Bringing Design Thinking into Greek Secondary Language Classrooms

Eleni Papantoniou
MAEd., Ph.D, Teachers' Coordinator, Regional Centre of Educational Planning of Sterea Ellada (PE.K.E.S of Sterea Ellada, Ministry of Education), Lamia, Greece

Abstract

This study tries to describe the method by which Design Thinking, a dynamic, innovative model of problem-solving procedure for the challenges of our time, can be adjusted to the modern school language curricula and make language courses meaningful and interesting to secondary students. Design Thinking (DT) traditionally originated from architecture, design and the world of enterprises and business, has given educational environments (schools and institutions) up to date pedagogical tools to reframe the way they prepare students for modern societies. The author and secondary teachers' coordinator/trainer made an effort first to adjust the Stanford DT five working stages in Greek language curriculum and courses and then train secondary language teachers accordingly, so as to implement DT in real life school settings. This effort comprised seminars and a main training workshop, regular contact with the schools and the participant teachers' attitudes' investigation. So, the final purpose of the study was to explore the main impact of the DT classroom application in Greek language lessons in the basis of advantages and disadvantages, as there is a need for further work and research in the field.

Keywords: Design Thinking, language curriculum, innovative and cooperative educational tools, problem solving skills, communicational language practice

Introduction

Design Thinking. From the world of enterprises in the world of education.

Design is becoming a more recognizable and significant part of the work of teachers generally, but, despite the flowering of tools and methods over the past 20 years it is still up for debate whether teachers can easily comply with all new design methods and creatively make complex design

choices in their everyday practical work (Gooyear & Dimitriadis, 2013). There is always a gap for them between theoretical instructional framework, usually developed in close educational projects, and the activities to do in real class. In fact, what happens in educational systems is the absence of a connector link that will unite the findings of pedagogical science with educational reality and new skills. Teachers prefer to follow more traditional and familiar methods of learning which consequently leads to what is characterized as "21st century gap" (Noel & Liub, 2016).

As the educational landscape continues to become increasingly complex, it suggests a need for a teacher-driven creative approach to developing instructional lessons (Elwood, K., Jordan, M.E.,2022). Scholars and practitioners alike increasingly recognize that teaching is an activity that requires not only implementation expertise, but also design expertise (Bennett et al., 2018; Penuel & Gallagher, 2009; Svihla et al., 2015; Weiner et al., 2020) and according to many of them (Elwood, K Jordan ME 2022: Goldman S., Zielezinsky M. B 2022 De Sutter, D., Stieff, M. 2017: Aranda, M.L., Lie, R. & Selcen Guzey, S 2020) these increasingly complex curricular expectations for teachers can be met through Design Thinking creative process.

Coming to Design Thinking (DT) model and to what new brings in terms of learning action and educational activities, as it comes from extra educational settings, where scientists and entrepreneurs attempt to reframe the way we see world, it embeds methods and strategies for dealing with crucial issues and finding the way out. Exactly these strategic steps and methods are those which can reframe the emerging educational classroom activities.

More specifically, the term and use of 'design thinking' is originated in architecture, design, art and later in management and was basically associated with a certain way designers thought. The term has gained popularity in business media and become a label for the awareness that any kind of business and organisation can benefit from the designers' way of thinking and working (Tschimmel, K., 2012). Over time, the concept of design thinking has been stretched and is understood as a complex thinking process of conceiving new realities, expressing the introduction of design culture and its methods into a wide range of fields. So, at present, DT is identified as a paradigm of creative thinking – first found in Rowe, 1987 "a method of creative action" – and problem solving in many fields considered 'as a novel approach to develop 21st century skills in a non-traditional way, making the learning process more interesting and challenging' (Luca, A. 2019). In the last decades, working in fast evolving work environments and dealing with complex social, environmental and social problems, makes Design Thinking more and more attractive as a holistic, flexible model for generating ideas and solutions. That's why its framework can be applied across a wide range of

fields and its approach makes DT a 'toolkit for innovation' (Rishma Hansil, 2020).

Not surprisingly, during recent decades, DT has gathered popularity in education. Universities and colleges first have started to teach Design Thinking in the courses and degree programs. Likewise, the use of design thinking in K-12 education has increased as well. It became popular because DT includes experiences such as remembering, understanding, applying, analyzing, evaluating, and creating, which are considered crucial cognitive human experiences targeted in the 21st-century educational goals (Koh, Chai, Wong, & Hong, 2015). Especially, cultivating design thinking in educational programs is encouraged to meet industry needs and build a bridge between education and industry in the global age (Ruveyda KARAMAN DUNDAR, 2022). Design thinkers are people who can solve complex problems by cross-disciplinary groups or by individuals (Curedale, R., 2016). So, the actual process of engaging in design thinking helps K-12 students to develop knowledge, skills and mindsets that are important for problem-solving (Goldman S., Zielezinsky M. B 2022, McLaughlin, J.E., Wolcott, M., Hubbard, D. et al. 2019). Through DT projects, students become introduced to and start developing and mastering a toolkit of skills, activities and mindsets that they bring to problem-solving. Alongside problem solving abilities, DT also presents additional educational advantages as reinforces students' motivation, eliminates stress and embarrassment, enhances real life situations understanding (Luca 2019).

Design Thinking for Language Learning

According to the Stanford School, DT involves five key stages: Empathize, Define, Ideate, Prototype and Test and this approach is most effective when addressing problems that are unknown or ill-defined (https://www.interaction-design.org/literature/topics/design-thinking) .

In the mainstream language learning classroom DT can help bridge the gap between creative problem solving and structured learning. It gives teachers additional tools to build understanding and provide students with frameworks for critical thinking and problem solving (Rishma Hansil, 2020). In the second language classroom, design thinking is a powerful way to engage students with the target language and cultures in a creative, authentic way, as structured thinking in the process, leads to original text and language production in the target language (Ron Sperling, 2022).

Generally speaking, in language classrooms students are asked to practice empathy by questioning, observing, and conducting research, which can help drive learning about different cultures. Students usually enjoy the creative freedom and flexibility that DT affords and they can generate impressive ideas. They are engaged with real-life tasks anchored in authentic

language and the resulting interactions are important parts of the design thinking process that can lead to new ideas and authentic use of the target language (Ron Sperling, 2022*)*.

It is also found that by integrating DT into language courses design, the design process becomes more collaborative, creative and efficient and the teachers' experiences gets improved both in the design process and when teaching the course (Kelley Crites, Emma Rye, 2020). DT practitioners can get very creative through various strategies as writing down ideas, collecting information, causing brainstorming, whereas collaborating skills enhance students' communication and thinking skills (Cleminson, T., & Cowie, N. 2021)

Up to this point, language may be linked with problems deriving from other epistemic disciplines and is used as the communication vehicle for negotiation, analysis, evaluation, suggestions. What, happens, though, if language itself, through speaking and writing, is faced as a problem to be solved?

Writing a text is a complex meaning-building process, similar to the problem-solving process, where the student-writer must spontaneously manage content and language problems (Flower, 1994). Thus, since writing itself is a demanding, high-level intellectual task (Flower, L. S. & Hayes, J. R., 1977), much research has focused on how teachers/educators can provide facilitation techniques for students to overcome language problems and reduce anxiety about correct expression by connecting language activities to real life situations (Richards, J. C., & Rodgers, T. S., 2014).

Apart from this way of introducing DT in language classrooms, another way may imply reflection on linguistic issues themselves. As reflective thinkers (e.g., linguistic experts) hold the epistemic belief that knowledge can be seen as a relative truth, then the solution to a problem is the best choice in a given context and is justified by contextual considerations. For example, in analyzing a language issue, students they will not only explore the prescriptive language rules, but also consider other perspectives, such as language reality and their own language intuitions (Wijnands, A., van Rijt, J., Stoel, G., Coppen, P., 2022).

Neverthless, applying DT in language courses somehow constitutes a method of cognitive approach, as it forms a problem-centered framework of information search, language practice through use and exchange of ideas, which is basically closer to Haliday's communicative approach and Bakhtin's concept of language as a language intertwined with communicative acts from real life and action (Bakhtin, M. M., 1986) The language is learned, improved, enriched, expanded, adapted according to the problem, the deceptions it raises, the linguistic goals of the teacher, the questions and responses (Shirkhani, F., Nesari, A. J., & Feilinezhad, N. 2015). Language is learned in its

contextualized uses and does not obey normative frameworks, indirectly preparing students for an already fluid, unpredictable, rapidly changing world. So, in the teaching of the mother tongue and related (humanitarian-social) subjects in the study programs of various countries, the problem-centered approach is understood as a confrontation, a discussion of the students on various topics that touch the real world that lead the students to an argumentative speech or writing

Also, often, language teaching is applied cross-curricularly through correlation with subjects of the S.T.E.M area (physical, technological, mathematical sciences). The recent emphasis on teaching science, technology, engineering and mathematics through language teaching can be successfully incorporated into the problem-based model (Boothe, D. et al, 2011) and by extension into DT model. From this point of view, it is emphasized that the connection with the real world enhances students' lifelong learning skills and competitiveness in the labor market, while at the same time strengthens language competence within a wider range of cognitive subjects (Boothe, D. et al, 2011).

Bringing Design Thinking in the Language courses of Greek Secondary schools

In the present study, the DT model is used with the prospect of refreshing language courses in secondary school settings and eventually making them more interesting and meaningful for students. Language awareness and fluency does not become an end in itself, but is being acquired in communicational settings and scenarios, according to the above theoretical framework.

The basis of the present educational DT based scenario was adjusted to the Stanford Model which consists of a sequence of five steps: Empathy – Identifying – Ideating – Prototyping – Testing (https://dschool.stanford.edu/resources/getting-started-with-design-thinking). The whole process is designed so as to generate thoughts, ideas and suggestions in a problem solving venture in real world situations.

The DT model, as mentioned above, was launched in an educational environment, however not in the familiar STEM area, but in the Greek Senior High School language curricula. The instructional design, through the above five working stages, had to be associated with linguistic aspects, the official curricula needs and the emerging students' expected performance in the subject field. It has to be connected with language curriculum skills referring to comprehending and composing verbal and written speech, studying and reflecting on the world around us (merits, attitudes, current issues, course content), exercising language skills through the use of appropriate spelling and structural rules.

Schools, where subjects are taught as isolated disciplines and the technologies employed consist mainly of textbooks and the use of the chalk/white board are referred to as traditional schools (Koh, Chai, Wong, Hon, 2015). Actually, Greek secondary schools continue to moderate on the basis of separate subjects and their textbooks. As the education system is strongly centralised, the dominant teaching practice is driven by a single textbook per subject (Koutsogiannis D., et al, 2020). Their technologies, though, comprise interactive whiteboards, high internet connection and computer labs. Additionally, new curriculums increasingly recommend interdisciplinary connections between subjects, something that is not highly served by teachers, as this assumes proper educational planning and training.

Under these conditions, Design Thinking is not an everyday educational tool for those working in Greek state Secondary Education. In fact, very little is known about DT as an educational approach. Lesson planning, teaching and learning is organized in small units and sessions according to the official school books instructional pattern and the curriculums' directions. Additionally, classroom pedagogy is based on teachers' personal educational culture and the evaluation criteria during the final, annual exams as set by the educational legislation and related circulars. Despite the above restrictions, there are many secondary teachers who struggle to arouse their students' interest in school knowledge and are willing to try more challenging and motivating teaching practices in their classrooms.

As a Secondary Teacher's Coordinator, working for a Regional Educational Center of the Ministry of Education (PE.K.E.S of Sterea Ellada), the writer of the article introduced the concept of Design Thinking in Education by organizing teachers' seminars in collaboration with the University of Thessaly (Dec. 2021) and then organized a special workshop for Language teachers, where she presented ways of implementing and applying DT in language courses. The last workshop was attended by twenty five (25) secondary school teachers. Language practice should be held in certain subject units in accordance to school curriculum and a variety of language acquisition skills had to be met (oral and written expression, comprehension, genres study). So, the writer/trainer decided to apply the DT model in the following indicative thematic field of social inequality and injustice in everyday life problems. The trainer had to find ways to deal with these matters in a creative, experiential and communicational manner as is dictated by the DT model. At the same time, she had to indicatively apply such educational tools which would facilitate the teachers' work in each DT phase and would work as an example for further utilization in their classrooms. Each step had to be designed carefully so as to comprise a set of teaching suggestions and ideas on how to activate thinking and share knowledge among students, but also to provide tools for language/communication/vocabulary practice.

At this point, it' s worth saying that in secondary education, students, when they sit final language exams, are always asked to express their opinion and ideas in a rational, argumentative manner. Even if this writing task is given in a situational frame ("suppose you have to write a speech, article, letter, blog…"), or is bound with certain approaching attitudes towards the texts and different writing styles are to adopted, usually what the students are expected to do in the end, is to develop their thoughts and knowledge in an argumentative, rational and persuasive way which complies the following elements: defining the issue, analyzing it by explaining causes and results or advantages-disadvantages, proposing solutions and measures to be taken. As a result, most of the language teachers during their courses give concept-maps or handouts with detailed plans of essay compositions in their effort to cover all the aspects of the subject under negotiation. Inevitably, though, because this way of delivering knowledge is basically a teacher-centered, one-way procedure, often students become indifferent and hardly do they manage to assimilate all this packaged information. This mainly results from the fact that teachers believe that their main goal is to provide knowledge about a subject and this prevents them from finding time in their lessons to let students be self-active about their learning (Vosniadou et al., 2020).

A reason that DT found very positive response on behalf of the language teachers in this workshop was because DT model met their need to cover a subject thematic area in the classroom in an argumentative, multifaceted way and, at the same time, experiential, practical and interesting for the students. The tasks of defining the issue, explaining causes and results or advantages-disadvantages, making proposals -proposing solutions /measures to be taken were carried out through the DT process and its comprised educational tools.

In this article, I describe how I implemented DT in teachers' training on new pedagogies in language classroom, the type of learning environment and student engagement it facilitated and the knowledge it generated.

Introducing Design Thinking into Language teachers' seminars and workshop

During the workshop, the trainer (and writer of the article) indicatively adjusted the DT model into a social problem, that of the social inequality as it is described below. The teachers, in a students' role-playing situation, had to carry out tasks related to various techniques in each of the five DT phases. In the table below these techniques and the tools they comprise are given in their five phases of the DT model which is the time sequence of the teaching scenario phases.

Table 1. DEALING WITH SOCIAL INEQUALITY in LANGUAGE CLASSROOM THROUGH DT MODEL

The paradigm as was presented in the workshops	
EMPATHIZE (The concept of being socially disadvantaged: what and how it is)	
Indicative educational tools & practices	
Interviewing	The teacher asks students to address some questions to people they know (friends, relatives, older siblings, neighbors.) and come back to class with their interviews completed. The students may address questions like the following: - Have you ever felt social injustice? - Were there times, that for some reason, you were not treated the same way as the others? - Can you give examples of social inequality/injustice that you have met in your life?
Commenting on photos and images	The teacher brings into classroom pictures referring to social injustice situations and asks students to put themselves in the people in photos place or to describe what is happening in or to think about the reasons/the consequences of their situation…
Building awareness through discussion in teams	Students are divided and work in groups: Each member reports to the others the cases of social inequality that they brought as examples from their interviews. The teams write down their cases. They decide to tell the plenary 2 typical examples of social injustice and discriminatory treatment.
Filling questionnaires	The teacher brings into the classroom questionnaires about 'what do we know about inequality' and discusses the results with the students.
Reading and interpreting	The teacher distributes photocopies of selected readings from literature, press and other publications of various textual genres. The selected readings refer to various forms of social injustice and present graded difficulty in terms of reading and literacy. The selected texts must provide information that answers the following questions: How does the offended person feel? Can you put yourself in to his/her place? What was the problem that the main person of the story faced? What are his-her dominant emotions? What effects did the discrimination have on his-her life? What are his/her expectations or wishes?
DEFINE	
Indicative educational tools & practices	
Categorizing the cases of the previous stage. The various cases of social injustice are grouped and analyzed in the classroom according to their characteristics. See the following example.	

POVERTY	SEXISM	GEOGRAFICAL BARRIERS	JOBS' DESTINCTIONS
1. "My mother's family didn't have as much money as her classmates" – "for example, she couldn't participate in the school's excursions"	1. "They didn't let me attend college because I was female"	1. "I had never been to theater because I used to live in the village"	1. "People treat doctors differently than other professionals. Doctors enjoy a higher prestige".
2. "My uncle worked during summers while others were on vacation.."	2. "I didn't have as much freedom in going out and having fun as my brother did"	2. "There was no high school in my village and I had to take the bus. Many times I was late or did not go to school at all".	2. "Others didn't take me seriously when I told them my job" (e.g. actress, singer, clown, etc.)
3. "My father couldn't wear expensive clothes or go on trips with his parents"	3. "I do most of the housework because I am a girl/woman"	3. "Living in villages/remote places we often feel forgotten. We have to go down to the city to visit a doctor or go to the hospital"	3. "Many freelancers do not declare their income to the tax office and do not provide receipts of the services they are paid for"
4. "There are children who do not have extra curricular activities because their parents can't afford them"	4. "There employers who avoid hiring women or dismiss them because of pregnancy or family obligations".		4. "Everybody expected me to do my father's job. They were surprised to hear that I am going to university.."
5. "Some people can't afford a lawyer to get their rights"	5. "Mothers do the most of the household and they do not find time to deal with the commons or make a career"		
6. "Because 'X' could not pay extra money for expensive hospital treatment, he had serious health problem"			
7. "I and my siblings don't have our own room space at home to do our homework".			

Putting questions in order to investigate and identify the nature and the extent of the problem(s): Who or what conditions caused the problem(s), what are the symptoms and characteristics of various cases of discriminations, in what contexts they appear (description), can we hypothesize consequences in people's lives or describe emerging feelings?

Drawing general conclusions and patterns on how e.g. poverty, sexism, residence and job affect social equality

Creating multimodal content:
    A poster for social campaign
    A report for a newspaper, blog readers, the ombudsman of the citizen, human rights watch institutions and so on
    Sketches/videos

Playing games e.g 'the treasure game' by which we pick up social rights notes from the 'social treasure' box, read them loudly and then identify those which are being violated in certain case studies projected on a digital screen.

Decision making for the next stage:
Each group or the whole class decides which field/category of social injustice will deal with thoroughly (e.g. sexism) in order to move on to the next stage

IDEATE
Each group of students goes on with one aspect of injustice. (e.g. gender discrimination). How does the teacher help students to generate ideas to solve the specific problem, that is, for example, to minimize social discrimination against women?

Indicative educational tools & practices
The students are asked to:

a) suggest a solution for each case in the table (Table 1). How easy is it to be applied? Perhaps further measures have to be taken…

b) suggest ideas-solutions-key-words starting with a letter of alphabet: a, b, c…….
  e.g. **A**id/Action, **B**elieve, **C**ommunity, **D**emand, **E**quivalent, **I**ntegration, **L**ine, **M**orality

c) take inspiration from images-photos the teachers bring into the classroom

d) take ideas from texts, ads, news reading that promote initiatives, measures, etc

e) play roles: what I would do as an individual, family, municipality-community, school, neighbor, state, legislator

PROTOTYPE **Indicative suggestions**
- The students, in groups, are asked to propose a package of measures and actions that can be implemented with the assistance of the Municipality. The problem is put in a real-world situational framework (e.g. referring to the local women's low access and participation rates in the commons and labor market). Each group draws up a text of proposals: a declaration, a letter, an article, a memorandum of actions. They work together to propose, draft, correct their product of measures and ideas and finally deliver it to another group for evaluation.   - The students may be encouraged to create a short video/film by making a scenario/script, editing and merging photos, playing roles.   - …………………………….

TESTING **Indicative suggestions**
Groups take on the role of evaluating the other group's work: - How easy is it to carry out the specific measures? Are there realistic enough?   - Are the proposals clear enough or do they have to be more specific?   - Are there any other proposals and ideas?   - Did the film/video managed to touch socially sensitive matters and propose alternative solutions?   - ……………….

In the end, the students may turn to specialists (e.g. the competent deputy mayor, a consultant, their parents, etc.), hand in their findings and proposals or even publish them.

Methodology and Data Collection

Teachers who participated in the workshops committed themselves to follow the DT model in their own classrooms in any of these thematic fields of social inequality. They also proposed that DT could perfectly much in war and peace topics of discussion/writing in classroom (situations, consequences). They were asked to implement the DT pedagogy as presented and discussed in the workshops, evaluate their students' correspondence and give feedback back to the trainer during the application.

At the end of the workshop the attendees completed a short questionnaire (Table 2) where they were asked to check advantages and disadvantages of the DT based teaching model according the workshop' s experience. Their answers are presented according to their descending percentages, as for the advantages they were asked to check from a list of positive characteristics and for the disadvantages they were asked to note down their first notifications and aspects in short.

Table 2. Teachers' questionnaire answers at the end of the workshop

Main Advantages rating from 1-6 (from the most significant to the least significant): You think that DT process is:
- **Creative** 95%
- **Cooperative** 93%
- **Exploratory** 82%
- **Motivative, stimulating** 70%
- **Cognitively constructive** 56%
- **Encouraging** 45%
Main Disadvantages ('Write down 3 main disadvantages you think they hinder DT' classroom application').
- **Demanding** from the teacher's perspective in terms of time and recourses needed   100%
- **Time consuming** in class (it takes s set of lessons to fully complete the five stages)   60%
- **Not fully educationally realistic** in the sense that school conditions and students' extracurricular activities do not allow much space for empathy practices   52%

Most of the workshops' participants finally applied partially the DT model by implementing only some of pedagogical tools and techniques in their lesson plans. They found it more convenient and much easier to carry out only few of the techniques they were shown, as that was less stressful and time consuming. Though, three of the teachers completed the tasks of all the five DT model's phases. They came from the following schools of Fthiotida: High School of Raches, High School of Stylida and Evening High School of Lamia and they applied the DT model in order to cover curriculum subject areas and the correspondent book units regarding social matters (everyday life problems-types of injustice) and war and peace issues. These three teachers gave the trainer regular email feedback during the whole process of classroom application in their schools. Some indicative pieces of their mail correspondence are given in the Table 3, below. Finally, the teachers and I, as their trainer/coordinator, made a common online Webex meeting (May 2022) during which I applied some open-ended questions and conducted a short polling test (Table 4).

Table 3. Email feedback from the teachers applied the DT model in classroom during the 2021-2022 school year

Teacher A (27/02/2022, Stylida High School)

………..

I just finished unit 6 (in the language book) I really liked your suggestion about design thinking. The kids enjoyed the teamwork (it took me a long time to use it too, due to covid). …………………….I want to add that, because of the pandemic, the children are finding it difficult to do homework, soI tried to apply DT in two school classrooms of Stylida Gymnasium, but one responded much better. I made a post on alldayschool blog (https://alldayschool.blogspot.com/2022/02/blog-post.html) detailing what I have done.

I'll keep trying anyway. The ideas we shared in the workshop were very good and practically inspiring. They helped a lot with group handling, group tasks and students' motivation.

Teacher B (from Raches High Scool)

In class we started by talking about social inequalities, exploring the term 'inequality'. The students gave examples of social inequality that they or their own people have experienced (examples of poverty, gender discrimination, geographic inequality, discrimination in the school environment, etc.).

In plenary we studied the following texts (see the attached sources) …………………………

Then the students worked in pairs and created a multimodal text with a social message. Also, by following a hypothetical scenario (as presented in the workshop) on gender inequalities, according to which in our Municipality, during the pandemic, many women were left unemployed and others faced the violence of a partner/husband, the students were asked to write an announcement for the local newspaper. The announcement regarded measures for addressing the above problems with the aid of the local authorities.

From the book, 2-3 texts were selected mainly for the study of adverbial clauses and for lexical items (pronouns). The unit ended by discussing rights, social problems and volunteering in general.

Understanding the way design thinking works in a real classroom was really interesting and helpful. It is about a dynamic and innovative tool in education. The students really enjoyed the teamwork method and asked to work again in the same way! They are looking forward to get engaged in another theme through DT.

Teacher C (from the Evening School in the city of Lamia)

I applied the DT model and the educational tools in the schoolbook unit concerning 'War and Peace'. The challenge was to understand what war is, in the sense of everyday life effects and try to find solutions for the problems are caused. My students were definitely benefited and I wish I could implement DT for all school sections. The students enjoyed it because they participated! The whole procedure looked like a step by step discovery of things, like a game of hidden treasure! Everything was done in the classroom. Blackboard notes and flows, photocopies, boards/concept maps, questionnaires and a lot of team work were fully utilized. Of course, I had to guide them through the process. Unfortunately, students have little or none digital literacy and find it difficult to correspond to multimodal text writing when this was asked. They work hard on ideas and solutions through the techniques we worked on during the seminar. We mainly used the classroom board to note down thoughts and then I transferred them myself to a digital format/presentation (have a look in the attached files)…

Certainly, it is a different way of teaching, much more attractive to students, as the burden of learning is shifted to them, but we need time in order to get familiarized with it, because we are used to traditional teaching methods!

However, the workshop helped us very much, because you made it very experiential, while until now all this was on a theoretical level in our minds!

Table 4. Webex on line meeting with teachers who applied DT

Open-ended questions addressed to teachers	1. Which were the strongest advantages of applying the DT in your language classroom? 2. Which are the main restrictions/difficulties you faced when applying DT? 3. How was your role in class changed?
Poling questions & automatic results 1. I could / I couldn't successfully implement DT in my language classroom without the workshop 2. For me, it was necessary/not necessary to have regular support and feedback from my trainer/coordinator 3. It is easy/not easy to get prepared for DT implementation in class (real life problems to be addressed, connection with book units, choosing strategies, resources and tools) 4. Applying DT in class is manageable/hardly manageable 5. DT reinforces 21st century skills in what ways (write down 3 key-words) 6. DT reinforces language literacy adequately /not adequately 7. Would you strongly recommend DT as suitable for interdisciplinary educational practices/scenarios? YES/NO	1. I couldn't/t 100% 2. Necessary 80% / not necessary 20% 3. Not easy 90% 4. Manageable 80% / hardly manageable 20% 5. 'problem solving' (85%), 'alternative/new ideas'(70%), 'social caring'/'active citizenship' (90%), 'work in groups'/'cooperation' (95%) 'taking initiatives'(55%), 6. Adequately 90% - not adequately 10% 7. YES 100%

Findings

According to the data collected from the email feedback and the teachers' answers in the final Webex online meeting, they appeared to agree on some crucial positive points.

Covid-19 pandemic and the obligatory in distance schooling by digital means affected students' behavior and relation with school community and classroom (Huck, C., & Zhang, J., 2021). Students, coming back to school, faced difficulties in regaining previous characteristics of studentship such as careful attendance, high level of classroom concentration, high levels of engagement, self-disciplined study (UNESCO, 2021), whereas there were

many cases of social and psychological deviation. The emerging situation had made teachers' work in classroom especially difficult and they all agreed that rarely their students corresponded to traditional homework.

By bringing DT in their language courses, they activated their students' participation and engagement in classroom and surprisingly most of them managed to analyze the under negotiation subjects within the available time. They found out that the time spent on handouts, traditional reading comprehension activities and writing was about the same with the DT circle of five working stages when the learning benefits seemed to be more essential now, in terms of skills and knowledge as well.

Teachers agreed that DT gave them innovative and flexible tools to analyse problems from different perspectives and this strengthened their students' ability for deeper understanding. The pedagogical techniques employed through the DT stages unlocked students thinking skills and cooperation in teamwork. As teachers, they had certain tools in their hands by which they managed to bring their students in an experimental and meaningful learning process. They also noticed that, being already well prepared for every DT working stage, it was easier for them to carry out activities since the main burden of work was transferred to students, whereas they were mediators and supporters to the whole procedure. Students were guided through mental situations, various social data, thoughts, ideas, complex variables of the problems, logical suggestions, evaluative critical thinking, imaginative but necessarily realistic solutions while being exposed in communicational and argumentative situations. Their students connected theoretical knowledge with real life world and complex challenges and this augmented learning motivation. The majority of their students -even those with low performance and participation – corresponded very well by taking part in groups' work, in brainstorming, speaking and writing.

The whole process led to various results: guided speech, memorandums, posters, letters, meetings with local authorities. These final products were either artistic or constituted more practical solutions driving to action policies. In fact, they said that being creative in the process helped students to reach the generation of creative products. This actually is very important since "the focus is not only on the product itself but also on what the product means to those who create it, how creativity can change their conceptions of language, and how the process of creation affects student motivation" (Cleminson, T., & Cowie, N., 2021). In result, all the teachers that applied DT agreed that DT based instructional design improves language literacy in the end.

They also underpinned the model's strength to cultivate social caring and active citizenship. Finally, they noticed that DT pedagogical design and strategies fit very much with the "Skills Laboratories" that the Ministry of

Education and Institution of Educational Policy had introduced in Greek state for the development of twenty-first century skills in schools. Actually, one teacher linked "Skills Lab" with her language classroom in an effort to achieve a cross curricular connection and show her students how different knowledge areas are connected when it comes to real problem-solving. Actually, all the participants remarked that DT gives them and their students to approach a problem from different scopes and how knowledge from other sciences are helpful in their language class.

The data, on the other hand, also revealed main difficulties and constraints in everyday classroom application in Greek schools. The participants admitted that without the appropriate training and the fact that they were actually exposed in DT working model during the workshop, they could not easily find the appropriate tools and manage the time so as to guide their students through DT phases. They would very much hesitate shifting from their safe zone of conventional teaching to an experimental situation. By practicing strategies and methods in the workshop found themselves more confident to manage time, activities, groups and process in classroom. They need not only a clear theoretical framework, but also specific examples adjusted in units of their language courses compatible with the official language curriculum. Some of them, also, seemed to feel less safe with the open and less predictable nature of DT procedure, but they overcome their inconvenience when they saw their students think and express themselves in unpredictable, surprisingly creative ways. They underpinned, though, their need to be continuously trained and refresh their techniques. Finally, they agreed that the 'whole system (many school subjects and demanding extracurricular activities for students) is very tightly close for such an open, innovative method and the final exams define significantly' the way they teach'. However, the DT teaching and learning experience renewed their language classrooms and brought new skills' exercising along with new knowledge.

Data Availability: All the data are included in the content of the paper.

Conflict of Interest: The authors reported no conflict of interest.

References:

1. Aranda, M.L., Lie, R. & Selcen Guzey, S. Productive thinking in middle school science students' design conversations in a design-based engineering challenge. Int J Technol Des Educ 30, 67–81 (2020). https://doi.org/10.1007/s10798-019-09498-5
2. Astrid Wijnands a,c , Jimmy van Rijt b , Gerhard Stoel c , Peter-Arno Coppenc Balancing between uncertainty and control: Teaching reflective thinking about language in the classroom. Linguistics and Education 71 (2022) 101087
3. Bakhtin, M. M. (1986) Speech Genres and Other Late Essays. Translated by Vern W. McGee. Austin, Tx: University of Texas Press.
4. Bennett, S., Lockyer, L., & Agostinho, S. (2018). Towards sustainable technology-enhanced innovation in higher education: Advancing learning design by understanding and supporting teacher design practice. British Journal of Educational Technology, 49(6), 1014–1026. https://doi.org/10.1111/bjet.12683
5. Boothe, D., Vaughn, R., Hill, J., & Hill, H. (2011). Innovative English Language Acquisition Through Problem-based Learning.
6. Cleminson, T., & Cowie, N. (2021). Using design thinking as an approach to creative and communicative engagement in the English as a Foreign Language (EFL) classroom. Journal of University Teaching & Learning Practice, 18(4). https://doi.org/10.53761/1.18.4.7
7. Cleminson, T., & Cowie, N. (2021). Using design thinking as an approach to creative and communicative engagement in the English as a Foreign Language (EFL) classroom. Journal of University Teaching & Learning Practice, 18(4). https://doi.org/10.53761/1.18.4.7
8. Cleminson, T., & Cowie, N. (2021). Using design thinking as an approach to creative and communicative engagement in the English as a Foreign Language (EFL) classroom. Journal of University Teaching & Learning Practice, 18(4). https://ro.uow.edu.au/jutlp/vol18/iss4/7
9. Curedale, R. (2016). Design Thinking Process and Methods. (3rd Ed.). Los Angeles, CA: Design Community College. P 62
10. DeSutter, D., Stieff, M. Teaching students to think spatially through embodied actions: Design principles for learning environments in science, technology, engineering, and mathematics. Cogn. Research 2, 22 (2017). https://doi.org/10.1186/s41235-016-0039-y
11. Elwood, K., Jordan, M.E. (2022). Development of the Design Thinking and Instructional Lessons (DTAIL) model: a creative approach for teachers. Education Tech Research Dev (2022). https://doi.org/10.1007/s11423-022-10140-w

12. Flower, L. (1994). The construction of negotiated meaning A social cognitive theory of writing. Carbondale, IL: University of Southern Illinois Press.

13. Flower, L.S., & Hayes, J.R. (1977). Problem-Solving Strategies and the Writing Process. College English, 39, 449.

14. Goldman Shelley, Zielezinski Molly B. (2021). Design Thinking for Every Classroom. A Practical Guide for Educators. 1st Edition. Routledge. New York. ISBN 9780367221331 DOI: 10.4324/9780429273421-1

15. Goodyear, Peter & Dimitriadis, Yannis. (2013). In medias res: Reframing design for learning. Research in Learning Technology. 21. 10.3402/rlt.v21i0.19909.

16. Greenier, V. T. (2018). The 10Cs of project-based learning TESOL curriculum. Innovation in Language Learning and Teaching, 14(1), 27-36. doi:10.1080/17501229.2018.1473405

17. Huck, C., & Zhang, J. (2021). Effects of the COVID-19 Pandemic on K-12 Education: A Systematic Literature Review. New Waves-Educational Research and Development Journal, 24(1), 53-84.

18. Ineta Luca (2019). Design thinking in pedagogy: Frameworks and uses. European Journal of Education, Research, Development and Policy. 54 (4). https://doi.org/10.1111/ejed.12367 pp. 499-512

19. Joyce Hwee Ling Koh, Ching Sing Chai, Benjamin Wong, Huang-Yao Hon, 2015. Design Thinking for Education Conceptions and Applications in Teaching and Learning. Springer.

20. Kelley Crites, Emma Rye, 2020. Innovating language curriculum design through design thinking: A case study of a blended learning course at a Colombian university. System, Volume 94, 2020, 102334, ISSN 0346-251X, https://doi.org/10.1016/j.system.2020.102334.

21. Koh, J. H. L., Chai, C. S., Wong, B., & Hong, H. Y. (2015). Design thinking for education: Conceptions and applications in teaching and learning. Springer

22. Koutsogiannis Dimitrios, Papantoniou Eleni, Zagka Eleftheria, Matos Anastasios, Nezi Maria & Polkas Lampros (2020). Human and Non-Human elements in a "big" conference on distance learning during the Coronavirus pandemic in Greece, Digital Culture & Education, July 10, 2020, ISSN: 1836-8301.

23. Luca Ineta (2019). Design thinking in pedagogy: Frameworks and uses. European Journal of Education. Research, Development and Policy. Volume54, Issue4 Pages 499-512

24. McLaughlin, J.E., Wolcott, M., Hubbard, D. et al. A qualitative review of the design thinking framework in health professions

education. BMC Med Educ 19, 98 (2019). https://doi.org/10.1186/s12909-019-1528-8

25. Noel, L., Liub, TL. (2016). Using design thinking to create a new education paradigm for elementary level children for higher student engagement and success. In: Proceedings of DRS 2016, design research society 50th anniversary conference. Brighton, UK. Ανακτήθηκε από https://ojs.lboro.ac.uk/DATE/issue/view/184 (24/2/2019)

26. Penuel, W. R., & Gallagher, L. P. (2009). Preparing teachers to design instruction for deep understanding in middle school Earth Science. Journal of the Learning Sciences, 18(4), 461–508. https://doi.org/10.1080/10508400903191904

27. Programme and meeting document, retrievable from https://unesdoc.unesco.org/ark:/48223/pf0000377841

28. Richards, J.C. and Rodgers, T.S. (2014) Approaches and Methods in Language Teaching. Cambridge University Press, Cambridge, England.

29. Rishma Hansil (2020). Design Thinking in the ESL Classroom. Retrievable from https://rishmahansil.medium.com/design-thinking-in-the-esl-classroom-11d26f20db16

30. Rishma Hansil 2020. Online article https://rishmahansil.medium.com/design-thinking-in-the-esl-classroom-11d26f20db16

31. Ruveyda KARAMAN DUNDAR (2022). Design Thinking in Education. In Education & Science 2022. EFE ACADEMY PUBLISHING.

32. Shirkhani, F., Nesari, A. J., & Feilinezhad, N. (2015). Bakhtinian dialogic concept in language learning process. Procedia-Social and Behavioral Sciences, 205, 510-515.

33. Sperling Ron (2022). Design Thinking in the Second Language Classroom. On line article https://www.caslt.org/en/blog-design-thinking/

34. Svihla, V., Reeve, R., Sagy, O., & Kali, Y. (2015). A fingerprint pattern of supports for teachers' designing of technology-enhanced learning. Instructional Science, 43(2), 283–307. https://doi.org/10.1007/s11251-014-9342-5

35. Tschimmel, K. (2012). Design Thinking as an effective Toolkit for Innovation. In: Proceedings of the XXIII ISPIM Conference: Action for Innovation: Innovating from Experience. Barcelona. ISBN 978-952-265-243-0

36. UNESCO (2021). Recovering lost learning: what can be done quickly and at scale? UNESCO COVID-19. Education Response, Education Sector issue notes. Issue note n° 7.4 –June 2021
37. Vosniadou, S., Lawson, M. J., Van Deur, P., Wyra, M., & Jeffries, D. (2020). Pre-service teachers' belief systems regarding the importance of teaching students learning strategies: A conceptual change approach. International Journal of Educational Research, 99, 10149. http:// doi.org/10.1016/j.ijer.2019.101495
38. Weiner, S., Warr, M., & Mishra, P. (2020). Fostering system-level Perspective taking when designing for change in educational systems. TechTrends, 64(5), 779–788. https://doi.org/10.1007/s11528-020-00529-w
39. Wijnands, Astrid, van Rijt, Jimmy, Stoel, Gerhard, Coppen, Peter-Arno (2022). Balancing between uncertainty and control: Teaching reflective thinking about language in the classroom, Linguistics and Education, Volume 71, ISSN 0898-5898, https://doi.org/10.1016/j.linged.2022.101087