Research methodological approach of connecting education with workplaces

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Abstract

The purpose of this paper is to present the research methodology of connecting general secondary education with workplaces in order to a) integrate in the Curriculum of STEM lessons the development of knowledge and skills, which are adapted to the changes of workplaces of the modern changing world and are considered necessary for the adolescent's future employment, b) provides opportunities to explore future careers through connections and collaborative relationships with workplace experts (employers / professionals). For the examination of the research questions, the exploratory research design was chosen, where it provided flexibility to adapt the methodological approaches, as new knowledge and information emerges during the conduct of the successive phases of the research. Also, a mixed methodological approach was chosen, where the analysis of the qualitative data provides explanations to strengthen the results of the quantitative data and to better understand the research issues.

Key words: general secondary education, workplaces, exploratory research design, mixed methodological approach.

1.Introduction

The rapidly evolving modern society makes the role of the school critical in preparing young people to equip them with knowledge and skills to be able to play an active role as future citizens in actions and decisions that will have a positive impact on personal, their social and professional life (OECD, 2019). At the same time, the school must offer them opportunities to explore the fields of their future professional careers, labor market trends, required skills, the functions of professional workplaces, so that they can make valid and informed decisions about their departmental choices of Higher Education (Hofer, et.al, 2020).

Taking into account the above challenges, it is important to examined:

1) What Knowledge and skills, are necessary for graduates of General Secondary Education, in order to have a successful and safe transition to the labor market
2) What methodologies teachers could integrate into the STEM lessons of General Secondary Education for the development of the knowledge and skills required by the workplace
3) What are the strategies of connection and create collaborative relationships between General Secondary Education and workplaces so that students receive valid and up-to-date information on the labor market

2. Research methodological approach: Exploratory design

For the examination of the research questions, the exploratory design was chosen (figure 1)

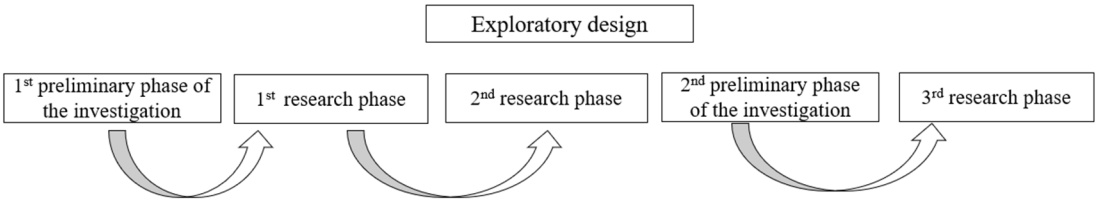

Figure 1: Exploratory research design

In the 1st preliminary phase, it was examined whether school education provides teenagers with support to prepare for the transition to their professional life (figure 2). The search tool of collecting the data of the 1st preliminary phase of the research, was a closed questionnaire based on the categories included in the PISA 2018 questionnaire (OECD, 2020). The findings of the 1st preliminary phase the need to implement the

research plan, starting from the investigation of the operating frameworks of the workplaces and the required skills (1st phase), as the quantitative analysis of a sample 111 students aged 16 years old present low percentage of participation of activities, such as job shadowing, visits to workplaces, information reports on professional issues and jobs (jobs fairs), visits to Higher Education Institutions during school program of secondary education.

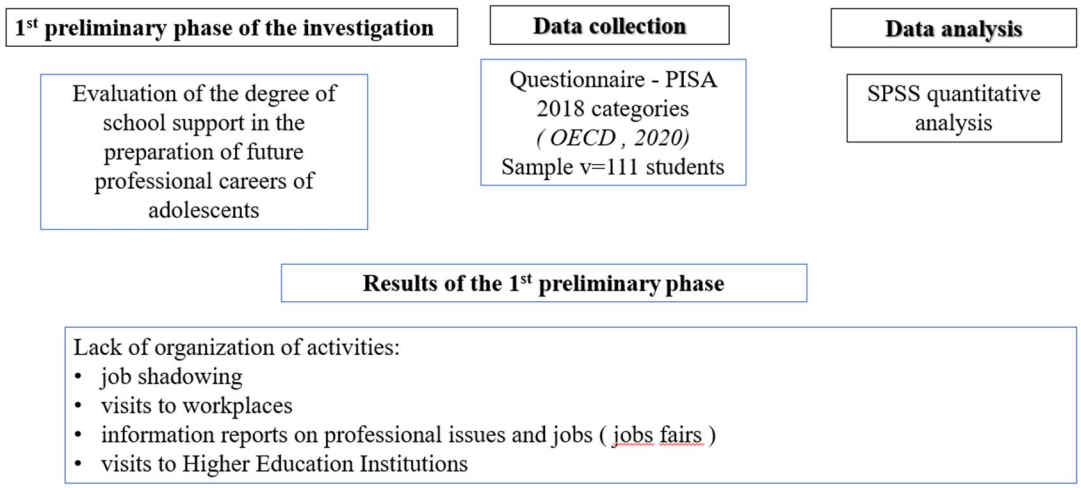

Figure 2: 1st preliminary phase (purpose, data collection, results)

In the 1st phase, the 1st research question is examined regarding the knowledge and skills that graduates of general secondary education need for a smooth and safe transition to the workplace (figure 3). The results of this phase result from two stages: a) Participatory observation of the researcher in a food industry (1st stage), b) expert questionnaires from the workplaces (2nd stage). The results of this phase are used in teaching practice applied in the 2nd phase of the research, where it is examined how teachers can integrate in the science classroom of general secondary education methodologies for the development of the knowledge and skills required by the workplaces.

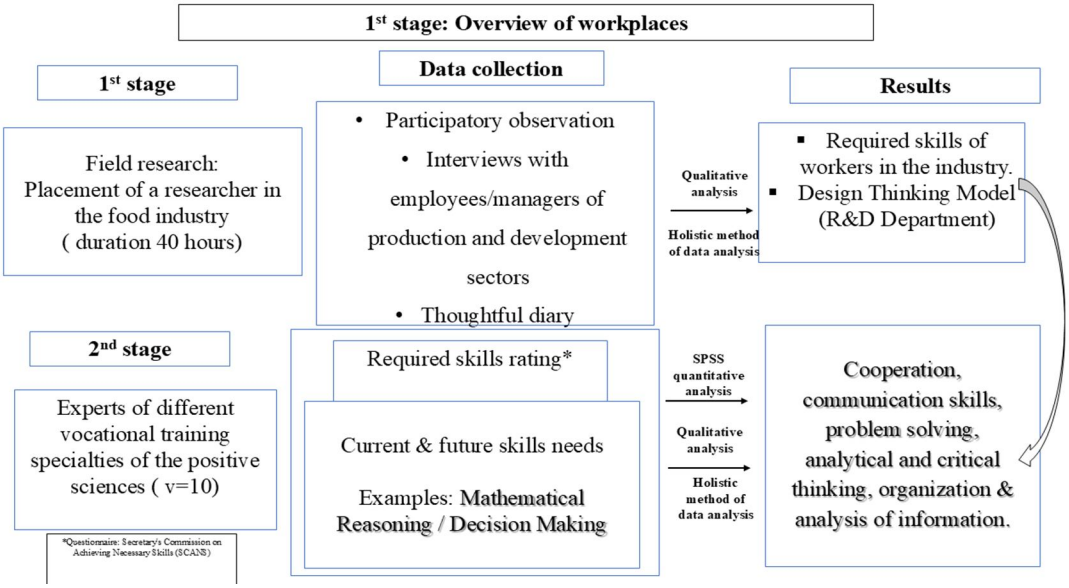

Figure 3: 1st phase (skill and knowledge required of workplaces)

From my participatory observation in the field research in the food industry in the 1st stage it emerges that the Design Thinking model is a key strategy for producing products that will be competitive and innovative. The results for the skills of workers considered essential in the labor market are also supplemented and validated by the questionnaires of workplace experts (2nd stage of the 1st phase of the research). More detailed the workforce needs to have skills of collaboration, communication, problem solving, analytical and critical thinking, organization & analysis of information. It should also be mentioned that they also exemplified the role and importance of mathematical reasoning, literacy and decision-making in the performance of professional tasks. These findings provide specific skill categories and are not numerical scales of skill list statistics. They are therefore a source of knowledge for the Greek educational community, where they need to be integrated into the educational planning of the teaching of STEM lessons through appropriate methodologies.

During the implementation of the 2nd phase of the research phase, the 2nd research question was examined, regarding how teachers can integrate the knowledge and skills required by the workplaces into the Science Curricula of General Secondary Education. For this reason, the researcher used the findings of the 1st phase of the research in the educational design of the teaching practice, which she applied in the science classroom.

The students, guided by the goals of sustainable development, looked for real problems of the modern world. This interdisciplinary approach aims to prepare the future global citizen, covering trends of educational reforms mentioned above. The design thinking stages of workplace product production are transferred as stages of knowledge production in the classroom through creative problem solving (figure 4).

Applying the Design Thinking model, in the empathy stage, groups of students look for scientific data on the topics they have chosen. Scientific data comes either from a literature review, or from databases with figures, where students interpret and understand the information of statistical graphs. The empathic stage aims to develop mathematical reasoning and scientific literacy, which is also a challenge in workplaces. Also, in the empathy stage, students simulate the role of financial analysts of an industry/company, where in the first stage for product design they investigate the existing situation through numerical data. Utilizing this scientific data, student groups create questions in statistical problems with the aim of data organization and analysis and problem-solving skills. These problems are shared with their classmates to solve. Based on these, they create questions and problems that they communicate/share to the student community to solve. Below are excerpts from the statistical scientific data processed by the student groups.

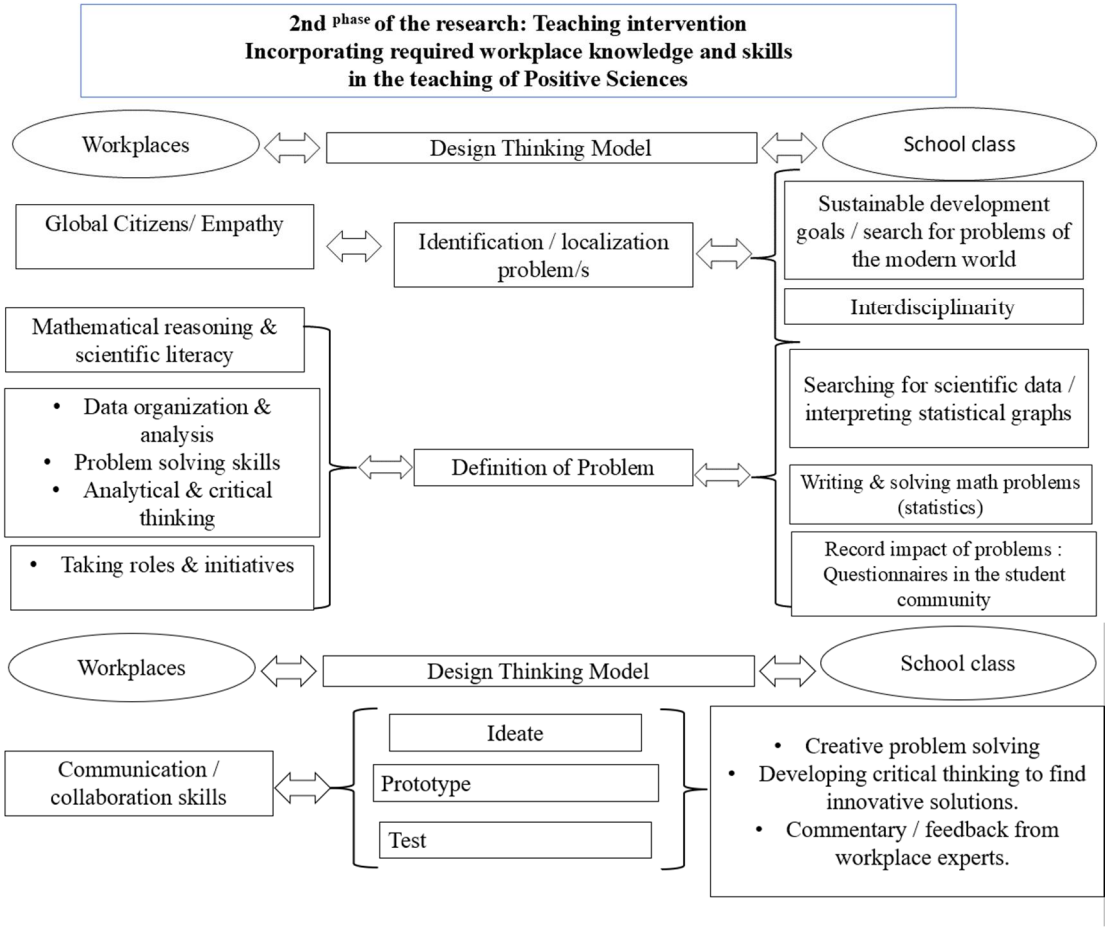

Figure 4: Comparative analysis of Design Thinking Model in workplaces and in STEM classroom

The results of the 2nd preliminary phase of the research provide important interpretations, through the themes that emerge, for the students' perceptions of the research question "Connecting Education and Workplaces". The creation of the themes is the result of the critical reflection of the codes and especially the connections between them, which results from the in-depth examination of the data. The 2nd preliminary phase consists of three successive stages (figure 5): a) Perceptions of connecting education and workplaces (1st stage), b) Ways/proposals to connect education and workplaces (2nd stage), c) c1) expected benefits from contact with workplace experts with further consideration of possible questions to them, c2) expected benefits from workplace visits with further consideration of expected results from job shadowing (3rd stage).

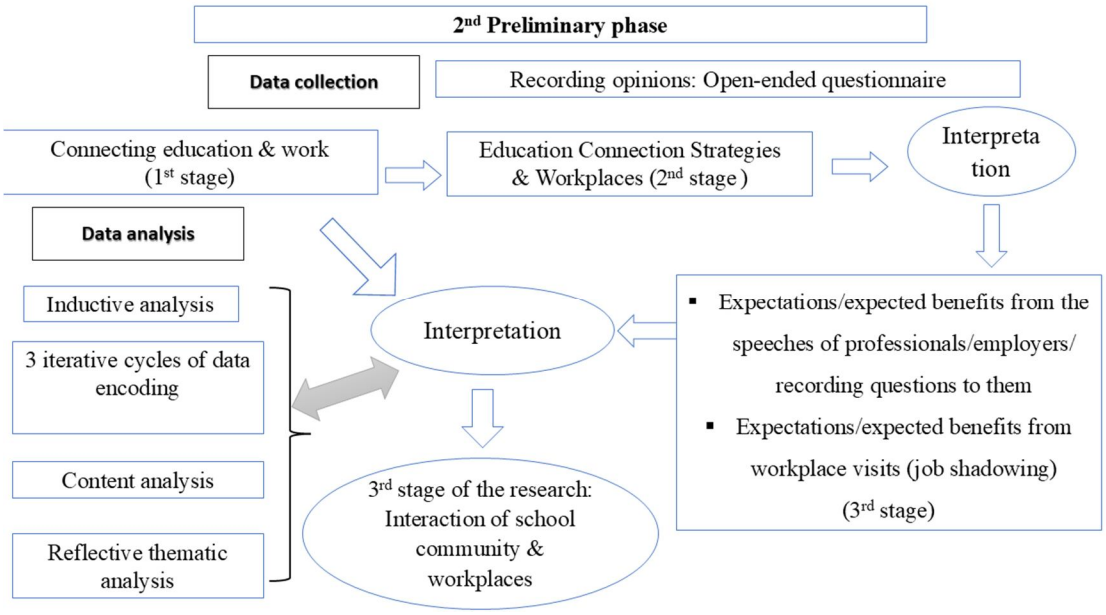

Figure 5: Stages of 2nd preliminary phase

The 3rd phase of the research is guided by the results of the 2nd preliminary phase of the research, as the strategies for connecting education and work include contact with workplace experts, but also visits to workplaces. In addition, in the 2nd preliminary phase, the expected results were also presented, where the survey sample justified why they consider it important to get in touch with experts, visit workplaces and carry out job shadowing programs. In this 3rd phase of the research, the students participate in such learning activities and it is examined what are the results a) of the events with suggestions from experts from the workplaces, b) of the visits to workplaces, where the students carried out job shadowing. Therefore, the 3rd phase of the research examines how these good practices (contact with experts, workplace visits/job shadowing) contribute to the professional readiness of young people.

In other words, the 3rd phase of the research aims to examine the 3rd research question about which good practices contribute to the creation of cooperative relations between general secondary school education and workplaces, so that students receive valid and up-to-date information about labor market. Under this framework, the 3rd phase of the research was implemented in two stages to examine the results of the two good practices (strategies connecting education and work): a) Online events/meetings with speakers experts of workplaces (1st stage) b) Visits to workplaces (2nd stage).

3. Mixed methodology

The mixed method approach focuses on the collection, analysis and blending of both quantitative and qualitative data in a single research design. The central assumption is that the combination of quantitative and qualitative approaches provides a better understanding of research problems than either approach alone (Creswell, 2014, p. 19). Conducting the research design with a mixed methodology approach does not imply the collection of multiple types of quantitative data or qualitative data, but that the analysis and interpretation of the quantitative data/qualitative data provides meaning for the next phases of the research or the next stages of each phase of the research. research (Tashakkori & Creswell, 2007).

The above analysis provides the researcher with the criteria for making decisions regarding the methodological approach she will follow to conduct the exploratory design (Subedi, 2016). The choice of methodological approach is directly related to the nature of the research questions and whether they can be

examined only with a qualitative or quantitative methodological approach (Stage & Manning, 2015; Tashakkori & Creswell, 2007).

The required skills and needs of workplaces, if only quantitative data collection using a graded scale was applied to a list of skills or needs, a full interpretation and description of the operating context and the workplace challenges. Correspondingly, in order to examine how the needs and skills of workplaces are integrated into the STEM lessons with the aim of developing skills, it was necessary, in addition to a quantitative methodological approach, to grade the level of development of the students' skills and the adding a qualitative methodological approach to describe the learning processes that contributed to this grading.

Finally, for the examination of the 3rd research question, which investigates how the school community and workplaces can cooperate, in order to contribute to the professional readiness of teenagers, two stages were implemented: a) In the 1st stage, through the collection of qualitative data, it was investigated how the speeches of experts they contributed to informing the teenagers about the labor market and therefore preparing their transition, b) in the 2nd stage of the research, quantitative data collection was implemented at the start and at the end of the group's activities to compare the skill level. After this comparison, it was necessary to examine with a qualitative methodological approach the factors that contributed to these changes. The mixed methodological approach is considered to provide a better understanding and completeness, i.e. a comprehensive description of the research question (Creswell & Plano Clark, 2017).

4. Discussion

This paper is part of PhD thesis “Connecting General Secondary Education and Workplaces: A Methodological Approach to Mainstreaming Career Readiness – A Case Study for the Positive Sciences” (Argyri, 2024) and focus on provided methodological approaches to research community for issues, where there are no clear references and answers, due to the wide range of areas involved. In the exploratory design, the researcher provides knowledge, understanding of the issue and directions, through different fields (workplaces, school classroom), which can be used for further research. Preparing adolescents for their future careers is a topical issue, but references in the existing literature provide an empirical body of knowledge, which is fragmented in different contexts such as higher education, vocational education and belong to different epistemological approaches (psychological, institutional).

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