SUCCESS CASE GUIDE

critical
TECHVETLAB
thinking

TECHVETLAB: □a solution for postcovid‑19 laboral market through a technical training of vet students with obstacles

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INTRODUCTION

The Erasmus Plus Programme project "TECHVETLAB: A SOLUTION FOR POSTCOVID-19 LABORAL MARKET THROUGH A TECHNICAL TRAINING OF VET STUDENTS WITH OBSTACLES" has aimed to contribute to the development of tools for technology-oriented vocational training. The project has been carried out by a partnership made up of technology-based companies (Ikasia Technologies SL, Smallcodes SRL, Somática Materials & Solutions, W4A) and vocational training educational centers (1st Epalgematiko lykeio kato achaias, Lycée Charles et Adrien Dupuy, IES Enrique Tierno Galván) and experts in learning methodologies (RedTree Making Projects) from Spain, Italy, Greece and Portugal.

The central axis of the project is the methodology that we have called Being a part of it, BPI. At the beginning of a vocational training cycle, a group of students, ideally an entire classroom, participates in a project planned and directed by a technology company. The work is organized according to company methods, directed by a teacher in the classroom and by a technician from the company via telematics.

The work carried out with this methodology has proven to be very motivating for students both for their training at the school and in general for their professional life. In this sense, the fact that the work is proposed by a company based on innovation and is framed in one of its lines of business is an essential factor. The students have been immersed in the development of a new product, with a realistic goal. At the same time, they have realized that they are capable of contributing with their creativity to the results achieved by the group and, on the other hand, they have been aware of the importance of advancing in the acquisition of key competencies for their professional life, such as critical thinking applied to technological development. autonomous learning, group work techniques, linguistic competence, expressing oneself efficiently both orally and in writing, intellectual honesty, responsibility and others.

The BPI methodology is described and analysed in detail in the "Methodological Guide to Turning the Classroom into Part of a Company: From a Classroom to a Research Laboratory" [1]. In this document, we present the successful experiences of four pilot tests carried out within the framework of the project in two vocational training centres. At the end of the experience, a qualitative evaluation of the reception that the project has had in teachers and students has been carried out, and a quantitative evaluation of the motivation of the students in relation to the vocational training studies that they are starting, comparing with control groups in which the experience was not carried out.

BEEING A PART OF IT METHODOLOGY

The working methods in the company and in the educational centers are different and possibly it has to be so because of the training objectives of each area. This fact is very relevant in vocational training. Over the years, professionals who began their studies in a vocational training centre will have been trained in different areas during their activity in the companies in which they have worked, with or without the help of specialised courses. One of the problems recognised in the vocational training system and which is intended to be remedied by means of the new legislative changes, is the lack of accreditation of this non-regulated training.

First of all, it should be stated that in developing the BIS methodology, we do not think that business methods should be implemented in academic education. However, we do believe that it is necessary to take advantage of the complementarity of academic and business methodologies in the training of professionals. In this sense, it can be very positive to make students, at the beginning of their training cycle, see some brushstrokes of what a job in a technology company would be like and to do so with the most positive point of view, focusing on creativity, the capacity for innovation and the most cutting-edge technologies.

To put this idea into practice, the TECHVETLAB project relies on innovative companies. A project is set up as a collaboration between an educational institution and a company, possibly based in a different European country from that of the students. It is the company that prepares a project to be carried out by the students in the classroom, under the direction of their teacher and frequent contact with the company's tutor via telematics. The main objective of the project is framed within the company's lines of business and must seek a development in which the company is interested. It is considered important that students understand not only the immediate objective of the tasks they are going to carry out, but also how the project is immersed in the company's lines of innovation. The preparation of the work plan must be meticulous, but at the same time the work plan must be flexible in order to adapt to the reality of the students' progress in carrying out the planned activities. The advice of the teacher who will tutor the work in the classroom, to the person in the company who prepares the work schedule, can be key to the success of the project. In this sense, one of the results of TECHVETLAB is a guide for programming the project in the classroom that affects the development of students' critical thinking skills applied to professional work. The tasks of the work plan are divided into a series of subgroups in the classroom with defined tasks and a frequent follow-up of the results achieved in those tasks and the progress in achieving the objectives of the project is scheduled, with oral presentations by the different groups and discussion of the work with the tutor of the company. The management and coordination of the project and the work in the classroom is carried out using the educational management software "Techvetlab", developed within the framework of the Erasmus Plus project mentioned above [2].

Participation in these projects contributes to the advancement of students in the acquisition of basic secondary school competencies, as we have said before. This progress can vary greatly from one student to another and from one school to another in the European Union depending on the previous preparation, but the BPI methodology shows that in any case participation in one of these projects will show students the importance of acquiring these skills in order to be able to contribute to technological innovation in their professional lives. In this sense, these projects have turned out to be very motivating for the students for their studies at the VET educational center and their lifelong learning.

PILOT TEST

Four two-month pilot tests have been carried out during the implementation of the TECHVETLAB project. The programming of the projects has been carried out by two technology-based companies that are members of the TECHVETLAB partnership, one based in Portugal (Somática, Materials & Solutions) and the other in Spain (Ikasia Technologies SL), and the tests have been carried out in four vocational training centres, two in Greece (1st Epalgematiko Lykeio Kato Achais and EPAL Argous Orestikou). one in France (Lycée Charles et Adrien Dupuy- École de la Deuxième Chance - E2C Haute-Loire) and another in Spain (IES Enrique Tierno Galván). The projects have lasted 8 weeks and have involved a small group of students, selected for their interest in participation, knowledge of English and the studies in which they are enrolled.

Below is a brief description of the projects in which they have participated:
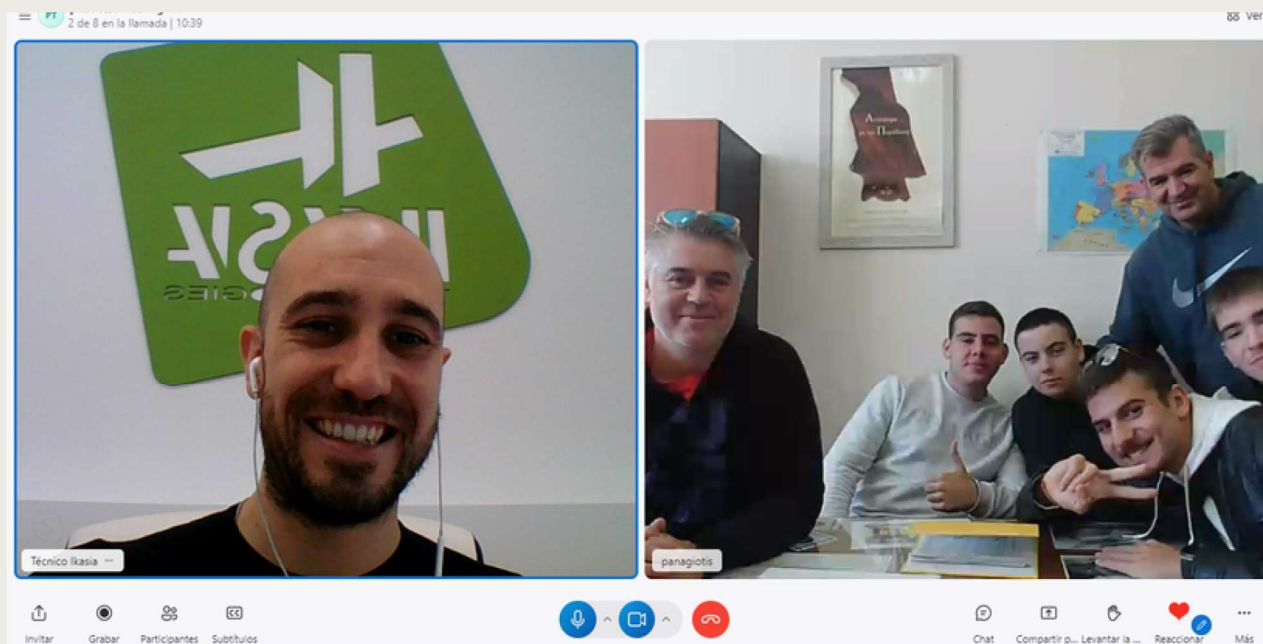
Simulation, design and probing of an electronic circuit

This project is part of the area of development of keyboards for industry, by Somatica, Materials & Solutions [3].Somatica is a technology-based company, created in 2007 as a spin-off of the University of Minho. The company's main goal was to develop electroactive materials to produce sensors and actuators. A few years later, the company began to develop and market keyboards for all industries, using different materials and technologies, as well as developing human-machine electronic interfaces (HMIs).

The technical problem raised is the design, construction and fine-tuning of a signal filtering circuit for a sensor that has a sinusoidal output that is intended to be read by an analog-to-digital converter (ADC), the sensor information is stored at a known frequency. However, sometimes the signal is contaminated by noise from many sources, such as sensor material components, network noise, or neighboring devices. Therefore, an interface circuit must be applied between the sensor and the respective ADC, which will provide digital control with the information provided by the sensor.

Within the work plan, students have to look for information about the filtering of electrical signals, the types of filters that exist and what each one is used for. In addition, they must come to understand how noisy signals are the result of a sum of many polluting frequencies.

An electronic system is usually built by assembling many circuits, each representing a small component of the entire device. In this case, we will be simulating, building, probing, and designing a PCB (printed circuit board) for filtering circuits, which receive a sinusoidal input signal and emit the filtered signal at the other end of the circuit. The work plan is organized into five blocks of tasks:

- Searching for information, organizing and understanding it.
- Selection and simulation of filtering circuits;
- PCB design of the circuits used;
- PCB Board Construction & Tuning
- Written reports and final oral presentation.

The project has been carried out in a group of first-year students of the Intermediate Level Training Cycle in Electrical and Automatic Installations at the Enrique Tierno Galván Secondary School in Moncada (Spain). The IES Enrique Tierno Galván de Moncada is part of the network of public schools managed by the Ministry of Education, Culture and Sport of the GVA. The IES has become a benchmark educational centre in the region of L'Horta Nord, with a talent project for students with great learning capacity, with the incorporation of basic German in the linguistic-humanistic baccalaureate modality and with a Singular Molecular Biology programme thanks to which students from the CFGS Diagnostic Laboratory carry out different polymerase chain reaction tests.
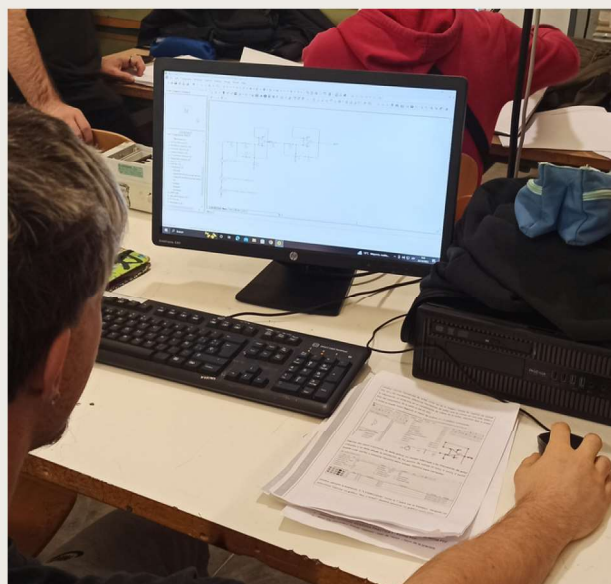
Design and development of a website capable of establishing Wi-Fi communication with a 3D printer and sending print control files at the user's request.

This project is related to the development of new 3D printing machines by the company Ikasia Technologies SL [4]. Ikasia Technologies is a Technology-Based Company established in 2015 as a spin-off of the Polytechnic University of Valencia and promoted by the Center for Biomaterials and Tissue Engineering, which makes available to the company both research results and talent and capacity. of its researchers. Ikasia's goal is to develop state-of-the-art technologies for the cost-effective mass production of complex materials, adapted to a wide range of applications, namely 3D, additive manufacturing, composite materials and biomaterials.

The printing of a part on a 3D printing machine is managed by a text file that can be transferred to the machine in different ways and contains all the instructions that the team needs to execute the part.
The project proposed to the students was to design and develop a website capable of establishing Wi-Fi communication with a 3D printer and sending text files at the user's request.

The students were commissioned to design and program a website that would meet the aforementioned requirements. All the parameters of the programming, language, communication protocols, architecture and interface design, among others, were defined and selected by the students, under the advice of the teacher and tutor of Ikasia Technologies. In addition to the regular communication between the students and the company's tutor, fortnightly meetings were held between all the students and the Ikasia tutor to discuss the development of the activities.

The result obtained was really valuable. In just 8 weeks, the students built a fully functional website and tested it with the 3D printing machines available at their school [5].

The objective of the internship was the simulation of a professional environment in a technology company. It was designed for students to acquire skills and experience useful in their preparation to enter the professional world. The activity was carried out by a group from the 61st Epalgematiko Lykeio Kato Achaias (Greece) and one at the EPAL Argous Orestikou (Greece), both in the second year of vocational training in the specialty of Computer Science.

1st Epalgematiko Lykeio Kato Achaias is a VET education center located in the municipality of Kato Achaia in the Achaea region (Western Greece), considered a benchmark in the planning and implementation of international education projects in the region.

The training they offer to their students is aimed at promoting technology and its applications in all professional fields. They believe that the future is intertwined with technological development. For this reason, they combine vocational training with technology, believing that it is the path to a successful career in the complex world in which we live.
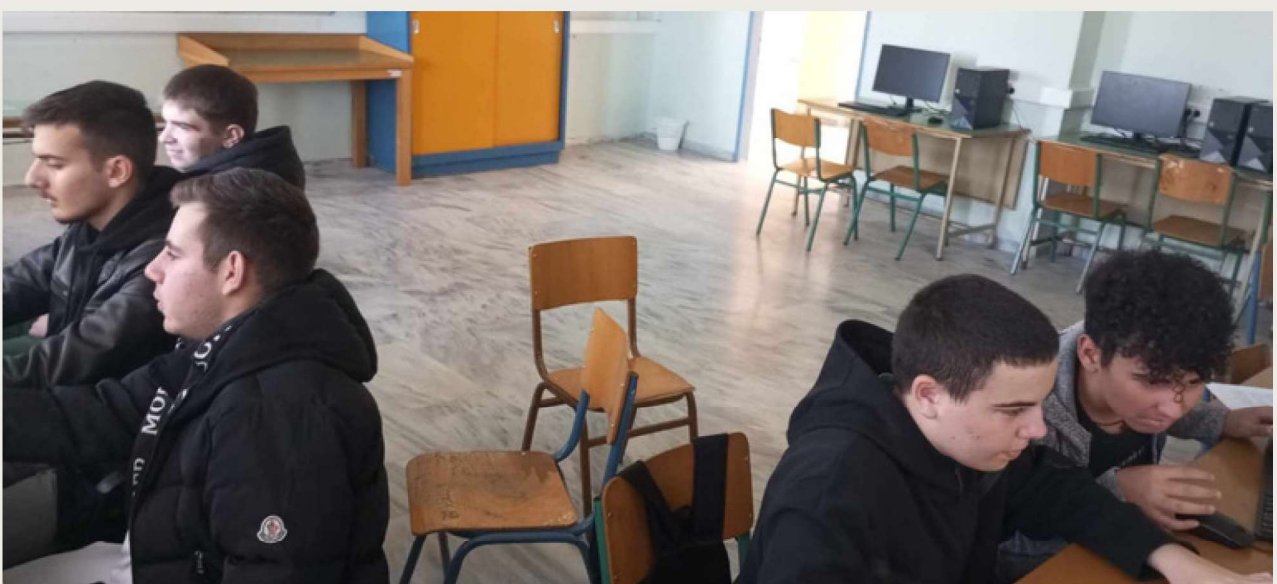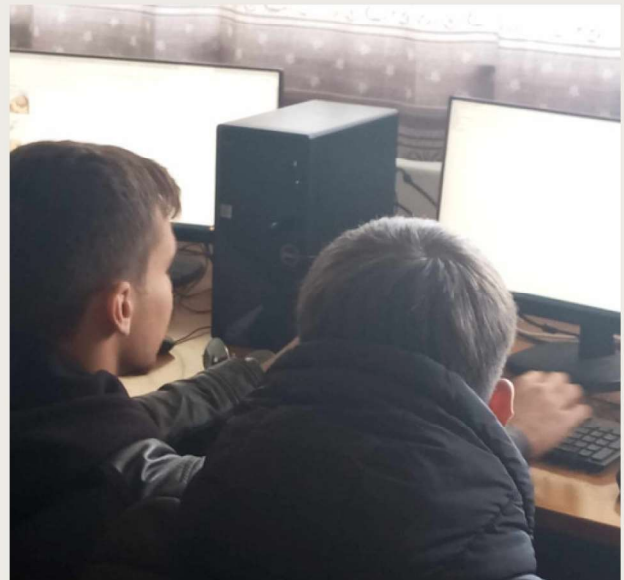
EPAL Argous Orestkiou is a public VET educational center located in the city of Argos Orestikos, Greece. We are a public vocational high school located in the town of Argos Orestikos.

It is located in a state-of-the-art building complex with fully functional laboratories where students from the departments of mechanical engineering, health wellness, and wellness are concentrated.
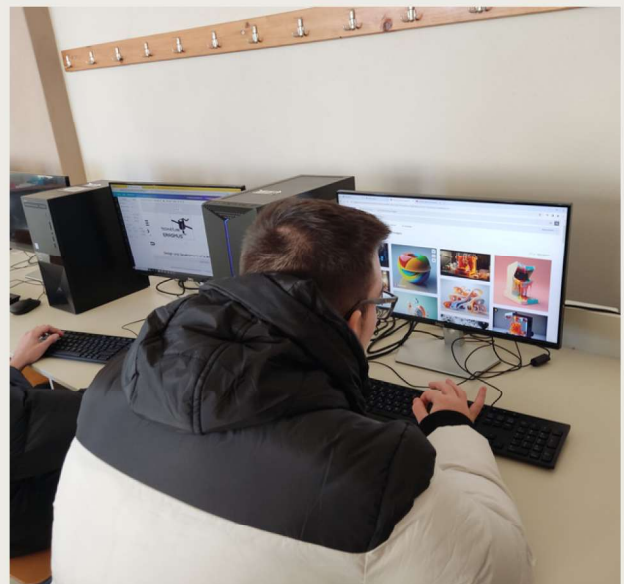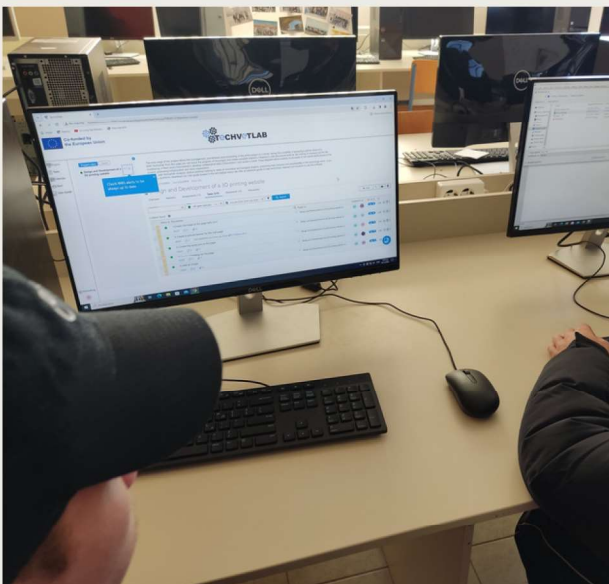
Construction set. 3D design and prototyping

The objective of this project, prepared by Ikasia Technologies, is the design and manufacture of a prototype of a toy along the same lines as the "Meccano". These are perforated pieces that are joined together with screws and nuts to form a variety of models. Students are asked to adapt this toy for young children, between 4 and 8 years old. To do this, the pieces must be made of plastic, in attractive colors, somewhat larger than those of the Meccano, but not too big, with a joining system that can be of screws and nuts, but it is preferable to look for alternatives that are easier for the little ones. A small number of parts were designed for the pilot test. These parts were designed in a 3D computer-aided design application. The 3D models were used to generate the printing files for a 3D printer by melting plastic filaments. With these files, the parts were printed on the Ikasia Technologies machines.

The project was carried out at the Lycee Charles et Adrien Dupuy School Of Deuxième Chance - E2c Haute-Loire (France).

This is a second chance centre located in Le puy en Velay (France) with independent operation, but legally dependent on the Lycée Charles et Adrien Dupuy. It was created in 2006 with the aim of ensuring the professional and social integration of young people aged 16 to 29 in a situation of serious exclusion. They accompany and support these young people, offering them mechanisms to ensure their social and professional inclusion, allowing them to regain confidence in their ability to act, find a job, find a work contract and access higher levels of training.

SUCCESS CASES

Qualitative evaluation of pilot tests.

Below are the evaluations made by some of the students, teachers and tutors who have participated in the pilot tests:

Anastasia Efopoulou – ICT Educational Innovation Lab. Regional Directorate of Primary and Secondary Education of Western Macedonia

"My experience of participating as an instructor-coordinator of the pilot test was extremely interesting and pleasant for me. At first, I saw it as a challenge, as a problem that we had to solve with the students, to work as if we were professionals in an IT company and using specialized project management software, to finally make a website that communicates with the 3D printer. The use and familiarization with the project management software was a very important experience for the students as such environments are used in large companies and will be an additional qualification for them when they find themselves in the professional field.

The most gratifying thing is that the students responded with great interest and understood its importance, a fact that is also reflected in the texts they wrote at the end expressing their opinion about the project. Thanks for the nice collaboration."

Georgia Andreopoulou – Teacher EPAL ARGOUS ORESTIKOU

"The construction of the page and the connecting with a 3d printer was a challenge for me and the students. The students showed great interest from the beginning. The Project developed smoothly because the goals we set were few, appropriate and easy. The students participated enthusiastically and worked individually and as a team to complete the Project with very little help from us. They engaged in the activities without difficulty and at the end of the hour we commented on what they could improve. The point they found difficult but more interesting was the connection the button to the 3d printer. In conclusion, both I and the students were pleased and satisfied with the achievement of the goals and we are waiting for the next project."
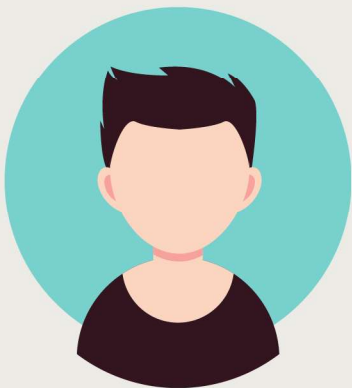
Thomas Papaefthymiou – Student of EPAL ARGOUS ORESTIKOU

"This project was ok for me because it was just different from all the different projects I've done in the past that involve computer studies and I have to say it's a better because how it keeps getting a bit fun because how it's starting to be … and more structured. Also I would love to visit you one time and it would be real nice if you gave us more projects because they are more enjoyable than the one we are doing at school."

Stefanos Avtzoglou – student EPAL ARGOUS ORESTIKOU

"I really liked working on this project and would love to do more similar projects. The experience fueled my passion for such projects and I look forward to contributing to more projects in the future."

Theofanis Afkos – student EPAL ARGOUS ORESTIKOU

"It was a good experience for me because it has a lot of things to do this project."

Stamatis Triantafyllou – student of EPAL ARGOUS ORESTIKOU

"It was very useful experience and we want to do more things like this project."

Efthymios Karapinas – student EPAL ARGOUS ORESTIKOU

"It was pleasant and useful and I want to go to Spain."

Luis Amaro Ribeiro Martins – tutor Ikasia Technologies SL

"I deem the pilot tests carried on very successful. The students were presented an opportunity to have a first experience on what would be working in a tech company. A challenge they took enthusiastically and successfully, on occasions even surpassing our expectations. It was equality fulfilling for the teachers to be able to guide and orient their students during the tests tasks and better prepare them for future challenges they may face.

I personally think these activities are very important for the students in preparing them for their future labor experience. Not only prepares them for the technical challenges but more so for the mental ones. Facing a challenge, a new environment, and sometimes both, can be difficult to manage. Acquiring the skillset and experience to easily and calmly face these challenges takes time. Being able to face them from a mixed scenario of new challenges and colleagues but with their own class and teacher puts them in comfortable place where they can absorb the novelty of the experience while simultaneously having the security of their know classroom.

This enriching experience will leave the students better prepared and experienced in facing the demands and novelty of the labor world. Taking challenges and changes with enthusiasm and confidence."

Kollias Giannis – student 1st EPALGEMATIC Lykeio Kato Achaias

"My experience with Techvetlab was vey nice because we use our skills to create a very nice application and finished it succesfully without any problems"

Zafeiris Katsaitis – student 1st Epalgematiko Lykeio Kato Achaias

"My experience with Ikasia was very fun and exciting because we used our skills to create a very nice application which actually ended up very good. finally i enjoed with the other people and i would love to do somthing similar to this."
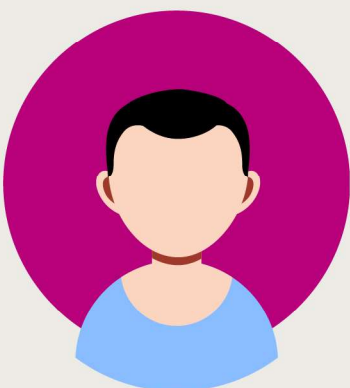
Nikolaidis Panagiotis – student 1st Epalgematist Lykeio Kato Achaias

"My experience was exciting. i like to say that this project make my knowledge better"

Aggelos Verras – student 1st Epalgematist Lykeio Kato Achaias

"I have worked with ikasia in the past so i decided to grab the opportunity to collaborate with them again. through the task they gave us. i practise my web developing skills and i also develop my team spirit because we work as teams."

Teacher IES Enrique Tierno Galván

"The project began with enthusiasm and the idea of overcoming obstacles, as it has been. The idea of organizing the different points of a project by means of a computer program undoubtedly catches the attention of the student and motivates them in its development. If we add to this the fact that they have always kept in mind that the results were received by a Portuguese company, it adds an even greater incentive."
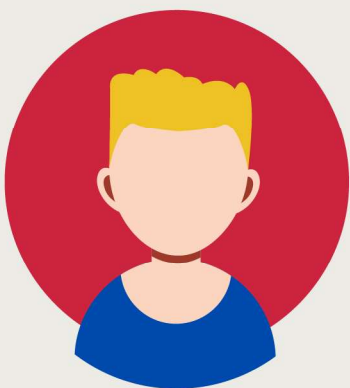
Student IES Enrique Tierno Galván

"I liked it. I think it's been helpful. I would recommend especially if you like to do research, it's a good way to reinforce it."

Student IES Enrique Tierno Galván

"I liked it. I think it's been helpful because I've discovered something new and interesting. I would recommend it because it is a new and entertaining process so other people may like it and discover something new."

Student IES Enrique Tierno Galván

"I liked it because it was different from what we teach in class. I think it's been helpful because you learn new things and I would recommend the process."

Student IES Enrique Tierno Galván

"I liked it. I think it's been helpful. I would recommend it."

Quantitative evaluation of students' motivation after completing the project.

The "Being a part of it" methodology, BPI, as well as other project-based teaching methods or case analysis, such as Case-based learning (CBL), are expected to promote in students a special motivation for learning. They are also expected to develop transversal skills such as autonomous learning techniques, group work, oral and written expression, critical thinking and others that will be important in their vocational training studies and in their subsequent professional career.

That is why we propose the application of this methodology at the beginning of vocational training studies. The students of a VET classroom, led by their teacher, carried out an engineering project proposed and supervised by a technology company, as if they were a development department of the company.

The pilot tests carried out in four vocational training centres in France, Greece and Spain that were carried out at the beginning of the 2023-2024 academic year have been an opportunity to carry out an evaluation of how being immersed in this project for a while generates in students an additional motivation towards VET studies and in general towards technological innovation.

The study and evaluation of motivation in students at any level of education is a basic aspect of the educational process, since a large part of the success in the teaching-learning process depends on factors related to motivation [6]. In order to be conclusive about the effectiveness of a specific methodology, the analysis of student motivation requires a model that articulates the evaluation. In this sense, the ACRS (Attention, Confidence, Relevance, Satisfaction) model proposed by Keller in 2010 provides an evaluation structure based on his conception of motivational learning design. This procedure allows the teacher to analyze the student's motivation in response to the introduction of a certain teaching material. The procedure is applicable to students from different educational systems, from secondary to university [7] [8]. The model proposes four fundamental elements in motivation: attention, trust, relevance and satisfaction. The attention element refers to how the methodology or teaching materials are able to capture the curiosity, enthusiasm and interest of the students, making the student have an active attitude towards learning due to the novelty it means for him. Relevance has to do with how the student connects teaching materials and methods to their learning needs, their goals and previous experiences and also to their preferences in relation to studying. Confidence has to do with the feeling of personal control and the success that is expected to be obtained at the end of the learning process with the methodology that is used. Satisfaction refers to the positivity with which the student approaches the learning process.

These four fields of analysis are evaluated by means of a survey in which the student is presented with a series of statements with which they show their agreement or disagreement with a numerical value from 1 to 5. Some of these questions refer to each of the fields in such a way that they finally arrive at a numerical value and an uncertainty for each of the fields that allow the results of an analysis group to be compared with a control group.

Hypothesis

The hypothesis of the study is that the fact of starting vocational training studies by participating in a development project proposed by a company will be an important motivating factor for students for their future studies at the vocational training center and their future career.

Method. Study Design

The study included, in each of the centers, a group that had carried out the pilot test with the BPI methodology and a control group of the same educational level. The answers were anonymized and the answers corresponding to the analysis group and the control group were collected in two sealed envelopes.

The study sought to answer the question: Does the fact of having carried out the internship following the BPI methodology positively influence the student's motivation for their vocational training studies?

It was based on a survey of 34 questions, following the ACRS model of the "Course Interest Survey" (Keller 2010), adapting the language of the questions posed to the level of studies corresponding to the beginning of vocational training studies. Responses are rated as follows: 1: strongly disagree, 2: strongly disagree, 3: somewhat agree, 4: strongly agree, 5 strongly agree
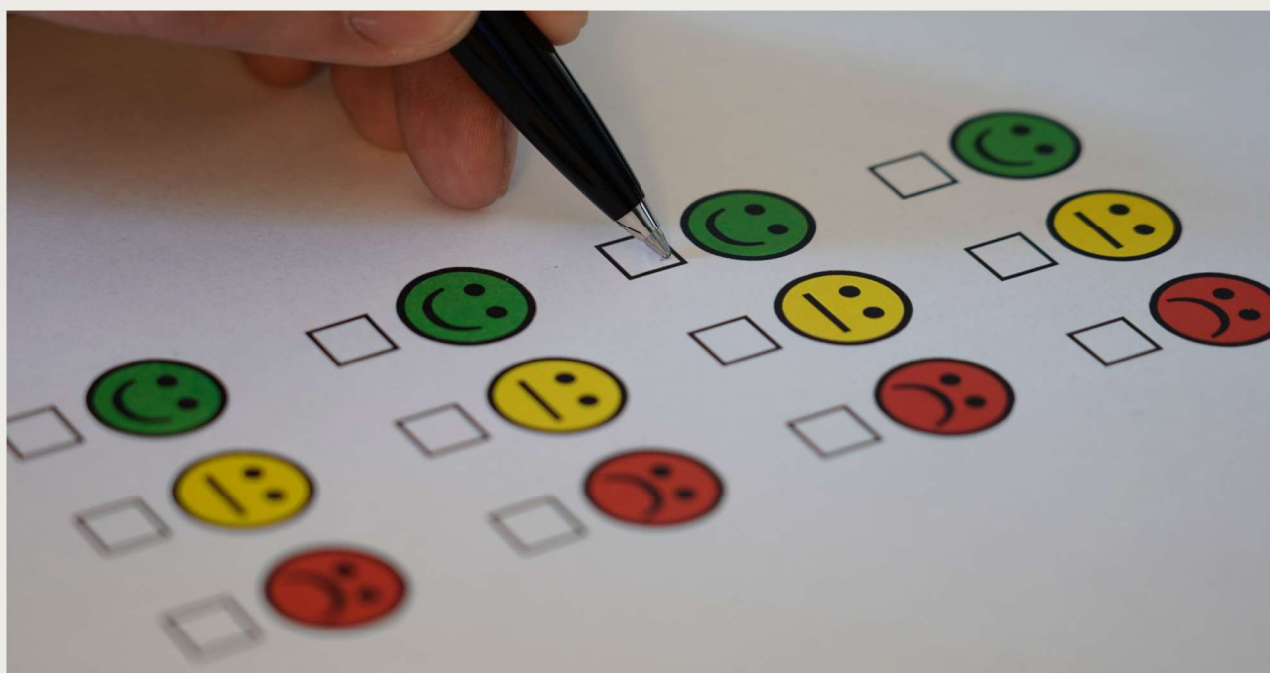
	1	2	3	4	5
1. The instructor knows how to make us feel enthusiastic about the subject matter of this course.					
2. The things I am learning in this VET course will be useful to me.					
3. I feel confident that I will do well in this VET course.					
4. This class has very little in it that captures my attention.					
5. The teachers make the subject matter of this VET course seem important.					
6. You have to be lucky to get good grades in this course.					
7. I have to work too hard to succeed in this course.					
8. I do NOT see how the content of this VET course relates to anything I already know.					
9. Whether or not I succeed in this VET course is up to me.					
10. The teachers create suspense when building up to a point.					
11. The subject matter of this VET course is just too difficult for me.					
12. I feel that this course gives me a lot of satisfaction.					
13. In this class, I try to set and achieve high standards of excellence.					
14. I feel that the grades or other recognition I receive are fair compared to other students					
15. The students in this class seem curious about the subject matter.					
16. I enjoy working for this course.					
17. It is difficult to predict what grade the teachers will give my assignments.					
18. I am pleased with the instructor's evaluations of my work compared to how well I think I have done.					
19. I feel satisfied with what I am getting from this course.					
20. The content of this course relates to my expectations and goals.					
21. The teachers does unusual or surprising things that are interesting.					
22. The students actively participate in this class.					
23. To accomplish my goals, it is important that I do well in this course.					
24. The teachers use an interesting variety of teaching techniques.					
25. I do NOT think I will benefit much from this course.					
26. I often daydream while in this class.					
27. As I am taking this class, I believe that I can succeed if I try hard enough.					
28. The personal benefits of VET studies are clear to me.					
29. My curiosity is often stimulated by the questions asked or the problems given on the subject matter in this class.					
30. I find the challenge level in this course to be about right: neither too easy not too hard.					
31. I feel rather disappointed with this VET course.					
32. I feel that I get enough recognition of my work in this course by means of grades, comments, or other feedback.					
33. The amount of work I have to do is appropriate for this type of course.					
34. I get enough feedback to know how well I am doing.					

Guide to Course Interest Survey Evaluation

| Attention	Relevance	Confidence	Satisfaction
1	2	3	7(reverse)
2 (reverse)	5	6 (reverse)	12
10	8 (reverse)	9	14
15	13	11 (reverse)	16
21	20	17 (reverse)	18
24	22	27	19
26 (reverse)	23	30	31 (reverse)
29	25 (reverse)	34	32
	28		33
* There are questions posed in negative form, the assigned values should be taken in reverse order, i.e. 1 is 5, 2 is 4 3 is 3, 4 is 2 and 5 is 1.			

Statistical analysis

Mean values of the scores assigned by the students were used, obtaining an assessment for each of the fields and the sum of the four was considered the final assessment of motivation. Each school that participated in the pilot tests contributed two sets of data. One of the students who participated in the "practical-BPI" test, and another of the same students who did not participate in the "control" pilot test. The students in the control group were either from the same class as those who participated in the practice or, in the case where the pilot test was carried out in the classroom as a whole, the control group was defined as students from a group that coincided in the center, course, teacher and field of study with which the practice was carried out.

IInitially, a Shapiro-Wilk test was performed to check normality. All groups passed the test. A two-way analysis of variance (ANOVA) followed by Sidak's multiple comparisons test was performed to find statistically relevant differences between the " Results" and " control" for each of the categories indicated. The p-value threshold was set at < 0.1 to consider the results to be statistically relevant.

Results

Figures 1 to 3 show the comparison of the survey results in the four fields of motivation analysis. In general, it can be said that in all fields the average value of the scores of the students who participated in the pilot test is higher than in the control groups.

Thanks to this evaluation, we can affirm that the BPI methodology effectively manages to motivate VET students, especially in terms of how the student connects the teaching materials and methods with their learning needs, their objectives and previous experiences and also with their preferences in relation to study (Relevance) and the feeling of personal control and the success that is expected to be obtained at the end of the learning process with the BIS (trust) methodology.
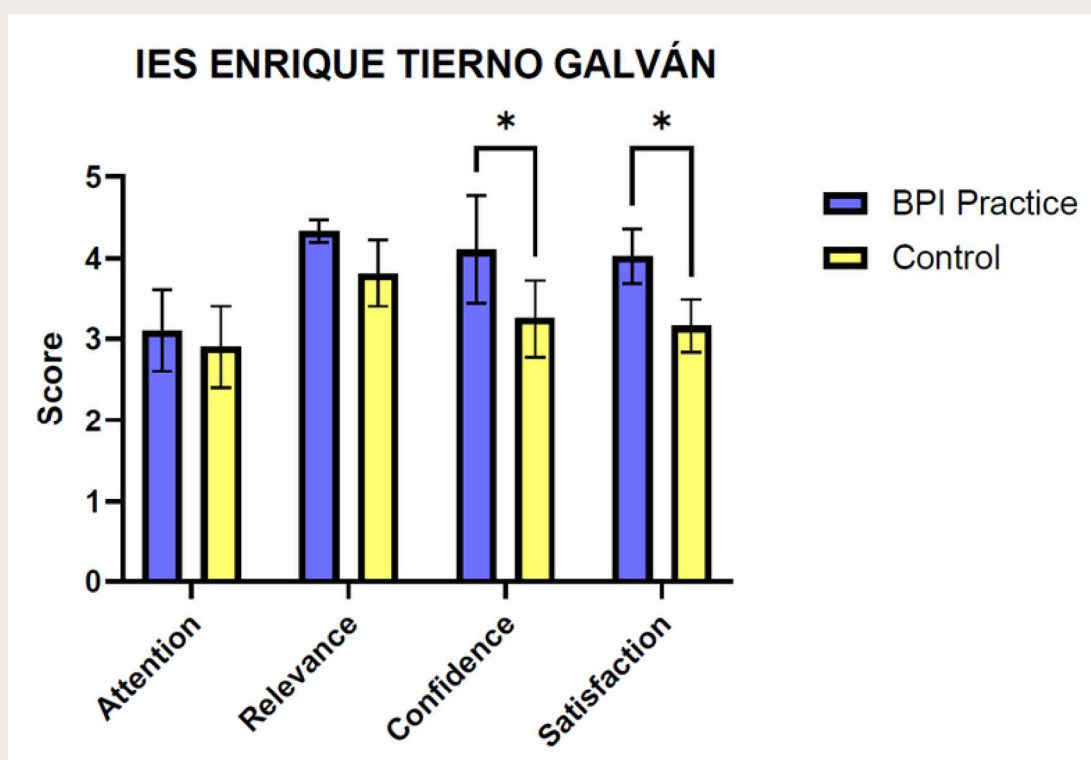
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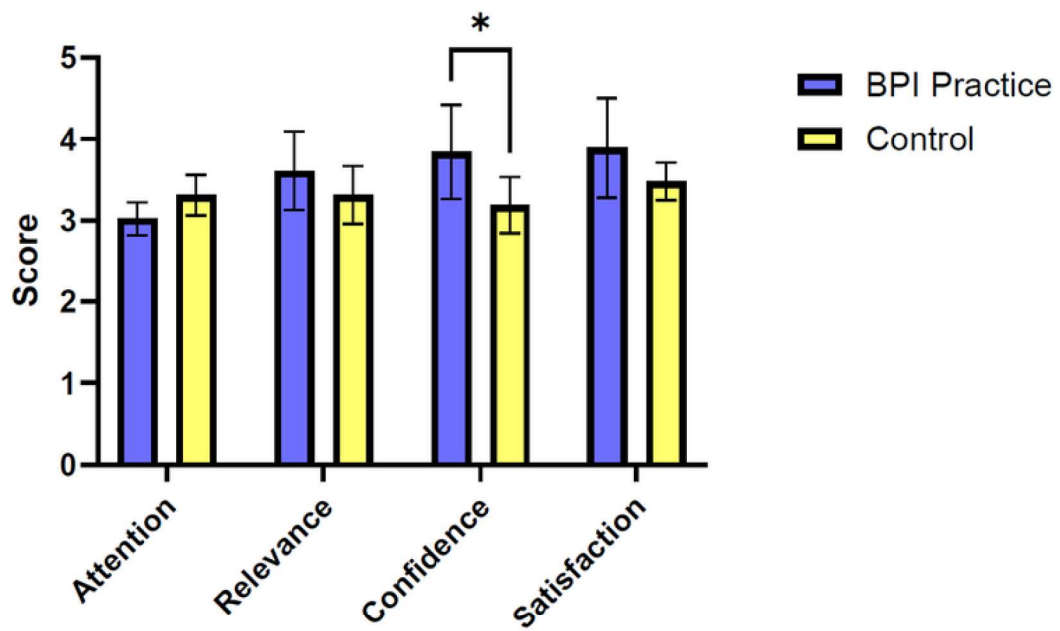
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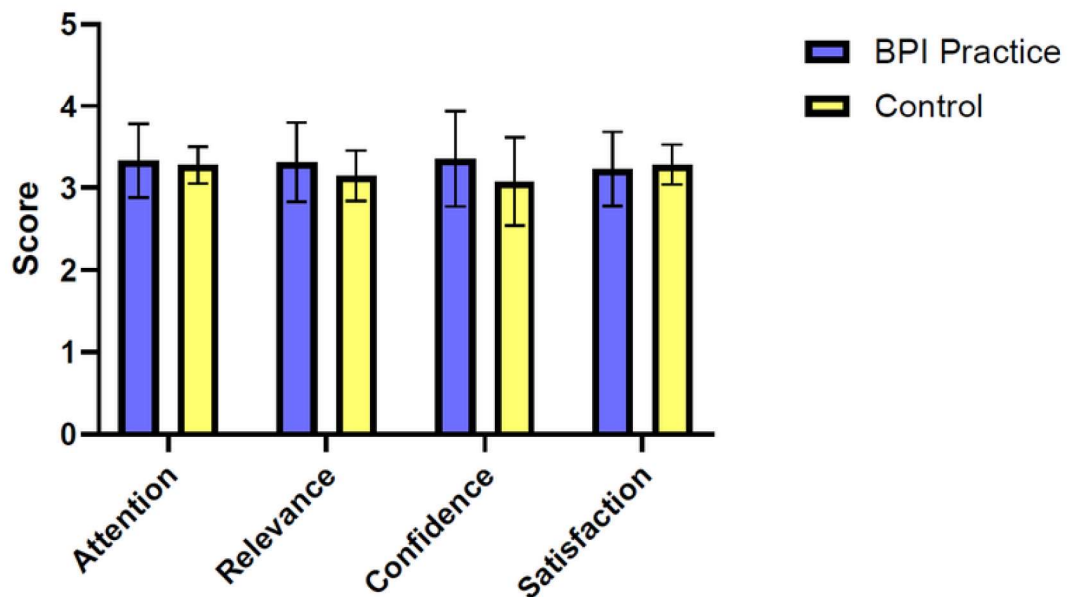
REFERENCES

[1] L. Gómez Estrada et al. (2022). Methodological guide to turning the classroom into a part of a company: from a classroom to a research lab "Being a Part of It". The Erasmus Plus Programme project "TECHVETLAB: A SOLUTION FOR POSTCOVID-19 LABORAL MARKET THROUGH A TECHNICAL TRAINING OF VET STUDENTS WITH OBSTACLES" has aimed to contribute to the development of tools for technology-oriented vocational training. The project has been carried out by a partnership made up of technology-based companies (Ikasia Technologies SL, Smallcodes SRL, Somática Materials & Solutions, W4A) and vocational training educational centers (1st Epalgematiko lykeio kato achaias, Lycée Charles et Adrien Dupuy, IES Enrique Tierno Galván) and experts in learning methodologies (RedTree Making Projects) from Spain, Italy, Greece and Portugal.

[2] Erasmus Plus Programme project 2021-1-ES01-KA220-VET-000029545 «techvetlab: a solution for postcovid-19 labor market through a technical training of VET students with obstacles». The Erasmus Plus Programme project "TECHVETLAB: A SOLUTION FOR POSTCOVID-19 LABORAL MARKET THROUGH A TECHNICAL TRAINING OF VET STUDENTS WITH OBSTACLES" has aimed to contribute to the development of tools for technology-oriented vocational training. The project has been carried out by a partnership made up of technology-based companies (Ikasia Technologies SL, Smallcodes SRL, Somática Materials & Solutions, W4A) and vocational training educational centers (1st Epalgematiko lykeio kato achaias, Lycée Charles et Adrien Dupuy, IES Enrique Tierno Galván) and experts in learning methodologies (RedTree Making Projects) from Spain, Italy, Greece and Portugal.

[3] https://www.somatica.pt/

[4] Hutp://www.iksia.es/

[5] Project developed by EPAL Argous Orestikou: https://sites.google.com/view/3dprintingwebsite/

[6] Reigeluth, C.M. Instructional Theory and Technology for the New Paradigm of Education. Rev. Educ. Distancia RED 2012, 32, 1–18. Available online: https://revistas.um.es/red/article/view/270781 (accessed on 30 May 2023).

[7] Keller, J.M. Motivational Design for Learning and Performance: The ARCS Model Approach; Springer: Berlin/Heidelberg, Germany, 2010.

[8] Rodríguez-Bailón, M.; Fernández-Solano, A.J.; Merchán Baezo, J.A.; Vidaña-Moya L. From Clinical Practice to the Classroom. Advantages and Disadvantages of Video and Paper Cases on the Motivation and Clinical Reasoning of Occupational Therapy Students, Int J Environ Res Public Health 2021, 18, 9671 https:// doi.org/10.3390/ijerph18189671

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