

## Article

# Critical Thinking in Teacher Education: Course Design and Teaching Practicum

Angeliki Lithoxoidou <sup>1,\*</sup> and Triantafyllia Georgiadou <sup>2</sup><sup>1</sup> Department of Primary Education, University of Western Macedonia, 53100 Florina, Greece<sup>2</sup> Department of Psychology, University of Western Macedonia, 53100 Florina, Greece; tgeorgiadou@uowm.gr

\* Correspondence: alithoxoidou@uowm.gr

**Abstract:** Critical Thinking is considered a key component of Higher Education that supports graduates' preparation for the labor market. However, in the field of teacher education more research is needed to support student-teachers with regard to the complexity of schools. It is considered that a teaching practicum can set the stage for the cultivation of Critical Thinking skills and dispositions, as student-teachers have to face real problems and be led to decision-making. The paper presented here describes the curriculum transformation of courses offering theoretical lectures and teaching practicum in the Department of Primary Education, University of Western Macedonia. After focus group discussion with in-service teachers, the Critical Thinking skills and dispositions considered necessary for teacher education were thoroughly described and utilized for the course design. The courses were modified to include a variety of teaching strategies following the direct infusion approach for training in Critical Thinking with the aim of promoting reflective practices for fostering student-teachers' critical reflection. In this way, they can be empowered regarding their professional development.

**Keywords:** critical thinking; skills; dispositions; course design; teaching practicum



**Citation:** Lithoxoidou, A.; Georgiadou, T. Critical Thinking in Teacher Education: Course Design and Teaching Practicum. *Educ. Sci.* **2023**, *13*, 837. <https://doi.org/10.3390/educsci13080837>

Academic Editor: Dorothe Kienhues

Received: 16 June 2023

Revised: 28 July 2023

Accepted: 11 August 2023

Published: 17 August 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. The Importance of Critical Thinking in Teacher Education

Teaching pertains to a complex profession, and its effectiveness relies on the multidimensional teaching process, including cognitive, social, and affective goals. Additionally, teachers' managerial skills regarding the available time and materials can interfere in the teaching process. All these elements are defined and guided by the needs of pupils, who are influenced by factors both inside and outside school settings, such as the class environment and their family background [1]. Teachers should be constantly alert and make decisions; hence, they have to be organized and ready to tackle thorny situations, critical incidents, and problems [2]. This is the reason why student-teachers' competencies are organized into three major categories. The first category refers to their knowledge, the second to their skills, and the third to their attitudes, that is, the way in which they apply their knowledge and skills [3].

It is widely accepted that 21st-century skills exceed literacy and numeracy and refer to a variety of thinking, creative, metacognitive, problem-solving, and communication skills. These skills do not only define quality learning but they, also, describe the standards of quality teaching. [4]. Considering the current worldwide changes reflected in the school microcosm [5], teachers should be prepared for reforms in the direction of innovative, collaborative, and student-centered teaching practices that foster soft skills and critical thinking in combination with technology [6,7].

Under this rationale, Critical Thinking (CT) should stand as an integral part of teacher education, as it can be a link between teaching and learning while preparing student-teachers for a future career during which they struggle for their pupils to develop the concept as well [8]. Therefore, Higher Education Institutions undertaking the task of

teacher education should work in the direction of cultivating CT. To this end, Higher Education can collaborate with the labor market, in our case with in-service teachers, by constructing a learning community [9]. Previous research has suggested that in-service teachers emphasize the need for student-teachers to develop CT skills and dispositions to: (a) tackle critical incidents in classrooms, (b) effectively communicate and interact with pupils' parents, (c) understand and adapt to the administrative routines of school, and (d) cultivate self-confidence regarding their role and professional identity. In the same study, in-service teachers pointed out the need for student-teachers' awareness of ill-structured problems which may arise during their practicum and future careers in real working environments [10].

Cultivating CT in Higher Education is perceived as a key point, an antidote to worldwide instability [11] and is pursued and celebrated by labor market representatives. Many universities worldwide proclaim as an important part of their curriculum that their graduates become critical thinkers [12]. This is the point where a paradox arises. Even though policy makers, professors, and stakeholders have reached a consensus regarding the above, CT is not sufficiently developed in Higher Education [13]. Simultaneously, major controversies dominate in the field relating to the way it is taught, namely, the domain-specific or general approach, as well as how it can be assessed [14]. Further, there are other difficulties regarding effective CT integration in Higher Education curricula which are related to (a) students' attitudes which resist active learning and complex thinking, and (b) professors' understanding of the concept, its evaluation, and the strategies required for its acquisition [15]. In the field of teacher education, even though CT can stand as a connecting point between Higher Education and schools, in-service teachers' perceptions of how student-teachers should be trained are not usually taken into account or tend to remain unexplored in contrast to other fields such as business or sales [16]. Nonetheless, their role should be highlighted, as they can contribute by offering practical experience which can be applied in the teaching practicum.

Taking into consideration the aforementioned controversies, this is a theoretical paper describing how student-teachers can be trained for CT in the field of teacher education taking into consideration in-service teachers' perceptions. More specifically, it aims to analyze the design of courses which include both theoretical lectures and practicum and are offered to student-teachers attending the fifth or seventh semester of their eight-semester studies in the Department of Primary Education of the University of Western Macedonia. In detail, the paper thoroughly describes the way the material and the learning outcomes of the courses were modified in order to include both disciplinary competences as well as the CT skills and dispositions considered as necessary for student-teachers' practicum and future careers. The course curriculum was modified due to the Department's participation in the Erasmus+ program Critical Thinking for Successful Jobs (Think4Jobs). The program entails a collaboration between Higher Education Institutions and labor market representatives to bridge the gap between the skills that universities equip students with and those which are requested by stakeholders in the workplace. To this end, the program focuses on the development of CT skills and dispositions to ensure that graduates can be prepared to face the challenging and rapidly changing worldwide working conditions [17]. Ethical approval regarding the Department's participation in the program was received from the Research Ethics Committee of the University (Reg. No.: 21-2023/25-10-2022).

### *Instructional Approaches to Critical Thinking*

Training student-teachers for CT skills and dispositions is a demanding process that should include practical implementation [18]. Two major views are adopted when it comes to CT teaching and/or training: (a) the generalist view, according to which general CT skills apply to more than one area, and (b) the specifist view, which supports the idea that CT skills are connected to a particular scientific field [19]. These views lead to four different approaches to CT teaching/training. The general approach refers to teaching CT skills and dispositions as a separate unit without reference to the subject matter of each

course [20] and regardless of the scientific discipline [14]. In this approach, general issues referring to everyday life can be brought into class discussion. According to [18], teaching CT as an explicit component of the curriculum with emphasis on continuous practice can scaffold students towards its development. Additionally, the general approach can enhance CT transferability [21]. However, this approach is not so popular nowadays, as research suggests that CT presupposes content knowledge of a scientific field [14]. The second approach is infusion, which combines the instruction of a specific subject in combination with CT. In this approach, students are asked to think in the classroom and CT skills and dispositions are made explicit. Additionally, students are trained for particular CT skills (for example evaluation of evidence) and dispositions through activities within the subject matter. Immersion is the third approach which combines the subject matter alongside CT, which is not made explicit. In this case, there is the assumption that well-organized and efficiently designed instruction of the subject matter can train participants for the development of CT skills. Finally, there is the mixed approach which is a combination of the general approach with infusion or immersion. In this approach, there is a separate course or a series of lectures through which CT is taught separately, but students participate in instruction which combines CT and the subject matter of a course [14].

According to research data, explicit instruction of CT, especially when it is combined with opportunities for practice and triggering activities within the subject matter, may offer enhanced results [22,23]. Under this rationale, a recent approach called ‘direct infusion’ is applied. This approach includes the explicit instruction of CT components with examples and then their infusion into the subject matter with activities offering students the opportunity for further practice in the field. During all activities, thinking is modeled and formative assessment is offered to students so that they can be informed about their performance on CT while they simultaneously monitor this process [24].

## 2. The Courses: Theoretical Lectures and Teaching Practicum

Courses including lectures and practicum were particularly selected for the Think4Jobs program, as they mainly aim at (a) introducing student-teachers to contemporary teaching models regarding the subject matter, and (b) familiarizing them with the teaching process as they design a lesson plan. Further, student-teachers apply this lesson plan in real classroom settings during their practicum in primary schools cooperating with the Department. Therefore, opportunities for further practice are offered to them. The courses last 13 weeks and are organized in two major thematic axes emphasizing both theoretical and practical aspects of the subject matter. In detail, the first five weeks of each course include a three-hour lecture per week aiming at student-teachers acquiring disciplinary competencies in the field focusing on teaching models, as well as class and time management skills. The remaining eight weeks of each course refer to student-teachers’ practicum, and take place both on campus and in primary schools. Student-teachers are assigned a primary school class and choose a particular topic they are going to teach while taking into consideration pupils’ age and the official curriculum of the Ministry of Education. They design and implement a lesson plan on the selected topic and cooperate with a mentor, who supports and guides them during their practicum. Simultaneously, their lesson plan is discussed through critical reflection [25] on campus during class hours with fellow-students in the light of self-assessment and peer feedback [26].

Regarding the reformation of the courses’ curriculum described in this paper, the practicum was considered to set the stage for student-teachers’ training regarding CT, as it includes learning outcomes referring both to disciplinary competencies and CT skills and dispositions. This is the case because the practicum is perceived as a challenging task combining both scientific and pedagogical content knowledge [27] with several ill-structured problems arising during the process. Therefore, student-teachers can be equipped with skills to: (a) organize their teaching process in the appropriate way and (b) support primary school pupils in the direction of fostering CT skills.

On the other hand, embedding CT into the course curriculum and learning outcomes is considered a demanding process taking into consideration the multiple definitions of the concept as well as the diversity of ideas regarding the way it is cultivated and assessed. Therefore, curriculum reformation was followed by the following challenges: (a) explicitly defining and selecting the CT skills and dispositions that are considered essential in teacher education, and (b) utilizing the appropriate teaching strategies to achieve specific learning outcomes [14]. For the first case, in-service teachers' perceptions highlighted the field. For the second case, the contemporary literature was used to set the stage for the selection of the optimum teaching strategies. Another important challenge and limitation at the same time was associated with time management, as more material is added to the course curriculum while the time available remains the same. In this case, the solution lies in the fruitful collaboration that researchers develop with professors to ensure that the necessary adaptations can be applied with efficient actions and productive activities on campus.

### *2.1. Design of the Courses*

The direct infusion approach of CT teaching/training was adopted for the curriculum reformation in light of the encouraging findings it has offered in the field. Since it combines theory and practice [24,28], this approach is considered to be conducive to the teaching practicum. The first lecture of the semester refers to explicit teaching of CT (first step). Student-teachers are presented with multiple definitions demarcating the concept of CT [29]. Additionally, they are offered a thorough description of its components, that is, skills and dispositions with various general examples to enhance their understanding. The remaining four weeks of the lectures focus on: (a) infusing CT into the course subject matter, and (b) guiding instruction (second and third step). Student-teachers are provided with a handbook of notes, Powerpoint presentations, and supplementary materials from contemporary research findings regarding the disciplinary competencies surrounding the field (see Section 2.3). Through videos, they watch real lessons conducted in primary school settings and are invited to comment on the elements of each lesson as well as to discuss the content of the videos offering explicit argumentation. In detail, they are asked to reflect on the process, evaluate the teaching model presented in the video, and recognize mistakes or inappropriate class and/or time management. Open-ended questions are asked regarding these elements. Namely, the professor asks student-teachers to comment on: (a) the pros and cons of the teaching approach they watch and (b) the model of teaching presented; then, the student-teachers are encouraged to participate in critical discussion regarding the video. The second and third step of the design aim to train student-teachers for specific CT skills such analysis, interpretation, and inference during the critical discussion. Additionally, student-teachers are trained for explanation, systematicity, and evaluation, as they are invited to comment on the advantages and disadvantages and have to focus on specific elements of the teaching process while they express themselves with sound arguments.

When the five theoretical lectures are completed, student-teachers' practicum initiates. This is the fourth step of the course design, in which they are offered the opportunity to apply and practice the CT skills and dispositions they have acquired and receive corrective feedback. Simultaneously, the practicum is a milestone in student-teachers' preparation for their future profession [30] with emphasis on real working conditions and the problems that commonly follow.

In general, the first three steps of the design train student-teachers for a theoretical background which should be transferred and applied in the fourth step, i.e., the practicum. The practicum is conducted in primary schools and further discussed on campus with the assistance of other fellow students, the professor's guidance, and the mentors' participation. All these agents contribute to offering feedback as part of the courses' formative assessment. During this phase, the gap between theory and practice is bridged with the application of reflective practice. In detail, student-teachers are invited to review their lesson plans and assess their actions while spotting faults or pitfalls, referring both to teaching the subject matter per se and the way that they manage their class. A notable element related to their

practicum is that student-teachers are advised to first test their material and/or experiments at home before they apply them in front of primary school pupils. This requirement is part of their formative assessment and critical reflection development, in the sense that they are offered the opportunity for better preparation and elimination of mistakes as well as for self-monitoring. Professors commonly attempt to model their thinking in the direction of CT by asking open-ended questions such as the following:

- What factors should I take into consideration during my lesson plan?
- Which information should I obtain for my class and pupils before I design my lesson plan?
- How can I manage critical incidents in class?
- Did the instruction follow my lesson plan or did it deviate from that?

## 2.2. Teaching Strategies Employed in the Courses

Critical thinking can be cultivated in Higher Education by employing teaching strategies which can support student-teachers in the direction of combining subject matter with CT skills and dispositions. There are several different strategies for CT cultivation, such as problem-based learning [31], Socratic questioning [32], and argumentation [28]. In our case, we selected three strategies (collaborative, authentic, and experiential learning) to actively engage and activate even the most introverted and silent student-teachers in the process of constructing a learning community [33] which supports its members.

Cooperative learning encourages student-teachers to work in groups to achieve a common goal and this is conducted through communicative practices with emphasis on dialogue. In this way, they are offered the opportunity to explore different ideas, combine information for problem solving, reflect on different approaches, brainstorm, and evaluate possible solutions [34]. Therefore, student-teachers are trained for skills such as analyticity and systematicity as well as for dispositions such as cognitive maturity, especially when ill-structured problems are included [35]. In our case, collaborative learning is promoted through organized group discussions with fellow students, the professor, and the mentor during the practicum. These discussions aim at the analysis of critical incidents or the analysis of advantages and disadvantages regarding different teaching models. In this way, a community of practice is constructed through which open-mindedness is fostered.

Authentic learning is another teaching strategy employed to engage students in real-life situations and/or problems by involving higher-order thinking. Student-teachers are asked to reflect on and analyze their solutions as well as to explore their own experiences to utilize and apply knowledge [36] during their practicum. The teaching practicum entails an authentic learning environment where they can practice problem-solving and apply newly acquired content knowledge as well as skills [37]. More importantly for CT, the teaching practicum sets the stage for student-teachers' training in CT skills and dispositions. For example, they are trained in self-regulation when they have to tackle unexpected events such as pupils' conflicts, and for self-confidence when they have to support their scientifically grounded decisions.

Experiential learning offers student-teachers the opportunity to experiment and improve their practices, an element which adds to their professional development [38]. This strategy simulates reality, in which decision-making becomes a complex task, information may be lacking, and problems may be solved via multiple solution paths [39]. In our case, student-teachers watch videos from real classrooms which are characterized by three elements: ambiguity, realism, and complexity [39]. These videos include real-life cases in which hints are hidden or must be inferred. As a result, decision-making is hindered in a way that is analogous to reality, where this process is commonly complicated; thus, CT skills and dispositions such as evaluation of available elements and truth-seeking towards the best existing knowledge are promoted.

The combination of these teaching strategies promotes a framework for fostering CT. Because these are student-centered strategies [40], student-teachers are empowered as active participants who make informed decisions regarding their own learning. In this way,

the teaching process becomes meaningful and motivates student-teachers to obtain content knowledge as well as CT skills and dispositions. These skills can probably be retained during their professional career, helping to ensure that they are prepared to juggle the demands of the labor market.

### 2.3. *Disciplinary Competencies*

The disciplinary competencies included in the courses refer to covering the basic material student-teachers should obtain, such as different models of teaching which facilitate cognitive goals [41]. More skills are encompassed, including time and classroom management, as well as planning, which is considered particularly influential regarding the teaching process [42].

Regarding the three models of teaching taught in the courses, student-teachers are expected to be familiarized with their elements and to reflect on cases where they can apply them according to their pupils' characteristics. In detail, they should be able to select either teacher- or student-centered approaches after the evaluation of their pupils' needs and academic performance as well as the subject matter.

**The traditional model of teaching.** This model refers to the theory of behaviorism, which correlates learning with pupils answering correctly after a specific stimulus. Behaviorism supports the idea that pupils need reinforcement for effective learning and that knowledge, if generalized, can be transferred in common conditions [43]. In this model, pupils are considered passive recipients, while the teacher is the protagonist of the process responsible for transmitting knowledge [44]. This teacher-centered approach of instruction seems to follow a linear organization of the lesson plan according to the following stages: (a) introduction to the new concept; (b) analysis and practice in the new concept; and (c) review of the concept, homework assignment, and evaluation [45]. The behaviorist approach mainly focuses on declarative and procedural knowledge, and specializes in fragmenting the learning outcomes into smaller parts [46]. Student-teachers are invited to consider cases where the traditional model of teaching can be applied. For example, it may be useful when new ideas/concepts are to be introduced or if there is a tight time schedule during the lesson. However, they should be aware of the disadvantages of the model, as it is not aligned with the postmodern approach [47].

**The constructivist model of teaching.** This model is based on the premise that knowledge cannot be passively acquired; rather, learners should be active and their prior ideas and/or knowledge should be considered. Therefore, learning heavily relies on reconstructing and modifying pre-existing knowledge through social interaction when new tasks appear [48]. In this light, constructivist teachers may utilize teamwork approaches to allow pupils to discuss a problem. They do not interfere during this process [49], acting as facilitators [50]. Following the constructivist model, the phases of instructional design can be modified accordingly: (a) during the analysis process, the content is not fragmented and the interest is placed on pupils' prior knowledge regardless of whether it is correct or can be characterized as a misconception; (b) in the development process, the constructivist teacher aims at the creation of a student-centered learning environment with collaborative processes and the selection of contemporary strategies such as active and authentic learning. Finally, the evaluation of the teaching process focuses on thinking [51]. Student-teachers are presented with case studies which promote the application of the constructivist model, catering to pupils' academic performance as well as their socioemotional learning [52].

**The inquiry model of teaching.** In this model, pupils are familiarized with asking questions, examining, and investigating, promoting their critical ability [53]. They are supported to learn and utilize problem-solving in investigations related to scientific ideas, and teachers guide and support them in this process. Additionally, when pupils are taught with the inquiry model, they comprehend the way scientists produce contemporary scientific ideas, and tend to acquire relevant skills. Through this process, they become responsible for their learning, actively engage in activities, achieve greater knowledge internalization, and increase their motivation. It should be noted that there are variations

regarding the nature of inquiry: (a) structured inquiry (teachers provide pupils with the data they need to analyze); (b) guided inquiry (pupils are guided to collect their own data); and (c) open inquiry (pupils decide regarding the data they need and attempt to collect them). These variations are aligned with the procedural element of inquiry; however, inquiry does not necessarily start with well-formulated questions, but may initiate from simple interests or intuition [54]. Student-teachers are invited to reflect on cases where the inquiry model of teaching can be applied and to explicitly support their decisions with evidence while taking into consideration pupils' skills and readiness. In addition, they should consider the learning outcomes of the subject matter and realize that when adopting this model they may need to invest more time in the educational process in comparison to traditional methods [55].

**Organization of a lesson plan.** In this unit, student-teachers are acquainted with the components of a lesson plan, a term which refers to either the design of an upcoming lesson or the way the teaching process is generally organized. The importance of a lesson plan as an integral part of the educational process [56] lies in its components, as it includes teachers' activities such as questions, experiments, use of material, and means alongside pupils' actions such as discussion with classmates, answers to teachers' questions, and/or participation in experiments. Student-teachers are familiarized with organizing a lesson plan initiating from realizing pupils' needs and learning outcomes as well as the appropriate strategies to promote pupils' engagement and comprehension [57]. Student-teachers are supported in the direction of organizing a lesson plan through activities which promote reflection. For example, they are offered an incomplete lesson plan in terms of time or learning outcomes and are asked to spot the mistakes in it as well as to propose alternative ideas for its improvement. In this way, they are trained regarding CT skills such as systematicity and analyticity.

**Class management.** Learning outcomes can be accomplished when classrooms are effectively managed to facilitate teaching and learning to promote a non-threatening classroom environment. Student-teachers are required to obtain a set of skills in this direction [58]. In detail, they are trained to safeguard healthy relationships with their pupils as well as among them, cater to the selection of the appropriate strategies in order to facilitate pupils' learning, set rules, encourage pupils' motivation and development of social skills, and intervene when behavioral problems arise [59]. Further, they are acquainted with the ideal strategies to promote cooperation in classroom settings and to enable pupils to express their interests and focus on their needs [60] through differentiated instruction [61]. Here, CT skills and dispositions are promoted through student-teachers being led to decision-making while taking into consideration the different variables pertaining to the process. To this end, they are presented with scenarios including pupils' conflicts and asked to decide on the strategies they need to employ.

**Time management.** Time management in contemporary classrooms is an important skill, and student-teachers need to be familiarized with time management skills in order to improve their teaching and protect themselves from stress and a possible burnout. Additionally, research suggests that there may be correlations between teachers' management skills and their class performance, implying that teachers with restricted management skills may exhibit low performance [62]. Teachers commonly organize their lesson plans; however, various incidents such as pupils' conflicts may obstruct the teaching process, resulting in much time being invested in resolving problems instead of teaching. Nevertheless, the strict school schedule without flexibility is related to administrative needs, and teachers feel pressure to follow it while struggling with the ever-growing pedagogical needs that their pupils have [63]. Student-teachers are taught time management skills in order to juggle these challenging situations while being able to organize their lesson plans with flexibility. In this way, CT skills and dispositions such as self-regulation are promoted.

#### 2.4. Critical Thinking Skills and Dispositions

The courses aim at student-teachers' training for particular CT skills and dispositions according to the needs of the field of teacher education. To define the needs and decide on the particular CT skills and dispositions that should be targeted, a series of focus groups with in-service teachers participating in the Think4Jobs program were conducted [64]. Their ideas and understanding shed light on the preparation of the student-teachers' practicum; therefore, a memorandum of understanding between the HE and labor market was compiled with explicit reference to CT skills and dispositions [64].

The memorandum of understanding defined the CT skills, dispositions, and other CT-related components that are considered crucial for future teachers, namely, analysis, interpretation, evaluation, inference, explanation, self-regulation, inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, self-confidence, cognitive maturity, flexibility, reflection, and intellectual courage. Tables 1 and 2 present the specific learning outcomes that were defined for CT skills and dispositions.

**Table 1.** Critical Thinking skills [65] (p.15).

| CT Skill        | Importance in the Field of Teacher Education—Learning Outcomes                                                                                                                                                                                                                                                                 |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interpretation  | Student-teachers will be able to categorize the subject matter and/or the material that needs to be taught according to its significance, prioritizing their educational choices.                                                                                                                                              |
| Analysis        | Student-teachers will be able to analyze the advantages and disadvantages of the teaching models; thus, they will be led to the selection of the appropriate one according to the subject matter they have to teach as well as their pupils' needs and learning styles.                                                        |
| Evaluation      | Student-teachers will be able to evaluate their pupils needs during their practicum. Additionally, they will be in the position of assessing the official curriculum of each class and possibly adapt it to their pupils. They will also be able to evaluate their own lesson plans as well as those of their fellow students. |
| Inference       | Student-teachers will be able to conclude regarding their teaching choices during their practicum (i.e., desks organization in the classroom, selection of teaching strategies, rule setting).                                                                                                                                 |
| Explanation     | Student-teachers will be able to justify their choices with sound argumentation as well as to express their opinion regarding their fellow-students' lesson plans thoroughly.                                                                                                                                                  |
| Self-regulation | Student-teachers will be able to reflect, self-examine and self-correct themselves during their practicum. Additionally, they will be able to review their lesson plans after the end of their practicum.                                                                                                                      |

**Table 2.** Critical thinking dispositions [66] (pp. 347–348).

| CT Disposition  | Importance in the Field of Teacher Education—Learning Outcomes                                                                                                                                                                                                                              |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inquisitiveness | Student-teachers are expected to search for the appropriate material for their lesson plans. They should be able to design their activities so that they can be prepared for their practicum.                                                                                               |
| Systematicity   | Student-teachers are expected to be able to work systematically while designing as well as implementing their lesson plans during the practicum.                                                                                                                                            |
| Analyticity     | Student-teachers will be aware of the problems/difficulties and pitfalls that may arise during their practicum and are related to critical incidents and/or pupils' behavior in classroom settings. They will be able to consider all the elements available for organized problem-solving. |

Table 2. *Cont.*

| CT Disposition     | Importance in the Field of Teacher Education—Learning Outcomes                                                                                                                                                                                                                                                                                                                                         |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Truth-seeking      | Student-teachers are expected to ask questions to their mentors and the in-service teachers at school to improve their lesson plan or to be supported during a critical incident. This should be the case even if they get negative feedback for their actions/teaching choices.                                                                                                                       |
| Open-mindedness    | Student-teachers will be aware of their biases, such as confirmation bias [29] and strive to avoid them while designing and implementing their lesson plans. The same disposition should be emphasized during the reflection process with their fellow students and the process of receiving feedback offered by mentors and in-service teachers.                                                      |
| Self-confidence    | Student-teachers should feel confident in their teaching choices and their actions during the teaching process when these are aligned with the scientific knowledge deriving from the field of Pedagogy as well as Teaching Methodology. Being self-confident, they can deal with thorny situations commonly arising in school settings such as pupils' conflicts or disagreements with their parents. |
| Cognitive maturity | Student-teachers should be aware of the fact that despite their planning and design, there will be cases that their lesson plans are not effective as far as it concerns the learning outcomes. They should understand that their teaching choices are not to be based on dogmatic ideas but rather realize that there is a possibility of mistakes and need for reformation.                          |

### 2.5. Other Components Related to Critical Thinking

**Flexibility.** The term ‘flexibility’ applies in student-teachers’ practicum, taking into consideration that unexpected incidents may obstruct the teaching process and, oblige them to deviate from their lesson plan or reorganize it in real-time. Further, flexibility is needed regarding the way that the subject matter is approached. This element implies that teachers’ effectiveness lies in the selection of the appropriate teaching strategy/technique [67] according to theoretical background that they acquire from Higher Education. In a general framework, student-teachers are equipped with the flexibility skill to adjust to the social as well as the technological changes that schools undergo. These may refer to curriculum reformation, classrooms with pupils from multicultural backgrounds, or worldwide instability. Flexibility seems to stand as an invaluable tool that leads to innovative actions, while it can additionally be characterized as a ‘survival value’ for teachers [68]. Therefore, it is a CT component about which student-teachers should be informed and can be trained for while they are designing the learning outcomes of their lesson plans. It can be acquired through reflective practices during and at the end of the teaching practicum while they obtain feedback from their fellow students, the professor, or the mentors.

**Reflection.** Originating from Dewey’s theory [69] and extending to Schön’s reflection in and on action [70], reflective practice is identified as one of the most important elements of future teachers. Student-teachers should cultivate it, as they will be invited to reflect on their teaching practices and actions during the teaching process as a means of facilitating self-assessment and self-correction [71]. Reflection, as a higher-order skill, seems to define student-teachers’ profession [72], and it can be conducted in a cooperative framework similar to the one applied in the teaching practicum where fellow-students assess each other’s lesson plan. Therefore, a fruitful reflective discussion is organized in classroom settings, with mentors holding an assistive role. Student-teachers are acquainted with the process of collecting evidence and utilizing it to solve problems or make decisions during their practicum [73] by employing strategies of action research, acting as teachers and researchers at the same time [74]. Finally, reflection offers opportunities for development [75], which is an important factor contributing to their well-grounded preparation for the real working environment.

**Intellectual courage.** This component seems to relate to the disposition of truth-seeking, as an intellectually courageous person is willing to follow the evidence leading to truth even if this entails putting their own interests at stake [76]. In detail, certain ideas are robust and originate from reason even though they seem dangerous. On the other hand, personal beliefs cultivated by social norms may be considered false or problematic [77]. Intellectual courage should be activated when student-teachers decide to defy the ‘status quo’ dictated by society. In our case, student-teachers are invited to reflect on ill-structured problems arising from situations which are complicated or challenging (i.e., bullying incidents). In this way, they can be trained in intellectual courage and become aware of its importance.

### 3. Discussion and Conclusions

This paper describes the reformation of courses, including theoretical lectures and teaching practicum, in the context of the Erasmus+ Program Think4Jobs, aiming to combine both disciplinary skills and CT skills and dispositions in the direction of preparing student-teachers for their future career. Courses were reformed according to the direct infusion approach of CT teaching/training by combining three models of teaching, class, and time management skills as well as guidance on the design of lesson plans. All the components of the courses are explored through activities in the light of flexibility, reflection, and CT.

The course transformation can be characterized as a teaching intervention which is guided by principles which may be utilized to infuse CT in Higher Education in disciplines other than teacher education:

- (a) The course should be organized with explicit learning outcomes which include disciplinary skills and CT skills and dispositions. Therefore, particular attention should be paid to the course design as well as the teaching strategies that adopted to engage student-teachers in an active way. Emphasis should be placed on student-centered approaches in light of constructivism.
- (b) Activities designed for the course should particularly include goals referring to CT skills and dispositions alongside the subject matter.
- (c) Such kind of interventions need time [78,79] to bring about changes in skills and attitudes. Simultaneously, their continuation should be safeguarded for optimum results.
- (d) Practicum and authentic materials (i.e., real-life videos) should be utilized to ensure that thinking can be modeled and that student-teachers can be offered the opportunity to explore their potential in practice.
- (e) Student-teachers should practice reflective thinking and self-assessment over their teaching practicum in oral group discussion. Preferably, this process should not be assessed according to the course requirements, allowing them to be relaxed in a non-threatening environment.

Another important point is the role of student-teachers’ practicum in the direction of cultivating CT skills and dispositions. The teaching practicum can offer a ‘safe place’ for student-teachers to practice skills related to their profession and simultaneously develop their CT skills and dispositions. The reason for this is that they are invited to transfer their knowledge in a simulation of a working environment with real-life problems and complex decision making [10]. Additionally, considering that the teaching practicum stands as a threshold connecting Higher Education with the labor market, student-teachers’ professional development can be fostered [80] as they are empowered to apply CT skills and dispositions.

Reforming the course curriculum in light of CT skills and dispositions is considered a challenging task; however, it has proven beneficial for contemporary professionals, especially when combined with practice through a teaching practicum. The benefits of a reformation such as the one described in this paper lie in the meticulous organization of the course, taking into consideration in-service teachers’ ideas and the continuous practice of CT and reflection both on campus and during the teaching practicum. More specifically, the opportunity for non-judgmental discussion on campus seems to strengthen student-

teachers in acquiring subject matter while at the same time being trained for CT skills and dispositions. Finally, the teaching practicum plays a double role regarding CT. On the one hand, CT functions as a survival kit for student-teachers' performance during the practicum; on the other hand, multiple opportunities for its development are created. This condition can be supportive for student-teachers in their future careers, where they can be active agents successfully juggling the complex teaching process.

To conclude, the course reformation described in this paper can be potentially applied in Higher Education, as it can facilitate the learning outcomes of different scientific fields regarding the subject matter per se while fostering the cultivation of CT skills and dispositions; moreover, it specifically highlights the challenges to be met.

**Author Contributions:** Conceptualization, A.L. and T.G.; methodology, A.L. and T.G.; investigation, A.L. and T.G.; resources, A.L. and T.G.; writing—original draft preparation, A.L.; writing—review and editing, A.L. and T.G.; visualization, A.L. and T.G. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was supported by the “Critical Thinking for Successful Jobs—Think4Jobs” Project, with grant number 2020-1-EL01-KA203078797, funded by the European Commission/EACEA, through the ERASMUS + Programme. The European Commission support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Western Macedonia approved the study (Reg. No.: 21-2023/25-10-2022).

**Informed Consent Statement:** Informed consent was obtained from all participants involved in the study.

**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Lyu, M.; Li, W.; Xie, Y. The influences of family background and structural factors on children's academic performances: A cross-country comparative study. *Chin. J. Sociol.* **2019**, *5*, 173–192. [CrossRef]
2. Darling-Hammond, L.; Wise, A.E.; Klein, S.P. *A License to Teach. Building a Profession for 21st-Century Schools*; Routledge: New York, NY, USA, 1995.
3. Mohamed, Z.; Valcke, M.; De Wever, B. Are they ready to teach? Student teachers' readiness for the job with reference to teacher competence frameworks. *J. Educ. Teach.* **2017**, *43*, 151–170. [CrossRef]
4. Kim, S.; Raza, M.; Seidman, E. Improving 21st-century teaching skills: The key to effective 21st-century learners. *Res. Comp. Int. Educ.* **2019**, *14*, 99–117. [CrossRef]
5. Leaton Gray, S.; Scott, D.; Mehisto, P. *Curriculum Reform in the European Schools: Towards a 21st Century Vision*; Palgrave Macmillan: Cham, Switzerland, 2018. [CrossRef]
6. Bernhardt, P.E. 21st century learning: Professional development in practice. *Qual. Rep.* **2015**, *20*, 1–19. [CrossRef]
7. Jan, H. Teacher of 21st century: Characteristics and development. *Res. Humanit. Soc. Sci.* **2017**, *7*, 50–54.
8. Lorencová, H.; Jarošová, E.; Avgitidou, S.; Dimitriadou, C. Critical thinking practices in teacher education programmes: A systematic review. *Stud. High. Educ.* **2019**, *44*, 844–859. [CrossRef]
9. Botha, M.L.; Reddy, C.P.S. In-service teachers' perspectives of pre-service teachers' knowledge domains in science. *S. Afr. J. Educ.* **2011**, *31*, 257–274. [CrossRef]
10. Dumitru, D.; Christodoulou, P.; Lithoxoidou, A.; Georgiadou, T.; Pnevmatikos, D.; Drămnescu, A.M.; Enachescu, V.; Stăiculescu, C.; Lăcătuș, M.L.; Paduraru, M.E.; et al. *Think4Jobs Toolkit: Ten Work-Based Learning Scenarios*; University of Western Macedonia: Florina, Greece, 2021; ISBN 978-618-5613-01-3. Available online: <https://think4jobs.uowm.gr/results/intellectualoutput1> (accessed on 15 May 2023).
11. Bezanilla, M.J.; Galindo-Domínguez, H.; Campo, L.; Fernández-Nogueira, D.; Ruiz, M.P. Understanding critical thinking: A comparative analysis between university students' and teachers' conception. *Tuning J. High. Educ.* **2023**, *10*, 223–244. [CrossRef]
12. Davies, M. Introduction to the special issue on critical thinking in higher education. *High. Educ. Res. Dev.* **2011**, *30*, 255–260. [CrossRef]

13. Ennis, R.H. Critical Thinking Across the Curriculum: A Vision. *Topoi* **2018**, *37*, 165–184. [\[CrossRef\]](#)
14. Tiruneh, D.T.; De Cock, M.; Elen, J. Designing Learning Environments for Critical Thinking: Examining Effective Instructional Approaches. *Int. J. Sci. Math. Educ.* **2018**, *16*, 1065–1089. [\[CrossRef\]](#)
15. Bezanilla, M.J.; Galindo-Domínguez, H.; Poblete, M. Importance of Teaching Critical Thinking in Higher Education and Existing Difficulties According to Teacher's Views. *Multidiscip. J. Educ. Res.* **2021**, *11*, 20–48. [\[CrossRef\]](#)
16. Levin, M.; Peterson, L.T. A Sales Representative Is Made: An Innovative Sales Course. *Mark. Educ. Rev.* **2016**, *26*, 39–44. [\[CrossRef\]](#)
17. Caena, F.; Redecker, C. Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). *Eur. J. Educ.* **2019**, *54*, 356–369. [\[CrossRef\]](#)
18. Van Gelder, T. Teaching critical thinking: Some lessons from cognitive science. *Coll. Teach.* **2005**, *53*, 41–48. [\[CrossRef\]](#)
19. Abrami, P.C.; Bernard, R.M.; Borokhovski, E.; Waddington, D.I.; Wade, C.A.; Persson, T. Strategies for teaching students to think critically: A meta-analysis. *Rev. Educ. Res.* **2015**, *85*, 275–314. [\[CrossRef\]](#)
20. Ennis, R.H. Critical thinking and subject specificity: Clarification and needed research. *Educ. Res.* **1989**, *18*, 4–10. [\[CrossRef\]](#)
21. Tiruneh, D.T.; Verburch, A.; Elen, J. Effectiveness of critical thinking instruction in higher education: A systematic review of intervention studies. *High. Educ. Stud.* **2014**, *4*, 1–17. [\[CrossRef\]](#)
22. Heijltjes, A.; Van Gog, T.; Paas, F. Improving students' critical thinking: Empirical support for explicit instructions combined with practice. *Appl. Cogn. Psychol.* **2014**, *28*, 518–530. [\[CrossRef\]](#)
23. Abrami, P.C.; Bernard, R.M.; Borokhovski, E.; Wade, A.; Surkes, M.A.; Tamim, R.; Zhang, D. Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Rev. Educ. Res.* **2008**, *78*, 1102–1134. [\[CrossRef\]](#)
24. Bensley, D.A.; Spero, R.A. Improving critical thinking skills and metacognitive monitoring through direct infusion. *Think. Ski. Creat.* **2014**, *12*, 55–68. [\[CrossRef\]](#)
25. Brookfield, S. The concept of critical reflection: Promises and contradictions. *Eur. J. Soc. Work* **2009**, *12*, 293–304. [\[CrossRef\]](#)
26. Papanthymou, A.; Darra, M. Student Self-Assessment in Higher Education: The International Experience and The Greek Example. *World J. Educ.* **2018**, *8*, 130–146. [\[CrossRef\]](#)
27. Murphy, C.; Smith, G. The impact of a curriculum course on pre-service primary teachers' science content knowledge and attitudes towards teaching science. *Ir. Educ. Stud.* **2012**, *31*, 77–95. [\[CrossRef\]](#)
28. Bensley, D.A.; Crowe, D.S.; Bernhardt, P.; Buckner, C.; Allman, A.L. Teaching and assessing critical thinking skills for argument analysis in psychology. *Teach. Psychol.* **2010**, *37*, 91–96. [\[CrossRef\]](#)
29. Halpern, D.F.; Dunn, D.S. *Thought and Knowledge. An Introduction to Critical Thinking*, 6th ed.; Taylor & Francis: New York, NY, USA, 2023.
30. White, S.; Forgasz, R. The practicum: The place of experience? In *International Handbook of Teacher Education*; Loughran, J., Hamilton, M., Eds.; Springer: Singapore, 2016; pp. 231–266. [\[CrossRef\]](#)
31. Seibert, S.A. Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teach. Learn. Nurs.* **2021**, *16*, 85–88. [\[CrossRef\]](#) [\[PubMed\]](#)
32. Paul, R.; Elder, L. Critical thinking: The art of Socratic questioning, part III. *J. Dev. Educ.* **2008**, *31*, 34–35.
33. Love, A.G. The growth and current state of learning communities in higher education. *New Dir. Teach. Learn.* **2012**, *2012*, 5–18. [\[CrossRef\]](#)
34. Devi, A.P.; Musthafa, B.; Gustine, G.G.G. Using cooperative learning in teaching critical thinking in reading. *Engl. Rev. J. Engl. Educ.* **2015**, *4*, 1–14. [\[CrossRef\]](#)
35. Reed, S.K. The structure of ill-structured (and well-structured) problems revisited. *Educ. Psychol. Rev.* **2016**, *28*, 691–716. [\[CrossRef\]](#)
36. Dolapcioglu, S.; Doğanay, A. Development of critical thinking in mathematics classes via authentic learning: An action research. *Int. J. Math. Educ. Sci. Technol.* **2022**, *53*, 1363–1386. [\[CrossRef\]](#)
37. Beavers, E.; Orange, A.; Kirkwood, D. Fostering critical and reflective thinking in an authentic learning situation. *J. Early Child. Teach. Educ.* **2017**, *38*, 3–18. [\[CrossRef\]](#)
38. Girvan, C.; Conneely, C.; Tangney, B. Extending experiential learning in teacher professional development. *Teach. Teach. Educ.* **2016**, *58*, 129–139. [\[CrossRef\]](#)
39. Hamilton, J.G.; Klebba, J.M. Experiential learning: A course design process for critical thinking. *Am. J. Bus Educ.* **2011**, *4*, 1–12. [\[CrossRef\]](#)
40. Wright, G.B. Student-centered learning in higher education. *Int. J. Teach. Learn. High. Educ.* **2011**, *23*, 92–97.
41. Halawa, S.; Hsu, Y.; Zhang, W.; Kuo, Y.; Wu, J. Features and trends of teaching strategies for scientific practices from a review of 2008–2017 articles. *Int. J. Sci. Educ.* **2020**, *42*, 1183–1206. [\[CrossRef\]](#)
42. Bakır, S. The effect of microteaching on the teaching skills of pre-service science teachers. *J. Balt. Sci. Educ.* **2014**, *13*, 789–801. [\[CrossRef\]](#)
43. Ertmer, P.A.; Newby, T.J. Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Perform. Improv. Q.* **1993**, *6*, 50–72. [\[CrossRef\]](#)
44. Hackmann, D.G. Constructivism and Block Scheduling: Making the Connection. *Phi Delta Kappan* **2004**, *85*, 697–702. [\[CrossRef\]](#)
45. Kong, N.W.; Lai, K.S. ICT and constructivist strategies instruction for science and mathematics education. *J. Sci. Math. Educ. Southeast Asia* **2005**, *28*, 138–160.

46. Dohn, N.B.; Markauskaite, L.; Hachmann, R. Enhancing knowledge transfer. In *Handbook of Research in Educational Communications and Technology*, 5th ed.; Bishop, M.J., Boling, E., Elen, J., Svihla, V., Eds.; Springer: Cham, Switzerland, 2020; pp. 73–96. [\[CrossRef\]](#)
47. Wilson, B.G. The postmodern paradigm. In *Instructional Development Paradigms*; Dills, C., Romoszowski, A., Eds.; Educational Technology Publications: Englewood Cliffs, NJ, USA, 1997; pp. 297–309.
48. Qarareh, A.O. The Effect of Using the Constructivist Learning Model in Teaching Science on the Achievement and Scientific Thinking of 8th Grade Students. *Int. Educ. Stud.* **2016**, *9*, 178–196. [\[CrossRef\]](#)
49. Von Glasersfeld, E. Cognition, construction of knowledge, and teaching. *Synthese* **1989**, *80*, 121–140. [\[CrossRef\]](#)
50. Bada, S.O.; Olusegun, S. Constructivism learning theory: A paradigm for teaching and learning. *J. Res. Method Educ.* **2015**, *5*, 66–70.
51. Karagiorgi, Y.; Symeou, L. Translating constructivism into instructional design: Potential and limitations. *J. Educ. Tech. Soc.* **2005**, *8*, 17–27.
52. Yadav, R. Role of constructivism in learning. *Int. J. Educ. Stu.* **2016**, *3*, 93–96.
53. Andrini, V.S. The Effectiveness of Inquiry Learning Method to Enhance Students' Learning Outcome: A Theoretical and Empirical Review. *J. Educ. Pract.* **2016**, *7*, 38–42.
54. Bevins, S.; Price, G. Reconceptualising inquiry in science education. *Int. J. Sci. Educ.* **2016**, *38*, 17–29. [\[CrossRef\]](#)
55. McBride, J.W.; Bhatti, M.I.; Hannan, M.A.; Feinberg, M. Using an inquiry approach to teach science to secondary school science teachers. *Phys. Educ.* **2004**, *39*, 434. [\[CrossRef\]](#)
56. Uhrmacher, P.B.; Conrad, B.M.; Moroye, C.M. Finding the balance between process and product through perceptual lesson planning. *Teach. Coll. Rec.* **2013**, *115*, 1–27. [\[CrossRef\]](#)
57. Maryani, I.; Martaningsih, S.T.; Bhakti, C.P. Module based on pedagogical content knowledge to increase the engagement and skills of the future teachers in designing a lesson plan. *J. Educ. Learn.* **2017**, *11*, 91–102. [\[CrossRef\]](#)
58. Korpershoek, H.; Harms, T.; de Boer, H.; van Kuijk, M.; Doolaard, S. A meta-analysis of the effects of classroom management strategies and classroom management programs on students' academic, behavioral, emotional, and motivational outcomes. *Rev. Educ. Res.* **2016**, *86*, 643–680. [\[CrossRef\]](#)
59. Evertson, C.M.; Weinstein, C.S. (Eds.) *Handbook of Classroom Management: Research, Practice, and Contemporary Issues*; Lawrence Erlbaum: Mahwah, NJ, USA, 2006.
60. Marzano, R.J.; Marzano, J.S. The key to classroom management. *Educ. Leadersh.* **2003**, *61*, 6–13.
61. Santangelo, T.; Tomlinson, C.A. Teacher educators' perceptions and use of differentiated instruction practices: An exploratory investigation. *Action Teach. Educ.* **2012**, *34*, 309–327. [\[CrossRef\]](#)
62. Khan, H.M.A.; Farooqi, M.T.K.; Khalil, A.; Faisal, I. Exploring Relationship of Time Management with Teachers' Performance. *Bull. Educ. Res.* **2016**, *38*, 249–263.
63. Watts, G.D.; Castle, S. The time dilemma in school restructuring. In Proceedings of the Annual Meeting of the American Educational Research Association, San Francisco, CA, USA, 20–24 April 1992.
64. Pnevmatikos, D.; Christodoulou, P.; Georgiadou, T.; Lithoxidou, A.; Dimitriadou, C.; Payan Carreira, R.; Simões, M.; Ferreira, D.; Rebelo, H.; Sebastião, L.; et al. *THINK4JOBS TRAINING: Critical Thinking Training Packages for Higher Education Instructors and Labour Market Tutors*; University of Western Macedonia: Florina, Greece, 2021; ISBN 978-618-5613-02-0. Available online: <https://think4jobs.uowm.gr/results/intellectualoutput2> (accessed on 15 May 2023).
65. Facione, P.A. Critical Thinking: A statement of expert consensus for purposes of educational assessment and instruction. In *Research Findings and Recommendations*; American Philosophical Association: Newark, DE, USA, 1990.
66. Facione, N.C.; Facione, P.A.; Sánchez (Giancarlo), C.A. Critical thinking disposition as a measure of competent clinical judgment: The development of the California Critical thinking Disposition Inventory. *J. Nurs. Educ.* **1994**, *33*, 345–350. [\[CrossRef\]](#) [\[PubMed\]](#)
67. Zahorik, J.A. Stability and flexibility in teaching. *Teach. Teach. Educ.* **1990**, *6*, 69–80. [\[CrossRef\]](#)
68. Rosenblatt, Z. Skill flexibility and school change: A multi-national study. *J. Educ. Chang.* **2004**, *5*, 1–30. [\[CrossRef\]](#)
69. Dewey, J. *How We Think: A Restatement of the Relations of Reflective Thinking to the Educative Process*; D.C. Heath & Co Publishers: Boston, MA, USA, 1933.
70. Schon, D.A. *Educating the Reflective Practitioner: Towards a New Design for Teaching and Learning in the Profession*; Jossey-Bass: San Francisco, CA, USA, 1987.
71. Yan, Z.; Brown, G.T. A cyclical self-assessment process: Towards a model of how students engage in self-assessment. *Assess. Eval. High. Educ.* **2017**, *42*, 1247–1262. [\[CrossRef\]](#)
72. Pnevmatikos, D.; Christodoulou, P.; Georgiadou, T.; Lithoxidou, A. Undergraduate Students' Conceptualization of Critical Thinking and Their Ideas for Critical Thinking Acquisition. *Educ. Sci.* **2023**, *13*, 416. [\[CrossRef\]](#)
73. Farrell, T.S. Reflecting on Reflective Practice:(Re) Visiting Dewey and Schon. *Tesol J.* **2012**, *3*, 7–16. [\[CrossRef\]](#)
74. Nolen, A.L.; Putten, J.V. Action research in education: Addressing gaps in ethical principles and practices. *Educ. Res.* **2007**, *36*, 401–407. [\[CrossRef\]](#)
75. Smith, E. Teaching critical reflection. *Teach. High. Educ.* **2011**, *16*, 211–223. [\[CrossRef\]](#)
76. Baehr, J. Educating for Intellectual Virtues: From Theory to Practice. *J. Philos. Educ.* **2013**, *47*, 248–262. [\[CrossRef\]](#)
77. Paul, R. Critical thinking, moral integrity, and citizenship: Teaching for the intellectual virtues. In *The Social Worlds of Higher Education. Handbook for Teaching in a New Century*; Pescosolido, B., Aminzade, R., Eds.; Sage Publications: Thousand Oaks, CA, USA, 1999.

- 
78. Rivas, S.F.; Saiz, C. Evaluation of the effectiveness of the ARDESOS-DIAPROVE critical thinking training programme. *Think. Ski. Creat.* **2023**, *48*, 101306. [[CrossRef](#)]
  79. Payan Carreira, R.; Rebelo, H.; Sebastião, L.; Sacau, A.; Ferreira, D.; Simões, M.; Pnevmatikos, D.; Christodoulou, P.; Lithoxoidou, A.; Georgiadou, T.; et al. *THINK4JOBS Guidelines: A Protocol for Critical Thinking Transfer from Curricula to Labour Market*; University of Western Macedonia: Florina, Greece, 2023; ISBN 978-618-5613-11-2. Available online: <https://think4jobs.uowm.gr/results/intellectualoutput4> (accessed on 15 May 2023).
  80. Elder, L. Critical thinking as the key to the learning college: A professional development model. *New Dir. Community Coll.* **2005**, *130*, 39–48. [[CrossRef](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.