-343 Koszalin, Poland
[*] Corresponding author Email: dominik.katarzynski@tu.koszalin.pl

Keywords: *Demographics, labour market, innovations, social care, aging population*

1. Introduction

Modern societies grapple with the challenge of an aging population (Figure 1), exerting a substantial influence on local labour markets and the elderly care system [1]. This article delves into the analysis of demographic perspectives as a pivotal challenge for local job markets, concurrently emphasizing the imperative for training new professionals in the utilization of emerging technologies and their integration into the workforce. Furthermore, the article will present exemplary practices and innovative solutions currently applied within the elderly care system.

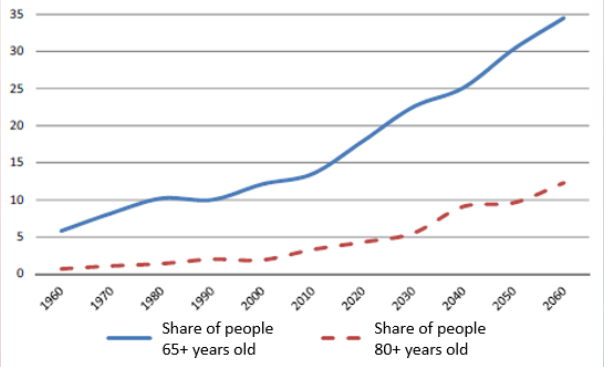


Figure 1. *Share of people 65+ and 80+ years old in Poland (1960-2060).*

The introduction to the demographic challenge offers a concise characterization of current demographic trends and highlights the crucial role of local labor markets in maintaining community stability. The research questions center on the influence of the aging process within communities on local job markets, the primary challenges posed by demographic changes for businesses and institutions, and the role of emerging technologies in bolstering employment.

2. Methodology

The analysis of the community aging process includes reviewing current demographic data and identifying factors influencing this progression [2]. The examination of the community's aging impact on local labor markets involves analyzing changes in employment structures and workforce efficiency within the context of a maturing workforce.

3. Results & Discussion

Within the business domain, the article addresses challenges related to adapting recruitment strategies to the changing demographic structure. It emphasizes the necessity of training new professionals in leveraging modern technologies in the workplace to increase workforce efficiency across various age groups [3].

In the context of public institutions, the article explores the imperative of ensuring adequate social benefits for the expanding senior demographic and utilizing modern technologies for improved organization and delivery of social care services. Simultaneously, it underscores the need to prepare professionals for working with new tools [4]. The article will showcase current best practices and innovative solutions effectively applied in the elderly care system.

The article places significant emphasis on the role of new technologies in the elderly care system, presenting innovative technological solutions such as telemedicine and self-assistive technologies for seniors. The analysis of the benefits arising from the integration of modern technologies into elderly care highlights workforce alleviation and underscores the crucial need to educate professionals capable of effectively utilizing these advanced tools.

4. Conclusions

The article's conclusion outlines the main findings of the analysis, emphasizing the crucial role of new technologies in addressing demographic challenges. The article aims to present a comprehensive approach to the demographic issue, considering both demographic changes and the necessity of educating new professionals in the field of emerging technologies. By identifying opportunities for integrating innovative solutions into the elderly care system [5] as a tool to support local labor markets, the article advocates for a modern approach to the complex challenges of an aging society, while simultaneously recognizing the need for education and skill development in the realm of new technologies.

The conclusions highlight the imperative for adaptation in both the labor market and the elderly care system amidst demographic shifts. The proposed strategies advocate for the integration of new technologies as a pivotal element in supporting an aging society. Additionally, emphasizing the necessity of educating new professionals in modern technologies, coupled with the presentation of best

practices and innovative solutions, constitutes a substantial contribution to the ongoing discourse on the future of societies, considering the challenges posed by the aging process within communities.

References

[1] M. Cristea, et al. The impact of population aging and public health support on EU labor markets. *International journal of environmental research and public health* 17(4) 1439, 2020.

[2] D. E. Bloom, et al. Global population aging: Facts, challenges, solutions & perspectives. *Daedalus* 144(2) 80-92, 2015.

[3] F. O. Oderanti, et al. Business models for sustainable commercialisation of digital healthcare (eHealth) innovations for an increasingly ageing population. *Technological Forecasting and Social Change* (171) 120969, 2021.

[4] T. Sobotka, A. Fürnkranz-Prskawetz. Demographic change in Central, Eastern and Southeastern Europe: Trends, determinants and challenges *in 30 Years of Transition in Europe: Looking Back and Looking Beyond in CESEE* countries. Holzmann, D. Ritzberger-Grünwald, & H. Schuberth (Eds.): 196-222, 2020.

[5] G. Cicirelli, et al. Ambient assisted living: a review of technologies, methodologies and future perspectives for healthy aging of population. *Sensors* 21(10) 3549, 2021.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

TACKLING THE BURNOUT CRISIS IN FEMALE DOMINANT INDUSTRIES. CASE: PROMOTING WORKPLACE WELLBEING OF PINK-COLLAR WORKERS IN FINLAND AT EU4DUAL

Merja Ala-Kotila[1*] and Paola Rosales Suazo De Kontro[1] and Antti Kotimaa[1]

[1] Savonia University of Applied Sciences, Wellbeing research unit
Microkatu 1, 70210 Kuopio, Finland
[*] Corresponding author: merja.ala-kotila@savonia.fi

Keywords: *Burnout, workplace wellbeing, pink-collar workers, humane leadership*

1. Introduction

The current work environment is changing rapidly and therefore it needs a comprehensive approach and innovative solutions to tackle the existing and future work life challenges. This paper addresses the importance of supporting more comprehensively worker wellbeing and preventing burnout in the current and future scenarios of work. Factors such as technological development, labor markets requirements, societal changes and globalization bring out diverse scenarios and opportunities. To align with the European Commission's initiative for a sustainable, human-centric, and resilient European industry 5.0, comprehensive measures are needed to address better work wellbeing, workability, and effectiveness. Burnout is a global occupational syndrome that poses a significant risk for exclusion and impedes economic growth. WHO defines burnout as *"A syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed*". Its symptoms are lack of meaning, exhaustion, and depersonalization. [1.] Post-Covid-19 crisis, Finland has witnessed a rise in burnout symptoms, particularly among workers under age 36, with women experiencing higher rates due to sectoral gender imbalances. [2,3,4.]

2. Case presentation

Savonia University of Applied Sciences has strong experience of work wellbeing related ESF funded projects e.g. Vireeksi-project [5]. In September 2023, Savonia launched a new 2,5-year ESF+ project "Promoting well-being of Pink-Collar workers in Finland". Recruiting 200 workers and 50 superiors from various professions such as nurses, early childcare teachers, and employees in cleaning and municipal central kitchen roles (so called pink-collar workers) in the North-Savo region, the project aims to prevent burnout and enhance work wellbeing and work-life balance. The project utilizes three level socio-ecological approach to tackle the burnout crisis. In the individual and organizational level, the coaching will be executed as one-year long hybrid modules.

2.1 Individual level: Workers receive hybrid coaching to support their work wellbeing and capabilities through a salutogenic approach. Coaching provides tools to support healthy lifestyle habits related to nutrition, exercise, sleep, and green empowerment, transforming knowledge into daily life actions.

2.2 Organizational level: Work communities will be provided coaching, including guidance on promoting healthy lifestyle habits within the work community level and improving communication between managers and workers. Additionally, managers will participate in tailored coaching sessions focusing on acquiring knowledge about humane leadership paradigm, with a simultaneous emphasis on supporting their own work well-being.

2.3 Society level: A work-life balance model will be developed as a result of the project, to support the quality of work life and work wellbeing with a work-life balance viewpoint. In addition, the project will contribute to the society level discussion of burnout prevention and how to enhance the quality of work through humane, equality and sustainable viewpoints.

3. Results & Discussion

The workers' and managers' work wellbeing are being supported through the activities of the project. The burnout of workers is expected to be diminished and prevented, and the number of sick leaves to be reduced. Workers will be given concrete tools to enhance their own wellbeing as well as work-community level will be improved. Managers will have the know-how to utilize humane-leadership tools in their work to support workers' overall wellbeing. In addition, a work wellbeing model will be developed as a society level result of the project. The model's intention is to support a more balanced and sustainable work life and to prevent workers' burnout.

Through the three-level approach, the project seeks to demonstrate that burnout is not solely an individual issue, but also an organizational and society level issue. Therefore, development actions need to be implemented on all these levels. A comprehensive and preventive approach is needed to gain a higher impact. It´s important to provide support especially for young professionals, ensuring they can have a long and healthy career. It is far more cost-effective to prevent new burnouts from occurring than to improve the condition of those already experiencing symptoms. Workplaces that support and enhance workers' wellbeing pursue a sustainable organizational culture and inclusive society.

4. Conclusions & Recommendations

The impact of this paper is to increase awareness of burnout as a significant threat to our current and future work, especially in pink-collar industries. Secondly, it gives an example of a concrete and comprehensive project to tackle the burnout crisis with the three-level approach. Thirdly, it gives a perspective that human centered actions and humane leadership approach in the organizational settings can be one solution to ensure the attachment, wellbeing, and efficacy of workers. In addition, we must give more attention to humane perspective in the rapidly changing digitalized environment.

Lastly, RDI projects are essential in translating the knowledge of recent studies into practical actions and developing innovative solutions for our modern work life. The overall well-being of individuals is integral to a thriving society and therefore it is pivotal to support comprehensively workers' overall wellbeing, workability, and

balance between work and free time. By investing in people, we can be forerunners of sustainable, humane and equal future of work.

References

[1] World Health Organization. "ICD-11 for Mortality and Morbidity Statistics, QD85 Burn-out." *International Classification of Disease*, 2019.

[2] M. Lee, and C. Cha. Interventions to reduce burnout among clinical nurses: systematic review and meta-analysis. *Scientific Reports*, *13*(1), 10971, 2023.

[3] H.Sutela and A.Pärnänen. Koronakriisin vaikutus palkansaajien työoloihin. Title in English: The impact of the covid crisis on employees' working conditions. Statistics Finland, 2021

[4] Finnish Institute of Occupational Health."Study on Finland's well-being". Miten Suomi Voi-Tutkimus, 2023.

[5] ESF-Vireeksi-project: Promotion of heavy-duty vehicle driver´s well-being at work. https://www.eura2014.fi/rrtiepa/projekti.php?projektikoodi=S21959, 2023.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

A GAMIFIED MOBILE SOLUTION TO IMPROVE DRUG CALCULATION SKILLS IN HEALTHCARE EDUCATION

Antti Kotimaa[1*] and Mikko Myllymäki[2]

[1] Savonia University of Applied Sciences, Wellbeing research unit
Microkatu 1, 70210 Kuopio, Finland
[*] Corresponding author: antti.kotimaa@savonia.fi

[2] Savonia University of Applied Sciences, Continuous education

Keywords: *Gamification, healthcare education, mobile learning, drug calculation*

1. Introduction

Patient malpractice resulting from false medical treatment remains a significant concern in healthcare facilities [1]. To address this issue, high-quality education is crucial, especially in the field of healthcare [2]. Digital tools and mobile apps offer agile and effective ways to enhance challenging areas of study [3]. Gamified methods are recognized for their engaging and captivating nature, effectively fostering learning through repetitive practice. Gamification has been identified as a promising method for enhancing learning, highlighting the potential of gamification to engage and motivate learners, personalize learning experiences, and improve knowledge retention, collectively underscoring its value in healthcare education. [4,5]

2. Case presentation

Our team developed a game tailored to enhance drug calculation skills, aiming to transform the typically challenging and mandatory education into an engaging, enjoyable, and easily accessible experience. The content of the game was designed together with experts and lecturers that teach drug calculations. The technical development was outsourced to ensure a seamless user experience. The game was officially launched in February 2020 on both Google Play and the App Store. In this abstract, we delve into the primary user data analytics obtained from the Google Play store, concentrating solely on this platform.

We administered a qualitative questionnaire targeting healthcare students to elicit feedback regarding the game's impact on learning, its effectiveness in understanding drug calculations, the comparative ease of learning with the game versus traditional methods, and the most significant advantages perceived in gamified learning. Through this questionnaire, we aimed to gain insights into the practical utility and user perceptions of our gamified approach to healthcare education.

3. Results & Discussion

Within the first month following its release, the game attracted nearly 3000 users. Since its debut on the Google Play store exclusively, the app has been downloaded on over 12,500 active devices. Presently, there are approximately 3000 monthly active users, and the game maintains an average rating of 3.79 on Google Play.

Biggest advantages: The feedback highlights the game's effectiveness in simplifying complex calculations, offering clear instructions, and aiding in practical understanding through visual aids. Users appreciate its versatility, encompassing both basic and specialized calculations commonly encountered in exams. Furthermore, they note the game's role in reinforcing concepts and fostering long-term improvement, albeit requiring persistence. However, some negative feedback has surfaced, primarily concerning technical glitches and bugs stemming from the diverse range of Android software and devices.

Ease of learning: Users appreciate the ability to engage with problems independently without immediate answers, the convenience of accessing the game anytime and anywhere via their phones, and the visual aids provided within the app, especially for unit conversions and dosage calculations. Additionally, the game's colorful and clear tasks create a more enjoyable learning environment, facilitating practical learning experiences.

Applicablity to professionals: The responses affirm the game's suitability for nursing professionals, particularly in refreshing memory on drug calculations and aiding in retaining essential information. Users express confidence in utilizing the game to reinforce their knowledge and recommend it to others in the field, emphasizing its relevance to nursing practice, especially concerning medication dosage calculations.

4. Conclusions & Recommendations

The responses from healthcare students underscore the global challenge of mastering drug calculations in healthcare education. The successful implementation of the LääkeMaisteri game in Finland, supported by user data analytics, showcases its efficacy in bridging this educational gap. To further enhance the game's reach and impact, we are expanding its content. We are currently developing a Swedish translation version and have plans for an English version, aiming to make the game accessible to a broader international audience.

The positive feedback received from users affirms the potential of gamified learning methods in healthcare education and suggests its applicability across various healthcare fields worldwide. As such, the gamification approach holds promise for revolutionizing learning experiences beyond drug calculations, potentially benefiting diverse healthcare professionals and students globally.

References

[1] S. Berdot, F. Gillaizeau, T. Caruba, P. Prognon, P. Durieux, B. Sabatier. "Drug Administration Errors in Hospital Inpatients: A Systematic Review." PLoS ONE, vol. 8, no. 6, p. e68856, Jun. 2013.

[2] S. Stolic. "Educational strategies aimed at improving student nurse's medication calculation skills: a review of the research literature." Nurse education in practice. Nurse Educ. Pract., vol. 14, no. 5, pp. 491-503, Sep. 2014

[3] P. Lall, R. Rees, G. C. Law, Gerard Dunleavy, Živa Cotič, J. Car. "Influences on the Implementation of Mobile Learning for Medical and Nursing Education:

Qualitative Systematic Review by the Digital Health Education Collaboration." J. Med. Internet Res., vol. 21, no. 2, p. e12895, Feb. 2019

[4] A.E.J. van Gaalen, J. Brouwer, J. Schönrock-Adema, T. Bouwkamp-Timmer, A.D.C. Jaarsma, and J.R. Georgiadis, "Gamification of health professions education: a systematic review," Adv. Health Sci. Educ. Theory Pract., vol. 26, no. 2, pp. 683-711, May 2021.

[5] R. Garett and S. Young, "Health Care Gamification: A Study of Game Mechanics and Elements," Technol. Knowl. Learn., vol. 24, 2019.

SKILLS FOR THE FUTURE WORKPLACE IN INDUSTRY 5.0

Szilvia Varga

Language Teaching and Examination Centre, John von Neumann University,
10 Izsáki Rd., Kecskemét, Hungary
varga.szilvia@ nje.hu

Keywords: *Industry 5.0, technological skills, soft skills, fusional skills*

1. Introduction

This abstract explores the essential abilities individuals need to navigate and thrive in the current professional environment of Industry 5.0. It is a new concept which refers to an emerging phase of industrialization that focuses on robots and smart machines working alongside people. Industry 4.0 concentrated on technologies such as the Internet of Things and big data, among others. However, Industry 5.0 intends to complement the advances made in Industry 4.0. Industry 5.0 represents a paradigm shift towards a human-centric design solution, fostering ideal collaboration between ideal human companions and collaborative robots (cobots). This innovative approach also influences the capabilities of enterprise social networks to support personalized autonomous manufacturing [1, 2].

2. Case Presentation

Industry 5.0 is characterised by three elements: a human-centric approach, resilience, and sustainability. Human-centric approach recognizes people's individualities and personal skills. This means that rather than people serving organisations, organisations will serve people [1]. Industry 5.0 refocuses on creating added value for workers with the aim of attracting and keeping the best employees.

The second important dimension of the Industry 5.0 is resilience. It is the ability to recover from setbacks, adapt to changes. It involves not only overcoming difficulties but also learning from experiences, building strength, and developing an ability to work in unfavourable conditions. Individuals, communities, and systems that show resilience can effectively cope with adversity and continue to grow and evolve.

Industry 5.0 actively aims to extend the concept sustainability that involves the responsible and balanced use of resources to ensure the longevity and well-being of both the present and future generations. These guidelines suggest that human, environmental and social aspects are expected to come to the fore. The human-centric approach creates an environment for the new generation of workers that encourages them to develop and collaborate; in this way, they can contribute to their full potential.

The technological changes pose a challenge to education because the convergence of artificial intelligence, robotics, the Internet of Things (IoT), and human-machine collaboration demands a multifaceted skill set from individuals entering the workplace.

3. Discussion

To effectively address the challenges of our era, prospective employees must demonstrate proficiency in both hard and soft skills e.g. technological proficiency, adaptability, cross-disciplinary collaboration, data literacy, and sustainability awareness [1,3,4]. The role of professionals expands beyond technical expertise. In the traditional discipline-specific programmes, the essential aim is to transmit blocks of knowledge in distinct specialist packages. However, research studies suggest that an integrated approach must be introduced in the curriculum design which promotes and enables the integration of disciplinary knowledge. This approach suggests breaking the old classifications and enabling learners to see knowledge in a more contextual way [3, 4]. Daugherty and Wilson suggest that the human-machine collaboration will require new “fusion skills”. An important fusion skill might be to “reimagine how AI can be utilized as a resource to change the way we learn or work [3, 4].

According to the human-centric approach there should be increased emphasis on soft skills. They are personal attributes and interpersonal qualities that enhance individuals’ interactions, communication, and enable them to work effectively with others. Effective communication is the cornerstone of successful collaboration within any organization. Soft skills such as active listening, clarity in expression, and the ability to convey complex ideas in a comprehensible manner are vital for facilitating smooth interactions. In a diverse and globalized workforce, the capacity to communicate across cultures and languages promotes understanding and teamwork.

Education attempts to support students’ progress in these skills. One of the most important teaching tools for improving the skills mentioned above is project-based learning (PBL). PBL engages students in first hand experiences, allowing them to apply theoretical knowledge to practical situations and develop critical thinking skills in a realistic context. Furthermore, dual education system, which combines theoretical classroom learning with practical on-the-job training, develops a diverse set of skills, including technical skills related to their field of study and essential soft skills as well. This makes the students well-rounded and adaptable professionals.

4. Conclusions & Recommendations.

Industry 5.0 can be viewed as enhancing the progress achieved in Industry 4.0, aiming to support humans rather than replace them. It is reshaping the future of work, as technology continues to advance industries become more interconnected. Current research studies found that the new era requires a combination of hard and soft skills, and even fusion skills [1,3,4]. This abstract gave a brief review of the skills future employees must acquire, and it intends to be a start of a research project. Future directions include a more extensive literature review and empirical research involving dual partners and the students taking part in the dual education to get insight into the competencies to be successful at future workplaces, and to gain a comprehensive understanding of the dimensions and development of these skills. The anticipated results could be harnessed to improve the effectiveness of the training system.

References

[1] European Commission, Directorate-General for Research and Innovation, Breque, M., De Nul, L., Petridis, A. (2021). Industry 5.0: towards a sustainable, human-centric and resilient European industry, Publications Office of the European Union. https://data.europa.eu/doi/10.2777/308407
[2] Maddikunta, P.K., Pham, V.Q., Prabadevi, B., Deepa, N., Dev, K., Gadekallu, T.R., Ruby, R., & Liyanage, M. (2021). Industry 5.0: A survey on enabling technologies and potential applications. J. Ind. Inf. Integr., 26, 100257
[3] Daugherty, P. & Wilson, J. (2019) Human + Machine: Reimaging Work in the Age of AI. Boston, Mass. Harvard Business Press.
[4] Mitchell, J., & Guile, D. (2022). Fusion Skills and Industry 5.0: Conceptions and Challenges. Intech Open. doi: 10.5772/intechopen.100096

THE HEIS OF ARMENIA EMBRACE THE PRINCIPLES OF INDUSTRY 5.0

Dr. Lilit Sargsyan

Yerevan State University Associate Professor

RA Representative of the BFUG WG on L&T

The Higher Educational Institutions of Armenia are navigating the transformative landscape of the Fifth Industrial Revolution to bridge the skillset gap in the labor market and develop future-proof students for them to be able to contribute to the technological developments and societal well-being of the country. As this new phase of industrialization marks a departure from the traditional focus on efficiency and productivity, placing a strong emphasis on a person-centeredness, sustainability and resilience, the HEIs of Armenia gear towards reforming their curricula by fostering transformative approach to learning and teaching denoting continuous professional development of academic staff, student-centered learning experience in a digitalized environment to improve the employability of students and graduates. To be able to fully align their curricula with the principles of Industry 5.0, the leading Tertiary Level Institutions of Armenia have reiterated their commitment to responsible and ethical integration of AI in research, learning and teaching to prepare their students for performing efficiently in the AI-powered world of such priority sectors as the IT sector. The timid attempts to implement university-enterprise models in few HEIs in the past do no longer raise debates related to their efficacy. Moreover, the implementation of innovative methods of learning, such as Work-based learning approach, has made the Higher Education of Armenia more attuned to the changing demand of the labor market on national level.

Along with universities becoming more proactive internationally, which is expressed in increasing mobility of academics and students, joint research and learning programs with international universities, the university-based business incubators are becoming a more impactful on students' learning experience. The intended outcomes of such cooperation will be graduates' competences working alongside advanced technology and even run AI-powered systems.

However, the surveys, conducted by the leading consultancies of Armenia, encompassing vast number of respondents and HTS sector representatives, have underscored considerable skills mismatch in the priority sectors of Armenia. In hindsight, the reported skillset gap was the consequence of HEIs' decades of inertia towards abandoning the role of a driving force of progress and innovation, and investing little effort in maintaining sustainable dialogue with enterprises. This, ergo, has had an adverse effect on the industrial development of the country.

In the European countries the journey towards Industry 5.0 has been shaped by the evolution of industrial revolutions over centuries, starting with the steam-powered machines of Industry 1.0 in the 18th century to each subsequent phase that brought new industrial developments along with resistance conditioned by not-invented-here

syndrome, precariousness of work, fear of unemployment and various preconceived ideas related to technological advancements. The weakening role of education and literacy has had dire effect on societies' attitudes and behavior in the past and even nowadays. By way of illustration, the protest movement of Luddism against cost-saving machines was unfolded in the beginning of the 19th century or the metastasizing fear of fictional dystopian future becoming a reality is almost ubiquitous in the current phase of Industry 4.0 characterized with the proliferation of digital and AI transformation.

Nevertheless, the technological developments of the last years, as well as the strengthening of social institutions and evolving media have led to the emergence of Industry 5.0, emphasizing AI augmentation, the human-centered collaboration between humans and advanced technologies.

While European countries have been growing through series of innovative disruptions, Armenia has been shaken by several industrial upheavals since the second decade of the 20th century and most significantly after the collapse of the USSR. Since the economic transition of 1990s and noughties the growing brain drain, radical educational reforms and the overall volatile geopolitical situation in the region have contributed to the occurrence of a disparity of industrial development, when the IT sector appears to be in the proximal zone of development compared with European IT sectors, whereas the other priority sectors of Armenia, such as Hospitality and Agriculture are lagging behind still struggling in the "analog world" of weak sustainability and insufficient digitalization.

To embark upon the new phase of full digitalization and sustainability in all the priority sectors, the Ministries of Economy, High-Tech Industry, as well as Ministry of Education, Science, Culture and Sport, Ministry of High-Tech Industry have developed national strategies to support transition to new era of industrial development. Accordingly, the HE of Armenia is undergoing a new stage of transformation when universities are empowered to be in the forefront of progress gearing towards international collaboration in research and development initiatives. Collaborations between academic institutions and high-tech industry leaders have resulted in industry-relevant projects that expose students to real-world challenges. Moreover, by recognizing the increasing importance of technology in priority industries, universities in Armenia have revamped their curricula to incorporate leading-edge courses in data science and artificial intelligence. In response to employer dissatisfaction with the level of graduates' soft skills, universities in Armenia have also incorporated soft skills development programs into their curricula, aiming at equipping students with the skills of analytical and critical thinking, problem-solving and leadership that are essential for thriving in Industry 5.0.

On the other hand, incubators and accelerators within the university ecosystem are introducing aspiring entrepreneurs to students of master and post-graduate programs encouraging mentorship, networking opportunities and at the same time creating necessary resources for the development of students' knowledge and skills.

Thus, due to international collaboration and sustainable partnership with enterprises universities are implementing a holistic approach to education, which goes beyond

traditional learning and encourages students to think critically and creatively, as well as develop a leadership mindset for them to succeed in a rapidly changing global landscape.

In conclusion, the HEIs of Armenia are embracing the principles of Industry 5.0 to address the skillset gap and prepare students for the evolving workplace. By aligning their curricula with this new industrial revolution, universities in Armenia demonstrate their commitment to ensuring that graduates possess the competences required for technologically enhanced collaborative work, as well as demonstrate resilience, creativity and leadership to be able to contribute to the AI-driven industries of the digital world.

References

[1] https://eua.eu/downloads/publications/3_davies_salikhov.pdf
[2] http://www.anqa.am/hy/%D5%B0%D5%A1%D5%BE%D5%A1%D5%BF%D5%A1%D6%80%D5%B4%D5%A1%D5%A3%D6%80%D5%B8%D6%82%D5%B4/#ExpertReports
[3] https://www.ehea.info/page-ministerial-conference-yerevan-2015
[4] https://www.eif.am/eng/researches/
[5] https://ehea.info/Upload/BFUG_SE_BA_84_WG_LT_Progress_Report.pdf
[6] https://armenia2041.org/wp-content/uploads/2022/04/Armenia-2021%E2%80%932041.Research-Education-2021_ENG.pdf
[7] https://mail.google.com/mail/u/0?ui=2&ik=bce2ee9ab0&attid=0.1&permmsgid=msg-a:r5680732762190904594&th=189078921e84640a&view=att&disp=inline&realattid=1890789060cdbc6e4ae1
[8] http://www.anqa.am
[9] THE 2021-2026 ACTION PLAN OF THE GOVERNMENT OF THE REPUBLIC OF ARMENIA, Annex No 1 to Decision of the Government of the Republic of Armenia, No 1902-L, 18 November 2021.
[10] https://www.eua.eu/issues/20:learning-teaching.html
[11] https://eua.eu/resources/projects/786-lotus.html
[12] https://ehea.info/Upload/BFUG_PT_AD_76_11.1_etuce%20report%20on%20covid%20impact%20on%20her%20staff.pdf
[13] Lotus Final conference. Policy Lab. Parallel Session, Brussels, September 28-29
[14] https://armenic.am/education/?lang=en#:~:text=The%20Armenian%20higher%20education%20system,institutions%20with%20the%20State%20participation
[15] https://mail.google.com/mail/u/0?ui=2&ik=bce2ee9ab0&attid=0.1&permmsgid=msg-a:r5785949340641825907&th=183e0f6598d961d5&view=att&disp=inline&realattid=183e0f636346fd541651
[16] https://mail.google.com/mail/u/0?ui=2&ik=bce2ee9ab0&attid=0.1&permmsgid=msg-

a:r2654562085267288309&th=183e0f5c3a315044&view=att&disp=inline&realattid=183e0f5a30cb3dfe6a91
[17] http://ysu.am/news/hy/The-winners-of-annual-competition-2021
[18] https://erasmusplus.am/course/4055/
[19] http://ysu.am/international/en/1531206057
[20] https://www.vatl.ysu.am/
[21] http://diaspora.gov.am/en/structures/1/office-of-high-commissioner
[22] Mapping Labor Market Mismatches and Skills Gaps in Armenia / Baseline Needs Assessment Study. https://www.eif.am/files/2897/Report-AWDA-Mapping-Study_ENG_Final_02.08_2022.pdf
[23] Armenia 2021-2041 ideas in action. Overview. September 2021. 3 - year report. 2017-2020. en route to innovative Armenia. FAST Discovering the Future. 2020.
[24] Crisis Management and Technology, Scientific and scientific-methodical collected articles, N 11, Yerevan, 2017.
[25] Development Strategy. 2014-202,5 RA ESCS.
[26] Concept on Work-based learning of 2019-2025, RA ESCS.
[27] Specific Support to Armenia Raising the bar: a new mission for science in Armenia's development. SS%20Armenia_Final%20Report_1.pdf.

ARTS EDUCATION AND ITS MEASURED, POSITIVE IMPACT IN THE MARKETPLACE

Christine Matovich, MA, BA, Christine Matovich | LinkedIn

Founder, CommonTime.online; International School Arts Educator; Arts Administrator

Keywords: *Arts Education, Outreach, Creative Skills, STEM, STEAM, Artistic Acumen, Innovation, Creative Economy, Intercultural Understanding, Transdisciplinary Learning, Mother-Tongue Language, Marketplace, Workforce*

Abstract

What if there was a magic formula that could enhance intercultural understanding, support mother tongue languages, integrate subjects, drive inclusive practices AND foster creative and innovative skills needed for today's marketplace and economy? This is what arts education offers at the primary, secondary, and higher education levels.

International schools and many private schools keep arts education as a required curricular subject from nursery to graduation (Pre-K to Grade 12) because a) they can afford to do so, and b) the school administration has identified the success matrix of learning the arts. These schools make the arts a keystone of transdisciplinary learning; it is a subject that fosters mother tongue languages and intercultural understanding – improving both hard and soft skills. Most international school communities are composed of over thirty nationalities and accompanying languages. However, it must be noted that arts education is afforded to only a small percentage of schools, globally. Schools in economically disadvantaged areas often have no arts at all, focusing on STEM over STEAM[1], at the loss of their own cultural wealth and heritage. Migration, as a result of war or economic opportunities, is changing the ethnic and demographic landscape of educational institutions at unprecedented levels. This migration has made multiculturalism the norm in the classroom. The connecting and embracing of curricular, cultural, and creative understanding can be achieved through arts education.

[1] "…the difference lies in the way they approach scientific concepts. STEM focuses explicitly on the hard scientific, technological, engineering or mathematical skills to drive progress or create a new concept. In STEAM curricula, per The Conversation, students leverage both hard and soft skills to solve problems. STEAM encourages collaboration to understand a STEM concept. By integrating concepts and practices of the arts, STEAM uses tools such as data visualization or fine art imagery to deepen one's understanding of science, math and technology. This kind of out-of-the-box thinking is what leads STEAM professionals to create new products using 3D printers or distill complicated data sets into easy-to-understand formats, such as infographics." https://www.ucf.edu/online/engineering/news/comparing-stem-vs-steam-why-the-arts-make-a-difference/ (last accessed Dec. 28, 2024)

Learning for big picture thinking, collaborative skills, and process and problem solving to project-based outcomes are expectations of learning when the arts are a central subject. Each project-based outcome is a measurement of developing creative skills as well as an ongoing measurement of the learner's reflection and critical self-assessment of their own learning journey – skills that can be connected to their other subjects. These skills are vital to today's $2 trillion creative economy marketplace and the ever-growing market of tomorrow.

This paper examines the practices and benefits of arts education and its measured, positive impact in the marketplace. This will be evidenced, qualitatively and quantitatively, by case studies that illustrate successful arts education practices and outcomes in the past and present; these will include case studies in international and private schools, in arts exchange programs, and in arts outreach programs in Germany (in comparison with those in other countries).

This study's intent is to exemplify that arts education is a necessary component of present and future creative, collaborative, and innovative skills that are original (human) in thought and outcome; that arts practitioners, and those who possess artistic acumen, are needed in the workforce and marketplace; and that these indelible skills, collectively, are contributors to the growth of the creative economy.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

SKILLING FOR THE FUTURE: ENHANCING VOCATIONAL LEARNING AND WORKPLACE PRODUCTIVITY WITH CREATIVE AI TOOLS

Daren Scerri[1*]

[1]Institute of Information and Communications Technology, MCAST, Paola, Malta
* Corresponding author Email: daren.scerri@mcast.edu.mt

Keywords: *Artificial Intelligence, Vocational Education, IT Industry, Generative AI, AI tutors*

1. Introduction

Developments in AI technologies, especially generative AI (GAI) and Large Language Models (LLMs) are suddenly taking place an unprecedented rate, raising both opportunities and concerns in industry and education sectors. Generative Pre-trained Transformer (GPT) models distinguish themselves in their ability to understand human-like prompts and generate contextualized and coherent responses. Recently launched AI tools like OpenAI's GPT 3 and 4, MidJourney, LLaMA (Large Language Model Meta AI), and LaMDA (Language Model for Dialogue Applications) can engage in dialogue, understand images, and even generate images. Given the ability to adapt to different scenarios and complexities, these tools are already impacting work processes within organizations like in customer care, marketing, and software development [1]. The education sector is not spared, with great concerns arising especially in relation to authentic and correct knowledge generation, skills development, and assessment of learners [2, 3, 4].

This study aims to address the urgent concerns and opportunities of creative AI tools. To this aim a two-part study is proposed; part one seeks to understand the current state of industry and education stakeholders in relation to recent disruptive innovations like GPT-4, and a second part to possibly identify ways that promote the proper use of these new tools and propose curricular changes accordingly. The results of such study can assist to adapt work practices, vocational curricula and pedagogy in consideration of the new AI assisted reality.

2. Methodology

This study proposes a constructivist grounded theory methodology [5], employing abduction and founded on pragmatism, with the initial objective of this study being to understand the challenges faced by the IT industry, identify vocational training needs, proceeding to capturing data through manual observations,interviews and AI tools during training of sample curricular tasks within the IT field. Given the field of study being investigated is the software development industry, three ICT lecturers with industry experience, a small IT business owner SME, and a student engaged in work-based learning were selected to provide their insight via semi-structured interviews, with respect to the recently launched AI tools like GPT-3, GPT-4 and

LLaMa models. Nine other students provided AI-dialogue transcripts which were used to elicit discussion and evaluated by the main participants.

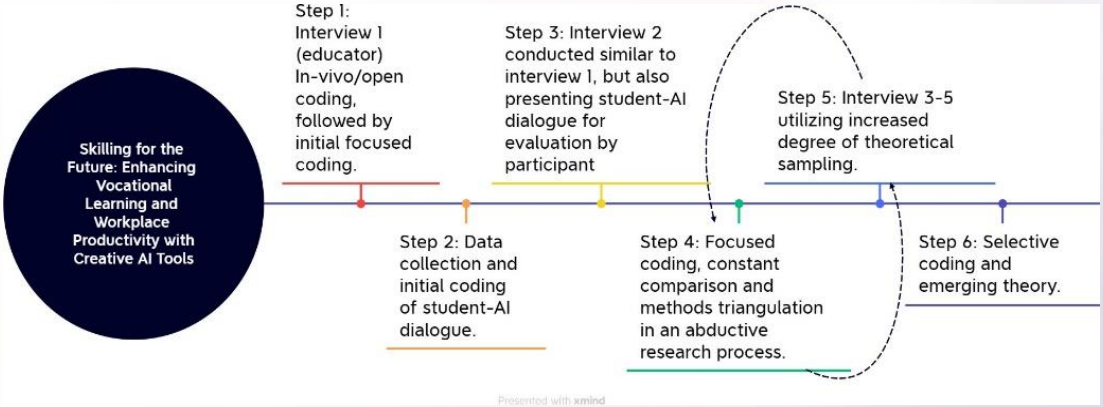


Figure 1. *Research Pipeline*

3. Results & Discussion

Following the process of coding using constant comparison on emerging categories, sub-categories and properties, an initial conceptual process model is being forwarded (Figure 2). Congruent with participants' initial reactions, developing thoughts and adoption behaviour in the use of GAI, the fluctuating arrow denotes how the process of using creative AI tools effectively goes through a series of waves. The process commences with the current disruption and change scenario in both education and industry, as provoked by the recent launch of a new breed of more powerful GAI tools, which are able to engage in lexically tolerant conversions using different languages and styles. Whilst increased accessibility and personalization of learning are a highlight of GAI tools, the emerging constructs suggest that self-discipline and maturity in using AI to learn is critical.

Figure 2. *Initial conceptual model for 'Skilling for the future: Enhancing Vocational Learning and Workplace Productivity with Creative AI Tools.'*

4. Conclusions

Contrary to the perception of AI replacing humans, participants in this study, highlighted the importance of the human element. AI is good as much as the human interaction with it is good. A positive interaction requires intelligent dialogue, auditing processes and validation with other sources like experts. This is especially the case for complex projects in highly domain-specific and specialized industries. Apart from text-based systems the development of multi-sensory systems which include visual, tactile and auditory is viewed as an important research area that still requires development. There is also an urgent need to formulate ethical policies which lay down clear, mandatory guidelines including attribution similar to working in a team, and addressing the arising intellectual property issues.

References

[1] Haleem, Abid, Mohd Javaid, and Ravi Pratap Singh. "An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges." *BenchCouncil transactions on benchmarks, standards and evaluations* 2.4 (2022): 100089.

[2] Bains, Rhythm. "Artificial intelligence-assisted medical writing: With greater power comes greater responsibility." *Asian Journal of Oral Health and Allied Sciences* 13.2 (2023): 1.

[3] Haluza, Daniela, and David Jungwirth. "Artificial Intelligence and Ten Societal Megatrends: An Exploratory Study Using GPT-3." *Systems* 11.3 (2023): 120.

[4] Lund, Brady D., and Ting Wang. "Chatting about ChatGPT: how may AI and GPT impact academia and libraries?." Library Hi Tech News 40.3 (2023): 26-29.

[5] Charmaz, Kathy. *Constructing grounded theory*. sage, 2014.

AMBIGUOUS INTEGRITY AND THOUGHTS ON GOOD FUTURE WORK AMONG HIGHER EDUCATION INTERNATIONAL STUDENTS

Pia Viklund

Savonia University of Applied Science, International Unit, Microkatu 1, 70210 Kuopio, Finland
Corresponding author Email : pia.viklund@savonia.fi

Keywords: *Integrity, ethics, good future work(place), higher education, international students*

1. Introduction

Organizations all over the world are in the middle of challenging and demanding period and in a turning point regarding future work. They are screening and implementing the principles of Industry 4.0 and scenarios of industry 5.0, while also welcoming the arrival of new generations Z (born 1995-2013) and Alpha (born after 2013). Both generations have an important role in changing current organizational practices, as well as work, leadership, and behavior.

When talking about future of work, we easily turn our thoughts and discussion towards technology and its impact on how, when and where we work [4]. But what about integrity, ethics, and values? Do they play a part in our understanding and opinions of a good work(place) and if they do, what is their role? Acting and leading in accordance with integrity and ethics are elements, which promote employee engagement to an organization [1,3,4]. During last years, integrity, ethics, and their influence on future of work have faced kind of reborn among scholarly discussions. Metacrises – factors like differences in ethical and moral thinking – are behind many visible crises. Research institutions, like Harvard Business School and Gartner, have highlighted the increase in ethical conflicts among employees and the ability of superiors to resolve such disagreements as one of the key trends in work from 2024 onwards. [2,5]

2. Case Presentation

In this qualitative case study, I am interested in the elements, which are meaningful for higher education students when describing a good work/good workplace in their future dream organization. In addition, I am interested in finding out, what role, if any, ethical and value-based elements play in this context. The focus is on understanding and interpretation based on the phenomenological thinking. Core concepts are integrity, ethics, and good work(place). Integrity is understood as an ambiguous concept based on the definition of Viklund' s doctoral dissertation including individual, professional, and organizational perspectives as well as understanding integrity as a coherent whole [3].

Empirical data was collected from Savonia's international students, who were participating a course called *Human Resources* in the spring 2024. The total amount

of students was 53 and they represented 23 counties from Europe, Asia, Australia, Africa, and North America. The data was collected using a narrative method and participatory observation. Totally 48 narratives were obtained. The data is analyzed using theory-driven content analysis. Study results are mirrored in the perspectives of integrity defined in the Viklund' s doctoral dissertation by allowing the material to speak its own language as well.

3. Results & Discussion

The analysis of results will be finalized by the end of May 2024. In the preliminary analysis of the study results, six key elements that the target group felt were important in their dream job in the future can be identified (Figure1). Many similarities could be identified, but also some opposing views. For example, some students wanted to have clear hierarchical structures, while some wanted to have as free and agile organization and work environment as possible. Some described the qualities of a good supervisor, while a few felt that they did not want a supervisor at all.

Figure 1. *Elements of a good future work(place)*

Integrity and ethics were seen mostly as a meaningful element. However, a few students felt, that the most important topic is to reach targets, no matter how. Integrity and ethics were described as e.g., acting according to law, legal and ethical awareness, and internal moral motivation. The following quote of integrity by one student is a good descriptive summary of the most common views of integrity and ethics that emerged from the data: "*Integrity is more than simply a word in this context; it's the foundation of each choice and deed. A strong code of conduct directs the company and its personnel towards moral excellence by acting as a compass*."

4. Conclusion & Recommendation

When the study results are preliminarily compared with the definition of integrity in Viklund' s dissertation, it shows that integrity can be understood in as many similar and several different ways as mentioned in the dissertation. However, the most important observation is that integrity and ethical conduct are things that young

higher education international students consider important in their future workplace and companies should invest in them.

References

[1] A.S. Engelbrecht, G. Heine and B. Mahembe, B. Integrity, ethical leadership, trust, and work engagement. *Leadership & Organization Development Journal*, 38(3): 368–379, 2017.

[2] E.I. Lysova, J. Tosti-Kharas., C. Michaelson, L. Fletcher, C. Bailey, and P. McGhee. Ethics and the Future of Meaningful Work: Introduction to the Special Issue. *Journal of Business Ethics*, 185:713–723. 2023.

[3] P. Viklund. Monitulkintainen integriteetti. Sisäasiainhallinnossa työskentelevien näkemyksiä hyvästä julkisesta toiminnasta (Ambiguous Integrity. Public servants' views of the good work in the context of the Ministry of the Interiors' administrative branch). *ACTA WASAENSIA 481*, University of Vaasa. 2022.

[4] P. D'Cruz, S. Du, E. Noronha, K.P. Parboteeah, H. Trittin-Ulbrich and G. Whelan. Technology, Megatrends and Work: Thoughts on the Future of Business Ethics. *Business Ethics*, 180, pp. 879–902. 2022.

[5] Z. Stein. Education is the Metacrises. *Perspecta*. January 27. https://systems-souls-society.com/education-is-the-metacrisis. 2022.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

CASE STUDY IN THE TEXTILE SECTOR TO ASSESS RESISTANCE TO CHANGE AND THE SKILLS NEEDED TO IMPLEMENT INDUSTRY 5.0

Amanda Bernar [1,2*], Jérémy Legardeur [1] , Hélène Chanal [3]

[1] Univ. Bordeaux, ESTIA-Institute of Technology, EstiaR, F-64210 Bidart, France

[2] Petit Bateau, 15 Rue du Lieutenant Pierre Murard, 10000 Troyes

[3] Université Clermont Auvergne, Clermont Auvergne INP, CNRS, Institut Pascal, F-63000 Clermont-Ferrand

[*] e-mail : amandabernar@rocketmail.com

Keywords: *Industry 4.0, Industry 5.0, Resistance to change, Human skills*

1. Introduction

Staying competitive in the business world is becoming more challenging due to rapidly growing digital technologies. This requires production lines to be adaptable, smart, and flexible enough to meet updated requests [1]. As technological advances consolidate, human are required to be highly flexible and cultivate important skills to adapt in a complex and changing work environment [2]. The fourth industrial revolution focused on process automation and the introduction of intelligent computing through data collection and management, resulting in challenges for the business world, such as a shortage of adequate skills in human resources, security issues in communication technology, reliability of the stability of machines, resistance to change, and in some cases, an increase in unemployment due to automation. The core of this revolution was to improve process efficiency and better utilization of resources [1, 3]. Industry 5.0 proposes a human-centered approach, balancing economic progress and solving social problems through a highly connected system between cyberspace and the real world. While Industry 4.0 focuses on automation, Industry 5.0 promotes synergy between humans and collaborative machines [1, 4]. This socio-technical transformation requires an in-depth understanding of the necessary human skills [5]. Automation and artificial intelligence redefine work requirements, demanding advanced cognitive skills. Continuous learning is fundamental with soft skills (critical thinking, creativity) that are essential for problem-solving, adaptability to staying ahead of innovations. Emotional intelligence and effective collaboration in global teams requires empathy, intercultural skills, and leadership. Digital literacy increases with professionals assisted by new technologies (like conversational AI) and use advanced tools. Digital security is vital to protecting personal and corporate data in an interconnected world.

2. Cases Presentation

In line with dual education principles, we developed an immersive approach that was conducted by a PhD student who is developing “action-research” within a company. First, we conducted a literature review and identified sources of resistance and

management approaches. Sources of resistance, according to the literature, include feelings of excessive supervision, unclear values, feelings of inadequacy, concerns about the loss of power and jobs, and work overload. Suggested management approaches are communication, participation, and training. Two case studies were carried out in a textile company in France. The studies considered the impacts of cultural differences and technological transition in mostly manual environments.

The first case involved the implementation of a station with a collaborative robot (cobot) in the clothing sector. The innovation of this project stands out due to the technological gap in the textile sector compared to other economic segments, resulting from the phenomena of production relocation since the 1950s. This phenomenon not only resulted in a deficit of innovation but also generated fears of loss of jobs among employees, perpetuating resistance to technological innovations. In this study, we present practical solutions to effectively address this issue with employees, promoting acceptance of new technology through active participation, clear communication, and training. The results were an exceptionally efficient production process, with added value, reliable autonomy, and a significant reduction in waste and associated costs. In this case, the cobot transcended the function of a programmable machine for repetitive tasks, becoming a true work partner.

The second case study validates the statement that innovative companies that invest in continuous training of their employees reap the benefits of rapid adaptation to the demands of Industry 5.0. The project was conducted in the dyeing sector and consisted of implementing real-time production control systems. Several sources of resistance were identified, the main one being the feeling of excessive supervision. In this scenario, employees' skills were tested, requiring adaptation to new technologies. Line managers, operators, maintenance personnel, and managers needed to adjust to new information systems, methods for obtaining production data, procedures to improve machine profitability, and new practices for reporting losses, and failures, and resolving issues concerning everyday technical problems. The results of this study were significantly positive with a 6% increase in the overall performance of the equipped machines over 6 months of use, demonstrating genuine engagement from everyone involved. This was possible through a cohesive approach to resistance management.

3. Results & Discussion

These practical projects revealed challenges, from resistance to change to disparities in internal skills. However, they also highlighted opportunities for professional and personal growth, emphasizing employees' capacity for innovation and adaptation when there is a welcoming environment. The success of Industry 5.0 requires an emphasis on flexibility, continuous learning, and business ethics to shape human-centered production centers, even in the face of technological revolution.

4. Conclusions & Recommendations

Although Industry 5.0 proposals are promising, the occurrence of resistance during the implementation and use of new technologies in production systems is expected,

either due to the need for personal adaptation or other fears. Literature regarding the disruptions caused by such resistance is scarce, and few sources address appropriate management strategies to deal with this issue. This research was set out to investigate, in practice, effective strategies to address resistance to the adoption of advanced technologies in the industry, focusing on the integration and active participation of human workers in interconnected production systems but we recommend more studies in this field.

References

[1] Nahavandi, S. Industry 5.0, A Human-Centric Solution. Sustainability, 11(16), 4371. 2019.

[2] Longo, F., Nicoletti, L., & Padovano, A. Smart operators in industry 4.0 : A human-centered approach to enhance operators' capabilities and competencies within the new smart factory context. Computers & Industrial Engineering, 113, 144-159. 2017.

[3] Jafari, N., Azarian, M., & Yu, H. Moving from Industry 4.0 to Industry 5.0 : What Are the Implications for Smart Logistics? Logistics, 6(2), 26. 2022.

[4] George, D. A. S., George, A. S. H. Industrial revolution 5.0: the transformation of the modern manufacturing process to enable man and machine to work hand in hand. 15(1533). 2020.

[5] Neumann, W. P., Winkelhaus, S., Grosse, E. H., & Glock, C. H. Industry 4.0 and the human factor – A systems framework and analysis methodology for successful development. International Journal of Production Economics, 233, 107992. 2021.

UNIVERSITIES AS A PLACE FOR DEVELOPING COMPETENCES OF THE FUTURE

Edyta Halista-Telus[1* nr orcid 0000-0001-9457-9268]

[1]Department of Humanities, KoszalinUniversity of Technology, Koszalin, Śniadeckich 2, Poland
[*] Corresponding author Email: edyta.halista-telus@tu.koszalin.pl

Keywords: *Soft skills, universities, labour market, expectations of employers, students*

1. Introduction

We live in times of very intense social, economic, technological and IT changes. Social phenomena such as the coronavirus pandemic and the war in Ukraine and Israel show the fragility of the reality in which we live. Moreover, the development of artificial intelligence poses new challenges to us. More often we ask ourselves: will the world be dominated by robots? Will they replace humans in all areas of human functioning? Anthropocentrism puts humans at the center of the universe. We are an entity that strongly favors itself over other entities. Scientists who focus their considerations on what is non-human suggest not separating humans from non-humans [1]. Human products are a part of our world, so far dominated by humans. We expect significant changes in this area, for which people should be prepared. Preparing young people for such a dynamically changing reality should be a priority at Universities.

I see an important role of education for today's changes and the needs and trends that follow. What should education be like for the future? What will the labour market look like and what will be the nature of our work? What competences should we develop in students during teaching? We cannot say exactly what the world will look like in the future. However, we know that universities whose main goal is just to pass nformation to students are obsolete (outdated). Access to information is currently very simple, but on the other hand, how can an average person know which information is true and reliable? Moreover, we are increasingly distracted by completely irrelevant information [2]. So what should teaching look like?

Universities offering a dual education or a practical profile meet the growing expectations of young people and the labour market. On the one hand, they educate and on the other hand, they introduce young people to professional work, for example through apprenticeships. They are closely related to the labour market and try to meet the expectations of employers. The question that arises at this point is: what skills should we develop in young technical students that will make it easier for them to survive in such a dynamically changing world? What are employers' expectations and to what extent do universities fulfill this task? The soft competences currently mentioned in the literature as the most important ones are: the ability to think critically, communication, cooperation, creativity, time management, conflict resolution, ability for lifelong learning, stress management, emotional development, effective use of new technologies, high awareness, adaptability, resilience, flexibility, value orientation [3]. Each of the competences mentioned above is equally important

and necessary in experiencing job satisfaction. It is worth noting at this point that most competences listed appear in employers' expectations of future employees. Developing soft skills is a lifelong investment that has a multi-faceted positive impact on professional and personal life. These skills are becoming increasingly crucial in the working environment of the future, which requires flexibility, collaboration and adaptability.

2. Methodology

The research was qualitative analyzing of existing documents (desk research). In her considerations, the author started with a thesis that indicates the need to develop soft skills during studies. The competences acquired by graduates will enable them to move freely and flexibly on the labour market in a dynamically changing environment.

My thesis is:“A graduate equipped with soft competences will adapt easily and seamlessly to the dynamically changing labour market through, for example, flexibility, the ability to cooperate or to manage emotions.”

Research subject: The subject of the research are soft skills that are developed during first-cycle of studies in engineering fields at Polish technical universities.

Purpose of the research: Examining which courses contain content related to soft skills and which competences are specified in the course topics.

3. Conclusions

Universities should create conditions for the development and formation of soft skills. The ignorance of Universities in this regard can be dangerous. The fact is that soft skills are developed in social studies and humanities. It is no longer so obvious in technical studies. Of course, in the educational outcomes, lecturers often declare the development of soft skills during their classes, but unfortunately this is not included in the specific content that organise the learning process.

References

[1] M. Chutorański, *Not (only) human dimensions of education. Towards non-athropocentric pedagogy*, University of Szczecin Publishing House, Szczecin 2021.
[2] Y.N. Harari, *21 Lessons for the XXI Century*, Literary Publishing House, Kraków2018.
[3] M. Polakova, J. HorvathovaSuleimanova, P. Madzík, L.Copus, I. Molnarova, J.Polednova, Soft skills and their importance in the labor market under the conditions of Industry 5.0, *Heliyon*, volume 9, p. 1-20, 2023,doi. https://doi.org/10.1016/j.heliyon.2023.e18670

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

INDUSTRY 5.0: TOWARDS A MORE SUSTAINABLE HUMAN CENTRIC FACTORY OF THE FUTURE

Puviyarasu SA[1*] and Christophe MERLO[1]

[1]ESTIA Institute of technology, University de Bordeaux, Technopole Izarbel, Bidart, France
[*] Corresponding author Email: puviyarasu.sa@estia.fr

Keywords: *Industry 5.0, Human-centric 5.0, Human values, 4-dimensions model*

1. Introduction

Industry 5.0 is an emerging concept and forethoughtful industrial revolution. It is a strategic initiative from European Commision to industry for achieving economic and societal goals. It offers many innovative opportunities for industry to create prosperity, wisdom and foresight. The core pillar includes Human-centric, Sustainability and Resilience [Wang, X. et al,2023]. The human-centric pillar aims to consider human being integrated to advanced technology to bring more harmonious and fulfilling workplace. By leveraging this integration, it promises to create a well-balanced and collaborative industrial environment. As a result, it empowers industrial workers to achieve their well beings and fulfilment in their jobs.

This paper explores this human-centric pillar and proposes a 4-dimensions model for I5.0 factory.

2. Methodology

First a large bibliographic work has been achieved to explore human aspects for I5.0. Second research gaps have been identified. Third an integrated model for enhancing human-centricity is proposed. State of the art allows to declare that human-centric approaches mostly focus on human-machine collaboration to improve the efficiency of production [Lu, Y. et al, 2022], such as human workers and universal robots that are boosting the productivity of manufacturing industry [EU, 2022].

However, the current exploration and shared understanding of the human-centric pillar in Industry 5.0 is still relatively scarce. Particularly, human elements, their typology and human-centric technology are yet to be explored.

As a result, there is a lack of systematic and authoritative literature. A systematic view on human centric aspects is necessary to outline the definitions, terminology, taxonomy, projected key technologies, and value driven impacts of human-centric aspects.

3. Results & Discussion

In Industry 5.0, the Human-centric concepts are placing the human at the heart of what the industry does. Figure.1 presents the different point of view for I5.0 human-centric approach. It outlines the human centric dimensions considering that a human

worker is seen through its relationship within its digital and physical manufacturing environment by sensing, processing and actuating with it:

1) Terminology and definitions: Industry 5.0, manufacturing components, human being as a worker.

2) Taxonomy considering input/output modalities: human, machine and human-computer interaction modalities.

3) Human centric key technologies: augmented/virtual reality and other technologies for the worker or for his/her interaction with the digital and physical environment.

4) Human value ensuring the industrial worker to have proper work life balance: self-actualisation, accountability, privacy, welfare; autonomy and altruism; and their impacts on achieving professional goals, making decisions, demonstrating engagement and reliability, ensuring personal health and self well-being.

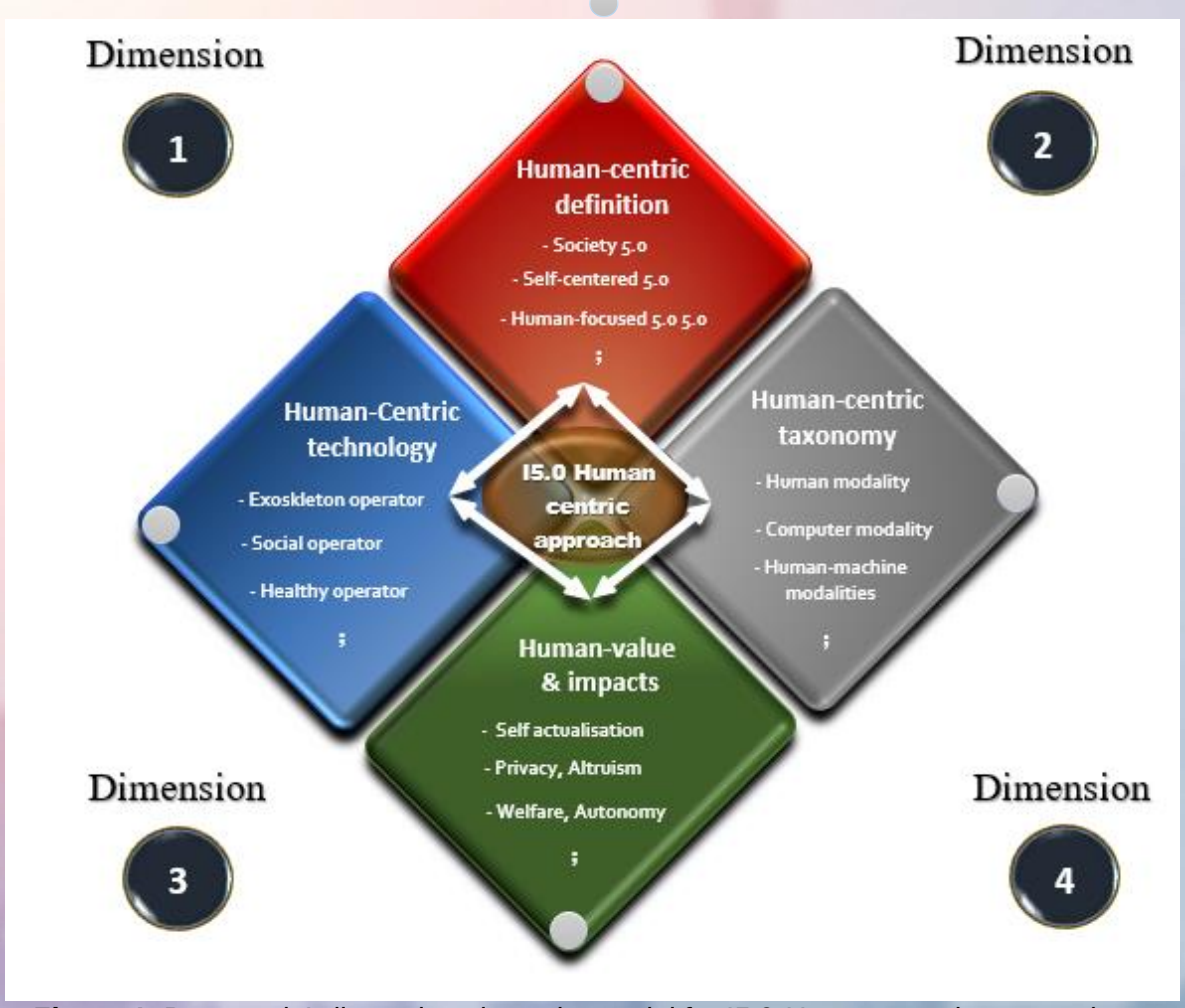


Figure 1. *Proposed 4-dimension viewpoint model for I5.0-Human-centric approach.*

Discussion

The 4 dimensions allow to define a global human-centric approach in order to achieve societal jobs and growth by respecting the boundaries of the planet!

Nevertheless, skill gap challenges must still be explored e.g. for recent robotics, artificial intelligence, and data analytics technologies. Applying this model requires strong investments in Education and Training, especially for social safety networks. Finally, companies should analyse much more the impacts of introducing new technologies not only on their processes but also on the human workers, in all their dimensions. This will generate more time and investments but on will bring more trust on Industry 5.0 capabilities.

4. Conclusion

The different point of view, and their fundamentals aspects have been presented. It summarizes the current and projected body of knowledge within the industry 5.0 context. It is expected to bring lively discussion together to strengths and build a comprehensive human-centric factory of the future.

References

[1] Leng, J., Sha, W., Wang, B., Zheng, P., Zhuang, C., Liu, Q., ... & Wang, L. Industry 5.0: Prospect and retrospect. *Journal of Manufacturing Systems*, 65, 279-295, 2022.

[2] Adel, A. Future of industry 5.0 in society: Human-centric solutions, challenges and prospective research areas. *Journal of Cloud Computing*, 1(1), 1-15, 2022.

[3] Li, X., Nassehi, A., Wang, B., Hu, S. J., & Epureanu, B. I. Human-centric manufacturing for human-system coevolution in Industry 5.0, *CIRP Annals*, 72(1), 393-39, 2023

[4] Rajumesh, S, Promoting sustainable and human-centric industry 5.0: a thematic analysis of emerging research topics and opportunities, *Journal of Business and Socio-economic Development*, 2023.

[5] Mourtzis, D, The Metaverse in Industry 5.0: A Human-Centric Approach towards Personalized Value Creation, *Encyclopedia*, 3(3), 1105-1120, 2023.

DESIGNING: FROM WORK-BASED LEARNING TO WORKPLACE LEARNING!

Nina Spithost MCC

NHL Stenden University of Applied Sciences
Rengerslaan 8/10
8917DD Leeuwarden, The Netherlands
Nina. Spithost@nhlstenden.com

Keywords: *Dualisation, Designing Workplace learning, vocational education, work & study*

1. Introduction

Workplace learning is attracting more and more attention. Universities and the professional field are increasingly working together to develop programs where the bulk of learning itself is taking place ín the workplace. Workplace Learning (WPL) is not new though. It actually is a corollary to traditional 'guild learning' where the apprentice, at work, learns from the practical expert. As time has passed, there have been increasing changes in thinking on how knowledge ánd skills can be taught, although historically, universities have predominantly emphasized an academic orientation to learning. The integration of vocational education into higher education, particularly within Universities of Applied Sciences, has been a relatively recent development.

Universities of Applied Sciences play a crucial role in the labour market. Both quantitatively and qualitatively, providing hígher vocational education, they can contribute to professional workforce development. But in Universities there may be a tendency to view student development too narrowly by focussing mainly on knowledge. This tendency is unsurprising given the traditional emphasis on academic pursuits within university settings, but too tight a focus on knowledge can result in losing connection with professional practice (academic drift). Conversely, close interaction and cooperation with the world of work, can enhance the focus on skills and professional attitude and steer towards WPL. This said, Universities have (to) become more and more attuned to the demands of the labour market. The necessary professional development of learners is increasingly an integral part of higher education. And it is precisely in this context that we see different concepts of WPL emerging.

Parallel to this, we increasingly see (under the umbrella term 'lifelong learning') working (young)professional entering our universities with a need for further development in part-time and work & study (or so-called dual) programs. And therefore next to the "traditional fulltime student" we see a more diverse population entering higher education, with differences in for example age, (work) experience, life phase, ambition and/or differences in social/ economic background. Some students want (or need!) to obtain a degree alongside and/or integrated with their work. Universities are evolving with these changes in student populations and as they now also cater to the needs of working students. So, in higher education, "workplace learning" is gaining attention.

2. Case presentation

In the Netherlands, higher education includes full-time programs preparing students for the labour market, alongside part-time and dual (work-study) programs for working individuals. The introduction of 2-year “Associate degrees” has sparked significant interest in workplace learning. Mind you: 50% of Ad students are combining work and study! NHL Stenden, with over 20 years' experience in dual programs, pioneered the first “100% dual” bachelor program in the Netherlands. And their participation in the Dutch “Experiment on Learning Outcomes” from 2015-2023 led to redesigning over 40 programs, offering greater flexibility to meet the needs of working students. Working towards the upcoming “Learning Outcomes Act”, providing high quality workplace learning opportunities proved to be a relevant or even crucial theme. Whereas before, WPL was mainly referred in the context of vocational programs, nowadays "dualized education" is an upcoming and urgent topic for all programs in *higher* education. The challenge remains: how to effectively design such programs?

3. Results

NHL Stenden offers a diverse range of programs including approximately 23 Associate degrees, 70 bachelor's, and 20 master's across various sectors such as hospitality, engineering, nursing, and business. The university emphasizes the integration of professional practices into education, involving the professional field in curricula and addressing real-(work)life learning. As a result, workplace learning (WPL) at NHL Stenden takes on various forms tailored to different target groups, programs, and domains. The publication “Workplace Learning at NHL Stenden” [1] comprehensively outlines the spectrum of workplace learning (WPL), spanning from traditional full-time and part-time studies to immersive work-study programs. It delineates a continuum where educational approaches transition from hands-on, practice-based learning on the left to fully integrated, real-world workplace experiences on the right. At one end, learning activities are designed to simulate practical scenarios, while at the other, learning unfolds within authentic professional environments, embodying real-life learning. The publication furnishes indicators enabling readers to position various WPL models along this continuum. Additionally, these indicators serve as benchmarks for assessing and enhancing program quality, facilitating the refinement of educational offerings towards high-quality WPL experiences.

4. Conclusion

Incidentally, during the development of this NHL Stenden publication, the NVAO (Netherlands Flemish Accreditation Organization) presented the publication “A route map for high-quality work-based learning in higher education”[2]. This shows that on a national level this subject is also in the spotlight. NHL Stenden's publication is not only in line with this national initiative, but offers a more in-depth elaboration and concretization. This publication can therefore serve as a practical guide for dualizing your own programs, fitting the target group you have in mind. Prepare to innovate and dualize your educational endeavours with this valuable resource.

References

[1] N.Spithost, C.Witteveen, S.Janssen. Workplace learning at NHL Stenden, defining and conceptualising, NHL Stenden university of Applied sciences, April 2023.

[2] A route map for high-quality work-based learning in higher education. A dialogue model for the quality of work-based learning in higher education, NVAO 1 April 2022

METHODOLOGY TO ADAPT LEARNING SCENARIOS TO AN INDUSTRY 5.0 PERSPECTIVE

Unai Ziarsolo [1*] , Aitor Sotil[2], Alexios Papacharalampopoulos[3] , Panagiotis Stavropoulos[3], Christine Lichem-Herzog[4]

[1]Tknika, Internationalization department, Zamalbide z/g Renteria, Basque Country
[*] Corresponding author Email: uziarsolo@tknika.eus

[2] Miguel Altuna LHII, Basque Country

[3]LMS, Greece

[4]FH Joanneum, Austria

Keywords: *Industry 5.0, Learning Factory, industrial practices*

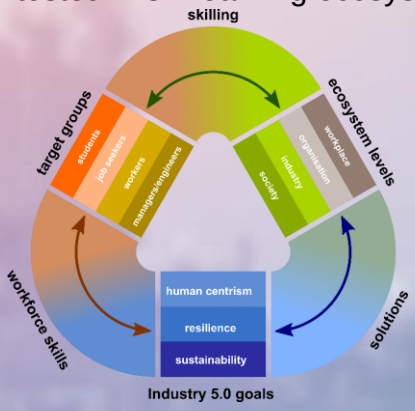
1. Introduction

Transitioning to Industry 5.0 (I5.0) requires businesses to rethink their cultures, strategies, and workforce skills. This new era emphasizes human-centric approaches, resilience, and sustainability, making it essential to adopt a tailored approach across different industries and groups[1]. However, identifying the specific skills needed for I5.0 remains difficult, slowing down its integration into companies. To address this, the Horizon Bridges5.0 project [2] focuses on adjusting training programs towards I5.0 requirements within learning ecosystems. The project identifies the main practices of the leading companies considered I5.0 in Europe and aligns education with the demands of those.

This article outlines the method's key steps and its application in diverse learning environments, offering a promising approach to bridge the education-industry gap in I5.0.

2. Case Presentation

Within the Bridges5.0 project we introduce a methodology to tailor training programs in learning ecosystems for I5.0 demands. The efficacy of this methodology will be tested in six learning ecosystems across Europe.



I5.0 is characterized as a multidimensional concept with various interacting pillars, as illustrated in Figure 1 [3] Addressing the challenge of defining specific I5.0 skills arising from these interactions, the methodology emphasizes the **organizational practices of I5.0 companies** (I5.0 practices). The initial step involves the identification of European companies recognized as I5.0 frontrunners.

Figure 2: Framework model for workforce skills in I5.0 [3]

By identifying organizational practices that promote human centricity, resilience, and sustainability, the objective is to understand implemented structures, associated tasks, technology adoption strategies, and prevailing attitudes.The methodology unfolds through several key phases:

- Preliminary Phase: Identifying I5.0 practices of model companies and assessing the current status of learning ecosystems by evaluating existing I5.0 elements in ongoing learning programs.
- Design the pilots: Details the training activities and the technology integration by means of enhanced Learning Factories for I5.0.
- Evaluation of achievements, feasibility and drawing of generalized conclusions through pilot comparisons.
- Future proof of the interventions for sustained impact.

3. Results & Discussion

Five learning ecosystems - FH Joanneum/I4.0 Platform (AUT), Basque VET Pilot (BC) Smartmakers (NL), Sharehouse (NL), LPK (LT) - , are piloting the methodology for advanced manufacturing training programmes for students, companies and job seekers.[2]

In the preliminary phase, the project identified the initial status of the learning ecosystems related to I5.0 aspects. The assessment was carried out by comparing to what extent I5.0 practices are implemented in those ecosystems. See table for results (the scores are in a 1-5 scale).

Initial situation (A)	**I5.0 score**	**Human Centricity**	**Resilience**	**Sustainability**
Learning ecosystem 1	2,2	2,0	2,5	2,0
Learning ecosystem 2	2,5	2,4	2,5	2,5
Learning ecosystem 3	3,0	3,1	2,5	3,5
Learning ecosystem 4	1,7	1,7	1,0	2,3
Learning ecosystem 5	1,9	1,6	1,5	2,8
Average	**2,3**	**2,2**	**2,0**	**2,6**

[2] Bridges 5.0 include another 4 pilots in companies, Comau (IT), Infineon (AUT) Mondragon Corporation (BC), Kitron (LT) following the methodology adapted to their needs.

The initial assessment puts the basis to define which I5.0 practices must be improved and to design the training pilots, including the enhanced Learning Factories. Each learning ecosystem sets the priorities, technologies and targets to address.

However, for a more accurate comparison between pilots a further elaboration of the I5.0 practices are necessary. The level of complexity of the interactions among I5.0 dimensions makes the assessment rather vague. This vagueness is accentuated by the fact that the results of the evaluation depend to some extent on the person carrying it out, which reduces objectivity. Furthermore, the organizational aspects that highly influence upon I5.0 adoptions are not always straightforward applicable in education environments.

4. Conclusions & Recommendations

The methodology reveals the potential to formulate training interventions for I5.0 by drawing from successful industrial practices focusing on human-centric, resilience, and sustainability aspects. A selection of I5.0 practices have been utilized to assess the current status of the learning ecosystems involved and to determine the targets for the pilot programs.

Despite the benefits of establishing a common baseline for comparison and extrapolating findings for subsequent work, prudence is necessary due to the subjective nature of the analysis.

Recommendations:

- Better understanding of mechanism used in industry to deploy human centric, resilience and sustainability aspects.
- Explore further integration of I5.0 principles into diverse learning ecosystems.
- Foster ongoing discussions on assessment methods for I5.0 practices.
- Encourage the replication I5.0 practices in Learning Factory settings.

References

[1] European Commission, D.-G. for R. and I. Industry 5.0 - Towards a sustainable, human-centric and resilient European industry. (2021).
[2] Bridges5.0 (2023) https://bridges5-0.eu/
[3] P. Oeij et al., *Conceptual framework of Industry 5.0 to study workforce skills BRIDGES 5.0 deliverable D1.1.(2023)*

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

THE IMPORTANCE OF PARTICIPATION IN THE IMPLEMENTATION OF NEW TECHNOLOGIES IN THE HEALTH AND SOCIAL SECTOR AT THE WORKPLACE

Johanna Muckenhuber[1*]

[1]Institute of Social Work, FH JOANNEUM, Eggenberger Allee 11, 8020 Graz, Austria
[*] Corresponding author Email: johanna.muckenhuber@fh-joanneum.at

Keywords: *Implementation new technologies, healthcare and social sector, participation, inclusive change management*

1. Introduction

The social and health care sector are strongly focused on the face to face interaction partly including body-contact between patients/clients with the health and social work professionals. Compared to other sectors, the health and social sector show a low degree of digitalization and implementation of technology (Scharf et al. 2023). However, these processes and organization of work are changing including digitalization and the implementation of artificial intelligence in health and social care. But technological disruption can lead to resistance of the professionals (Muckenhuber et al. 2021). As the implementation of new technologies including the change of work organization is a complex process (Lohmer & Möller, 2019) it is important to carefully study the challenges in the process and potential resistance to change at the workplace.

Therefore, the aim of this paper is to present and to discuss results of a study on challenges in the process of digitalization and technological disruption in the health and social sector.

The following main research questions will be answered:

What factors will support technology driven organizational change? And what factors will inhibit change processes and lead to resistance in the team?

2. Methodology

In order to answer the research questions a qualitative social science research design was applied by the author of this paper. Following process of theoretical sampling in grounded theory, 30 Qualitative interviews were conducted with health professionals and with professionals in management positions in the region of Styria in Austria. The interviews were analyzed using qualitative content analysis and open coding. In a circular research process each interview was analyzed and the next interview partner was recruited according to the grounded theory principles of maximal and minimal contrasting.

3. Results & Discussion

The analysis showed that technological disruption with the implementation of new technologies can lead to strong resistance in the team which can impede successful organizational change. This is often related to employees apprehension of an increase of control over their daily working routines, to previous experiences with additional tasks and an intensification of work and to concerns related to their standards of high quality of work with as much time in direct contact with patients and clients as possible.

But there are also cases of successful processes. The success is mostly linked to the possibility and mode of participation of health care and social work professionals in the process of implementation of new technologies. Results show that high levels of employee participation including as many decisions as possible strengthen employees commitment.

4. Conclusions

Therefore I conclude, that it is possible to successfully integrate new technologies in the sector, but the success is strongly dependent on the change process. To allow participation and to take an Inclusive approach has shown to be more successful and sustainable than top down implementation.

References

[1] A. Scharf, S. Haug, M. Ritthaler and G. Raptis. Opportunities and Challenges of Digitalization in Rehabilitation: Results of a Survey of Rehabilitation Facilities. *Rehabilitation*, (62) 229-307, 2023

[2] J. Muckenhuber, G. Janschitz and T. Klebel. Digitalisierungsprozesse im Pflegebereich: Organisationaler Wandel zwischen Kooperation und Top-down Implementierung. In *„Disruption der Arbeit? Zu den Folgen der Digitalisierung im Dienstleistungssektor“.* J. Muckenhuber, M. Griesbacher, J. Hödl, L. Zilian [Hrsg.] Campus Verlag. 2021

[3] M. Lohmer and H. Möller. *Psychoanalyse in Organisationen. Einführung in die psychodynamische Organisationsberatung*. Kohlhammer, 2019

Theme 2: Track 2

Future of Work – Changing Dynamics of Remote Work

EU4Dual The European Dual Studies University
EUROPEAN UNIVERSITIES Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

THE FUTURE WORKPLACE: BOOSTING HUMAN CONNECTIVITY IN A RAPIDLY TRANSFORMING WORK ENVIRONMENT

Doris Kiendl,[1*] Sabrina Sorko,[1*] and Helene Stainer[2]

[1]Department of Management, FH JOANNEUM University of Applied Sciences, Austria
[*]doris.kiendl@fh-joanneum.at

[2]bluebird.space, Salzburg, Austria

Keywords: *Work place, open innovation, communities of learners, living areas*

1. Introduction

This paper deals with two current phenomena and one vision for the future of work. The two phenomena are: First, fundamental changes in the workplace are happening with increasing speed, leaving many people with a lack of orientation and the feeling to be left alone. Secondly, changes in the society take place, in particular in younger generations, which blur the borders between work and wellbeing ecosystems. These two global megatrends have led to new definitions of the workplace in a system of individual connections and aspirations. This leads to the vision for the future workplace presented in this paper: future workplaces are spaces where people meet, work on their individual tasks, can use complementary skills of other people and engage in inspiring communication.

Work environments have been transforming fundamentally due to technological and global developments. Remote work, which had been widely introduced during Covid19, has stayed in place in many industries. The number of small companies run by single entrepreneurs is constantly increasing; up to 41% of SMEs do not belong to any formal network,[1] which is a huge challenge in terms of creating an innovative and productive ecosystem. Both, the evolution of single CEOs and staff working remotely leads to several problems: a significant decrease in direct human interaction within the workforce, a lack of the sense of belonging, challenges in solving of problems, deficiencies in dealing with stressful situations and to a lower potential of innovation due to a lack of inspiration and playful social interaction in the workplace. New communities and networks need to be formed to support the creation of a vision for the future of work. In addition, younger generations, in particular generation Z require new workplaces in order to be loyal to their employer.

As regards entrepreneurs, success in new ventures heavily depends on networks for financing, market research, product innovation and for social interaction to cope with stress and fears of failure.[2] Entrepreneurs benefit enormously from communities since being part of an innovative and diverse work space provides them with the necessary network, inspiration and the chance to fill up with energy.

The transformation of the work environment is also strongly shaped by disruptive technological developments. These enable not least an increase in process speed and flexibility. Artificial intelligence is now used for many tasks in all areas, leading to the need to redefine the jobs to be performed by human beings. The need to create and nourish new communities open to innovation grows, since the introduction of new technologies may leave many entrepreneurs and employees, in particular if they are facing a lack of social interaction, with anxieties, uncertainties and a sense of being overwhelmed by these rapid changes.

Opening up private areas for work purposes and the longing for innovation networks brings with it another challenge. *Oldenburg* [3] divides human living areas into first, second and third places. First places are the home and private environment of people. These places are characterized by a high degree of individuality per person and offer security, a wellbeing environment and space for self-fulfillment. In addition, *Oldenburg* subsumes the family, in particular the people with whom one lives. The working environment is defined as second place. [4] This includes the workplace, the working atmosphere and culture as well as the team structure and social interactions in the workplace. Third Places are public comfort zones, which means public areas in which people pursue their individual wellbeing needs. [5] This could be a coffee house, a park or other leisure activities. According to *Oldenburg*, every place has its own purpose to support human wellbeing and all three should build a balance. These developments lead to a shift between those places and the necessity to adjust the framework of *Oldenburg*.

This paper addresses the research question on how the future workplace should look like in order to achieve high productivity, efficient work, a sense of belonging and a culture of open innovation. The future workplace is a space where human connectivity is nourished for the purpose of bridging the need for human interaction and exploration of new business opportunities. This paper presents a best practice example of a new workplace: *bluebird.space* in Salzburg, Austria.[6]

2. Case Presentation

Bluebird.space is an award-winning institution of inspiration in the future of work development. *Bluebird.space* is a Shared Office and Coworking space creating an ambience where people feel at home, get inspiration to work and use the skills of the community in the space.

What is so special about *bluebird.space*?

The concept of the workspace has three dimensions: It is a space where different services are offered. *bluebird.space* includes a Workplace as a Service and rents out flex desks, fix desks and enterprise offices, attracting people of all ages of various businesses. Learning and working go together well, this is why they also offer various learning formats and understand themselves as a learning workspace. Residents and guests meet at business events in the space, talk and develop new ideas, start a project, making *bluebird.space* a Makerspace as well. According to *bluebird.space´*s values they want to promote the idea of sharing, leading to win-win situations, and so the workspace is a Showcase as well. Several companies are

given the chance to present themselves and their products while providing the residents with top quality products at the same time. Furniture, ergonomic chairs, height adjustable desks, acoustic solutions, lighting, curtains – many small and medium sized companies are involved in the project and use the workspace as their showcase.

Bluebird.space is in an attractive location within the city limits. Well connected to the public transport system, airport and highway it can easily be reached. It is on a multipurpose compound, which allows residents to reach local suppliers, restaurants, gym and kindergarten within a 15-minute walk, entirely in line with the concept of the 15-minute city. Surrounded by a park, workers have easy access to the outdoors.

The room concept enables activity based working. The space is divided into 3 zones (market area, meeting area and focus area). Residents choose the surrounding that is best for their work, be it a quiet zone in our respite room, or the WorkCafé where you can mingle with others and listen to jazz tunes. Residents can choose between 11 different high-tech-equipped meeting rooms. Elegantly furnished, *bluebird.space* appeals to all senses: haptic, acoustic, visual elements are important, just like the biophilic aspect. The extended “green” office is highly popular among residents, many of which like to work in the atrium or on the roof top terrace in summer.

The fanciest space, however, is nothing without its inhabitants. It´s the people, that matter. And this is why *bluebird.space* spoils them. By entering the space many guests feel something they cannot put into words. Is it the scent? Is it the vibes? Is it the warm welcome through the host? The host takes real interest in people and that makes the difference. When it comes to new residents they focus on the cultural fit. They host social events like welcome parties for new bluebirds, seasonal events, open house etc. Nobody has to, but every resident is invited to attend and become part of the bluebird.community.

Founded by people who have a life-long work experience in different places and work-environments worldwide, *bluebird.space* meets the need and desire of many. A first-class work environment with easy access digital devices and full service on the one hand and a hotel feeling on the other hand. A place where you can work hard in a pleasant atmosphere and unfold your potentials at the same time. By linking business and lifestyle, work and life *bluebird.space* is a workspace where deep work meets high end living, and therefore almost becomes a third place. It is an attractive nest but also an attractive networking and starting point for take-off and unfolding your potentials. 26 companies and 43 residents in April of 2024 are the evidence of this success.

3. Results & Discussion

This case study illustrates that there is a solution to the need of a future workplace. There is a vision which satisfies the requirements raised due to the fundamental changes described above.

The findings show that future workplaces can be described as productive well-being environments, providing supporting infrastructure and atmosphere. In this respect,

companies needs to provide areas that are not only functional in terms of process efficiency, but are oriented towards the need of wellbeing. Thus, there needs to be areas for co-creation and social interaction, ergonomic and motivating infrastructure as well as state-of-the-art technology. As for the atmosphere, future workplaces provide a place where employees on various hierarchical levels can interact with each other at eye level, where open communication, feedback and a sense of belonging is lived. The case study on bluebird.space shows that spaces are in high demand which enable productive work and social interaction in a world with increasingly fragmented structures.

4. Conclusions & Recommendations

Based on the theory described above and the case study presented, the following conclusions and recommendations can be derived:

4.1 Conclusions

- The future workspace ultimately needs to combine work and life. The ingredients are:
  - Accessible location (ideally reachable by public transport, local suppliers, gym, kindergarten etc. within walking distance)
  - interior design: mix office equipment with boutique hotel furniture
  - integrate art into the work environment (books, music, fine art objects)
  - provide 24/7 access as people may have different schedules
- The future workspace needs to offer amenities you cannot have in your home-office, such as
  - digital tools and equipment
  - meeting rooms and quiet zones
  - representative ambience for meetings with customers & clients
  - networking possibilities
  - community-events
  - appealing work environment (plants, if possible, terrace with a view, ergonomic furniture)
- The future workspace needs to prioritize wellbeing
  - Flexibility where to work - different workplaces within the space
  - Access to open spaces like gardens or terraces
  - Fresh fruits and non alcoholic beverages in the WorkCafé
  - health food restaurants in walking distance
  - yoga, pilates-classes and other facilities for workout
  - create a people first-environment
- The future workspace needs to emphasize on work culture, as it boosts motivation as well as mental health
  - Trust
  - Fair use
  - Empathy
  - Appreciation

4.2 Recommendations

- By all means work has to be in the focus. Amenities are nice, but their purpose is to support productive working.
- Never stop improving the work-environment. Listen to the coworkers, try out new things, don´t hesitate to change and remove things that do not work; stay innovative.
- Make people feel important, valued and appreciate their feedback.
- Be authentic and create the workplace that suits your company and your employees.
- Write a playbook in your team which includes rules on interaction.
- Choose a suitable person as community manager, she/he should be humble and empathetic, should be a good host but also implement the rules of the office playbook.

References

[1] OECD SME and Entrepreneurship Outlook 2023 | en | OECD (accessed on March 7th, 2024).
[2] GEM Global Entrepreneurship Monitor (gemconsortium.org) (accessed on March 7th, 2024).
[3] R. Oldenburg, (1989). The Great Good Place: Cafes, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day. New York: Paragon House. ISBN 978-1-55778-110-9. (Hardback)
[4] P. Pratul, Choudhary. (2022). Assimiliting Third Place Architecture in Jhe Indian Context. International journal of landscape planning and architecture, doi: 10.37628/ijlpa.v8i1.922
[5] A. Morisson, (2019). A Typology of Places in the Knowledge Economy: Towards the Fourth Place. In: Calabrò, F., Della Spina, L., Bevilacqua, C. (eds) New Metropolitan Perspectives. ISHT 2018. Smart Innovation, Systems and Technologies, vol 100. Springer, Cham. https://doi.org/10.1007/978-3-319-92099-3_50
[6] bluebird.space (accessed on March 7th, 2024).

Co-funded by the Erasmus+ Programme of the European Union

COLLABORATIVE LEARNING FACTORY TO ENABLE THE FUTURE OF WORK

Prof. Dr.-Ing. Klaus Dieter Rupp[1*], Unai Ziarsol[2]. Liher Errasti Gonzalez[3]

[1]DHBW, Engineering, Marienstrasse 20 89518 Heidenheim, Germany
[*] Corresponding author Email: klaus-dieter.rupp@dhbw-heidenheim.de
[2]TKNIKA, Department, University/Company, Address, Spain
[3]Miguel Altuna LHII Agirrebidea 2, 20570 Bergara, Spain

Keywords: *CLF, Micro-Credentials, LCAMP,IIOT, MES, MobileRobot*

1. Introduction

Learning factories lend themselves to education through contextualized training. In the context of dual training, they can play a key role in the modern teaching of advanced manufacturing content. Therefore, learning factories can be used in different ways, as described in the morphology dimension "didactics" of learning factories. Learning factories are already being used intensively for educational purposes. Through the digital networking of these factories, the future of work can be depicted even more realistically. In the context of Industry 5.0, the understanding of what exactly managers and organizations need to do should be improved. The benefits of the interaction between human workforce and technology resources are thereby better exploited. This goes hand in hand with the optimal use and distributed decision making of digital technology.

2. Case Presentation

Within the framework of the LCAMP project, it is investigated how a learning factory can be used with different approaches and types of training. The designed collaborative learning factory is spread over numerous project partners. Essential building blocks here are the cooperation of students and teachers across national borders and a digital link between the individual learning factories. The Learning Factory appears to the outside world as a network of different production facilities that together describe a value chain. The starting point is a common product, a standardized mobile robot with a wide range of variants.

The collaborative Learning factory CLF[2] forms the backbone for sharing modules in the form of micro-credentials across the connected partners. Teaching modules are connected to the collaborative learning factory along the entire product life cycle. Each partner brings in some specific micro-credentials[4] that underpin the qualification network. Across the Learning Factory, the attempt is made to reconcile various levels of education. Training content and research projects from EQF level 3 to EQF level 8 work together on the collaborative learning factory. [5]

3. Results & Discussion

The first steps already done:

- Definition of a common product [1]
- Connection of 2 workplaces with a MES System. Two more from Spain and Italy are in the que.[3]
- Establishment of a joint development platform with 3D experience.
- Establishing the LCAMP – Platform including the open innovation space.

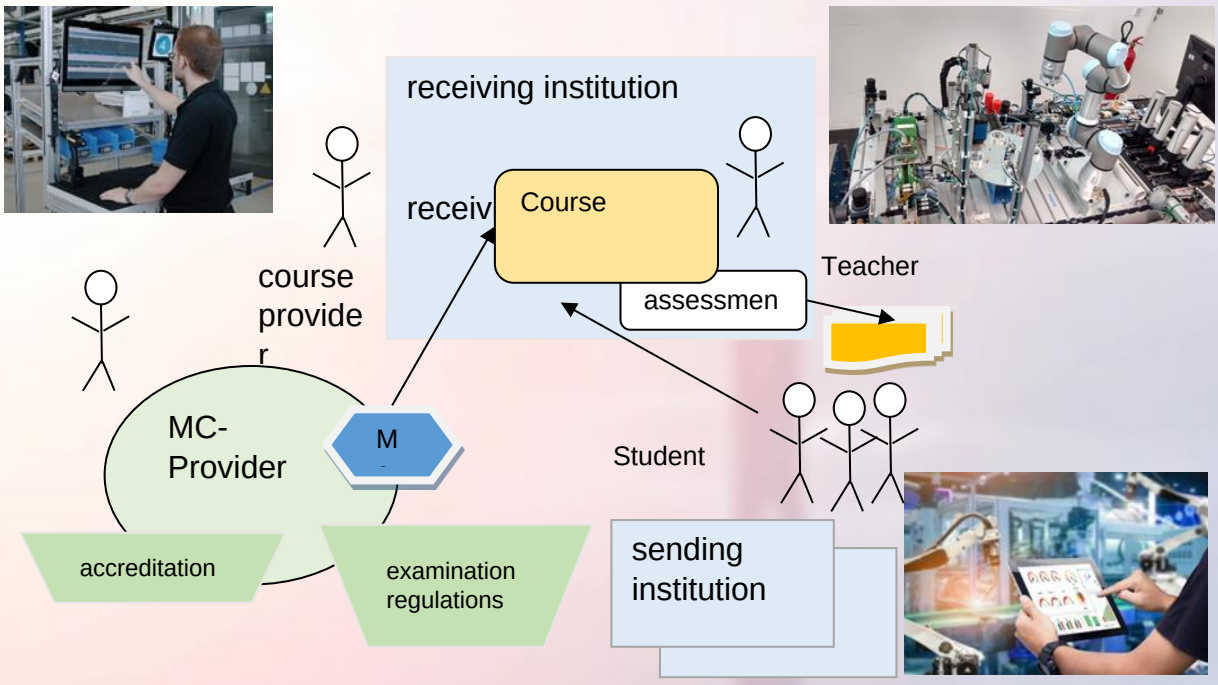


Figure 1. *Model of Collaborating Courses.*

Further learning factories are to be linked to the network.

The collaborative learning factory will be built as an agile, self-organizing network. Without hierarchical relationships and decentralized, largely autonomous entities.
The teaching modules in the collaborative learning factory combine 3 essential areas:

1. The production of parts using modern methods such as additive manufacturing of parts, production of composite fibre structures, as well as classic methods such as turning and milling embedded in a reference architecture. It is particularly interesting to integrate classic manufacturing processes such as casting or welding into the distributed manufacturing process. This also creates internal competition for the most effective technologies.
2. The assembly of sensor systems, drive units and the final assembly of the entire robot. This also involves system testing and calibration tasks. Since the product itself is a component of the Internet of Things, it can communicate with its distributed manufacturing environment.
3. International product management, Quality-management, Lifecycle-management, Customer Value-Management, European cooperation, product design and the connection of the logistics chain with resources management system

The collaborative learning factory is an environment conducive to learning, as it implements not only the pure transfer of knowledge but also the application and reflection of the skills learned. The embedding in the European context creates an additional motivating atmosphere.
This results in a reduction in the resources required for training through distributed tasks and a common platform. The virtual environment is fed by real data. It supports distributed curses with practical experience.

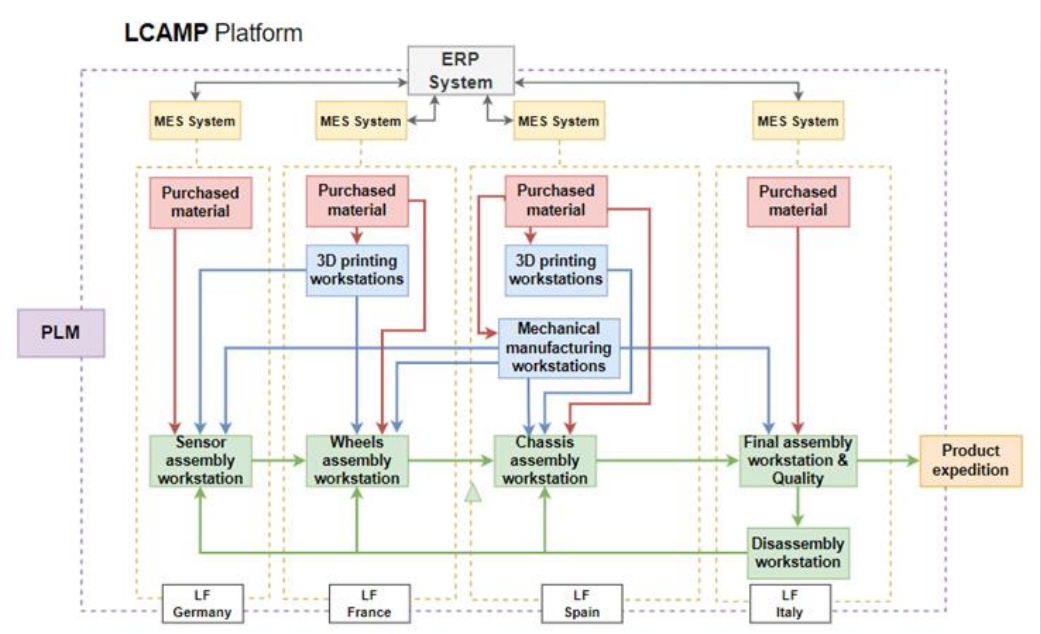


Figure 2. *Collaborative Learning Factory.*

4. Conclusions & Recommendations

Most of the project partners in LCAMP are Centres of Vocational Excellence (CoVE). The initiative takes a bottom-up approach to excellence, enabling VET institutions to rapidly adapt their skills offerings to ongoing changes in economic and social needs. LCAMP is a skill based dual learning context with Student an equipment collaboration and is. one of the transnational platforms that promotes cooperation. In the context of Eu4Dual, this is an involvement of the partner companies and an approach to both academic training and professional qualification.

References

[1] Rupp, Klaus-Dieter and Martinez, Luis and Lööw, Linus and Ziarsolo, Unai, Modular Mobile Robot System for Open Innovation (June 5, 2023). Proceedings of the 13th Conference on Learning Factories (CLF 2023), Available at SSRN: https://ssrn.com/abstract=4469275

[2] Ziarsolo, Unai and Araiztegui, Iñigo and Irazabal, Josune and Errrasti, Liher and Rupp, Klaus-Dieter and Hudak, Raimund, Collaborative Learning Factory as An Integration Tool for the Learner Centric Advanced Manufacturing Platform (June 5, 2023). Proceedings of the 13th Conference on Learning Factories

(CLF 2023), Available at SSRN: https://ssrn.com/abstract=4469793

[3] Wengle, Markus and Dalm, Kris and Sahuji, Rohan, Implementation of a Prototype Production Line based on concept of Industrial Digitalization in an existing Learning Factory environment (May 23, 2023). Proceedings of the 13th Conference on Learning Factories (CLF 2023), Available at SSRN: https://ssrn.com/abstract=4456952

[4] A Learning Approach for Future Competencies in Manufacturing using a Learning Factory Procedia CIRP Volume 118, 2023, Pages 1039-1043 https://education.ec.europa.eu/education-levels/higher-education/micro-credentials

[5] Morphology the LCAMP collaborative learning factory, (LCAMP deliverable D6.1 part 2. December 2023) https://lcamp.eu/wp-content/uploads/sites/53/2023/12/D6-1_Part-2-Morphology-of-the-CLF-v-1.0.pdf

DIGITAL PARTNER – A FUTURE ORIENTED LEADERSHIP STYLE TARGETING DIGITAL NATIVES

K. Seybold[1*], S. R. Sorko[1] and L. Leitenbauer[1]

[1]Institute Industrial Management, Department Management, JOANNEUM University of Applied Sciences, Werk-VI-Strasse 46, 8605 Kapfenberg, Austria
[*] Corresponding author Email: Klaus.Seybold@fh-joanneum.at

Keywords: *New leadership, generational management, digital natives, quantitative research*

1. Introduction

The last decades are characterized by rapid technological development, transforming nearly all areas of life. Described as digital transformation, the technological possibilities have a persistent influence on economic trends and personal lives in the 21st century [Dittes et al., 2019]. Due to those new connectivity possibilities, volatility and access to information are constantly increasing. Real-time, long-distance communication, information transparency and availability as well as the use of technology to maximize profits are some of the resulting trends changing industries. But, these changes not only influences working processes. They also have an impact on society and human socialization, both in the private sector and in the working environment asking questions such as: In which places is it possible to fulfill work duties? Under which conditions will work take place in the future? and How can work-related interaction be organized between colleagues and between employees and leaders? As an example, the most evident development is the normalization of home office and remote work, which has been pushed by the COVID-19 pandemic. From today's perspective, work in the future will largely be digital and flexible, not only in office environments but also in production, retail, and other branches. The high level of connectivity allows us to control systems and machines, access data and carry out versatile activities regardless of location and time.

In addition to the technological possibilities, the requirements, attitudes and attributes of individual generations are also shaping the world of work. There are currently four generations of working age: According to Klaffke (2014) and Wagner (2018) starting with the Baby Boomers (birth cohorts 1956-1965), through Generation X (1966-1980) and Generation Y (1981-1995) to Generation Z (1996-2009). Every generation is shaped by a unique set of economic and social circumstances. Influenced by global events, socialization and the reaction to one's own experienced upbringing, work-relevant characteristics of people are formed. This results in different thought and behavior patterns, as well as value systems of people influencing companies. In other words, a high degree of individuality will shape work, working conditions and workplace design, far more than now.

In literature, the term digital natives is used in addition to the division into generations shown above [Baum, 2020]. Digital natives are particular drivers of digital transformation as they grew up with digital technologies. Therefore, digital natives

consists of Generation Z and late-born Generation Y cohorts. People allocated to this group depend on technology and thus brings their experience and skills in this regard to their everyday work. But not only technology has shaped this generation. A measurable effect is the increase in helicopter parents [Weibler & Volgmann, 2016]. This leads to the effect, that digital natives exhibit a high need for security and structure, and a desire for self-realization also regarding their work. Thus, this generation is accompanied by a new set of requirements, that needs to be addressed from companies to remain an attractive employer.

Leadership behavior in particular often needs to be rethought in this respect. This paper describes challenges for leadership but also presents a new innovative leadership style targeting the requirements of digital natives.

2. Methodology

Firstly, a literature review was done regarding leadership styles, generational management and digital natives. Secondly, a quantitative study was conducted surveying students within the target group (digital natives) in Styria using an online questionair. The survey covered questions regarding classical and modern leadership elements as well as generational influenced topics such as motivational factors or the importance of various aspects of leaders. Those results give insights into the needs of digital natives and their requirements regarding leadership. Both results are combined and build the basis for the development of a new leadership model named “Digital Partner” presentet within this paper.

3. Results & Discussion

The model should help organizations and especially leaders to invent new innovative forms of leading to attract and retain young talents. Thus, recommendations and examples are provided on how leaders can become Digital Partners.

Some main findings were that although digital natives are used to work with new technologies, they strongly require face-to-face contact with their leaders. Also they expect flexible collaboration, clear target orientation and task distribution. Furthermore, the study shows, that core elements of future leadership are both solving conflicts and providing a pleasant working atmosphere. Overall digital natives also appreciate a respectful, transparent and authentic leader. According to those findings leadership characteristics were derived such as empathy or openness.

Nonetheless, the study was limited to students of similar educational level who did not all have professional experience. Therefore, their ideas about leadership may differ from digital natives who show prior professional experience.

4. Conclusions

Summing up the results, it becomes clear that a person leading digital natives must have different characteristics than traditional leadership theories claim. Thus, in the future, companies will be faced with the question of how leadership tasks need to be redesigned and what competence requirements this will create.

References

[1] Baum, T. (2020). A changing world of work. What can we learn from the service sector about employing Millennials (and Gen Z)?. *Organizational Dynamics*, *49*(3), 1–8.

[2] Dittes, S., Richter, S., Richter, A. & Smolnik, S. (2019). Toward the workplace of the future: How organizations can facilitate digital work. *Bussiness Horizons*, *62*(5), 649–661.

[3] Klaffke, M. (2014). *Generationen-Management: Konzepte, Instrumente, Good-Practice-Ansätze*. Springer Gabler.

[4] Wagner, D.J. (2018). *Digital Leadership: Kompetenzen – Führungsverhalten – Umsetzungsempfehlungen*. Springer Gabler.

[5] Weibler, J. & Volgmann, K. (2016). Next Generation: Generation Z. *Leadership insiders*. https://www.leadership-insiders.de/next-generation/

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

DETECTING HOME OFFICE POTENTIAL - A MODEL FOR IDENTIFYING HOME OFFICE WORKPLACES IN MANUFACTURING COMPANIES

Ch. Lichem-Herzog[1*], A. Steinberger[2], S. Sorko[3] and K. Seybold[4]

[1,3,4] Institute Industrial Management, Department Management, FH JOANNEUM University of Applied Sciences, Werk-VI-Strasse 46, 8605 Kapfenberg, Austria

[*] Corresponding author Email: christine.lichem-herzog@fh-joanneum.at

[2]ANDRITZ AG Graz, Global IT, Stattegger Straße 18, 8045 Graz, AUSTRIA

Keywords: *Home Office, Teleworking, future of work, evaluation model*

1. Introduction

In a constantly changing world of work, the concept of dislocated work is becoming increasingly important. Companies are faced with the choice of different variants, from purely remote working from home (classic home office) to highly flexible general location-independent working (telework). However, it is not only the type of remote working that needs to be defined, the detailed framework must also be determined within the company. This article presents the results of a research project that deals with the question of the extent to which a structured approach to identifying workplaces that are suitable for a teleworking environment is helpful (or useful) for companies. In addition, an overview is given of the suitability of home office in industrial companies and the associated legal framework [1].

The underlying initial situation is as follows: In recent years, the world of work has changed fundamentally due to technological progress, social developments and changing employee expectations. One of the most noticeable changes is the increasing transition to more flexible working models, in which dislocated work plays a central role [2]. Originally seen as a niche solution, the COVID-19 pandemic has suddenly brought the necessity and feasibility of working from home to the forefront. Companies around the world have been forced to rapidly transition to remote working models, leading to an unprecedented acceptance and normalization of remote working [3]. This change goes beyond short-term adjustments and reflects profound changes in the way we understand and organize work. For many employees, working from home or other places than the company offers flexibility, a better work-life balance and the opportunity to combine work and private life more harmoniously. On the other hand, the disadvantages for employees have also become clear. These include the blurring of the boundaries between work and leisure time, which can lead to a lack of work-life balance, more difficult communication with colleagues and superiors and the fact that some employees miss the stimulation and energy that a corporate workplace environment offers. This can lead to a loss of motivation and social isolation.

At the same time, organizations face the challenge of developing effective strategies and policies to ensure productivity and promote cohesion within teams. Whilst there are undoubtedly benefits to working remote, not all jobs and industries are equally suited to this way of working. A differentiated view and a structured approach are required to find the optimal balance between flexibility and efficiency. This paper focuses especially on home office and not remote work in general and presents the results of two research projects in this field.

2. Methodology

A scoring model [4] was developed that maps a corresponding home office level by evaluating various criteria and a subsequent classification. The result is a four-stage home office model that shows the process from assessing suitability to determining the impact [5]. One aim was to define industry-independent activity groups for different occupational groups. Using a decision tree, 16 different occupations in manufacturing companies were assigned to different job groups. This model was validated with companies and a guideline was subsequently created. This supports companies in a structured approach to the selection of home office suitable jobs.

3. Results & Discussion

During the validation of the model, it became clear that many companies do not think about the ideal scope of home office. In traditionally managed companies, the focus is primarily on central key factors such as the basic possibility of decentralized service provision or equipping employees with hardware. The aspects of fairness and the personal wishes of the employee also have a high priority. By applying the developed multi-stage analysis model, various criteria are taken into account, including the activities, technological requirements, and team interactions. Firstly, the basic characteristics of activities that enable spatial independence are analyzed. Subsequently, an evaluation matrix is presented that enables companies and employees to assess the suitability of certain roles for the home office. An initial result of the research work showed that individual work preferences of both the employer and the employee are given too little consideration in the model. These were included in the model as part of the ongoing research.

4. Conclusions

By systematically applying this model, organizations can make more effective decisions about teleworking opportunities while promoting employee productivity, satisfaction, and work-life balance. A one-size-fits-all solution for different industries cannot be derived, as each industry has a different relationship to the selected criteria. This structured approach therefore serves as a guideline for companies that want to create a flexible working environment while harmonizing their corporate goals and the needs of their employees.

References

[1] E. Felten. Home-Office und Arbeitsrecht, in: Das Recht der Arbeit, Heft 391, 2020, S. 510-514.

[2] D. Lindner. Virtuelle Teams und Homeoffice, Empfehlungen zu Technologien, Arbeitsmethoden und Führung, *Springer Gabler*, Wiesbaden 2020.
[3] A. COX. Working from home is key to productivity., in: Credit Control, Volume 39, Issue 1/2, 2018, S. 68.
[4] R. Bergmann, Ma. Garrecht. Organisation und Projektmanagement, 2. Auflage, Springer Gabler Verlag, Berlin 2016. S. 145.
[5] A. Steinberger. Homeoffice, nachhaltiger Change oder temporärer Trend, Graz 2021M.

Theme 2: Track 3

Future of Work – Technological Disruption

VIRTUAL TECHNOLOGY IN THE DEVELOPMENT OF WORKING LIFE AND TRAINING IN SMES IN FINLAND

Kimmo A. Pakarinen[1*], Ville E. J. Heiskanen[1] and Anssi J. Mähönen[2]

[1] Smart and Sustainable Wellbeing, Savonia University of Applied Sciences, Microkatu 1, FI-70210 Kuopio, Finland
[*] Corresponding author Email: kimmo.pakarinen@savonia.fi

[2] Continuing learning, Master School, Savonia University of Applied Sciences, Microkatu 1, FI-70210 Kuopio, Finland

Keywords: *Extended reality, working life, virtual technology*

1. Introduction

The project VirTech (Virtual technology in development of working life and training) unfolded from 2021 to 2023, targeting small and medium-sized enterprises in Northern Savo, Finland.

2. Objectives

The goal of the project was to respond to the challenges posed by the COVID-19 pandemic and similar future emergencies by developing operational models that facilitate cost-effectively the smooth progress of businesses and organizations across various sectors in challenging conditions. The project utilized virtual environments (e.g. 360-degree) and augmented reality solutions made possible by virtual technology. Additionally, the objective was to enable companies and organizations to comprehend and implement virtual technology in their daily routines.

3. Methods

Methods involved tailored guidance, assistance, pilot projects and training sessions, addressing various applications of virtual technologies for enterprises in the region to adopt and apply virtual technology according to their specific needs.

Training sessions held during the project promoted multiple different methods and use cases for different approaches on how companies can utilize virtual technologies. The topics of the training sessions were chosen to address as many diverse use cases as possible, where virtual technologies could offer alternative approaches (e.g. VR, MR, AR, Lidar and 360 technologies in business).

Notable pilot projects in collaboration with enterprises included a mobile application for e.g. visualization of interior unit of an air-source heat pumps, yielding proof-of-concept version of application for the enterprise. Proof-of-concept application helps companies to further develop production version of such application.

4. Results

The project engaged 17 active companies in diverse sectors and 22 different training sessions with approximately 200 participants. As a result of the pilot projects various operational models were developed such as 360-degree space presentations, AR mobile apps and remote support solutions for smart glasses. These models enable effective onboarding, space presentations, remote service provision, and other seamless activities for personnel in various industries. These operational models are applicable and transferable from one company to another.

A general operational model for transitioning to virtual technology was created, demonstrating its adaptability across companies. The project also established a preliminary cooperation model between companies and the Savonia XR-Center, fostering flexible partnerships in the realm of virtual technology. It allows flexible collaboration and services for companies in the North-Savo region related to virtual technology and its utilization. The finalization of the model requires a market survey, which was initiated during the project and is expected to finish in 2024.

5. Conclusion

In summary, there is a gap between small and medium-sized companies in adoption of virtual technologies in Finland. Companies require assistance and guidance to integrate and utilize these technologies for their use. Companies are interested in new technologies and how they can cost-effectively utilize them.

Future projects should be aimed at small and medium-sized companies to provide practical solutions and hands-on guidance. There is also a need for developing educational materials tailored for enterprise use to empower companies to make informed decisions related to virtual technologies.

Business keeps evolving, and it is important to recognize the significance of virtual technologies and their capabilities in various fields of business. Virtual technologies are expected to become more popular in enterprise use. Educational institutes should respond to this trend by training more experts who possess a better understanding of virtual technology and its potential in a business context.

6. Acknowledgements

We thank everyone in Savonia UAS Virtech project team: Sirkka-Liisa Halimaa, Jaana Konttinen, Sonja Kärkkäinen and Ari Tanskanen. Also we want to thank ESF+ program for making this possible, project code: S22658

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

DIGITAL HUMANITIES AND DIGITAL SKILLS FOR LOCAL NEEDS

K. Wasilewski[1*] and T. Królikowski[2]

[1]Faculty of Humanities, Digital Humanities and New Media Lab, Koszalin University of Technology, Str. Śniadeckich 2, 75-453 Koszalin, Poland
[*] krzysztof.wasilewski@tu.koszalin.pl

[2]Faculty of Mechanical Engineering and Energetics, 3D Printing Center, Koszalin University of Technology, Str. Śniadeckich 2, 75-453 Koszalin, Poland
tomasz.krolikowski@tu.koszalin.pl

Keywords: *Digital humanities, information and communication technology, heritage, citizen science*

1. Introduction

The advent of the digital era has profoundly transformed the landscape of academia, bringing forth a paradigm shift in the ways we approach research, education, and societal engagement [1]. This research paper delves into the intersection of Digital Humanities (DH) and the development of digital skills tailored to address local needs. As societies navigate the complexities of an increasingly digitalized world, understanding the role of DH and its impact on cultivating essential digital skills becomes paramount [2].

The paper begins by providing a comprehensive overview of the Digital Humanities, exploring its roots, evolution, and interdisciplinary nature. Digital Humanities encompasses a diverse range of methodologies, tools, and technologies that empower researchers to analyze, interpret, and disseminate information across various disciplines. Its interdisciplinary nature fosters collaboration between humanities scholars and technologists, shaping a dynamic field that transcends traditional academic boundaries.

The main part of the paper focuses on the case study of using new technologies in preserving local heritage in the West Pomerania region in Poland. The Digital Humanities and New Media Lab at the Koszalin University of Technology has carried out a number of cooperative projects serving local needs. One of them was using the 3D printing technology to reconstruct and rebuild a demolished monument of the Virgin Mary, which has strong links to the local identity. Another project, done in cooperation with the National Archives and Public Library involved digitization of a regional journal – the oldest printed magazine referring to the local history. The Lab has also carried out, together with local governments, projects on digital heritage, such as the Digital Heritage of the West Pomerania. It made possible to save online comments referring to important local issues [3].

All the projects involved theoretical review, cooperation with external institutions and citizens (citizen science). As for the first, critical heritage perspective was implemented, allowing researchers to use new technologies to reconstruct, preserve, and create (digitization) local heritage [4]. The involvement of external partners, especially citizens to participate in research made it possible for researchers to reach

out to the community they live in. Digital humanities has proved to be useful not just for theoretical research, but first and foremost for applicable projects serving local communities. Moreover, the evolving digital landscape demands a workforce equipped with a robust skill set encompassing digital literacy, data analysis, and technological proficiency. The case studies have established strategies and frameworks for integrating digital skills development initiatives within local educational systems, thereby contributing to the creation of a digitally adept and empowered populace.

In conclusion, this research paper contributes to the ongoing discourse on the intersection of Digital Humanities and the cultivation of digital skills for local needs. By illuminating the potential of DH in preserving cultural heritage, fostering community engagement, and addressing local challenges, the paper advocates for the integration of digital methodologies in diverse educational and societal contexts. Emphasizing the importance of inclusivity and equitable access, the research seeks to empower individuals and communities to navigate the digital future while preserving their unique identities and histories.

References

The accuracy of the references in the paper is under the full responsibility of the Author/Authors of the paper. All publications cited in the text should be referred to by a number in square brackets, [1,2,3]. The full reference should be given in a list (of not more tnan 5 references) at the end of the paper according in the following format:

[1] A. Burdick, J. Drucker, P. Lunenfeld, T. Presner, J. Schnapp (2016). Digital_Humanities. United Kingdom: Penguin Random House LLC.
[2] S.E. Jones, *The Emergence of the Digital Humanities*. Taylor & Francis, 2013.
[3] R.Bonney, et al. "Can citizen science enhance public understanding of science?." *Public understanding of science* 25.1 (2016): 2-16.
[4] H. Rahaman, „Digital heritage interpretation: a conceptual framework”. *Digital Creativity* 29, nr 2–3 (3 June 2018): 208–34.

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

DIGITAL TRANSFORMATION & COOPERATIVISM: THE CASE OF MONDRAGON CORPORATION

I. Saez[1*] , M. Gago[*1] and S. Segura[1]
[1]Mondragon Unibertsitatea, Oñati, Spain
[*]Corresponding author Email: mgago@mondragon.edu

Keywords: *Digital Transformation, Robotic Process Automation, Cooperative*

1. Introduction

Digital transformation is commonly used to refer to the changes that companies must undergo to successfully adapt to new digital technologies.Robotic Process Automation (RPA) is one of these, which enables the automation of repetitive tasks based on pre-established rules with minimal human involvement, allowing individuals to focus on higher-value tasks [1]. Its ease of implementation and rapid return on investment have popularized its use across organizations.

RPA demands substantial transformation in organizations. At the heart of organizational transformation is the human element, which will experience automation firsthand. Employees may perceive RPA as a direct competitor for their jobs.This fear of job loss can lead to resistance towards change [2], resulting in a negative predisposition towards automation. Individuals require the organization's support throughout the process. An appropriate personnel policy and communication can reduce the fear of job loss among employees [3]. Automation will also require new skills, creating new roles within organizations [4]. The challenge of finding external personnel with the right skills will amplify the importance of investing in the development of new skills within organizations [5].

Cooperatives are also impacted by digital transformation. Cooperatives are characterized by a flexible structure, the involvement and participation of their members, and corporate values that lead them to invest in developing their human capital. The impact of digitalization on individuals, from the perspective of cooperatives, is influenced by the dual aspect of their members being both owners and workers. This research aims to address this distinctive element in cooperatives when managing the impact of automation on workers.

2. Case Presentation

The study was conducted in one of the cooperatives of MONDRAGON.The analyzed company initiated the automation process in 2019. They embarked on its implementation without knowing whether the technology would benefit them or not. They selected cases where there was a good definition and a high repetition of tasks with little need for thought on the part of the workers. The initial results were not very positive but the experiment served as a test to visualize the possibility of integrating technology into various areas. Hence, they tried to include all the staff in the task selection process.

3. Results & Discussion

From the content analysis of the interviews, these are the main results:

- Importance of considering who takes the leadership role when implementing the technology.
- The role of leadership and communication to foster employee involvement and participation and to reduce fears [3]
- Years ago, administrative personnel were needed; nowadays, the more manual and lower-value tasks should be done by the robot, and people should focus on analysis [1],[4],[5].
- The fears are related to stepping out of the comfort zone, thinking that a machine could take over the work [2].

4. Conclusions & Recommendations

The problems/challenges in the cooperative are similar to those found in the literature in other types of organizations. The clear difference is that in the cooperative there is no fear of losing the job but there is also reluctance and mistrust for the adoption of RPA.

There are some general conclusions that are useful for all other types of organizations. For example, the important role of leadership in the whole process: both in making decisions on the implementation of technology and in accompanying workers in the adoption process, through communication. Also, there is a need to change the profile of the workers, to stop doing manual tasks of little value and to dedicate themselves to tasks of greater added value, to encourage their analytical capacity.

References

[1] Lacity, M. C., & Willcocks, L. P. (2016). Robotic process automation at telefónica O2. MIS Quarterly Executive, 15(1), 21-35.
[2] Waizenegger, L., & Techatassanasoontorn, A. A. (2022). When robots join our team: A configuration theory of employees' perceptions of and reactions to Robotic Process Automation. Australasian Journal of Information Systems, 26.
[3] Truong, D., Warmate, F., & Okoye, C. I. (2023). Robotic Process Automation and its effect on Employees' Attitude and Behaviour.
[4] Kokina, J., & Blanchette, S. (2019). Early evidence of digital labor in accounting: Innovation with Robotic Process Automation. International Journal of Accounting Information Systems, 35, 100431.
[5] Fernandez, D., & Aman, A. (2018). Impacts of Robotic Process Automation on Global Accounting Services. Asian Journal of Accounting and Governance, 9, 123-132. https://doi.org/10.17576/ajag-2018-09-11

ESTABLISHING START-UP COMPANIES IN THE EU4DUAL COUNTRIES : THE ROLE OF INSTITUTIONS

First Ákos Tóth [1*] and István Pesti[2]

[1]Neumann János Egyetem, Kecskemét, Hungary
[*] Corresponding author Email: toth.akos@nje.hu

[2]Neumann János Egyetem, Kecskemét, Hungary

Keywords: *EU4DUAL countries, quality of institutions, start-up companies*

Abstract

This article examines how institutions can encourage start-up companies in EU4DUAL countries. The assumption is that start-ups are more likely to be successful in countries with higher quality institutional systems.

The statistical data of EU4DUAL member states are compared using comparative analytical methods, followed by tests using econometric models for evaluation.

Furthermore, the article aims to illustrate the similarities and differences the EU4DUAL countries from the perspective of start-up establishment.

On the one hand, the World Governance Indicator, Human Development Index and International Property Rights Index of the examined European countries, and on the other hand the eu-startups.com online industry database are used to answer the puzzle.

The hypothesis is that institutions and the quality of governance play an important role in the success of start-up companies.

1. Introduction

Start-up companies have a determining role in the economic growth of the world. The value of start-up companies was 3 trillion USD in 2019. If we compare the industrial sectors from the number of start-ups point of view it turns out that the transportation and logistics sectors are ranked third after the technology and communication sectors and the finance and insurance and real estate sectors in North America in 2020 [1].

In this article we aim to find evidence how many start-up companies have been established in the EU member states in the various geographical regions. As start-ups are fast created and intellectual property, such as patents and statutes are key determining factors of the establishment and the successful implementation of these companies, we analyze whether the quality of governance, HDI and the level of property rights have any influence on the number of start-ups in a country.

The hypotheses are as follows:

- The quality of formal institutions has positive influence on the number of start-ups.
- In those countries in which the quality of governance, the HDI and the level of property rights are higher, the number of start-ups is also higher.

2. Institutions Matter

North [2:97] defines institutions as follows: *"Institutions are the humanly devised constraints that structure political, economic and social interactions. They consist of both informal constraints (sanctions, taboos, customs, traditions and codes of conduct), and formal rules (constitutions, laws, property rights)"*. This definition suggests that institutions have a role in the political, economic and social action. In this article we examine a segment of the whole political, economic and social era of the European Union Member States. We focus on how institutions have an influence on start-up companies.

The informal and formal institutions differ in characteristics. Informal institutions are norms, customs, beliefs, traditions and religion. They are spontaneously created and embedded into the actors' beliefs and norms. The roots of the informal institutions are in the actors' individual preferences. These types of institutions change in an endogenous way very slowly (100–1000 years). They cannot be modified by top-down formal rules. If formal rules are not in harmony with the informal institutions, then the formal ones won't become part of the actors' norms and beliefs, so institutional stickiness does not function properly. *Pejovich* [3:171] describes this phenomenon in his Interaction Thesis:

"If changes in formal rules are in harmony with the prevailing informal rules, the interaction of their incentives will tend to reduce transaction costs in the community (that is, the cost of making an exchange and the cost of maintaining and protecting the institutional structure) and clear up resources for the production of wealth. When new formal rules conflict with the prevailing informal rules, the interaction of their incentives will tend to raise transaction costs and reduce the production of wealth in the community."

Boettke et al. [4] also emphasizes the importance of the harmony of informal and formal institutions. They create a model to demonstrate the connection between these two types of institutions. Boettke e al. categorizes the formal institutions into three groups (Figure 1.).

IEN institutions are indigenously-introduced endogenous institutions. IEN institutions are those we associate primarily with spontaneous orders. These embody the local norms, customs and practices that have evolved informally over time in specific places. Language, for instance, is an IEN institution [4:5].

IEX institutions are indigenously-introduced exogenous institutions, those we associate with the internal policies created by national governments. For example, federalism in the United States is an IEX institution. Federalism represents a state-constructed institution designed by Americans. Similarly, the British Parliament

constitutes an IEX institution. It is a designed institution of British construction for example [4:5].

FEX institutions are foreign-introduced exogenous institutions. FEX institutions are those we typically associate with development community policy. For instance, a legal system change introduced by the development community in a reforming nation would constitute a FEX institution. Although the decision regarding such a change ultimately lies in the hands of the indigenous government, the policy change is chiefly the creation of outsiders and the institutional change is constructed [4:5]. The supranational level rules of the European Union are examples of these types of institutions.

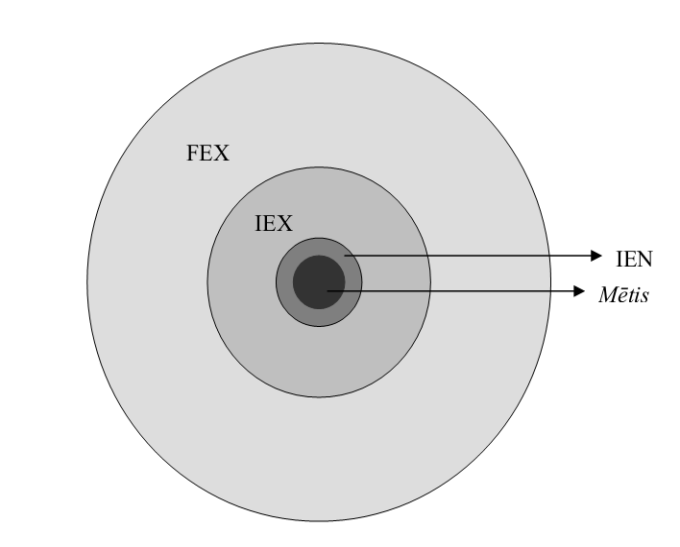


***Figure 1**: Institutional Stickiness, Source: Boettke et al. [4:16]*

The *metis* symbolizes the most embedded traditions, norms and beliefs of the society. The further the formal institutions are from the metis, the lower the stickiness of institutions is.

This model also emphasizes if there is harmony among institutions, the political, economic and social life performs better, in one word the society's welfare is higher.

Williamson, C. R. [5] also examines and describes the role of institutions on economic performance. The findings of the article suggest that the presence of informal institutions is a strong determinant of development. In contrast, formal institutions are only successful when embedded in informal constraints, and codifying informal rules can lead to negative unintended consequences.

All the previous literature referred to suggests that the harmony of institutions is determining in economic development and performance as well. Based on the findings we assume that institutions have a determining role in the economic performance such as the establishment of start-ups.

Williamson, O. [6] uses a different model on the one hand to show how various types of institutions depend on each other and on the other hand how fast institutions can change or can be modified by external effects (Figure 2.).

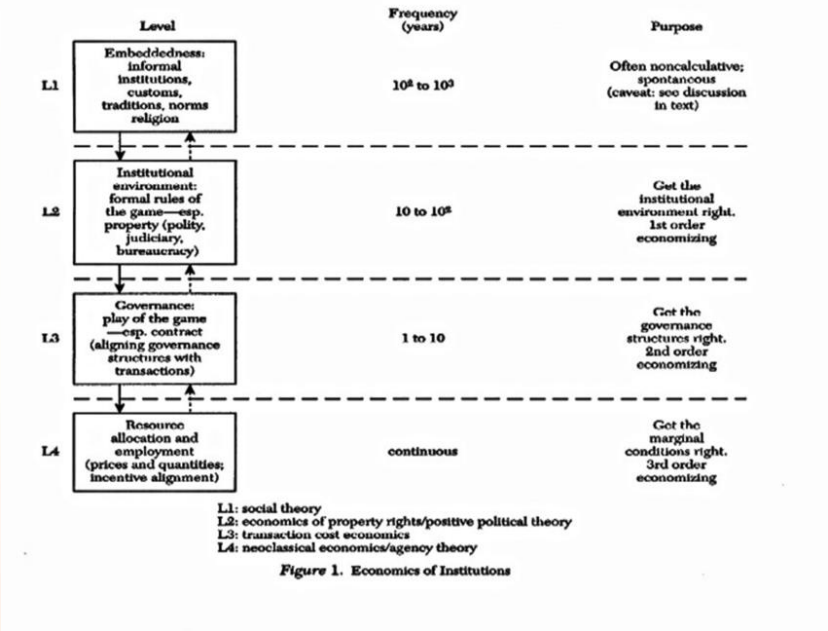


Figure 2. *Four Levels of Social Analysis, Source: Williamson, O. [6:597]*

In this research our focus is on the L4 (Company) and L3 (Governance) levels as we analyze whether the quality of formal institutions such as the quality of governance have influence on the successful establishment of start-up companies.

3. Methodology

In this section of the article first the used methodology, then the compared variables are introduced.

The main methodology is the comparative analysis, which approach puts institutions into its focus (see previous chapter).

We cover in the research the data of all the EU member states. The examined variables are as follows:

Human Development Index (HDI) is a measure of average achievement in key dimensions of human development, including longevity and health, knowledge, and a decent standard of living. HDI represents the geometric mean of normalized indices for each of the three dimensions.

The health dimension is measured by life expectancy at birth, and the education dimension by mean years of schooling for adults over 25 years of age and expected years of schooling for children entering school. Gross national income per capita is used to measure the standard of living dimension. A logarithm of income is used in the HDI in order to reflect the diminishing importance of income with increasing GNI.

In order to produce a composite index, the three HDI dimension indices are aggregated using geometric means [7].

HDI can be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes. These contrasts can stimulate debate about government policy priorities.

Worldwide Governance Indicators (WGI) index covers individual governance indicators for over 200 countries and territories for six dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. In this research we use only the government effectivness in our analyses [8].

International Property Rights Index: in a free society based on the creation of a citizenship that controls their own destiny and controls their own lives, property rights are an important institution.

The following are the three core components of the IPRI [9]:

- Legal and Political Environment (LP)
- Physical Property Rights (PPR)
- Intellectual Property Rights (IPR)

The Legal and Political Environment (LP) component provides information about the strength of a country's institutions: the respect for the 'rules of the game' among citizens. This component has a significant influence on the development and protection of physical and intellectual property rights.

The other two components of the Index, Physical Property Rights (PPR) and Intellectual Property Rights (IPR), reflect the two kinds of property rights unequivocal for countries' socio-economic development. The items included in these two categories provide quantitative and qualitative information regarding de jure rights and de facto opportunities in each country. Figure 3. demonstrates the structure of the IPR index in details.

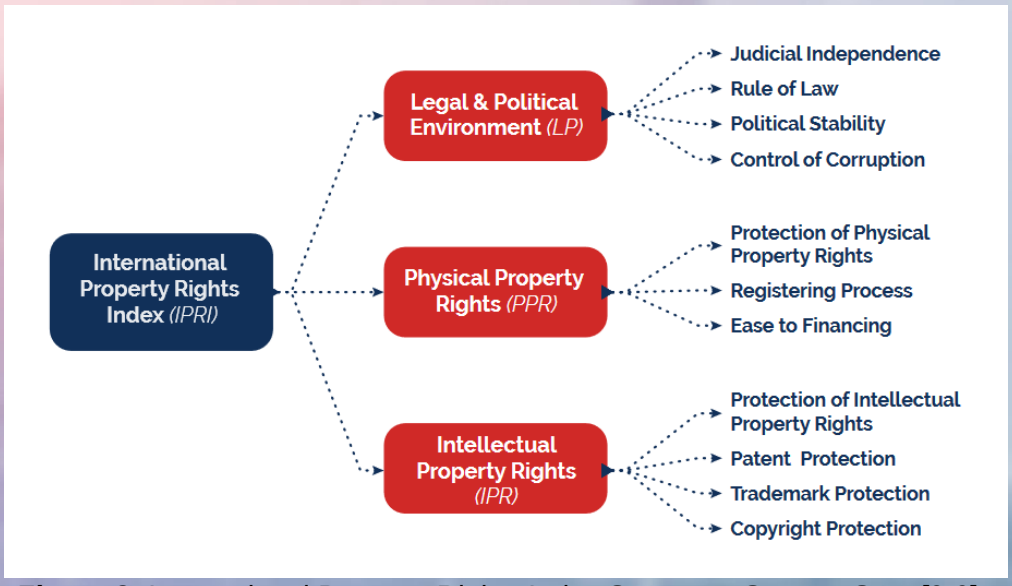


***Figure 3**. International Property Rights Index Structure, Source: Sary [9:6]*

Start-up database on EU27+ countries online database [10] was also useful to get data about how many start-up companies were founded in the EU 27 countries in 2023.

All these data are summarized in Table I. and based on the data we created 4 clusters.

- **Western European countries**: Austria, Belgium, France, Germany, Ireland, Luxembourg and the Netherlands.
- **Eastern European Countries**: Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.
- **Mediterranean Countries**: Cyprus, Greece, Italy, Malta, Portugal and Spain.
- **Scandinavian countries**: in the comparative analysis based on the data it turned out that the results of the Baltic countries (Estonia, Latvia, Lithuania) show stronger correlation and similarities with the Scandinavian countries (Denmark, Finland, Sweden) so the Baltic and Scandinavian countries are categorized into one group for further analysis.

Table 1. *The statistical data of EU27 countries on institutions and start-ups (own editing)*

Country	HDI (UNDP) 2022	WGI Government effectiveness (World Bank) 2022	IPR 2022	Nr. of startups (eu-startups.com) 2023
Western European Countries (average)	**0,93**	**90,57**	**7,45**	**27,71**
Austria	0,916	91,51	7,77	14
Belgium	0,937	84,91	7,28	18
France	0,903	83,02	6,78	41
Germany	0,942	88,21	7,47	67
Ireland	0,945	93,40	7,20	14
Luxembourg	0,93	97,64	7,89	2
Netherlands	0,941	95,28	7,78	38
Eastern European Countries (average)	**0,86**	**65,33**	**5,52**	**4,63**
Bulgaria	0,795	42,92	4,97	4
Croatia	0,858	70,28	4,92	3
Czech Republic	0,889	81,13	6,40	1
Hungary	0,846	68,87	5,42	5
Poland	0,876	61,79	5,41	16
Romania	0,821	53,30	5,48	5
Slovakia	0,848	63,68	5,58	2
Slovenia	0,918	80,66	6,00	1
Meditteranean Countries (average)	**0,89**	**73,98**	**5,76**	**15,50**
Cyprus	0,896	75,47	5,84	7
Greece	0,887	66,51	4,81	6
Italy	0,895	66,98	5,66	21
Malta	0,918	76,89	5,78	4
Portugal	0,866	80,19	6,21	13
Spain	0,905	77,83	6,25	42
Skandinavian Countries (average)	**0,91**	**89,07**	**7,05**	**10,83**
Denmark	0,948	98,58	7,806	7
Estonia	0,89	89,62	6,73	19
Finland	0,940	96,70	8,173	10
Latvia	0,863	75,00	5,94	9
Lithuania	0,875	79,72	6,05	9
Sweden	0,947	94,81	7,601	11

4. Comparative Analysis

In this chapter of the article the focus is on the comparative analysis of the EU27 member states. The first step was to calculate for each cluster the averages of the statistical indices examined. Then we ranked the clusters for each index from the highest to the lowest scores. The ranking color code scheme is the following (Table 2.):

***Table 2**. Ranking color code scheme (own editing)*

Rank 1
Rank 2
Rank 3
Rank 4

It is a robust result based on the ranking that the Western European countries perform the best in all the indices.

All three indices on institutional quality (HDI, WGI, IPR) are the second strongest in the Scandinavian countries. However, the number of newly established start-ups in 2023 are the second lowest among the compared clusters.

The Mediterranean countries have weaker institutional system, than the Scandinavian and the Western countries. However, this cluster performs better than the Scandinavian one in terms of newly established start-ups. This cluster have half of the start-ups than the Western countries even with a rank 2. Despite the lower institutional quality these countries perform better than the Scandinavian and the Eastern European ones. It is an interesting result, which should be examined in more detail such as the Scandinavian case.

The Eastern European countries perform the weakest in all indices. So the Western- and Eastern country clusters fully prove the assumption, that the quality of institutions have determining role on the number of newly established start-up companies.

However, the Scandinavian and Mediterranean cases need to be further analyzed (this is the plan of the authors in another article). The assumption is that location factors such as Land, Labor, Transportation, Costs, Risk, Accessing Market, Taxation, Infrastructure, Hegemony and Economic Ascendency or the Ease of Entering the Market may have positive effects on start-up establishment.

To check the results of the comparative analysis a correlation analysis was ran on the data. The results are as follows (Table 3.):

Table 3. *Correlation Analysis of the examined Indices (own calculations)*

	HDI (UNDP) 2022	WGI Government effectiveness (World Bank) 2022	IPR 2022	Nr. of startups (eu-startups.com) 2023
HDI (UNDP) 2022	1			
WGI Government effectiveness (World Bank) 2022	0,9486	1		
IPR 2022	0,90709	0,974429077	1	
Nr. of startups (eu-startups.com) 2023	0,85994	0,687148819	0,70106	1

- the most significant correlation is among the three institutional indices, so if the government effectiveness is higher, than the level of property rights and human development are also higher,
- the HDI index, followed by IPR and Government Effectiveness have moderate, but positive influence on the number of newly established start-ups in 2023.

If we focus only on the EU4DUAl countries (Austria, Croatia, Finland, ,France, Germany, , Hungary, Malta, Poland, Spain,) then the following findings can be summarized (Table 4).

Table 4. *The statistical data of EU4DUAL countries on institutions and start-ups (own editing)*

Country	HDI (UNDP) 2022	WGI Government effectiveness (World Bank) 2022	IPR 2022	Population	Nr. of startups (eu-startups.com) 2023	Nr- of citizens/ nr. of start-ups
Austria	0,916	91,51	7,77	895896	14	63993
Croatia	0,858	70,28	4,92	4008617	3	1336206
Finland	0,940	96,70	8,173	5545475	10	554548
France	0,903	83,02	6,78	64756584	41	1579429
Germany	0,942	88,21	7,47	83294633	67	1243203
Hungary	0,846	68,87	5,42	10156239	5	2031248
Malta	0,918	76,89	5,78	535064	4	133766
Poland	0,876	61,79	5,41	41026067	16	2564129
Spain	0,905	77,83	6,25	47519628	42	1131420

Finland has the highest scores for HDI, WGI and IPR indexes. Although 10 start-ups were established in 2023 in Finland, compared to the population of the country it is a high number.

If we compare the number of citizens per number of start-ups the best performing country is Austria (the lower the number is , the better the ranking is), followed by Malta and Finland. Hungary not only has the lowest scores for institutional quality among the examined countries, but has the second least favourable result in the number of citizens per number of start-ups. The post-socialist countries Poland,

Croatia and Hungary are the least innovative countries among the EU4DUAL ones. France, Germany and Spain have the highest number of start-ups established in 2023. However, if we consider the number of citizens per number of start-ups variable, we can conclude that although these countries have a high level of institutional quality and a high population, they do not perform as well as one would expect.

5. Conclusions

In this article we aimed to test, whether the quality of institutions as a macro-economic driver has influence on the number of newly created start-ups among the EU27 member states. In the first chapter of the article, we reviewed all those literatures, which demonstrate the importance of institutions for the development of the economy. An overview of the methodology used in this article and the indices that were examined is presented in the second section. In the main chapter we created clusters, then compared the data of the countries and the clusters. The main findings of the research are:

- the most significant correlation is among the three institutional indices exist (HDI, WGI and IPR),
- the HDI index, followed by IPR and Government Effectiveness have moderate, but positive influence on the number of newly established start-ups in 2023, so the three hypotheses of the article are tested and verified,
- the best performing country is Austria, followed by Malta and Finland,
- the post-socialist countries Poland, Croatia and Hungary are the least innovative countries among the EU4DUAL ones,
- France, Germany and Spain have the highest number of start-ups established in 2023. However, if we consider the number of citizens per number of start-ups variable, we can conclude that although these countries have a high level of institutional quality and a high population, they do not perform as well as one would expect.

References

[1] 61 Startup Statistics You Can't Ignore Data on Challenges & Success Rates (2024). Retrieved from https://financesonline.com/startup-statistics/ (accessed: 20 November, 2023)
[2] North, D. C. (1991): Institutions. *Journal of Economic Perspectives*. Volume 5, Number 1 – Winter 1991 pp. 97–112.
[3] Pejovich, S. (1999): The Effects of the Interaction of Formal and Informal Institutions on Social Stability and Economic Development. *Journal of Markets &Morality*. Vol. 2. No. 2. Fall. pp. 164–181.
[4] Boettke, P. J. – Coyne, C. J. – Leeson, P. T. (2008): Institutional Stickiness and the New Development Economics. *American Journal of Economics and Sociology*, 67(2), pp. 331–358.
[5] Williamson, C. R. (2009): Informal institutions rule: institutional arrangements and economic performance. *Public Choice* DOI 10.1007/s11127-009-9399-x.
[6] Oliver E. Williamson (2000): The New Institutional Economics - Taking Stock, Locking Ahead, *Journal of Economic Literature*, Vol. 38, No. 3, pp. 595-613

[7] Human Development Index (HDI) (2023) Retrieved from https://hdr.undp.org/data-center/human-development-index#/indicies/HDI (accessed: 20 November, 2023)
[8] Worldwide Governance Indicators (WGI) (2023) Retrieved from https://www.unesco.org/en/world-media-trends/worldwide-governance-indicators-wgi (accessed: 20 November, 2023)
[9] Levy-Carciente, Sary (2023): International Property Rights Index 2022. Retrieved from https://atr-ipri22.s3.amazonaws.com/IPRI_FullReport2022_v2.pdf (accessed: 20 November, 2023)
[10] Startup database on EU27+ countries (2024). Retrieved from https://www.eu-startups.com/directory/ (accessed: 10 January, 2024)

LINKING INNOVATIVE DRONE TECHNOLOGIES WITH NOVEL EDUCATIONAL FRAMEWORKS

DI Dr.-Ing. Holger Friehmelt[1*] and FH-Prof. Mag. Dr. MSc. Gernot Paulus[2]

[1]Institute Aviation, Department of Engineering, FH JOANNEUM GmbH, Alte Poststr. 149, 8020 Graz, Austria
[*] Corresponding author Email: holger.friehmelt@fh-joanneum.at

[2]Geo Information, SIENA Spatial Informatics for Environmental Applications, FH Kärnten gGmbH, Europastraße 4, 9524 Villach, Austria

Keywords: *Drone Pilot, Drone Expert, UAS, Continuous Eduction, Microcredentials*

1. Introduction

Flying a drone may seem deceptively simple, but mastering the skill comes with its own set of challenges that contribute to the difficulty of drone operation. If you want to use a drone in a professional environment and make money, this task becomes even more challenging. Several factors contribute to this complexity, ranging from technical intricacies to regulatory considerations.

This disruptive new technology of commercial drone operations also requires novel and carefully designed training and educational means. This opens up the possibilities to also consider new academic educational frameworks as depicted in Figure 1 below from the currently ongoing research project DronePilot (funded In Austria by FFG within the TAKEOFF Program of BMK).

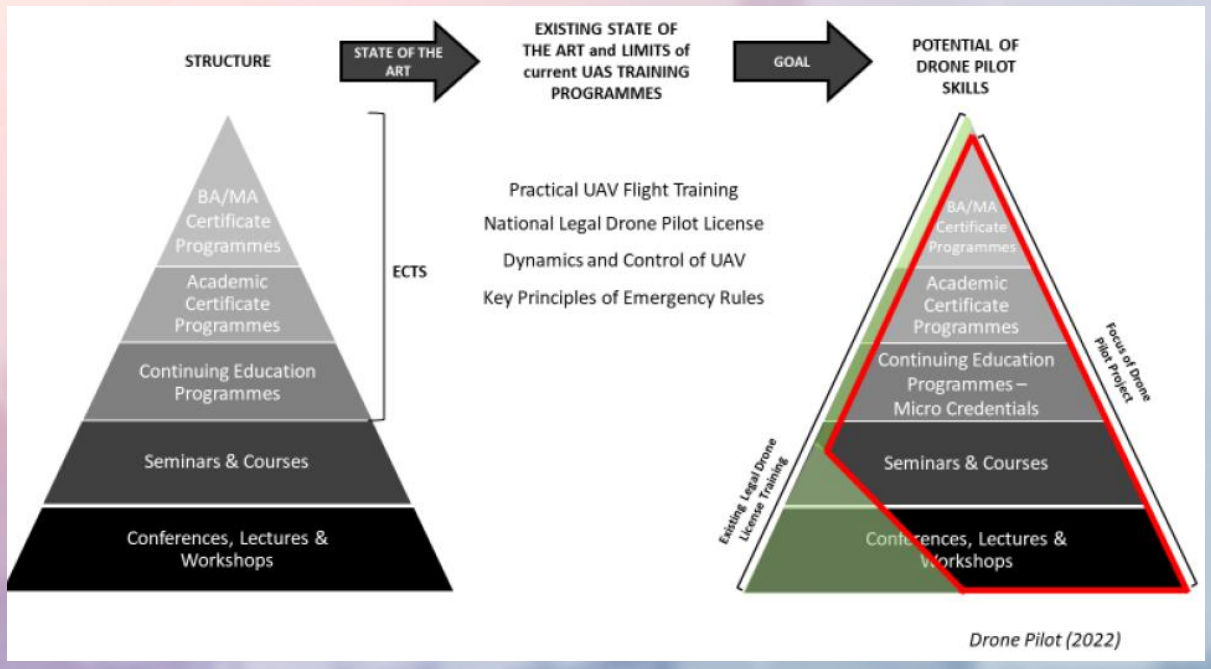


Figure 1. *Open Innovation & Design Thinking Approach*

Within this project, the vision of developing an internationally recognized and fully certified European Drone and Data Academy (EDDA) positioning Austria as a key UAS education hub is pursued.

2. Case Presentation: Systematic Approach to Develop an Educational Framework

Mastering the art of flying a drone requires a systematic and disciplined approach that encompasses both theoretical understanding and practical application. Whether you are a beginner or seeking to enhance your skills, here's a comprehensive guide on how to better learn how to fly a drone.

2.1. Start with Research

Begin by researching the basic principles of drone flight. Understand the various components of a drone, such as propellers, motors, sensors, and the flight controller. Familiarize yourself with the terminology associated with drone operation, including pitch, roll, yaw, and throttle.

2.2. Select the Right Drone

Choose a drone that matches your skill level. Beginner-friendly drones often come with features like auto-stabilization, easy controls, and durability. As you progress, you can move on to more advanced models with manual controls and additional functionalities.

2.3. Start with Research Understand the Drone's Manual

Thoroughly read the manufacturer's manual that accompanies your drone. This document provides crucial information about the specific model you own, including safety guidelines, operational limits, and troubleshooting tips. Understanding the manual is fundamental for responsible and effective drone piloting.

2.4. Practice in a Controlled Environment

Initiate your drone-flying journey in a spacious, open area away from obstacles and people. This controlled environment minimizes the risk of accidents and allows you to focus on basic maneuvers. Practice hovering, ascending, descending, and basic directional movements to build foundational skills.

2.5. Master Basic Flight Modes

Most drones offer different flight modes, such as GPS-assisted mode, altitude hold, and manual mode. Gradually transition through these modes as you become more comfortable with the controls. GPS-assisted modes are particularly useful for beginners, as they provide stability and help prevent crashes.

2.6. Learn About Safety Precautions

Prioritize safety at all times. Understand the legal requirements for drone operation in your region, including no-fly zones and altitude restrictions. Be aware of your surroundings, and always fly in compliance with local regulations. Regularly check and maintain your drone to prevent technical issues that could compromise safety.

2.7. Join Online Communities

Engage with online forums and communities dedicated to drone enthusiasts. Platforms like Reddit and specialized drone forums provide valuable insights, tips, and troubleshooting advice. Learning from the experiences of others can accelerate your own learning curve and help you avoid common pitfalls.

2.8. Take Online Courses

Explore online courses and tutorials that cover drone piloting. Numerous platforms offer both free and paid courses, ranging from basic to advanced levels. These courses often include video demonstrations, quizzes, and practical exercises to enhance your understanding and skills.

2.9. Simulator Training

Utilize drone flight simulators to hone your skills in a risk-free virtual environment. Simulators replicate real-world flying conditions and allow you to practice various scenarios without the fear of damaging your drone. This is particularly beneficial for refining your control inputs and reactions.

2.10. Progress Gradually

As you gain confidence and proficiency, gradually challenge yourself with more complex maneuvers. Experiment with flying in different weather conditions (within safe limits), practice precise landings, and explore advanced flight modes. Pushing your boundaries incrementally ensures a steady progression in your piloting abilities.

2.11. Seek Professional Instruction

Consider enrolling in a drone pilot training program or seeking one-on-one instruction from experienced pilots. Professional guidance can provide personalized feedback, address specific challenges, and accelerate your learning process.

2.12. Stay Informed and Updated

Keep abreast of the latest developments in drone technology, regulations, and best practices. Subscribe to industry publications, follow reputable drone-related websites, and participate in workshops or events to stay informed and continuously improve your skills.

2.13. Applying Open Innovation & Design Thinking Strategies

By combining theoretical knowledge, hands-on practice, and a commitment to ongoing learning, you can better learn how to fly a drone. Remember that patience and persistence are key, and each flight, whether successful or challenging, contributes to your growth as a drone pilot.

Out of these introductory thoughts which have been augmented by many expert interviews, workshops, and a very comprehensive online survey (see Figure 2), the following main ten knowledge areas (Figure 3) have been identified:

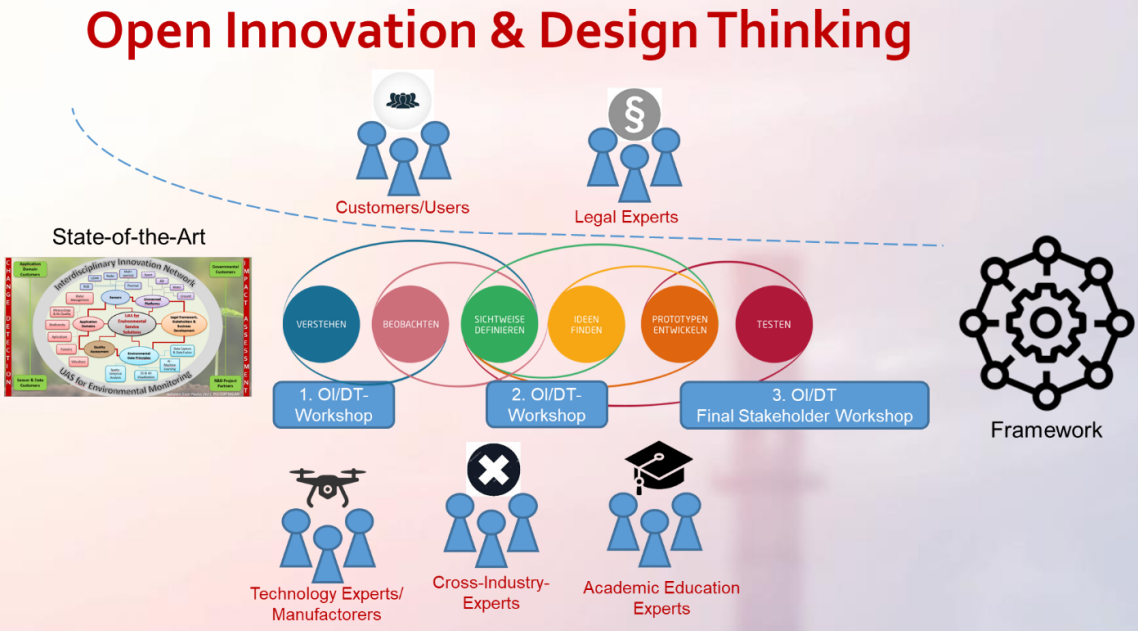


Figure 2. Open Innovation & Design Thinking

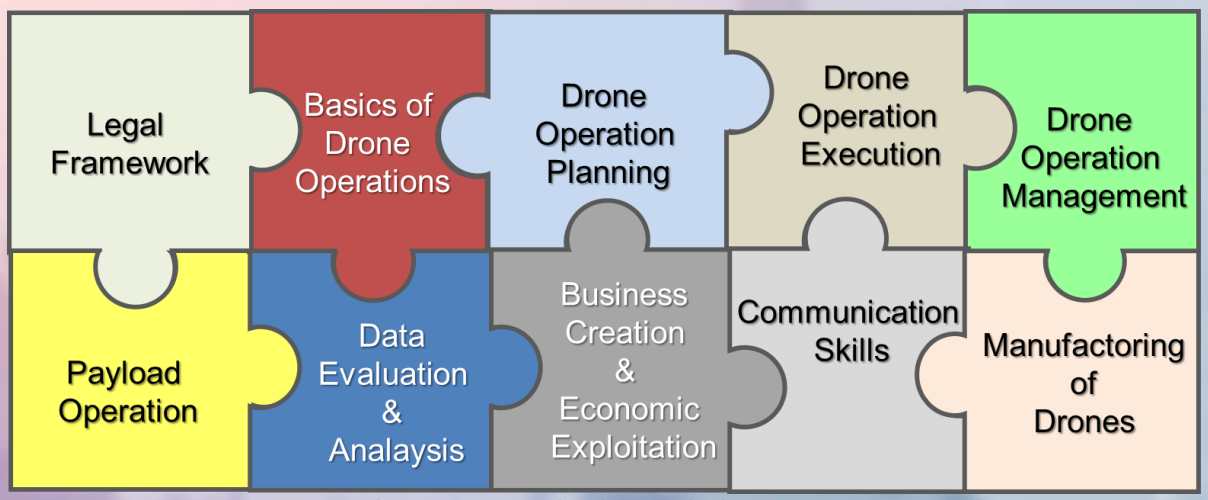


Figure 3. *Required Knowledge Areas*

3. Results & Discussion

For universities of applied sciences, research-based teaching is a key feature in the sense of application-oriented research. FH JOANNEUM and FH KÄRNTEN therefore strives for regular participation in research to be able to derive the necessary content for teaching as well. This project supports demand-oriented education and a high level of attractiveness for applicants to the various degree programs and continuous education programs at both institutions also with a strong link to the EU4DUAL program.

With the DronePilot project all involved partners can position themselves as an innovative interdisciplinary consortium with the unique vision to establish a "EUROPEAN DRONE and DATA ACADEMY" offering excellent certified and accredited UAS education and training concepts for different target groups at national, EU and international level. All partners are expected to be recognized as highly competent institutions not only in the area of applied research excellence but also as promising education institution attracting high potential prospective students interested in challenging and exciting careers.

4. Conclusions & Recommendations

The research consortium has concluded its work and giving the following recommendations in the context of higher education, potentially as dual education:

1. Standardized high-level & content-oriented description of Drone Expert Micro-Credentials.
2. Continuous feedback from initial microcredentials including its syllabi and curricula and further open innovation/design thinking stakeholder workshops.
3. Finalization of the holistic education framework for current and future Drone experts. It will be logically integrated into the EQF based on Micro – Credentials (e.g. in line with [2]).
4. Developing a vision for an internationally recognized and fully certified European Drone and Data Academy & identification of suitable follow-up funding opportunities (e.g. in line with [3]).

References

[1] Boud, D., & Jorre de St Jorre, T. (2021). The move to micro-credentials exposes the deficiencies of existing credentials. The Journal of Teaching and Learning for Graduate Employability, 12(1), 18-20. (kein Datum).
[2] HolonIQ (2021). Online degree and micro-credential market to reach $118B by 2025. (kein Datum). Von https://www.holoniq.com/markets/higher-education/global-online-degree-and-micro-credential-market-toreach-117b-by-2025 abgerufen
[3] OECD (2019). Trends shaping education 2019. OECD Publishing. (kein Datum).

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Co-funded by the Erasmus+ Programme of the European Union

DEVELOPING ATTRACTION IN ELDERLY CARE – A SELF ASSESSMENT FOR ORGANISATIONS

S. Pirskanen and H. Kekäläinen

Savonia university of applied science, PO Box 6, 70201 Kuopio, Finland
satu.pirskanen@savonia.fi

Keywords: *Elderly care, attraction and retention factors, magnetism in elderly care project, attraction model, self-assessment tool*

1. Introduction

Elderly care sector has suffered from a shortage of health care workers in the public and private sectors nationwide in Finland. The changes in the work environment and the negative image in the media and public debates have influenced Elderly Care work attractiveness, making it less appealing.

To tackle this challenge, a project called Magnetism in elderly care (Vetovoimainen vanhustyö in Finnish) was undertaken from 2020 to 2022. One of the project´s aims was to identify the attraction and retention factors of the elderly care, and to develop a tool by which the elderly care communities and organizations could identify and evaluate their attraction and retention.

2. Methodology

The identification of attraction and retention factors was initiated by familiarizing ourselves with the literature (4), previous studies (1, 2, 3) and companies already known to be attractive for employees. The Magnet Hospital concept and the Dutch Buurtzorg community-oriented organizing model were adopted as conceptual frameworks for a survey aimed at identifying the influencing factors. These were the bases for a survey aiming to identify attraction and retention factors. The questionnaire was answered by 358 personnel directly involved in elderly care and their supervisors across eleven organizations in the North-Savo region in Finland (5).

In addition to the questionnaire, we surveyed Finnish work communities by organizing a "Recommend the best work community in the elderly care" competition. All together 282 work communities participated, from which we chose 10 highest evaluated for benchmarking. Beyond the healthcare sector, also companies from various fields were evaluated to identify additional attraction and retention factors affecting work. This approach led to identification of nine key factors, forming the basis for the development of the Finnish attraction and retention model and an accompanying self-assessment tool tailored for elderly care work communities.

3. Results & Discussion

The attraction model consists of nine attraction factors, which work communities can affect: appreciation, human resources, flexible working life solutions, inclusive and

staff supportive management, orientation and student guidance, a functioning and prosperous work community, external communication, strong professional expertise and work development, and a resource-oriented approach to work for the elderly. Each attraction factor was linked to research and literature related to the topic, development tips and solutions on how to develop attraction. Upon completion of the self-assessment, the work community is provided with a composite score, offering insights into its own attraction and retention dynamics.

The tool´s impact to future of work in elderly care can be significant, as it identifies factors influencing attraction that organizations, teams, and members can address. Additionally, it provides insight into the skills necessary for organizations in the future, to succeed in competition for professionals.

4. Conclusions

This comprehensive framework serves as a valuable information for elderly care organizations seeking to enhance their workforce attraction and retention strategies. Organizations can easily use this tool via the web. The tool gathers open, anonymous data from all responses. This data show, that external communication, human resources, orientation and student guidance, strong professional expertise and work development still needs developing at elderly care organizations. This tool can also be used in managerial management training and can be modified to other industries.

References

[1] B. De Brouver, M. Kaljouw, L Schoonhoven and T. van Achterberg. Essential elements of the nursing practice environment in nursing homes: Psychometric evaluation. International journal of older people nursing, 12 (2), Jun 2017.

[2] JS. Mensik. The Essentials of Magnetism for home health. Journal of Nursing Administration. May; 37(5):230-4. 2007.

[1] Olakivi, L. Van Aerschot, J. Mathew Puthenparambil and T. Kröger. Ylikuormitusta, lähijohtajan tuen puutetta vai vääränlaisia tehtäviä. Miksi yhä useammat vanhustyöntekijät harkitsevat työnsä lopettamista? Yhteiskuntapolitiikka, 86 (2), 141154. 2021. http://urn.fi/URN:NBN:fi-fe2021041510496. (Title in English: Overload, lack of support from the immediate manager, or the wrong kind of tasks. Why are more and more older workers considering quitting their jobs?)

[3] P. Salovaara. Johtopäätös – Yhteisöt ja organisaatiot pomokulttuurin jälkeen. Kustannusosakeyhtiö Teos, Helsinki. 2020 (Title in English: Conclusion – Communities and organizations after boss culture.)

[1] A.Virolainen, S. Pirskanen and H. Moilanen. Hoitotyön ristiriitaista imagoa on mahdollista parantaa. Dialogi-verkkojulkaisu. http://urn.fi/URN:NBN:fi-fe202102245930. 2021. (Title in English: It is possible to improve the conflicting image of nursing.)

EU4Dual The European Dual Studies University
EUROPEAN UNIVERSITIES Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

FUTURE OF WORK AMONG NURSING PROFESSIONALS – FLEXIBILITY AND PSYCHOLOGICAL CONTRACTS

M. Kaarakainen[1*], M. Ring[2,3] and M. Hult[3]

[1]Savonia University of Applied Sciences, Microkatu 1, 70210 Kuopio, Finland
[*] Corresponding author Email: minna.kaarakainen@savonia.fi

[2]University of Eastern Finland, Yliopistonranta 1, 70211 Kuopio, Finland

[3]XAMK South-Eastern Finland University of Applied Sciences, Patteristonkatu 3 D, 50100 Mikkeli, Finland

Keywords: *nursing professional, future of work, psychological contracts*

1. Introduction

In this study we are interested in future of health and social care work, especially how the nursing profession is developing in the future, especially how to assure sufficient number of professionals to the field. The research, which this abstract is based, investigates the future of nursing work and nursing professionals and how the health care as working environment should be developed in order to secure enough enthusiastic professionals to the field. Theoretical background leans to the future perspective in health care professionals and nursing work: what kind of weak signals and megatrends can be seen in the Finnish health care sector context.

One of the main challenges in health care is the maintain and keep sufficient level of professionals in the field. Health care and all societal future forecasts are indicating that there will be lack of professional staff in health care in the future. Need for the professionals is increasing especially due demographic reasons especially in industrialized countries. Population is ageing and the birth rate is getting lower meaning that there will be shortage of professionals in all fields.

Even though ageing population is healthier than before and they are working to older age than before, eventually they will require more assistance and care, and the older professionals will leave their work to get retired. The health care sector needs to take care of more people with fewer people. In Finland, it is estimated that in the next ten years more 32,6% of auxiliary nurses and 25,5% nurses will leave the work due the retirement. Each year there will be at least 25 000 employment places due the shortage of staff [see e.g. 5]. High turnover rate in nursing professionals is a global challenge which is considered one of the most significant issues in health care [2]. For example, in Finland over 41% of the elderly care nurses have considered changing the field [4]. Based on these facts behind the nursing profession, we are claiming that we need to consider more psychological factors when developing the field and profession [see e.g. 5].

2. Methodology

Research was conducted as theme groups interview where we were discussing of the future of nursing work with few supporting questions like: who is doing the nursing work, how to assure the enough qualified professionals, where the work is done. The specific themes were raised from the groups. We conducted six focus group interviews for the nursing managers in autumn 2023 with altogether 17 nursing managers in Finland. Participants were representing different types of health and social care units from primary care to specialized hospital care. Geographically they were all over the Finland from different welfare districts.

3. Results & Discussion

Based on the preliminary analysis, the three main themes were arisen in the focus groups interviews: 1) technology will change the nurses work but not replace it; 2) nursing professional attractiveness and 3) polarization among nursing professionals and clients.

It was emphasized that even though the online visits and technological innovations will increase, the nurses work cannot be replaced totally. There will always be a need for real people and the key question is where to find these people.

Nursing profession is still attractive, and it is and will be a value based profession. Younger generations overall values towards work life will shape the nursing profession as well. In practice, this means attitudes towards work is different than older generation and they want more individualistic choices and flexibility. Moreover, it was indicated that nursing profession is a global profession which means that there are more possibilities to work internationally if the person wants to do so.

Polarization among nursing professionals will increase. This appears so that the professionals will be taken sides in certain issues. This was arisen especially in commitment to work, vaccination policies, accepting new working ways (including technology) and accepting multicultural working environment.

4. Conclusions

Study indicates that we need to recognize the factors that are influencing to the nursing professionals and health care attraction and turnover intentions in order to develop and plan health and social care as well as nursing profession. This should be considered in all levels: individual, leadership and management as well as policy.

References

[1] KEVA (2023). Retirement forecast 2030. Original in Finnish: Eläköitymisennuste 2024–2043. In: https://www.keva.fi/uutishuone/tutkimukset-tilastot-ja-ennusteet/ (Retrieved: 7.1.2024)

[2] T. Koehler and D. Olds. Generational differences in nurses' intention to leave. Western Journal of Nursing Research,44(5),446–455, 2022. https://doi.org/10.1177/0193945921999608

[3] L. Van Aerschot, M. Puthenparambil, A. Olakivi & T. Kröger. Psychophysical burden and lack of sup-port: Reasons for care workers' intentions to leave their work in the Nordic countries. International Journal of Social Welfare, 31(3), 333–346, 2022. https://doi.org/10.1111/ijsw.12520

[4] M. Ring and M. Kaarakainen. Salary is certainly one reason, but not the main one." Breaching of the psychological contract in the background of nurses' change of profession. Original in Finnish: "Palkka on tietysti yksi syy, mutta ei suurin" – psykologisen sopimuksen rikkoutuminen hoitajien alanvaihdon taustalla. Focus Localis, 51(4), 2023. In: https://journal.fi/focuslocalis/article/view/129057 .

EU4Dual
The European Dual Studies University
EUROPEAN UNIVERSITIES
Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

LEARNING WORKPLACES
AN INNOVATIVE PARADIGM FOR THE FUTURE OF WORK

Dr. Rupert Beinhauer and MMag. Waltraud Jelinek-Krickl

International Management & Entrepreneurship, FH JOANNEUM
University of Applied Sciences, Graz, Austria

Corresponding author Email: rupert.beinhauer@fh-joanneum.at

Corresponding author Email: waltraud.jelinekkrickl@fh-joanneum.at

Keywords: *Learning Workplaces, Informal learning, Microcredential, organizational change.*

1. Introduction

The modern workplace is a complex and dynamic environment, continuously reshaped by fast technological advancements and changing organizational dynamics. This evolving landscape demands a transformative approach to professional development, emphasizing continuous skill development and lifelong learning as key elements for career progression and organizational success. The "Learning Workplaces" project at FH JOANNEUM is leading in this transformative movement, aiming to integrate learning and work processes in a seamless way. The initiative recognizes that developing a microcredential system is crucial to support companies and their staff in becoming learning-oriented workplaces. This paper lays the conceptual groundwork for a detailed exploration into the design and implementation of such microcredentials, positioning them as transformative tools for fostering, documenting, and validating the evolution of learning-oriented workplaces in the future work landscape.

The initiation of the "Learning Workplaces" project at FH JOANNEUM marks a significant shift towards integrating learning and work processes to support professional and organizational development.

2. Case Presentation

2.1. The Role of Informal Learning

Informal learning, characterized by its unstructured, experiential nature, plays a crucial role in accumulating workplace knowledge and skills. This type of learning is vital for professional development, representing a vast resource of untapped knowledge and skills within the workplace. By integrating the eight components of informal workplace learning identified by Decius et al. (2020), this paper aims to deepen the understanding of informal learning's mechanisms and inherent value in contemporary work environments. Ley's (2020) research highlights the critical need to integrate learning processes into daily work routines, systematically nurturing and supporting the development of both individual and collective competencies.

2.2. The Microcredential System

The potential of informal learning is not fully realized, mainly due to the lack of a structured system for its recognition and documentation. The proposed microcredential system presents a groundbreaking approach, effectively bridging the gap between informally learning-oriented companies and those formally recognized and strategically aligned. This system serves not just as a tool for validation but as a framework for training experts, companies, and organizations, offering a robust and structured methodology to validate the journey toward becoming a true learning workplace. In doing so, it not only promotes individual career development as an expert but also significantly enhances the innovative capacity and adaptability of organizations.

3. Practical Implementation of the Microcredential System

The main content of the paper focuses on the practical implementation of the microcredential system. It details the process of identifying, capturing, and validating the development of a learning-oriented workplace in a structured and standardized manner. The paper explores best practices for designing microcredentials that are meaningful and valuable to employees, employers, and educational institutions. Moreover, it analyzes the crucial role of technology in facilitating this process, including digital platforms for tracking and showcasing acquired skills and competencies.

4. Cultivating a Learning-oriented Environment

The paper addresses the cultural and organizational changes necessary to cultivate a learning-oriented environment where informal learning is recognized and valued. It discusses the importance of leadership support, the development of a learning culture, and the creation of systems and processes that encourage and facilitate ongoing learning and development.

5. Addressing Implementation Complexities

The complexities involved in implementing microcredentials are briefly discussed, including the challenges of standardization, ensuring quality and relevance, and achieving widespread acceptance and recognition in the labor market and academia. Strategies to engage a broad spectrum of stakeholders, including educational institutions, employers, and policymakers, are proposed to create a cohesive and supportive ecosystem for the successful implementation of microcredentials.

6. Conclusions & Recommendations

This paper proposes a comprehensive and multifaceted approach to transform the workplace into a learning-oriented environment. It presents the microcredential system as a catalyst for change, fostering a culture of continuous learning and development.

References

[1] Decius, J., Schaper, N., & Seifert, A. Development and validation of a measure for informal workplace learning. Human Resource Development Quarterly, 31(1), 81-107, 2020

[2] Ley, T. Integrating knowledge structures and learning in the workplace: Over a decade of research. British Journal of Educational Technology, 51(3), 873-888. 2020.

[3] Kovács, Z., & Kálmán, C. Professional learning in the workplace. Journal of Adult Learning, Knowledge and Innovation. 2022.

EU4Dual The European Dual Studies University
EUROPEAN UNIVERSITIES Erasmus+
Co-funded by the Erasmus+ Programme of the European Union

WORKING LIFE RELATED VIRTUAL LEARNING AND FAMILIARIZATION ENVIRONMENTS IN HIGHER EDUCATION IN FINLAND

Anssi J. Mähönen[1*] and Kimmo A. Pakarinen[2]

[1]Continuing learning, Master School, Savonia University of Applied Sciences, Microkatu 1, FI-70210 Kuopio, Finland
[*] Corresponding author Email: anssi.mahonen@savonia.fi

[2]I Smart and Sustainable Wellbeing, Savonia University of Applied Sciences, Microkatu 1, FI-70210 Kuopio, Finland

Keywords: *virtual environment, extended reality, learning and familiarization environment, higher education, working life*

1. Introduction

Virtual learning environments (VLEs) are developing rapidly and are already part of everyday life. New technologies make it possible, for example, to transmit virtual work processes or instructions to the viewer's field of view as part of the real world view. In addition, these environments offer the opportunity to learn and familiarize yourself regardless of time and place. The novelty of the project is the virtual learning environments created together with education and working life, which represents real working life environments. The created environments benefit both education and working life. Students can study in up-to-date learning environments. Working life can use these environments for familiarization and continuous learning [1].

2. Case presentation

The aim of the project was to create VLEs enabling time and place independent learning, lifelong learning for professionals and online training in authentic environments. The target groups were students, teachers and professionals in the field of clinical laboratory, instrument maintenance and perioperative nursing. VLEs were created in cooperation between Savonia University of Applied Sciences and Savo Vocational College in Finland. The European Social Fund (ESF) funded the project.

The created VLEs utilize authentic and working life related learning environments taking advantage of different kinds of virtual technologies, like extended reality (XR). Students, representatives of working life and teachers from nursing, biomedical laboratory science, and instrument maintenance, tested the VLEs.

3. Results & Discussion

According to the survey made during the project and the feedback received, VLEs are stimulating and motivating for the learner, promoting both learning and familiarization. Both representatives of working life and students were eager to participate in testing the environments and wanted to increase the use of virtual technology in learning and familiarization.

4. Conclusions & Recommendations

VLEs are beneficial both working life and educational organizations. They bring studying, familiarization and work supervision to a new level. Especially during various exceptional circumstances such as the COVID-19 pandemic and other challenging situations in society, these technologies enable flexible, safe and cost-effective operations to continue. Virtual learning environments also developed the Savonia's satellite education model (distance learning model) [2] and provide new opportunities to implement both national and international distance studies.

5. Acknowledgements

Especially, we would like to thank Kuopio University Hospital, HUS Diagnostic Center and Servica Ltd. for participating in this project and making it possible to build up work life orientated learning environments. Special thanks to Savonia University of Applied Sciences and Savo Vocational College, who have taken this challenge and enabled the implementation of the FutureEdu-project. Also we want to thank ESF program for making this possible, project code: S21584.

References

[1] A. J. Mähönen, S. L. Halimaa, P. Kontro, J. Heiskanen, T. Kinnunen, S. Vuohelainen, K. Pakarinen. Work life related virtual learning (XR) environments for biomedical laboratory science and perioperative nursing in the FutureEdu project. *Educational Alternatives*. *Journal of International Scientific Publication,* 18:105–115, 2020.

[2] A. J. Mähönen and S.L. Halimaa. Educational Alternatives. Satellite education model – work oriented professionals for health care by a distance learning method. *Educational Alternatives. Journal of International Scientific Publications,* 18:116–123, 2020.

EU4Dual

EUROPEAN UNIVERSITIES
Erasmus+

Co-funded by the
Erasmus+ Programme
of the European Union

ERASMUS-EDU-2022-EUR-UNIV
Grant Agreement No.101089937