



Inco Smart

Developing interdisciplinary
competences for Smart
Logistics.

IO4: Train the Trainer


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IncoSmart IO4 Report: Train-the-trainer

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Abbreviations

EU European Union

IO4 Intellectual Output 4

T&L Transport & Logistics

ICT Information and Communication Technology

TMS Transport Management System

Executive Summary

In the EU, unemployment in general has been on the rise since 2008, due to the economic crisis which led to considerable job losses and fewer job offers. On the other side, 40% of vacancies cannot be filled, because of skills mismatch and too few people have the preparation, mind-sets, and competences to set up their own businesses or look for new opportunities. Higher education systems are key actors for improving graduates' employability by strengthening their transversal skills. Focusing on T&L sector, the project contributes to close the highlighted knowledge gap and skills mismatch enabling ICT and Business students to become the graduates that the T&L job market will increasingly require.

The participating institutions perform research by means of literature study, brainstorm sessions and a survey involving companies, students, alumni and teachers in the four member states providing insight in: (1) the current education and training content and approach at involved and other educational institutes, (2) the current and required knowledge and transversal skills of students who become available for the labor market as well (3) the expected developments for Transportation and Logistics in the coming 5 years.

Concluding that keeping the basic T&L and SCM attention in curricula, knowledge focus for the coming years should emphasize on facilitating digital transformation, software driven process changes, markets domestic commerce changes and machine-driven process changes considering sustainability and environmental interests.

Regarding transversal skills, students entering the labor market should operate more independently showing initiative and creativeness to deal with changing business environments that require flexibility and social behavior.

Foreword

“INCO_SMRT: Developing interdisciplinary competences for Smart Logistics” is a project co-funded by the European Commission in the framework of the Erasmus+ Programme. Focusing on the T&L (Transport & Logistics) sector its goal is to close the knowledge gap and skills mismatch between manufacturing industry requirements and academic curricula enabling ICT and Business students to become the graduates the job market will increasingly require.

The advent of the industrial Internet of Things (IoT) and what other research refers to as ‘Industry 4.0’ is allowing manufacturing companies, whatever they produce, to redefine everything from the way they interact with research institutions and introduce innovation to how they interact with customers and society at large. The introduction of AI into IoT infrastructure is hereby a critical element. The manufacturing industry is transforming, and the machinery installed in the production chains are prepared to incorporate IoT, AI and blockchain in their processes.

This level of IoT connectivity enables the integration of increasingly efficient production processes with greater doses of predictive intelligence and provides more proactive and robust cybersecurity mechanisms because of the application of AI and blockchain. But they need qualified staff provided not only with technological abilities but with a suitable level of creativity in planning and applying innovative solutions that facilitate the strategic evolution and growth of industry and services for citizens. Unfortunately, the academic curricula have not been updated as quickly as technology has evolved, with the serious consequence that there are not enough professionals able to lead and manage the vital transformation.

INCO_SMRT is performed by a strong consortium of 4 partners in 4 EU (European Union) Member States: Belgium, Denmark, Italy, and The Netherlands, representing a competent and skilled mix of excellent European HE institutions cooperating as a real “strategic partnership”.

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This document is the first project output concerning knowledge gaps and skills mismatch with specific focus on transversal skills. It is a continuation of the needs analysis carried out by the participating institutions when they decided to embrace this project.

1. The INCO_SMRT Project

1.1. Rationale

In the EU, unemployment in general has been on the rise since 2008, due to the economic crisis which led to considerable job losses and fewer job offers. Older workers are struggling to find new jobs despite their experience, and young graduates are struggling to find new jobs, because they have none. The youth unemployment rate in EU in August 2019 was 14,2 % and in the countries represented in the proposal the rate goes from 27,1% in Italy to 14,1% in Belgium, 9,7% in Denmark and 6,9% in the Netherlands. These data do not give evidence to the unbearable fact that in EU, 30% of higher education graduates are working in jobs that do not match their talents or even do not need a university qualification. On the other side, 40% of vacancies cannot be filled, because of skills mismatch and too few people have the preparation, mind-sets, and competences to set up their own businesses or look for new opportunities.

Higher education systems are key actors for improving graduates' employability by strengthening those transversal skills, not specifically related to a particular job, task, academic discipline or area of knowledge but crucial in a wide variety of situations and work settings, such as the ability to work in a team, problem solving and creative thinking, highly required by employers. At the same time, the way we work, learn, take part in society, and lead everyday life is quickly changing in line with the fast and disruptive technological developments. Thus, graduates of any field need to be equipped with the ability to learn and take initiative, as well as with cross-disciplinary knowledge and technical skills.

In a worldwide scenario the number of unemployed people is projected to rise, but this is not because of the economic crisis alone, but also of the industrial automation of processes previously performed by workers. The manufacturing industry is transforming thanks to the industrial IoT and what research refers to as "Industry 4.0". This is reflected in the machinery installed in the production chains, which come prepared to incorporate IoT, AI and blockchain in their processes. This transformation needs qualified staff provided not only with technological abilities but with a suitable level of creativity in planning and applying solutions that facilitate the

strategic evolution and growth of industry and services for citizens. Unfortunately, the academic curricula have not been updated as quickly as technology has evolved.

The project will provide ICT and Business students with knowledge, competencies and skills enabling them to become graduates the job market will more and more require. The project will focus on Transportation and Logistics that, like most other industries, is currently confronted with an immense change. Due to its multifaceted characteristics and problems, the solutions proposed will provide a useful toolkit for many other sectors.

1.2. Objectives

In order to provide the specific set of competencies to the particular graduate profiles will be achieved through the specific objectives. These objectives can be listed as shown below, though not in a prioritized order:

- to identify and define the new logistic skills;
- to develop and implement, together with companies, curricula that bridges both ICT and logistics skills;
- to develop and implement new models (toolbox) to assess transversal skills;
- to implement teacher training activities to enable them to adopt innovative teaching methods and design multidisciplinary; curricula providing transversal skills;
- to develop and implement teacher support systems;
- to achieve these objectives, teachers need to update their teaching and assessing methods, students need to acquire and develop transversal skills and institutions need to allocate resources to professional development activities. Therefore, the project will address students, teachers, university governance and representatives from the labor market.

Correspondingly, the INCO-SMRT project will develop six intellectual outputs, as listed below, (again not in a prioritized order):

- needs analysis
- multidisciplinary modules' development
- assessment toolbox

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- teacher-training module
- teacher support systems and pilot
- one training activity (teacher-training week)
- and four multiplier events (three local training seminars and one international conference).

The problems tackled by the project are shared all over the world, thus exchange of good practices among institutions with different scope and organization and from north and south countries ensures a better approach and a wide spread of outcomes and results.

Focusing on T&L sector, the project contributes to close the highlighted knowledge gap and skills mismatch enabling ICT and Business students to become the graduates that job market will increasingly require. Strategies, teaching and learning methods, flexibility, innovative assessment procedures, curricula design with a strong cross-disciplinary content and transversal skills enhancement, can be reproduced in many other sectors allowing the higher education institutions and systems to renovate and provide the graduates of tomorrow.

2. Resume: The Project Framework so far.

The project "Developing Interdisciplinary Competences for Smart Logistics Assessment Development," initiated in November 2022 under project number 2020-1-DK01-KA203-075093, is a collaborative endeavor involving partners from Belgium, Denmark, Italy, and The Netherlands. This project is part of the broader INCO_SMRT initiative, co-funded by the European Commission through the Erasmus+ Programme. Its primary objective is to address the pressing issues of rising unemployment and skills mismatch within the European Union (EU), with a particular focus on the Transport & Logistics (T&L) sector. (For more information see the reports on IO2 and IO3)

In recent years, the EU has grappled with increasing unemployment, primarily due to the fallout from the 2008 economic crisis, resulting in job losses and a dearth of suitably skilled candidates for available positions. Recognizing the pivotal role of higher education institutions in bolstering graduates' employability, the project emphasizes the enhancement of transversal skills — critical in today's ever-evolving job market.

This project centers its efforts on the T&L sector, aiming to bridge the knowledge gap and skills mismatch by equipping ICT and Business students with competencies that align with the needs of the job market. The core objectives include:

- Identifying and defining new logistic skills.
- Developing and implementing curricula that seamlessly integrate both ICT and logistics skills.
- Creating an extensive assessment toolbox for evaluating essential transversal skills.
- Providing teacher training activities, facilitating the adoption of innovative teaching methods and multidisciplinary curricula.
- Developing robust teacher support systems.

Extensive research, encompassing literature reviews, brainstorming sessions, and surveys involving companies, students, alumni, and teachers across four EU member states, underpins the project's goals. The insights derived from these efforts

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help identify relevant transversal skills, define precise learning outcomes, and craft course content equating to 30 ECTS.

Building upon the findings from this comprehensive needs analysis, the project has outlined six course subjects:

1. Dynamic Supply Chains
2. Data-Driven Supply Chains
3. Sustainable Driven Supply Chains
4. Business Process Optimization
5. Technology-Driven Supply Chains
6. Additional content, including a minor's thesis

Collaboration forms the cornerstone of this project, emphasizing cooperation among partners through both face-to-face and online interactions. Extensive engagement with industry representatives ensures that the developed curricula remain closely aligned with market demands. Moreover, the project champions experiential learning, capitalizing on participants' prior experiences in curriculum development, teacher training, assessment, and transversal skills.

Project workshops and presentations have been instrumental in facilitating the research process. Partners have shared insights into their respective educational systems and relevant study content. These exchanges have informed discussions on educational models and practices, fostering a holistic understanding of the project's objectives and outcomes.

The project attaches great importance to transversal skills as critical components of graduates' success. These skills encompass problem-solving, teamwork, creativity, initiative, adaptability, communication, and more. The project's comprehensive assessment toolbox incorporates mechanisms to evaluate these skills, ensuring that students are well-prepared to meet the demands of the job market.

The development of learning materials adheres to the principles of social constructivism, a learning theory that positions students at the center of knowledge construction. These materials are designed to be active, constructive, goal-oriented, and collaborative, with a pronounced emphasis on self-regulation. Each module's

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learning materials adhere to a structured format, including general introductions, presentations, challenges, additional materials, and project assignments.

3. Theoretical background

3.1 Challenges in Learning Environments in the Context of E-Learning

The advent of technology has revolutionized the landscape of education, ushering in a new era where learning is increasingly mediated through digital platforms. E-learning, with its promise of accessibility, flexibility, and scalability, has gained prominence as a powerful tool for disseminating knowledge and skills across diverse settings. However, this shift towards virtual learning environments comes with a unique set of challenges that educators, learners, and institutions must grapple with.

The Promise of E-Learning

E-learning has opened doors to education and training opportunities that were previously inaccessible to many. It transcends geographical boundaries, making it possible for individuals from different corners of the world to connect and learn together. Moreover, it accommodates varied learning styles and preferences, allowing learners to tailor their experiences to suit their needs (Ally, 2008). The potential benefits of e-learning are vast, but harnessing its full potential requires addressing the multifaceted challenges that arise in these virtual learning spaces.

Navigating the Digital Divide

One of the foremost challenges in the e-learning landscape is the digital divide. While technology has become pervasive in many societies, significant disparities persist in terms of access to hardware, software, and reliable internet connections (Warschauer, 2004). This inequality can exacerbate existing educational disparities, as learners without access to digital resources may find themselves at a disadvantage in an increasingly digital world. Bridging this divide is not only a matter of providing access but also ensuring digital literacy and skills development for all learners.

Maintaining Engagement and Motivation

E-learning environments often lack the face-to-face interactions and social cues that characterize traditional classroom settings. This absence of physical presence can challenge learners' engagement and motivation (Fredricks et al., 2004). Sustaining learner interest and participation in virtual classrooms requires innovative

approaches that foster a sense of community, interactivity, and personal connection among learners and instructors (Dixson, 2010).

Ensuring Quality Learning Outcomes

Quality assurance in e-learning is a critical concern. Educators and institutions must ensure that e-learning materials and assessments are of high quality and align with intended learning outcomes (Bates & Poole, 2003). The absence of physical oversight can create opportunities for academic misconduct, and hence, ensuring the integrity of assessments and evaluations is essential in e-learning environments.

Addressing Technological Challenges

Technical glitches, software compatibility issues, and cyber threats are inherent risks in e-learning environments. These technical challenges can disrupt the learning process and compromise the security of learners' data (Wang, 2014). Robust IT infrastructure, cybersecurity measures, and technical support systems are imperative to mitigate these risks effectively.

In this report, we delve into the multifaceted challenges posed by e-learning environments and explore strategies and solutions to address these issues. E-learning has the potential to democratize education and enhance learning opportunities on a global scale, but only by proactively confronting these challenges can we unlock its full potential and ensure equitable and effective digital learning experiences.

3.2 Learning in the Intersection of Danish, Dutch, Belgian, and Italian Cultures

In an increasingly interconnected world, the dynamics of learning have transcended national boundaries, giving rise to a rich tapestry of cross-cultural experiences. This is particularly evident in regions of Europe where diverse cultures converge, such as the intersection of Danish, Dutch, Belgian, and Italian societies. The unique blend of these cultures not only presents opportunities but also challenges in the realm of education and learning. This introductory section explores the multifaceted nature of learning in practice, highlighting the significance of cultural diversity and intercultural interactions in shaping contemporary educational landscapes.

The Cultural Mosaic of Europe

Europe stands as a captivating mosaic of cultures, languages, and traditions. The northern European nations of Denmark and the Netherlands are known for their progressive educational systems that prioritize inclusivity, innovation, and critical thinking (Hofstede, 1991). In contrast, Belgium's educational landscape reflects its intricate division along linguistic lines, with Dutch-speaking Flanders and French-speaking Wallonia presenting distinct educational approaches and philosophies (de Witte et al., 2015). Italy, on the other hand, boasts a rich historical heritage and places a strong emphasis on classical education and the humanities (Mazzoni, 2012). When these diverse educational traditions converge, the interplay of values, pedagogical methods, and cultural norms can profoundly influence the learning experiences of individuals within this complex context.

The Challenge of Cultural Convergence

The meeting point of Danish, Dutch, Belgian, and Italian cultures presents an intriguing challenge for educators and learners alike. It calls for a nuanced understanding of how cultural values, communication styles, and social norms impact the way knowledge is acquired, transmitted, and applied. Cultural dimensions, as proposed by Hofstede (1980), offer valuable insights into the variations in cultural values, such as individualism-collectivism, power distance, and masculinity-femininity, which have a direct bearing on educational practices. Additionally, theories of intercultural competence (Deardorff, 2006) and cultural intelligence (Earley & Ang, 2003) underscore the importance of developing the skills necessary for effective cross-cultural interactions, which are essential in a multicultural learning environment.

Navigating the Crossroads of Learning

As we delve into the intricate dynamics of learning in this cross-cultural context, it becomes evident that a deeper exploration is warranted. This journey necessitates a comprehensive examination of not only the theoretical frameworks that underpin intercultural learning but also the practical applications and challenges faced by educators and learners on a daily basis. This report seeks to unravel the complexities of learning within the Danish, Dutch, Belgian, and Italian cultural

intersection, shedding light on the strategies and approaches that foster meaningful and culturally responsive education.

3.3 Theoretical Framework for the Development of a train-the-trainer Module in Learning

In the field of education and professional development, the concept of "train-the-trainer" modules has gained prominence as a means to enhance the effectiveness of trainers and educators in various contexts. This section provides a theoretical foundation for the development of such a module, drawing upon key theories and models in the field of education and learning.

Situated Learning Theory by Wenger and Lave

Wenger and Lave's theory of situated learning emphasizes the importance of learning within authentic contexts and communities of practice. According to this theory, learning is not an isolated activity but is deeply embedded in social and cultural contexts. In the context of a train-the-trainer module, this perspective suggests that effective training should not merely focus on theoretical knowledge but should actively engage trainers in real-world scenarios and communities of practice, allowing them to apply their knowledge in context (Lave & Wenger, 1991).

Hiim and Hippe's Didactic Relations Model

Hiim and Hippe's didactic relations model provides a structured framework for understanding the various components of the teaching and learning process. It emphasizes the importance of clear communication, interaction, and collaboration between trainers and learners. When developing a train-the-trainer module, incorporating this model can help trainers understand the nuances of effective communication and how to establish productive relationships with their learners (Hiim & Hippe, 1989).

Kolb's Learning Cycle

Kolb's learning cycle is a model that outlines the stages of the learning process, including experiencing, reflecting, thinking, and acting. This model suggests that effective learning involves a continuous cycle of these phases. When designing a

train-the-trainer module, trainers should be equipped with the knowledge and skills to guide learners through each stage of this cycle, facilitating deep and meaningful learning experiences (Kolb 1984).

Illeris' Three Dimensions of Learning

Illeris' theory of learning encompasses three dimensions: cognitive, emotional, and social. This perspective highlights the multifaceted nature of learning and suggests that effective training should address not only cognitive knowledge but also the emotional and social aspects of learning. Trainers should be aware of these dimensions when developing and delivering training content in the train-the-trainer module (Illeris 2015).

Habermas' Communicative Action Theory

Habermas' theory of communicative action emphasizes the importance of open and honest dialogue in the learning process. In the context of a train-the-trainer module, this theory underscores the need for trainers to facilitate meaningful discussions and encourage critical thinking among learners. Effective communication is essential for creating an inclusive and engaging learning environment (Habermas 1995).

Scharmer's Theory U

Scharmer's Theory U proposes a framework for transformative learning and change. It suggests that effective learning involves a process of "unlearning" old patterns of thinking and "presencing" new possibilities. When designing a train-the-trainer module, trainers should be prepared to guide learners through this process of transformative learning, helping them develop a deeper understanding of the subject matter and their own role as trainers (Scharmer 2009).

In conclusion, the development of a train-the-trainer module should draw upon these key theories and models in the field of education and learning. By incorporating elements of situated learning, didactic relations, learning cycles, multidimensional learning, communicative action, and transformative learning, the module can empower trainers to facilitate effective and impactful learning experiences for their own learners.

4. Development and test of the train-the-trainer module.

The development of the train-the-trainer module was an ongoing theme during the whole project, but the actual planning and preparation was initiated in Vejle Denmark at a partner meeting at UCL in Vejle on the 17th-18th of May 2022. It was decided to deploy a didactical approach based on the models and discussions mentioned in section 3.

It was relatively early a concern, that various didactical approaches would be represented among the participating trainers, both in the pilot as well in the end product. This assumption would in part be founded in the different nationalities and academic background of the institutions forming different didactical beliefs of the trainers. This assumed obstacle was addressed by the train-the-trainer module, which aimed at establishing a common ground for the teaching and training involved in the Incosmart modules.

The train the trainer module should therefore involve actual teaching of students of the trainers as well as training sessions of these trainers. AP offered that this training week program module could be placed in relation to their international summerschool of sustainability, that their international coordinator, Karolien van Riel, was already planning.

4.1 Structure of training week

The training week consisted of a comprehensive program that included lectures and practical exercises. The trainers, in pairs, delivered lectures on three key subjects: Design Thinking, coaching and supervision as teaching methods, and assessments in project-based learning. These lectures aimed to equip the participating teachers with theoretical knowledge and practical strategies relevant to their teaching practice. By engaging in these lectures, the trainers were able to acquire new insights, methodologies, and perspectives to enhance their teaching approach.

Practical Application and Duo-Coaching:

Following the lectures, each pair of trainers was assigned one or two student groups to coach throughout the training week. This empirical engagement enabled the facilitators to operationalize their recently assimilated competencies, thereby

furnishing them with an arena for experiential learning and the further honing of their instructional aptitudes.

A dual-facilitation paradigm was implemented to expedite the transference of knowledge and to inculcate a culture of peer assessment. Within this collaborative schema, facilitators had the capacity to disseminate their specialized knowledge, reciprocate evaluative feedback, and mutually bolster each other in the efficacious orchestration and oversight of their designated learner cohorts.

[Integration with International Week:](#)

During the instructional seminar week, the facilitators were actively involved in a broader scope encompassing the International Week's agenda, transcending their designated roles as pedagogical coaches.

This level of integration enabled them to interface with a heterogeneous cohort of educational practitioners and learners, thereby fostering an environment conducive to cross-cultural dialogue and the dissemination of diverse pedagogical paradigms. Through their active immersion in this international milieu, the facilitators were afforded the opportunity to augment their professional affiliations, assimilate insights from fellow practitioners, and cultivate a more expansive outlook on educational methodologies.

[Feedback and Lessons Learned:](#)

The training week concluded with a feedback session, where trainers had the opportunity to reflect on their experiences and share insights gained throughout the week. This session served as a platform for trainers to exchange feedback, discuss challenges encountered, and identify lessons learned. The feedback received from the trainers enabled the organizers to assess the effectiveness of the training program and identify areas for improvement in future iterations.

To summarize the train-the-trainer physical training week proved to be a valuable professional development opportunity for the participating teachers. By combining lectures on key teaching methodologies with practical application and duo-coaching, the trainers were able to enhance their skills, promote knowledge transfer, and foster peer-evaluation. Symbiosis with the International Week agenda further augmented

the learning environment by offering an aperture to a multitude of educational practices across diverse cultural paradigms.

A summative feedback session, conducted at the seminar week's conclusion, provided an opportunity for facilitators to introspectively analyze their experiences, thereby contributing to the iterative enhancement of the training curriculum.

Collectively, the instructional seminar week efficaciously realized its established objectives, serving as a catalyst for professional maturation and development among the educators involved.

6. Learning outcome

These following identified learning outcomes exemplify the significant knowledge, skills, and experiences attained by the trainers through their active participation in the Train-the-Trainer Physical Training Week.

- **Enhanced Knowledge of Design Thinking:**
The trainers demonstrated an advanced understanding of Design Thinking principles, processes, and applications as a result of their participation in the lecture sessions during the training week. This outcome signifies their acquisition of theoretical knowledge related to Design Thinking in the educational context.
- **Acquisition of Coaching and Supervision Skills:**
The trainers acquired a diverse range of coaching and supervision techniques as teaching methods through the training week's instructional sessions. This outcome denotes their development of practical skills in effectively guiding and supporting learners within an educational setting.
- **Understanding of Assessments in Project-Based Learning:**
The trainers gained a comprehensive understanding of assessment strategies specifically tailored for project-based learning environments. This outcome displays their knowledge and ability to design and implement assessments aligned with the principles and objectives of project-based learning approaches.
- **Application of Learned Skills through Duo-Coaching:**
Through engaging in duo-coaching activities, the trainers actively applied the skills they acquired throughout the training week. This outcome underscores their practical experience in coaching and supervising student groups, enabling them to refine and put into practice their newly acquired teaching abilities.

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- **Knowledge Transfer and Peer-Evaluation:**
The duo-coaching framework facilitated the transfer of knowledge between trainers and provided opportunities for peer-evaluation. This outcome highlights the trainers' ability to share their expertise, exchange feedback, and engage in a reciprocal learning process with their peers, promoting a collaborative and supportive learning environment.
- **Exposure to International Perspectives and Practices:**
The trainers, by participating in the international week, were exposed to diverse perspectives and practices within the field of education. This outcome underscores their engagement with educators and learners from different cultural backgrounds, enabling them to broaden their understanding of educational practices beyond their own context.

The feedback session conducted at the conclusion of the training week allowed trainers to engage in critical self-reflection, identify challenges encountered, and share insights gained during their training experience. This outcome reflects their ability to engage in reflective practice, contribute to the continuous improvement of the training program, and enhance their professional development.

7. Conclusion

This report provides an evaluation of the development, and piloting of the train-the-trainer module, centered on an on-campus training week organized with the aim of enhancing the skills and knowledge of participating teachers. The training week, which encompassed a combination of lectures and practical application of the acquired skills, took place during the international week at AP in Antwerp from April 24th to April 28th, 2023.

The objective was to engage two teachers from each partner institution, allowing them to actively participate and gain firsthand training experience. This report highlighted the structure of the training week, emphasizing the importance of peer-evaluation, knowledge transfer, and teaching opportunities within the duo-coaching framework.

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