



Fostering Graduates' Critical Thinking with University-Business Collaboration: The Think4Jobs Project

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Abstract. Literature highlights a lack of Higher Education curricula that promotes graduates' soft skills. Critical Thinking (CT) is considered one of the soft skills associated with higher employment levels. The European-funded project "Critical Thinking for Successful Jobs" (Think4Jobs), currently in progress, aims at strengthening the collaboration between Higher Education Institutions (HEIs) and Labor Market Organizations (LMOs) to design, develop, implement and evaluate CT blended apprenticeships curricula in five disciplines (i.e., Veterinary Medicine, Teacher Education, Business and Economics, Business Informatics, English as a Foreign Language). The curricula are implemented for apprenticeships. We aim to summarize the findings and milestones achieved so far in the project. First, a focus group approach, document analysis, and observation of CT instruction in HEI and LMOs were conducted to assess the state of the art of CT teaching in HEI and the needs of the stakeholders (i.e., HE and LMO) regarding the instruction of CT in HEI apprenticeships and LMO internships. Our results revealed that there is not necessarily a "gap" between HEIs and LMOs concerning CT instruction but rather a difference in understanding and a need to develop a common language between stakeholders. Therefore, as the next step, intensive training for HE instructors and LMO tutors was conducted to establish a common understanding of CT. The results showed no statistical differences in participants' conceptual understanding of CT, but still drew attention to several misconceptions. Finally, the CT blended apprenticeships curricula were designed as a byproduct of the University-Business Collaboration. Currently, the implementation and evaluation of the effectiveness of the CT blended apprenticeships curricula are carried out.

Research Contribution: Our research within the project is deemed a relative interface that links HEIs and LMOs to establish a sustainable collaboration for developing graduates' CT.

Keywords: critical thinking · Higher Education Institutions · University-Business Collaboration

1 Introduction

In a complex and ambiguous world significantly influenced by the rapid exchange of information and the increased development of technology, Critical Thinking (CT) is a skill that labor market organisations increasingly require. The World Economic Forum [1] has ranked CT as one of the most critical skills needed in tomorrow's labor market. Unfortunately, in most cases, students are not taught how to think independently, so they rarely acquire these skills on their own [2–5]. Also, all the specific challenges of the 21st century, such as climate change, economic crisis, politics, and social instability, have confirmed the unique role of CT at the center of modern societies, with HEIs having a fundamental aim in preparing students to become critical professionals and active citizens [6]. The ability to think critically in the labor market and the higher education system has become more relevant with the emergence of various problems that organizations face, and it is becoming more and more complicated. However, employers' requirements cannot be met due to the existing gap between the labor market and the education system [7].

There are many definitions of CT in the literature. CT refers to a series of mental operations, strategies and images used to solve problems, make decisions and learn new information [8, 9]. According to Facione [10], CT is composed of six cognitive skills (interpretation, evaluation, analysis, inference, self-regulation, explanation) and seven main attitudes (dispositions): analyticity, open-mindedness, systematicity, truth-seeking, cognitive maturity, self-confidence, inquisitiveness [11].

CT signifies transforming accumulated knowledge and information from an inert process into a mental action to improve the perception and understanding of the collected data's content [8]. Thus critical thinking has often been associated with the processes of analysis and reasoning and, in some cases, with the process of decision-making and questioning [12, 13].

At the academic level, CT is seen as an educational objective. Thus, the academic community's efforts should be turned in that direction. Still, the academic community should prepare graduates according to the labour market requirements [14]. CT enables students to select information correctly, acting on it as a filter and encouraging data analysis to identify the most suitable to fully understand a particular process or phenomenon [15]. Fong, et al. [16] believe that critical thinking skills are also associated with better preparation of graduates to compete in a global society.

In terms of the labor market, CT is essential for business because effective CT helps: a healthcare professional to take the best decisions to save lives, a lawyer to bring the best decisions for their clients, or it allows a business person to be able to make strategic investment decisions in order to optimize client profit [17]. At the same time, according to employers, CT creates the necessary preconditions that a person needs to continuously improve their working style to constantly adapt to organizational changes [7, 18, 19].

The concept of CT is a term that, over the years, has been given many interpretations from different perspectives (Davies & Barnett, 2015): good, expected, desired thinking [7, 20, 21], effective solutions [7, 22, 23], managing critical, crisis situations [7, 24], innovative ability, innovative spirit [7, 25], dispositions [7, 26–30] skills and competences [7, 31, 32].

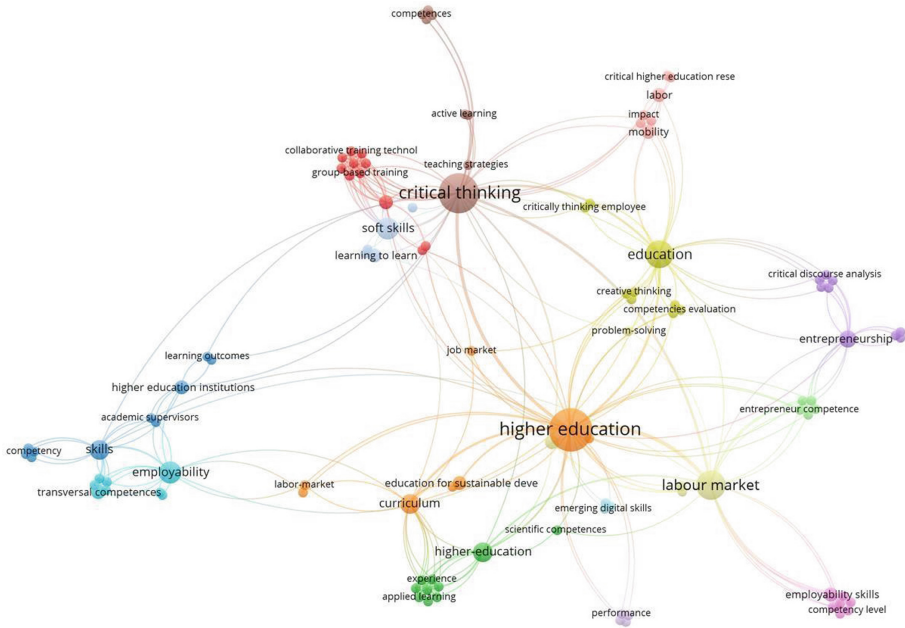


Fig. 1. Keyword co-occurrence regarding critical thinking & labor market. Source: The authors’ contribution

2 Method

A simple search of the Web of Science database for the keywords “critical thinking” and “labor market” and “higher institutions” returns 78 articles. After analysing them with the VOSviewer software, the words found next to them can be identified.

The most common keywords in the scientific articles resulting from the search “critical thinking” and “labor market” and “higher institutions” are: “soft skills”, “competences”, “transversal competences”, “skills”, “applied learning”, “employability skills”, “creative thinking”, “problem solving” (Fig. 1).

As mentioned above, CT contributes to achieving an organisation’s goals by developing the ability of its employees to react quickly to critical situations that arise through research-based reasoning and decision-making. Therefore, CT is often associated with HEIs and LMOs as it leads to a better understanding of information, follows its analysis, and enables graduates entering the labor market to participate in discussions rationally.

3 Findings and Discussion

3.1 Think4Jobs Project

Numerous studies highlight the importance of a better correlation between the training offered by universities and the demands of LMOs in terms of critical thinking. Thus, the

European Erasmus + project “Critical Thinking for Successful Jobs” (Think4Jobs-2020-1-EL01-KA203-078797), currently in implementation, has as its primary objective to strengthen the relationship between the university environment and the labor market by designing, developing and assessing Critical Thinking blended apprenticeships curricula that could promote students' critical thinking skills and dispositions in their transition into a professional context.

The implementation period of the project is 3 years (September 2020 - August 2023), bringing together a multidisciplinary team of labour market organisations (LMOs) and higher education institutions (HEIs) actively involved in critical thinking education from five countries: Greece, Romania, Germany, Lithuania and Portugal. Across the five disciplines addressed in the project (Veterinary Medicine, Business and Economics, Teacher Education, Business Informatics, English as a Foreign Language), students will have the opportunity to develop their critical thinking skills and dispositions through participation in apprenticeship programmes. The main specific objectives of the project are represented in Fig. 2.

The target group directly affected by the project activities consists of 30 HE instructors, LMO tutors, and approximately 150 students. Also indirectly positively affected by the project will be a number of employees from higher education institutions, labor market organisations, students, academics, professional organisations etc. The expected results of the project are represented in Fig. 3.

The first intellectual output corresponds to the first specific objective. It consists of the development of the Think4Jobs toolkit composed of a “map” of existing gaps in the development of CT at HEIs and LMOs level, detailing 10 work-based learning scenarios related to the 5 disciplines addressed in the project.

In the second intellectual output specific to objectives two and three, a training curriculum was developed to address the learning requirements of HEIs instructors and LMOs tutors regarding CT. The training curriculum was implemented at 30 participants

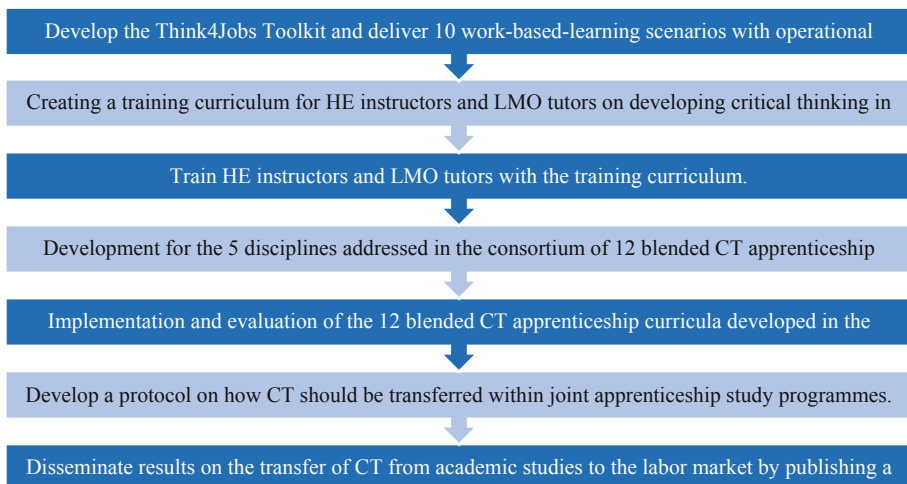


Fig. 2. Specific objectives of Think4Jobs project. Source: <https://think4jobs.uowm.gr/> [33]

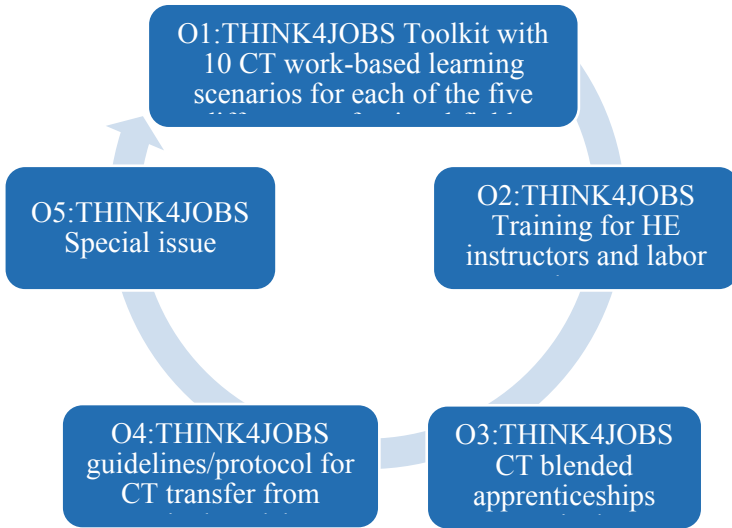


Fig. 3. Results of Think4Jobs project. Source: <https://think4jobs.uowm.gr/> [33]

during a Learning Teaching Training Activity (LTTA). At the LTTA both HE instructions and LMO tutors were trained and instructed.

The next intellectual output corresponded to the fourth specific objective, namely the design and development of 12 CT blended apprenticeships curricula. HEIs and LMOs collaborated and defined the learning objectives both for the discipline specific content and for CT. In addition, the material, activities and assessment methods were identified. The CT blended apprenticeships curricula were developed on the MOODLE learning management system. Within this, the objectives, evaluation criteria, activities and materials needed to develop the CT blended apprenticeships curricula are identified.

The penultimate intellectual output corresponds to objectives five and six consisting of the implementation and evaluation of the 12 CT blended apprenticeships curricula previously developed. Following their implementation, approximately 150 students will be influenced. The 12 CT blended apprenticeships curricula will be implemented and evaluated in three different moments: pre - during - post. Following the analysis and statistical interpretation of the results obtained a set of guidelines and good practices will be developed on how CT should be promoted in CT blended apprenticeships curricula.

The last intellectual output corresponding to the last objective is the preparation of a Special Issue to report the results obtained under intellectual outputs 3 and 4.

The international character of the project allows the creation of a common vision and means of action on CT in the field of apprenticeship, which can be replicated in other countries. At the same time, the partnerships created between HEIs and LMOs are a very effective way of creating a professional academic environment that supports the learning needs of students internationally.

3.2 Results Obtained in the Think4Jobs Project

Since the project is currently in progress so far, the necessary activities for the first three intellectual outputs have been completed. The activities of the other two outputs are in progress. Thus in the following, only the prominent results of the first three outputs will be presented. Also, the way of carrying out the evaluation of the 12 CT blended apprenticeships curricula within intellectual output 4 will be presented.

The first intellectual output had a twofold objective respectively: tracking and mapping the methods and techniques currently used in HEIs and LMOs' apprenticeships with a focus on the convergent and divergent points between them, as well as describing a work-based, learning scenario to improve critical thinking skills among students [34]. In order to achieve the first objective of the report, three research methods (focus groups, observation and documentary analysis) were used in combination with three tools (observational matrix, focus group rubric and documentary analysis rubric).

The obtained results revealed that although there is a definitive gap between HEIs and LMOs, there is a different context in approaching CT. Universities usually use various learning activities, focusing mainly on preparing students for a career with long-term goals, while LMOs pursue short-term learning and teaching strategies [34]. Regarding the second objective pursued, namely the learning scenarios, each team composed of HEIs and LMOs composed two scenarios following the needs, conclusions and recommendations previously identified.

In the second intellectual output, a training curriculum was developed in order to create a common understanding among HEIs instructors and LMOs tutors regarding the nature of CT, how it can be promoted in learning and instruction, and how it can be evaluated [35]. For developing the training curriculum, a bottom-up participatory design approach was followed. A pre-post design was followed, and participants' knowledge of the aspects mentioned earlier was assessed at the beginning and end of the training. Although no statistically significant differences between the two measurements were identified, the level of participants' knowledge about CT thinking increased [35].

The third intellectual output consisted of designing and developing 12 CT blended apprenticeships curricula for the 5 disciplines addressed in the project [36]. The developed curricula are a product of University-Business Collaboration. The relationship achieved in the intellectual output with the 12 CT blended apprenticeships curricula produces several positive effects on the field, both contributing to the improvement of collaboration between HEIs and LMOs. It also gives students the opportunity to benefit from synchronous and asynchronous learning, which contributes to facilitating reflective thinking and the development of other soft skills (communication, time management, collaboration, etc.) [36].

Regarding the fourth intellectual outcome, namely the implementation and the evaluation of the 12 CT blended apprenticeships curricula, results cannot be described as the preparation of the Intellectual Output is in progress. Still, we will describe the questionnaires employed to determine the development of students' critical thinking skills and dispositions in HEIs. Considering that the project intends to measure skills and dispositions associated with CT and because skill and dispositions are seldom evaluated together, it was decided to resource two tests (each one covering a different dimension) merged within the same questionnaire. The search resulted in the identification of two

questionnaires: one for skills – Critical Thinking Self-Assessment Scale (CTSAS) – developed by Nair [37], and one for dispositions – The Student-Educator Negotiated Critical Thinking Dispositions Scale (SENCTDS), developed by Quinn, et al. [38]. The first questionnaire was validated in a mixed Indian and Canadian nursing students population and is composed of closed questions and uses a 6-point Likert scale. The second questionnaire was validated in a mixed Irish and American student population and is composed of closed questions and uses a 7-point Likert scale. The final questionnaire distributed to students comprised a total of 81 questions (60 from CTSAS + 21 from SENCTDS), distributed to students in three central moments (pre-during-post) at the time of implementation of the CT blended apprenticeships curricula. Considering that the 12 CT blended apprenticeships were implemented in the 2021–2022 academic year, in the first semester or the second semester, the data obtained will be analysed and statistically interpreted in the following period. A total of 531 responses were recovered.

All the guides, reports, and materials resulting from the research carried out so far in the Think4Jobs project contribute significantly to the development of critical thinking among students, as well as to the improvement of the collaborative relationship between HEIs and LMOs and they can be accessed on the project's website.

4 Conclusion

The voice of employers who draw attention to the approach of critical thinking at the level of the labor market, which is in permanent change due to information overload, is increasingly heard (Indrasiene, et al., 2021). However, the lack of correlation between the requirements of employers and educational experts is an obstacle to finding a common language (Penkauskienė, et al., 2019). In this regard, the Think4Jobs project proposes a series of activities to form a network that encourages the formation of partnerships between stakeholders such as HEIs and LMOs. Hence, the project meets two critical objectives of the EU: increasing business-university collaboration and bridging the expectations gap. As conceptualised by the Think4Jobs project, this collaboration, which is bi-directional will help tailoring the young graduates to the needs of the labor market. By working together, both Business and Academy gain, either form a closer conceptualization of the soft skills requested on newly graduates, or by sharing common strategies to enhance said skills. At the end, the project foreseen to contribute in mitigating the perceived competencies mismatch between the two dimensions (academic and labor market). The project also foreseen that it may help to fasten the pace adaptative/reactive strategies often associated to HEI regarding the overcoming of perceived stakeholders needs.

Students also profit in a short-term from pedagogical activities designed by both stakeholders and educators, incorporating situations found daily in professional contexts. Translation of core knowledge intertwined with non-cognitive skills raise the interest and engagement of students, foster translations of learned approaches and decisions into new problems. Also, by requesting the students to critically reflect on their learning process and by creating habits of mind, the project further expects the students to enhance their critical thinking, engage in informed decisions making and became active/interventive members of the workforce.

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