ORIGINAL RESEARCH

Critical Thinking in Science: The Erasmus+ Project "Teaching Critical Thinking in Science through Nanolearning and Virtual Exchange Principles—NANO-THINK"

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Received on: 31 May 2024; *Accepted on:* 25 June 2024; *Published on:* 17 July 2024

Abstract

This paper aims to introduce the project NANO-THINK, "Teaching Critical Thinking in Science through Nanolearning and Virtual Exchange Principles," cofinanced by the European Union under the Erasmus+ program. This project started in February 2024 and is implemented by eight institutions from five countries. Its main goal is the development and implementation of a virtual exchange program on critical thinking using principles of nanolearning. In this sense, this paper aims to briefly introduce the concept of critical thinking as a goal of education, and nanolearning and virtual exchange as tools and approaches that will be utilized to implement the developed program.

Keywords: Critical thinking, Erasmus+, Nanolearning, NANO-THINK, Virtual exchange.

Science, Art and Religion (2024): 10.5005/jp-journals-11005-0082

Introduction

Critical thinking is often highlighted as one of the most important goals for 21st-century education. It is recognized to offer a range of benefits for the personal development of individuals and societies, which face significant and fast-paced changes and have a growing need for citizens and employees who are well-versed in observing, analyzing, evaluating, forming judgments, and making sound decisions.[1]

Even though the need to incorporate critical thinking skills in the learning outcomes is recognized in university strategies across different contexts and countries,[2] there are still widespread challenges in implementing it successfully in higher education curricula. Students finishing tertiary education, moreover, do not necessarily enter the market or research as skilled critical thinkers, which implies that tertiary education, including education in science, does not necessarily improve their critical thinking skills.[2,3] While the European Union recognized the relevance of critical thinking as one of the educational key competences, as evident in the European Commission Key Competences for Lifelong Learning,[4] Skills Agenda for Europe,[5] and focus on financing projects focusing on analyzing and developing this skills[a] (e.g., under ERASUMS+ and European Social Fund), the non-European Union countries still struggle in implementation of critical thinking in their educational curricula. Croatia has made some progress in the area by focusing on the implementation of critical thinking in education at all levels,[6–8] also requires a focused and clearly designed curriculum for critical thinking, with targeted training for key stakeholders, including teachers and scientists.

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How to cite this article: Crnko T, Pavelić SK. Critical Thinking in Science: The Erasmus+ Project "Teaching Critical Thinking in Science through Nanolearning and Virtual Exchange Principles—NANO-THINK". Sci Arts Relig 2024;3(3–4):98–104.

Source of support: Nil

Conflict of interest: Dr Sandra Kraljević Pavelić is associated as the Editorial Board Member of this journal and this manuscript was subjected to this journal's standard review procedures, with this peer review handled independently of this Editorial Board Member and her research group.

[a]*One example of recently implemented projects for critical thinking is CRITHINKEDU, also financed by ERASMUS+, url: https://crithinkedu.utad.pt/en/crithinkedu/. This project comprehensively dealt with critical thinking in higher education within the European Union.*

Project "Teaching Critical Thinking in Science Through Nanolearning and Virtual Exchange Principles," NANO-THINK, aims to fill this gap by creating and implementing a program based on the principles of virtual exchange and nanolearning to foster the development of critical thinking skills in scientific education. It recognizes the need to encourage rigor, objectivity, and accuracy, but also open-mindedness and consideration of the societal impact of scientific inquiry. One of the main results of the project is, therefore, to incorporate critical thinking learning outcomes in a virtual exchange program designed for participating countries, using innovative teaching methods like nanolearning.

However, apart from the challenges of designing a comprehensive curriculum that successfully incorporates principles of virtual exchange and nanolearning in science, the incorporation of critical thinking skills in teaching science presents challenges of its own. While repeatedly highlighted as one of the most important learning outcomes, especially in higher education, critical thinking is still one of the most overdefined and vague concepts in education.[9] Ennis[10] identifies >15 definitions of critical thinking, both from the dictionary to scholarship. Published data by Penkauskienė et al.[11] for example, shows that critical thinking is perceived as—(1) the capacity to avoid mistakes and make the right decisions; (2) the capacity to correct and regulate oneself; and (3) a social responsibility." The authors also conclude that participants in the research often have only general ideas on the critical thinking concept, even though this skill directly correlates with professional success and personal development. This poses a specific challenge in distilling what this concept may mean for the specific purpose of integrating it into the learning outcomes of tertiary scientific education in the project area. The aim of this paper is to give an overview of the project and the principles of virtual exchange and nanolearning tools that are planned to be incorporated into its outcomes. In addition, this short presentation paper aims to provide a preliminary introduction to the concept of critical thinking, which will further be developed and implemented in the curriculum designed during the project.

Overview of the ERASMUS-EDU-2023-VIRT-EXCH "Teaching Critical Thinking in Science through Nanolearning and Virtual Exchange Principles: NANO-THINK" Project

The project "Teaching Critical Thinking in Science Through Nanolearning and Virtual Exchange Principles" (NANO-THINK) is financed by the European Union under the Erasmus+ virtual exchange initiative. This initiative kick-started in 2018, aiming to expand Erasmus+ by introducing virtual exchange principles and blended mobility, combining physical mobility with virtual collaboration.[12] Project NANO-THINK is implemented under the special call for proposals—Virtual Exchanges in Higher Education and Youth, ERASMUS-EDU-2023-VIRT-EXCH, opened from 1st December 2022 to 26th April 2023. The general objectives of this call were to encourage dialog with third countries and increase tolerance by using online people-to-people interactions, to promote different types of virtual exchanges as a supplement to the physical mobility of students, to enhance critical thinking and media literacy, and to foster the digital skills and soft skills which are recognized as key competences in the Council Recommendation on Key Competences for Lifelong Learning,[4] and to promote common European values, like nondiscrimination, freedom, and tolerance.[b] This call encourages a bottom-up approach in designing virtual exchange in higher education, which means that the subjects of the offered courses can be designed freely, but they are to fit the objectives of the call. In this sense, project NANO-THINK focuses on enhancing critical thinking skills in tertiary education, as one of the most important skills recognized in Council Recommendations on Key Competences for Lifelong Learning. One of the goals of the project is, therefore, to develop a virtual exchange program titled "Critical Thinking in Science," which will offer critical thinking training for students from participating universities, including training of the academic staff who will be engaged in its implementation. This program will be implemented in the higher education institutions, which are beneficiaries of the program, namely—the University of Rijeka (Faculty of Health Studies) in Rijeka, Croatia; International Burch University in Sarajevo, Bosnia and Herzegovina; University of Belgrade (Electrical Engineering Institute Nikola Tesla) in Serbia; University of Donja Gorica (Faculty of International Economics, Finance, and Business) in Podgorica, Montenegro, and Medical University of Graz in Austria.

This program will include an innovative education technique called nanolearning, which includes very short interactive lectures, video material, infographics, and other materials that aim to break complex lessons into smaller bits. It will be combined with traditional teaching materials and methods, but also a collaborative approach and online group work. This program, therefore, aims to engage students and improve their critical thinking, creativity, and cross-cultural collaboration.

The curriculum for this program will be developed collaboratively, taking into account the specific circumstances and rules of each participating higher education institution partner country, with the longer-term intention of European Credit Transfer and Accumulation System (ECTS) accreditation. Apart from the creation of the program, the project aims to implement it in the participating institutions, which will require the development and implementation of training for teaching staff as well. This program will be implemented on the platform specifically designed for this purpose and will target >2,000 students and >50 staff members. The content designed for the platform, including nanolearning material, will, however, be available online for other universities that do not participate in the project, which leads to the transfer of knowledge and experience from the project to a wider population.

[b] *More details on the closed call can be found at the European Commission, European Union Funding and Tenders portal: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/erasmus-edu-2023-virt-exch (last accessed 21/5/2024).*

Project NANO-THINK, therefore, fits into the purpose of the call, which aims at the promotion of European values, intercultural dialog, and fostering soft skills in the student population.

This program, "Critical Thinking in Science," as one of the main project results, will be developed and implemented during the 36 months, from February 2024 to February 2027, during which project activities are cofinanced. The project is implemented under the lump sum grant scheme, with a total budget of €391,433.00 and a maximum European Union contribution of €371,861.00.

Partnership Consortium, Work Packages, and Project Activities

The Partnership Consortium consists of eight institutions from five countries, namely Croatia, Serbia, Bosnia and Herzegovina, Montenegro, and Austria. The Faculty of Health Studies, University of Rijeka, from Croatia, is the coordinating organization in the project, with the main responsibility of overseeing project implementation, assuring the quality of project results, and securing timely and proper project management. Other organizations, with the role of project partners, are tasked with implementing and overseeing those activities and work packages which best align with the professional expertise and experience of their project teams. This way, the project is designed to best ensure the exchange of knowledge, quality of project outputs, and the most efficient scientific and educational input.

The main role of the coordinating institution in the project, apart from project management and quality assurance, is to participate in designing the curriculum for critical thinking in science and providing support, together with the Medical University of Graz and the International Academy of Sciences and Arts in Bosnia and Herzegovina, to the non-European Union participating institutions in implementing it. This way, cooperation and transfer of knowledge are enabled between educational institutions from the EU, which are integrated into the European Higher Education Area, and non-European Union countries, which still face significant challenges in following and implementing educational principles and strategic measures highlighted by the European Union.

Partnerships on the project consist of institutions with different areas of scientific and professional expertise, which will be utilized for the benefit of the project outcomes.

The Faculty of Health Studies, University of Rijeka, Croatia, has strong expertise in the fields of nursing, public health, and basic medical sciences, with a continuous dedication to promoting education quality and integrating social awareness into their educational programs. Therefore, it will facilitate the implementation of the project and offer professional support in the development of the program.

The University of Donja Gorica, Montenegro, is a research-entrepreneurial university with significant experience in the implementation of projects cofinanced under a variety of EU-funded programs. Its main role in the project is to work on the development and implementation of the critical thinking program, especially related to the area of business, to provide its students with skills necessary for entrepreneurship and business.

International Burch University, Bosnia and Herzegovina, owned by Stirling Education, is also an entrepreneurial university, which incorporates strong digital elements in its curriculum and fosters innovation and an entrepreneurial mindset, incorporating soft skills in its programs. Its main role in the project is the development and implementation of the critical thinking program in the area of bioengineering.

The University of Belgrade, Serbia, is one of the largest universities in the region and will serve as a basis for the enrollment of students in the nanolearning course. Its role is to assist in creating and implementing the program, especially in the area of engineering, and in organizing collaborative events and debates.

The Medical University of Graz, Austria, has extensive experience in a range of areas within medical sciences, including research on metabolic and cardiovascular diseases, cancer, inflammation, stem cells, neurodegeneration, as well as aging and geriatrics, in which several EU-funded projects are being implemented. Its role in the project is to develop and implement the course within this area and to support other non-European Union countries in implementing it.

Verlab Research Institute is a private research institute in Bosnia and Herzegovina, operating in the fields of biomedical engineering, medical devices, and artificial intelligence. Its main role in the project is the development of the platform and implementation of the training for staff of the university to prepare them for participating in the courses. Verlab is also tasked with coordinating all dissemination activities of the project.

The International Academy of Sciences and Arts is an association registered in Bosnia and Herzegovina, consisting of >80 associates, researchers, and experts from academia, health policy, and healthcare professional associations. It is an independent research organization on a state level, and its role in the project is to supervise and advise during the process of forming and implementing the curriculum in critical thinking.

B Solutions d.o.o. is a company from Montenegro, with its core business related to engineering and the education of students and young professionals in the fields of engineering and business. Its role is to offer their expertise in the development of the program and training of the staff.

This partnership and construction of the consortium stem from natural connections between Southeast European countries and institutions involved in this project, which share cultural heritage, language similarities, and particularly historically similar educational programs and concepts. It is expected that synergies stemming from such a shared pool of knowledge and experience will provide synergies for innovative and advanced critical thinking curricula.

Project Activities, Results, and Work Packages

Project activities are divided into five work packages.

WP1 preparation focuses on the analysis of the existing implementation of critical thinking in participating countries, with a focus on the requirements and areas of improvement in cultivating critical thinking skills. One of the main activities in this work package is the preparation of an extensive analysis of critical thinking curricula in participating countries. This WP is primarily coordinated by the Faculty of Health Studies and Verlab Institute.

WP2 Development—Training Modules and Program "Critical Thinking in Science" aims to develop the curriculum for the program "Critical Thinking in Science," including the development of teaching material for the online platform, teaching methodology, and related training for the academic staff of participating countries. The teaching material for this program will incorporate short lessons, created using principles of nanolearning and virtual exchange. In this sense, the program will include lessons from science, technology, engineering, and mathematics (STEM) to humanities, focusing on critical thinking skills, communication skills, problem-solving, and analytical skills. Including all the steps in the scientific process, case studies, data analysis, critical reading, scientific projects, and debates, this program will encourage students to question assumptions, evaluate evidence critically, and consider alternative explanations. This program will also be prepared for accreditation.

WP3 Implementation—Pilot Implementation of Developed Curriculum focuses on implementing the program "Critical Thinking in Science" using the online platform developed for this purpose and utilizing a combination of material developed using nanolearning principles and traditional teaching material. Activities in this WP also include the implementation of the training programs for academic staff (total 50–60) on the implementation of different online/blended teaching methods and tools, which will be organized in Podgorica and Belgrade. The program is planned to be implemented for 2,000 students in the last year of the project.

WP4 Quality Plan—Quality Control and Management is a horizontal WP, comprising activities of project management and quality assurance. This WP is coordinated by the Faculty of Health Studies, Rijeka, and consists of establishing project management structure, designing procedures of quality assurance and management, and offering tools, like manuals and plans, for sound project management and quality assurance. Activities in this WP also comprise regular project staff meetings, reporting, and external revision of the project. To secure the quality implementation of the program in non-European Union countries, this work package includes activities of internal quality control primarily focused on the implementation of the program "Critical Thinking in Science" and training for the staff.

WP5 Dissemination, Exploitation, and Sustainability focuses on communicating and disseminating the outcomes of the project to relevant stakeholders. This WP includes designing the project's visual identity, development of the communication and exploitation plans, production and dissemination of project materials like brochures or infographics, and organization of events.

Virtual Exchange and Nanolearning in the NANO-THINK Project

The European Union recognized the need to innovate teaching methods as one way of addressing the social, economic, and educational challenges and transformations. The virtual environment has become a site of implementation of novel approaches in education, with virtual exchange programs gaining significant popularity, as is evident by the focus of the European Union to finance programs that utilize it, and also its strategic focus on digitalization and building digital skills, as evident in the Digital Education Action Plan 2021–2027.

Virtual exchange programs are designed in an online environment where guided virtual collaboration between learning peers from different contexts and countries is made possible by the implementation of technology. This transcultural collaboration, occurring in different modes (i.e., educator-led, collaborative forms, or as predesigned programs), allows fostering collaboration and the transfer of knowledge, with positive development of various "soft" skills like communication skills, intrapersonal skills, digital literacy, intercultural skills, and social skills, as well as critical skills relevant for employability in the 21st century.[12] A number of studies have shown that virtual exchange has a positive impact on education, improving different skills such as collaboration, and cross-cultural communication, as well as general motivation and satisfaction for students.[12] It is also, by utilizing technology and the internet, a means to access different education opportunities in transnational and transcultural contexts more easily, fostering a range of benefits for students who do not engage in physical mobility or as its supplement.[13] The online environment is, moreover, an appropriate site for the implementation of innovative teaching methods like gamification, project-based learning, collaborative learning, micro- and nanolearning, and other innovative approaches in education, which Project NANO-THINK recognizes in its effort to incorporate nanolearning principles in the design of curricula for critical thinking.

Nanolearning is an innovative teaching method that aims to provide short and well-structured lessons and learning elements that give basic information about specific topics.[14] Lessons designed using nanolearning principles diverge significantly from traditional, teacher-centered learning processes, where lessons containing large amounts of information are delivered to students by a teacher or educator, generally in a one-size-fits-all format. The main idea behind nanolearning is to break the content into smaller bits and steps, using technology, which is often more accessible to students. Nanolearning lessons are generally designed to cover basic information on some topic and concept by using digital technologies and various short materials (such as short videos, games, quizzes, infographics, short articles, etc.) which are tailored to engage learners that are more attuned to the fast-paced short bits of information.[15] Nanolearning material

may be well combined with more traditional teaching material and approach, allowing students to access various materials that break complex lessons into smaller, more comprehensible steps. Since this material may be designed using different digital tools, offering content combining video material, sounds, graphic materials, etc., it is more applicable to different learning styles of students. It is, therefore, highlighted as allowing a more personalized approach to education and being more effective in knowledge retention.[16] Nanolearning is also generally well-suited for online (or hybrid) learning environments and fits well into blended learning or virtual exchange approaches, which offer students some flexibility in accessing learning materials and the pace of learning.

The combination of virtual exchange, which utilizes online learning and virtual collaboration, with nanothinking principles, which incorporate innovation in learning materials and approaches, promises to actively engage students in the learning process and foster a wide range of soft skills, including collaboration, creativity, social skills, communication skills, and critical thinking.

Such an approach finds its relevance particularly in the growing need for personalized education and the demand for a flexible time schedule for learners. It is expected to boost both long-term memories as significant will-effort occurs during the learning process, but also train critical thinking skills through enhanced engagement.

Critical Thinking in Education: Exploration of the Concept

Critical thinking is often defined as reflective and reasonable thinking that is focused on deciding what to believe or do; this definition was proposed by Ennis,[17] one of the most prominent researchers of critical thinking in education, Ennis conceptualized critical thinking as careful, goal-directed thinking.[18]

Based on the Delphi study group sponsored by the American Philosophical Association, critical thinking, for the purpose of educational assessment and instruction, is understood to be:

"...purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations on which judgment is based... The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of the inquiry permit."[19]

The term "critical thinking," in relation to education, was first introduced by the philosopher John Dewey as early as 1910. Dewey often referred to it as reflective thinking and identified it as a scientific attitude of mind.[18] It was highlighted as an educational goal which should help foster curiosity, imagination, and an experimental and scientific attitude in learners. Experimental implementation of critical thinking in education in the United States began as early as 1930, aiming to implement teaching methods that highlighted problem-solving and a scientific approach to problems,[18] which are methods recognized and highlighted in contemporary efforts to implement student-centered education at all levels of education.

This concept sustained significant development from the first definition introduced by Dewey. In its first wave of applications, it mostly referred to a philosophical conception of thinking rigorously and analytically and entailed the introduction of formal and informal logic into the curricula.[20] Later, especially in the 1980s, which are also the years in which critical thinking gained prominence, it was expanded to include other elements like creativity, imagination, emotions, together with a wider sociocritical stance and domain-specific knowledge.[2] Critical thinking, in this sense, became more than having the ability and skills to think rationally and logically. It began to refer to engaging critically with the world,[2] which expanded the education for critical thinking from logic to the introduction of critical pedagogies.

Expanding on the logical core of critical thinking, which is key in the philosophical understanding of the term and rests on argumentation skills and logic, reveals that the concept of critical thinking cannot exclusively refer to thinking itself. It is standardly taken that critical thinking includes, apart from the ability to think critically, dispositions and attitudes to do so.[17,18] It also requires knowledge from the domain in which it seeks to be implemented. For the purposes of implementation in the context of higher education in science, therefore, all these dimensions should be taken into account.

Skills, Dispositions, and Knowledge

To be a critical thinker, as highlighted, one needs both skills and dispositions. In other words, cultivated skills in reasoning or argumentation are insufficient for engaging in critical thinking when needed or appropriate. Willingness to do so becomes necessary. For example, a student who is equipped with skills in rational thinking, argumentation, or logic, unless motivated or willing to, will not engage with the task or problem presented to him as a critical thinker. This means that incorporating critical thinking in education must not exclusively work with skills but also dispositions to engage them. To be able to do so, some clarity on these categories must be achieved. Following Ennis,[17] critical thinking may be conceptualized as including the following list of abilities and dispositions[c].

Critical thinking abilities include[17] the ability to have a focus and pursue it; ability to analyze arguments; the ability

[c]*It is worth highlighting that the list indicated above consists only of a selection of skills or abilities for critical thinking. Many other authors list other skills as relevant depending on their underlying conception of critical thinking.*[18]

to ask and answer clarification questions; the ability to understand and use math and graphical content; the ability to judge the credibility of the source of information and observation reports; ability to use and apply background knowledge and conclusions to a present situation; ability to use and judge deduction; ability to use and judge induction and inference to the best explanation; ability to form and evaluate judgments; ability to define terms and evaluate definitions; ability to recognize equivocation (or use of the term in multiple senses); ability to attribute and judge unstated assumptions; ability to think suppositionally and hypothetically; ability to deal with fallacious reasoning. Additionally, abilities to be aware of and evaluate one's own thinking, to be organized, and to deal with rhetorical strategies.

Observing the list proposed by Ennis reveals that the core of critical thinking abilities is tightly connected to both formal and informal logic and argumentation. For some, this implies that education for critical thinking mostly requires building the skills in argumentation,[21] or informal logic. However, generally, a much wider skill set is connected to critical thinking, especially in education. Core critical thinking skills derived from the APA Delphi study mentioned above are interpretation skills, analysis, inference, evaluation, explanation, and self-regulation.[9] Imaginative, experimenting, questioning, and emotional abilities are also often stressed as integral to critical thinking,[18] and skills like problem solving, information gathering, evaluation and interpretation of data, as well as the ability to recognize unstated assumptions or values, are also tightly connected to critical thinking.[9] This implies that the implementation of education for critical thinking at all levels of education is a complex process.

Taking into consideration dispositions also reveals that the task of education needs to expand into a much wider area than the philosophical core provides for it to be able to cultivate willingness to engage in critical thinking and dispositions to do so.

Ideal critical thinkers should, in this sense, be disposed to,[17] try to be well-informed; seek and offer clear statements, questions, and reasons; use credible sources and mention them regularly; take into account the context of the situation focusing on the basic concern in it; be alert for alternatives; be open-minded by considering different points of view and by withholding judgment when evidence is insufficient; adopt and change position depending on the evidence; be as precise as the situation requires; try to get it right depending on the context and feasibility; and finally, be willing to use one's critical thinking abilities.

Dispositions to thinking critically, more broadly defined as attitudes or habits of mind,[18] are also often considered intellectual virtues.[22] In this sense, critical thinking is often related to being attentive, having intellectual courage, being open-minded, having the habit or love for inquiry, being confident in one's abilities to think critically, and other virtues tightly related to dispositions identified above.

This means, in essence, that apart from skills, education should work on the way these may be fostered in the students, starting from primary education to education at the university level.

Finally, being able to think critically, especially in relation to domain-specific issues, dispositions, and abilities may not suffice. Approaching a subject matter in social sciences critically will generally require some knowledge related to important concepts within the specific subfield or domain of inquiry. This seems to be especially pertinent for tertiary level education, where critical thinking and domain-related knowledge should meet if universities aim to create scientists or employees capable of thinking critically in their own domains of expertise. Seeing critical thinking as domain-specific is, however, contrasted with an approach that highlights the generality of critical thinking, which can be taught separately and applied across different contexts.[9]

There is still, therefore, a lack of consensus on the way critical thinking should be implemented in tertiary education.[17] Critical thinking learning outcomes may be incorporated into the existing courses that deal with specific subject matters and domain-specific content. It may be taught as a separate course, and it may also be incorporated into the curriculum combining these two approaches.[23,24]

Conclusion: Toward Implementing Critical Thinking within NANO-THINK Project

Project NANO-THINK, cofinanced by the European Union under Erasmus+, is mainly focused on the development and implementation of the critical thinking virtual exchange program titled "Critical Thinking in Science." The core idea of the project is to offer a course on critical thinking to students of participating countries (and beyond), utilizing the principles of virtual exchange. This allows the participation and collaboration of students from different universities and countries, using innovative teaching methods that aid in fostering soft skills increasingly sought in the labor market.

The program "Critical Thinking in Science" will, in this sense, be designed to foster critical thinking skills for students participating in the course by using innovative teaching methods, namely nanolearning. Nanolearning seeks to present complex content in interactive and short learning material. The program will be designed to allow implementation in different contexts, taking into consideration different state-level rules and guidelines (of participating countries), and different fields of education and areas of expertise, ranging from the area of business to medical sciences and bioengineering (which are taught in the participating higher education institutions). This means that at least part of the program for critical thinking will include the general core of critical thinking, which will incorporate lessons on formal and informal logic and argumentation.

However, this core will be expanded by introducing critical thinking learning outcomes across domain-specific subjects, in which participating students will apply their critical thinking skills. This program will, therefore, aim to include a variety of domain-specific cases and examples on which these skills can be developed. This includes all steps of the scientific method (observation, hypothesis formation, experimentation, data analysis, and conclusion), but also different case studies, critical reading, scientific projects, and debates, on which critical thinking skills can be built and upgraded.

This program will aim to offer students resources and tools using modern and innovative teaching methods, with the hope that it will aid in creating critical consumers of information. Students will be prone to questioning assumptions, evaluating evidence, being rigorous, analytical, and attentive to fallacious reasoning. Moreover, they will be encouraged to be more open-minded to alternatives and more flexible. Most importantly, the aim of this project and "Critical Thinking in Science" as its main result is to encourage students to become critical thinkers in their everyday and professional lives.

Acknowledgments

We greatly acknowledge the European Commission for granting the project "Teaching Critical Thinking in Science through Nanolearning and Virtual Exchange Principles, NANO-THINK" within the ERASMUS-EDU-2023-VIRT-EXCH programme.

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