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Optimizing distance learning educational programs research project. Results and lesson learned from the conduction of university courses

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Abstract

Purpose – Optimizing Distance Learning Educational Programs Research Project (ODLEP) aimed at increasing the performance of educational courses by creating the best students' groups and assigning to them the most appropriate instructor. The present study sought to explore the link and correlation that may exist among the attributes and characteristics of students, their learning and teaching preferences with the course performance. Four questionnaires were constructed for the purpose of the study.

Design/methodology/approach – The ODLEP approach was implemented in the context of the provision of 12 university courses. The questionnaires captured the students' and instructors' learning and teaching preferences and their personality traits and the final assessment of the courses conducted. A significant number of students from 12 different courses of the undergraduate and postgraduate curriculum of the partnering universities participated in the survey. The responses were recorded in an SPSS database. Two types of analyses were performed. The first one involved descriptive statistics analysis and the second one involved correlation analysis using the crosstab method.

Findings – It became evident that the ODLEP approach led to optimized performance of the courses and specifically in the case where the groups of students were created and assigned to the optimum instructor based on personality traits, learning and teaching preferences.

Originality/value – It is the first time that a system creates collaborative groups of students and assign them to appropriate instructors based on psychometric test, learning and teaching preferences and multicriteria decision analysis.

Keywords ODLEP research project, Personality characteristics, Learning preferences, Teaching preferences, University students

Paper type Research article

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Introduction

Quality education in a virtual academic environment that fosters student progression and development is a fundamental objective of distance learning. It should be mentioned that the concept of distance learning first emerged in the 1970s, but in the Web 2.0 age, it truly became a competitive alternative to traditional schooling (Nikiforos *et al.*, 2020). One of the main goals of remote learning is to provide high-quality instruction in a virtual learning environment that encourages student growth and achievement. It becomes evident that online education needs to become more resilient (Aretoulis *et al.*, 2023a).

Nowadays, the conventional face-to-face method of teaching and learning is being supplemented by distance education, which is becoming more prevalent in the contemporary educational system. Due to the unique circumstances the educational community encountered during the COVID-19 pandemic, as well as new technologies like video conferencing that made the procedure easier, distance education has changed quickly. Because they have been well-established tools for a number of years, the digital environments (for video conferencing, shared writing, chat, forums and more) have been used extensively during the pandemic (Benassi and Mosa, 2022).

Moreover, numerous qualities and traits are defined by the need for a resilient educational system. Among them are the following (Aretoulis *et al.*, 2023b): flexibility, outreach, digital capabilities and students' and teachers' focused system. It is essential to mention that the face-to-face classroom is replaced in a remote education course with electronic communication systems. The potential of creating more engaging classrooms that promote learning communities is presented by distance learning. The objective is to establish a successful, transparent and Web-based individualized connection with students. Currently, there is a significant shift in the learning environment (Aretoulis *et al.*, 2024a).

According to Starr's (1998) prediction, institutions have long engaged communities. Distance education systems also look at diversity, inclusive systems and social elements. Lauzon (2000) endorsed the idea of viewing distant education as a community of practice that must recognize and accommodate differences. Programs for distance learning are an essential component of education. Distance education, however, "is moving faster than our empirical understanding of e-learning" (Welsh *et al.*, 2003). Aiming to improve distance learning programs in Greece, Romania, Italy and Serbia, the project "Optimizing Distance Learning Educational Programs" (ODLEP) seeks to understand the human factors that contribute to successful distance learning experiences.

ODLEP is a research project completed in June 2025. The preliminary results indicate that distance learning is of interest to almost all educators and students. There is, therefore, a need to delineate how educators and students think about distance learning, what their expectations are and how they prefer to deliver and acquire knowledge and training. This is achieved by developing a novel framework for choosing the best instructor for a particular group of students to create a competent and successful online distance learning program. The project's more focused objectives include a thorough, methodical evaluation of the qualities, teaching styles, abilities and preferences of educators as well as the qualities that students believe make the best instructors or educators for online courses in the countries of the partners. Knowledge of these factors will facilitate the best possible match between students and instructors in online courses and will contribute to successful distant learning experiences.

The following sections include an extensive literature review, and then a description of ODLEP's Conduction of Courses. Then follows the methodological approach along with the platform testing through courses and the design of the evaluation questionnaires. In addition, results regarding the students' evaluation of the course and the correlation analyses' results and instructors' evaluation are presented. Finally, analyses' findings aiming to optimize the efficiency of ODLEP approach and conclusions and further research are analyzed.

Literature review

The following research examines whether distance learning is a brand-new, fantastic way to enhance and expand educational opportunities. The topic of the study asks whether distance learning is a novel and troublesome instrument that will have a detrimental effect on the educational experience if it is not handled properly. The paper's main goal is to strike a balance between traditional and distance learning. The study highlights the benefits and drawbacks of implementing distance learning in a number of areas, with a focus on educational access (Rockenbach and Almagno, 2013).

Better interactive classrooms that promote learning communities can be created through distance learning (Flugrad *et al.*, 2000). According to Boticario's and Gaudioso's (2000) effort, the Web can successfully facilitate transparent and effective tailored interactions with users and students. It is significant that this is based on dynamically produced HTML and can be done without the need for specialized tools. At the same time, within the context of distance learning, the development of supportive and collaborative behavior among remote site students' needs to be further studied as it appears to be a significant factor (Fillion *et al.*, 1999).

The second factor to be looked at in the context of distant learning is its social component. According to Brower and Klay (2018), student socialization is essential. The socialization processes of upcoming generations of public employees are being reexamined as a result of new electronic technologies. Essentially, distance technologies are making it necessary to consider more effective ways to communicate the values of public service.

Libraries also play a role in facilitating this distant access to education. The services provided by distance education libraries must concentrate on acclimating students to the information system to achieve autonomy. Searching involves core processes. These resource-finding and identification tasks are part of particular academic disciplines and must be taught alongside substantive knowledge (George and Love, 1955).

One of the first to establish the framework for the success criteria for distance learning was Brigham (1992). Investigating the course development process in a particular online education setting was the goal of this exploratory project. At Syracuse University, a sizable private university in Central New York State, the study aimed to determine the variables and connections between variables that support and hinder the growth of remote learning programs.

Aretoulis *et al*. (2024a-d) made an extensive literature review regarding distance education. The analysis made it clear that distance education, particularly during COVID-19, was an important tool, more precisely, a crucial tool that has the capacity to revolutionize the educational process. It was able to do so quickly in the years that followed COVID-19. Looking at the people who are participating in the implementation of distant education programs, the analysis highlighted the fact that all these partners hail from a wide diversity of scientific domains. Together with psychologists, Website designers, application/software programmers and communication technology specialists, individuals with subject-matter expertise were able to form teams that supported this new teaching and learning environment.

Learning and teaching styles associated with distance education is the subject of the next paper. The modern educational landscape has been completely transformed by distance learning. Students are critical participants. The objective is to make education and learning in general effective, inclusive and accessible to all without regard to time, location or other constraints. Students' learning preferences are the main focus of the current research, which looks for the most effective ways to impart knowledge. In this case, instructors with enough expertise were given a similar structured questionnaire with 17 different learning styles. The following phrases could be used to summarize the most popular learning styles (Aretoulis *et al.*, 2024b):

(1) I can better conceive the instructional material through performing the practical, experimental and object manipulation via something more of a physical process (simulated or real).

(2) I have preference for tasks, projects and situations that require creation, formulation, planning of ideas, strategies. I like to decide what to do and how to do it, rather than to be told.

In other words, the two preferred learning styles could also be stated as follows (Aretoulis *et al.*, 2024b):

(1) Kinesthetic sensory-movement styles

(2) Legislative

Furthermore, research is continuously recording feedback regarding the distance learning developments. In this context, preliminary descriptive data on the ODLEP project had been gathered at the time of the study, and the pertinent literature had been examined and condensed. According to these analyses, most instructors and students have engaged in distant learning processes, and they believe them to be successful. Although instructors' comments indicate that their computer knowledge and other pertinent technical skills are above average, there is still a lack of certification for remote education programs. However, half of the students claimed to have below-average computer abilities, which could make it difficult for them to participate in online classes. It appeared that both faculty members and students are eager to attempt novel methods of instruction and learning (Aretoulis *et al.*, 2024c).

In relation to the evolving notion of education and the use of ICT in remote learning, Semradova and Hubackova (2016) were able to document varying degrees of accountability as well as trends in the perception of teacher duty. In their writings, students and aspiring educators share their belief that if a teacher is also the author of a distance learning course, their responsibility for integrating ICT into the classroom is equal to or greater than that of a teacher. According to the instructors, traditional face-to-face instruction typically entails more responsibility than online learning.

The purpose of the current study is to use educational data mining and an online questionnaire to conduct a comprehensive assessment of students' behaviors and perceptions to evaluate the quality of online academic courses. Instructional, communication, course workload and overall learning experience were the four areas of focus for the assessment (Soffer *et al.*, 2017).

In the next study, the questionnaire survey managed to collect data regarding participants' profiles and distance education preferences. The findings indicate that gender influences several preferences regarding distance educational programs and the students' experience within an online course. A number of highlights of the current findings focus on the learning styles. Male students prefer listening and oral teaching methods more than female students. Both male and female students have a preference for tasks, projects and situations that lend themselves to great flexibility of approaches, and to trying anything when, where and how they please (work asystematic or even antisystematic) (Aretoulis *et al.*, 2024d).

It is essential to note that according to Fornaciari, Forte and Mathews (Fornaciari *et al.*, 1999) not every institution can use every available method of distance learning. It is imperative that the equivalency of learning experiences should serve as the cornerstone of distant learning (Simonson *et al.*, 1999, 2011). In this context, a successful online course includes an association among creating and overseeing the course and instructing staff with content-area competence, methodological skills in managing online courses and technological competence to offer students technical support (Trentin and Scimeca, 1999).

ODLEP and the conduction of courses

The project "Optimizing Distance Learning Educational Programs" (ODLEP) aimed to understand the human factors that contribute to successful distance learning experiences and to boost the distance educational programs in Greece, Romania, Italy and Serbia by creating an innovative framework for selecting the most suitable instructor for a given group of students for

a competent and effective online distance learning program. More specific aims of the project included the detailed systematic assessment of the required characteristics for the most suitable instructor/educator for online class/course in the partners' countries as perceived by students and the characteristics, teaching styles, skills and preferences of the educators. The next aim included the formulation of a procedure for evaluating, scoring and summarizing all aspects of the instructors' profile, so that the desired characteristics for each candidate instructor can be easily and readily assessed. Subsequently, and based on the synthesis of the course/class students, the proposed framework would facilitate the ranking of available instructors, based on multicriteria analysis approaches, to select the optimum instructor. An online platform had put into practice the above-described ODLEP's approach (Aretoulis *et al*., 2024d).

University courses implementation is extremely significant and is a cornerstone of the ODLEP project. The project implemented a number of courses (twelve courses). The courses were implemented in each of the participating institutions. The goal was to apply the proposed ODLEP approach in real-life educational activities and examine the performance of the proposed methodology. As the courses progressed during the winter semester of 2024, all participants were continuously observing the operational aspects of the approach and tried to identify the advantages and disadvantages associated with the ODLEP implementation, as well as record the best practices.

In this context, the whole implementation was really carefully designed. A lot of planning and effort took place to make sure that courses covered a variety of instructors, students and educational environments. ODLEP partners implemented the project in 11 courses and one workshop (12 in total).

A carefully designed approach enabled the partnership to include both postgraduate and graduate courses, either online or in person. Furthermore, the selection of courses enabled the implementation to cover various scientific fields and course subjects with different perspectives. Some courses were more practical, while others were more theoretical in nature. One more positive development was relevant to the background of students. The courses included students of a wide range of ages. There was a pool of students that spanned from freshmen in the university till experienced professionals in the postgraduate courses. In the context of implementing the courses four novel questionnaires were employed, two for students and additional two for instructors, at the initial implementation of ODLEP and at the assessment/evaluation stage.

The ODLEP research project was implemented in many institutions. The six partners implemented the methodology within their universities/institutions. The Project Partners that participated included the following:

(1) University of Macedonia (UOM) (Greece)

(2) Aristotle University of Thessaloniki (AUTH) (Greece)

(3) University of Ioannina (UOI) (Greece)

(4) Universitatea Lucian Blaga Din Sibiu (ULBS) (Romania)

(5) Universita Telematica Degli Studi (IUL) (Italy)

(6) Univerzitet U Nisu (UNIS) (Republic of Serbia)

Twelve courses were implemented through ODLEP methodology that included both undergraduate and postgraduate courses, the delivery of lectures was either online or in person, and the subjects of the courses and degree of difficulty varied. The courses that were implemented per institution included the following:

(1) University of Macedonia (UOM): Quantitative Methods in Human Resources Management

(2) University of Ioannina (UOI): Didactics of Language II

(3) Aristotle University of Thessaloniki (AUTH): Project Economics

(4) Aristotle University of Thessaloniki (AUTH): Decision and Risk Analysis

(5) Aristotle University of Thessaloniki (AUTH): Project Management and Decision Theory

(6) Aristotle University of Thessaloniki (AUTH): Course Engineering Mechanics I

(7) Aristotle University of Thessaloniki (AUTH): Structural Analysis II

(8) Aristotle University of Thessaloniki: Investment Assessment

(9) Aristotle University of Thessaloniki (AUTH): Construction Management

(10) Università Telematica degli Studi (IUL): Modelli Di Gestione Delle Aziende Nazionali Ed Internazionali

(11) Universitatea "Lucian Blaga" din Sibiu (ULBS): The Basics of Management and Industrial Management

(12) University of Niš (UNIS): Operational Research

Methodological approach

In the case of courses' implementation, the proposed course of action is twofold. Either a full course delivered through the ODLEP methodology and platform, or in cases where this might not be bureaucratically feasible, the development of a workshop/seminar which would include at least two or three lectures in each participating university based on the ODLEP approach and methodology. Each participating university chose either an undergraduate or postgraduate course. The course could either be delivered face-to-face or long distance.

The number of instructors assigned to the course was at least a pair based on the special circumstances of the course. A number of scenarios were implemented to test and validate the efficiency of the approach and at the same time record the details that highlight the best practices.

Therefore, with a goal to maximize the feedback and record a plethora of best practices, it had been considered critical that the implementation of the ODLEP project was customized in such a way that facilitated the examination of all these considerations and parameters.

As a result, the implementation was scalable in nature. It activated workshop in one case, and a full course in other cases, among the six partnering institutions. This approach was combined with the above-mentioned critical performance factors and parameters and as a result maximized the variations in the implementation and collected extensive feedback from the project-based courses. The approach had as its main goal to test the ODLEP methodology and platform and capture implementation details, best practices, critical design parameters and conclusions. In this context, the implementation followed two basic scenarios.

In the first scenario, discrete groups creation with multiple instructors' approach was implemented. Within the current approach groups of students were created and assigned to instructors and at the completion of the course, the overall performance and experience of instructors and students were recorded. The following Figure 1 graphically depicts the first core approach and describes the processes/steps that were followed. Two instructors were selected and assigned to deliver the lectures. Instructors were called to respond to the structured questionnaire survey especially prepared for the ODLEP project. Responses were translated into scores for personality traits, teaching and learning preferences. These scores were the attributes considered by the ODLEP approach to facilitate group creation.

Course participating students were also called to respond to the focused questionnaire constructed especially for the students in the context of the ODLEP project. Responses were translated into scores for personality traits teaching and learning preferences. These scores were the attributes considered by the ODLEP approach for group creation. The ODLEP algorithm was implemented and produced the appropriate groups.

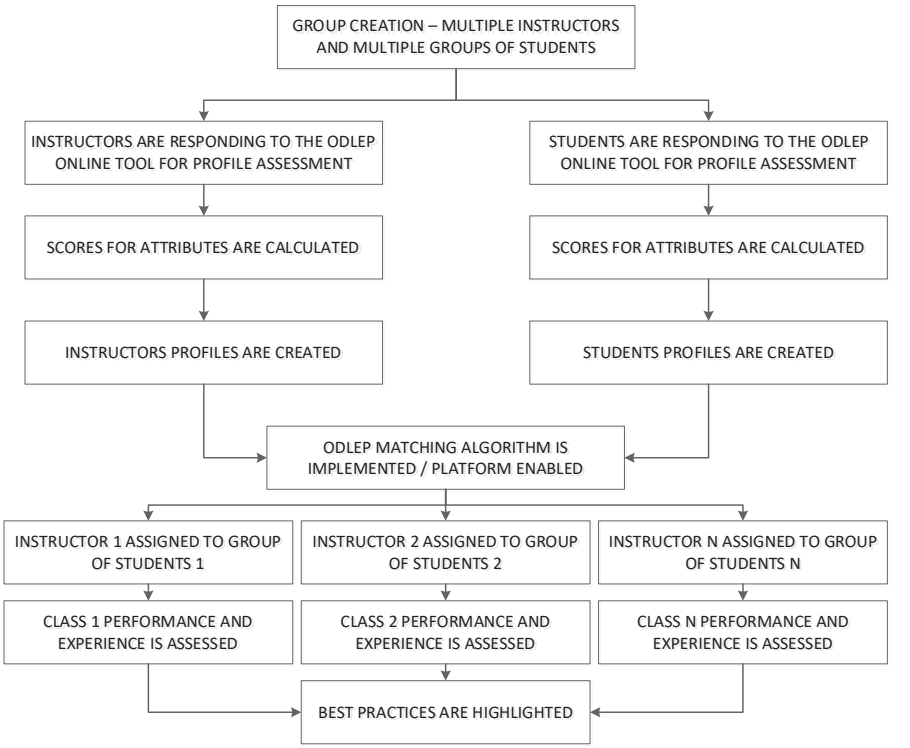

Figure 1. Pair of instructors assigned to groups of students. Source: Authors' own work

The course students were divided into two groups and were assigned to the most suitable of the two instructors. The two groups of students were presented with similar educational material by the two instructors as presented in Figure 1.

Upon the completion of the courses, the two groups of students were provided with a new structured questionnaire survey that was recording their experience and their views on the performance of the instructor. Similarly, upon the completion of the courses, the instructors were provided with a corresponding questionnaire that recorded his/her experience and his/her views regarding the performance of the students (see Figure 2).

The second approach was discrete groups creation with multiple instructors' approach within a workshop. The second scenario was a smaller version of the previous approach, whereas the course was a workshop that involved at least two lectures, with at least two different lecturers. The answers to the initial questionnaires were considered and recorded from both instructors and students. Similarly, the questionnaires consisted of three basic parts. More specifically, learning and teaching preferences were recorded along with the personality characteristics (Li *et al.*, 2023; von Stumm *et al.*, 2011) of the survey participants.

Within the first step, the personality responses were transformed into the five personality traits (Arispe and Blake, 2012; Besser *et al.*, 2022; Bunker *et al.*, 2021; Richardson *et al.*, 2012; Soto and John, 2009; Vedel, 2014) based on a standardized procedure. This transformation took place for both the responses of students and the responses of instructors. At the end of this process, the responses were transformed into five personality traits (Furnham *et al.*, 2003; Komarraju *et al.*, 2009; Quigley *et al.*, 2022; Zhou and Lu, 2011). These attributes, or any combination of them (learning preferences, teaching preferences and personality traits), were

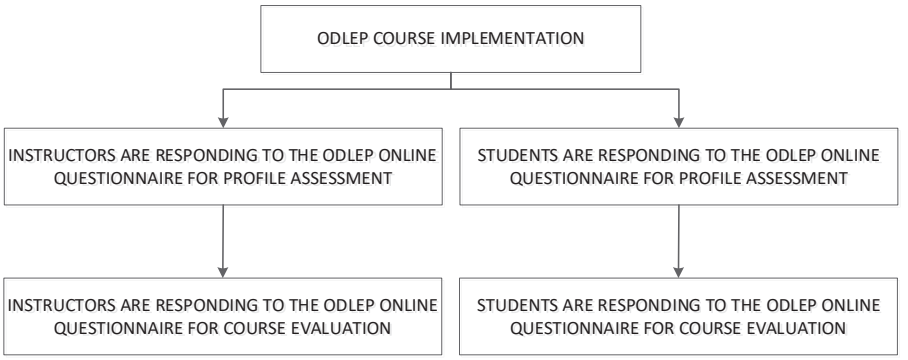

Figure 2. Questionnaires created for students and instructors for profiling and evaluation. Source: Authors' own work

used to run the ODLEP approach and platform. Two discrete files were created as input. One was the students' input file and the other was the instructors' input file.

All partners devoted time and resources to disseminating the required questionnaires and collecting responses both by Students and Instructors/Professors. The dissemination of the four types of questionnaires and the collection of responses took place through emails, e-learning platforms and in person with the aid of QR codes. The questionnaires were created in Google forms and lime survey. The initial questionnaires for profile assessment had three basic pillars, learning and teaching preferences along with personality traits (see Figure 1). The initial questionnaires both for students and instructors were processed, especially the part with the psychometric test, which needed to be properly transformed to obtain the scores for the five personality traits. These data were introduced to the ODLEP platform aiming to perform the groupings based on the ODLEP methodology. At the completion of the courses/seminars or workshops, the instructors and students participating were introduced to a new type of questionnaire for the evaluation of the course performance. The number of responses across all types of questionnaires and all institutions and courses appears in Table 1. Each partner devoted one course. In the case of the Aristotle University of Thessaloniki, ODLEP Platform was implemented in seven courses.

The methodological approach included firstly the recording of the responses of the participating students and instructors aiming to create their profile. A new set of questionnaires was disseminated to assess and evaluate the conduction of courses upon the completion of the lectures. The responses were properly transformed and in each case a database was created in IBM SPSS Statistics 31.0.1 (PS IMAGO PRO 11.0). Then statistical analyses identified all aspects that contributed to a successful implementation. The findings of the analyses along with the observations of the instructors participating in the ODLEP project created a report on the best practices.

The following Figure 3 graphically presents the process followed within the project to obtain feedback from the implementation of the ODLEP platforms in courses.

ODLEP approach testing through courses

One of the most important and interesting aspects of the ODLEP project was the platform testing through courses taking place at the partners' institutions. This provided an opportunity to assess the efficiency of the proposed approach. During the courses development instructors participating in the ODLEP project were observing the operational aspects of the approach and tried to identify the advantages and disadvantages associated with the ODLEP implementation, as well as kept notes regarding best practices.

Table 1. Responses obtained by students and instructors during ODLEP implementation

Institution	Initial students' questionnaires	Initial instructors' questionnaires	Students' evaluation questionnaires	Instructors' evaluation questionnaires
UOM	36	2	12	2
UOI	124	2	69	2
UNIS	20	2	15	2
LBUS	42	2	44	2
IUL	28	2	11	2
AUTH TS1400 Investment assessment	82	2	66	2
AUTH PPVA03 Decision and risk analysis	12	2	16	2
AUTH GE0700 Course engineering mechanics I	40	2	2	2
AUTH TE0800 Structural analysis II	50	2	15	2
AUTH TS2200 Organization project management	71	2	43	2
AUTH SSEA03 Project management and decision theory	62	2	50	2
AUTH Team building ex-post study	50	2	10	2
Pilot study at the technical university of Crete	16	1	–	–
Pilot study at AUTH	7	1		
Pilot study at Hellenic open university	1	–	–	–
Total	*617*	*24*	*352*	*24*

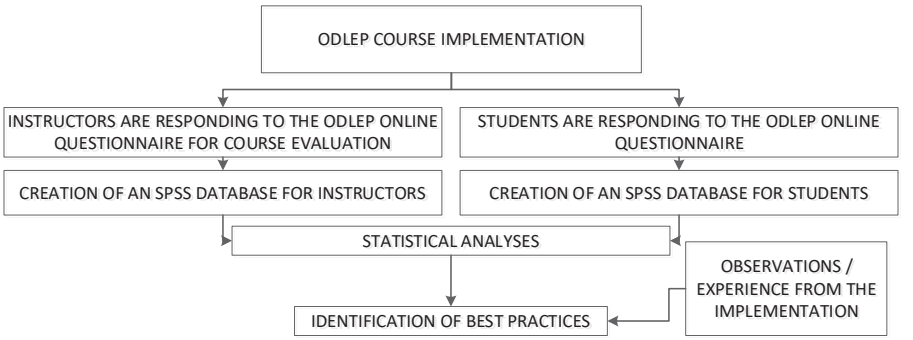

Figure 3. Questionnaires created for students and instructors for profiling and evaluation. Source: Authors' own work

The partnership made a sincere effort to exceed project expectations. In this context, instead of delivering one course per partner, which meant in total six courses, ODLEP partners implemented the project in 11 courses and one workshop (12 in total). The partnership managed to include postgraduate and graduate courses, either online or in person. The selection of courses covered various scientific fields and subjects with different perspectives. It is also important to mention that a number of courses were more practical in content while other were more theoretical in nature.

Through the second set of questionnaires (one for the students and one for instructors), the aim was to record the experience of the partners upon the courses completion, from both students and instructors, and process all these data and information to become future reference

while at the same time provide the best practices as guidelines for the future educators/ instructors that would implement the ODLEP approach.

It is very crucial to mention that the results from the evaluation verified the dynamic nature of the educational process and the reliability, robustness and effectiveness of the ODLEP approach. One of the most interesting findings is that the three-pillar approach to grouping students and assigning them to instructors with their relevant educational material was the most successful course of action. Therefore, it is clear that the attributes that should be considered in creating the appropriate groups and assignments should be based on teaching and learning styles and additionally personality traits. It is interesting to note that the preferred learning styles had some variations based on the type of course (practical or theoretical). The usual/mainstream learning styles appeared to be compatible with all types of courses. Experimental or practical courses call for learning styles that deal with object manipulation.

Design of the course evaluation questionnaires

The course evaluation questionnaires were really difficult to shape, especially regarding their content. The set of questions should be able to grasp, record and reflect the experience of the students and the instructors. Special attention has been provided to students responding to the questionnaire. Therefore, in addition to anonymity, great care has been provided to the statements included in the questionnaire. One question was left intentionally open for the students to identify and analyze potential improvements. It became clear that when the number of questions within the survey decreased the number of responses increased. The initial questionnaire, used to provide input to the ODLEP platform, included three pillars, learning preferences, teaching preferences and personality traits. The greatest number of questions are located in the personality traits assessment section which was based on the big five Personality Traits, a well acknowledged and widely used self-assessment test (McCrae and Costa, 1997, 2003; IPIP, n.d.). A number of trials have taken place by incorporating various criteria as attributes for the implementation of the ODLEP platform.

The current approach included a number of statements describing learning styles which are proposed to be used by the educators implementing ODLEP approach as attributes for the matching process. The list is the following:

(1) I can better discern the material through watching a demonstrative presentation of the information.

(2) I can understand the material better through listening and oral teaching methods.

(3) I can better learn the teaching materials through taking notes and reading the written contexts and texts.

(4) I can better conceive the instructional material through performing the practical, experimental and object manipulation via something more of a physical process (simulated or real).

(5) I have preference for tasks, projects and situations that require creation, formulation, planning of ideas, strategies. I like to decide what to do and how to do it, rather than to be told.

(6) I have preference for tasks, projects and situations that provide structure, procedures or rules to work with and can serve as guidelines to measure progress. I often prefer to be told what to do, and I will then give it my best shot at doing it well.

(7) I have preference for tasks, projects and situations that require evaluation, analysis, comparison–contrast and judgment of existing ideas, strategies and projects. I tend to like evaluative essays, commenting on other people's ideas, and assessing others' strengths and weaknesses.

(8) I have preference for tasks, projects and situations that allow focusing fully on one thing or aspect at a time, and staying with that thing until it is complete.

(9) I have preference for tasks, projects and situations that allow creation of a hierarchy of goals to fulfil. I will often make lists, and sometimes even lists of lists.

(10) I have preference for tasks, projects and situations that allow working with competing approaches, with multiple aspects or goals that are equally important.

(11) I have preference for tasks, projects and situations that lend themselves to great flexibility of approaches, and to trying anything when, where and how I please (work asystematic or even antisystematic).

(12) I have preference for tasks, projects and situations that require engagement with specific, concrete details. I tend to enjoy tasks that require to keep track of details and to focus on concrete specifics of a situation.

(13) I have a preference for tasks, projects and situations that require engagement with large, global, abstract ideas. I like to deal with big ideas, but sometimes I can lose touch with the details.

(14) I have a preference for tasks, projects and situations that allow me to work independently of others.

(15) I have a preference for tasks, projects and situations that allow working with others in a group or interacting with others at different stages of progress. I do not enjoy working alone.

(16) I have a preference for tasks, projects and situations that involve unfamiliarity, going beyond existing rules or procedures and maximization of change. I like new challenges and I thrive on ambiguity.

(17) I have a preference for tasks, projects and situations that require adherence to and observance of existing rules and procedures. I like to minimize change and avoid ambiguity.

Furthermore, a number of statements describing the teaching styles were used as attributes within the matching process. The list of selected statements includes the following:

(1) Instructor that has a preferred way of doing things and does not much like to do things in other ways.

(2) Instructor that carefully sets priorities and then sticks to them.

(3) Instructor that does not easily allocate class time so that the most important things receive the most coverage.

(4) Instructor that is not so organized in the teaching style, but is very creative, and sparks creative ideas in his/her students.

(5) Instructor that tends to be very detail–oriented in lecturing.

(6) Instructor that tends to be very general in his teaching and concentrate on the big picture rather than the details.

(7) Instructor that is not so enthusiastic about team teaching and prefer to teach on his/her own (Sternberg and Zhang, 2005).

(8) Instructor that welcomes team teaching or other opportunities to collaborate with fellow instructors.

(9) Instructor that likes to teach in new ways and to try new teaching techniques.

(10) Instructor that likes to teach in traditional ways and is hesitant to try new ways of teaching.

The attributes should also contain the big five personality traits as evaluated by a customized proposed psychometric test (McCrae and Costa, 1997, 2003; IPIP, n.d.). The combination of the learning and teaching styles, along with the personality traits produced successful groupings of students and assigned them to the proper instructors.

Results regarding the students' evaluation of the course

Within the questionnaires, the responses were collected based on a Likert scale. The 5-point Likert scale was used. The Likert attributes used were the following: Not at All: 1, Slightly: 2, Moderately: 3, Very: 4, Completely: 5. The reliability analysis based on Cronbach alpha returned the value of 0.926 which is exceptional. The statements that received the optimum score, more precisely the response was "Completely" included the following:

(1) How effectively were problems and questions addressed by you during the course?

(2) How would you rate your overall understanding of the course?

(3) How well did the training align with your initial expectations?

(4) How useful were the case studies and exercises in helping you grasp the practical aspects of the course?

(5) How effectively do you consider that you cooperated with each other when needed?

(6) Watching a demonstrative presentation of the information

(7) Listening and oral teaching methods

(8) Taking notes and reading the written contexts and texts

Students correlation analyses' results and instructors' evaluation

All responses were recorded in an SPSS database. Analyses took place focusing on the associations among the responses. The reliability analysis based on Cronbach alpha returned the value of 0.907 which is exceptional. Firstly, the findings focus on the association among "Course Performance" and "Course Delivery Type" in this case are presented. Table 2 presents the asymptotic significance (AS) and adjusted residual (AR):

Furthermore, the correlation analysis among institution course and students' performance – learning style took place. Based on the crosstab analysis, a number of interesting findings could be mentioned that included the following:

(1) Students at the Postgraduate Program SSEA03 consider that they effectively addressed problems and questions during the course. This was also true for the course at the University of Macedonia. In the case of the University of Ioannina, the students moderately addressed the issues.

(2) Students at the University of LBS state that they had an excellent understanding of the course and the same is true in Aristotle University of Thessaloniki.

(3) In the Aristotle University of Thessaloniki (TS1400) students felt that training aligned with their initial expectations.

(4) Similarly, again in AUTH, in the courses of TS1400 and SSEA03, students felt that the case studies completely helped them understand the practical aspects of the course.

(5) Students in TS1400 and SSEA03 courses felt that: the provided training materials in addition to projects–exercises during the course completely supported their learning and enhanced their understanding.

Table 2. Correlations among "course performance" and "course delivery type"

Course performance/Course delivery type	Online (asymptotic significance/ Adjusted residual)	In person (asymptotic significance/ Adjusted Residual)
How effectively problems and questions were addressed during the course	Completely (0.013/2.5)	–
Regarding the degree that the training aligned with the students' initial expectations	Completely (0.012/2.8)	–
Degree that the training aligned with the students' initial expectations	–	Moderately (0.012/2.5)
Usefulness of the case studies and exercises in helping students grasp the practical aspects of the course	Completely (0.04/ 2.6)	Moderately (0.04/ 2.5)
How well the provided training materials support students' learning and enhance their understanding	–	Moderately (0.011/2.6)
Usefulness of the listening and oral teaching methods	Completely (0.001/2.9)	Moderately (0.001/3.0)
Usefulness of the learning approach described as tasks and projects that involved unfamiliarity, went beyond existing rules or procedures and maximization of change	Very (0.034/2.5)	–

(6) Students in TS1400 and SSEA03 courses felt that watching a demonstrative presentation of the information completely helped them.

(7) Listening and oral teaching methods greatly work for students in UNIS and AUTH (TS1400).

(8) AUTH (SSEA03) and UNIS students greatly learn by taking notes and reading the written contexts and texts.

In the postgraduate courses a number of associations were observed, where students state that they:

(1) Completely addressed problems and questions during the course

(2) Very effectively built relevant skills through courses

(3) Found the case studies and exercises completely useful to grasp the practical aspects of the course

(4) Found completely useful the training materials to support their learning and enhance their understanding

(5) Completely understand the material through projects and exercises

It is very useful and interesting to briefly present the evaluation provided by instructors' regarding students' performance. The following Table 3 presents the descriptive statistics of the courses' context based on the views of the participating Instructors in the ODLEP implemented courses. A 5-point Likert scale was used to record the responses.

Analysis' findings to optimize the efficiency of ODLEP approach

The analysis of the findings, with emphasis on the evaluation responses/results provided by both the students and instructors, clearly states that each group of students and instructors "requires" specific–focused educational approaches. The teaching and learning methodologies should align, with the aim to reach the optimum educational result. It is true

Table 3. All instructors' descriptive statistics regarding the course performance

	How satisfied are you with the students' participation/ performance within this course	How effectively do you consider that students dealt with problems and questions addressed during the course	How effectively do you consider that students communicated with each other	How effectively do you consider that students cooperated with each other when needed	How would you rate your overall communication/ cooperation with the students
Mean	4.38	4.13	4.08	4.17	4.57
Median	5.00	4.00	4.50	5.00	5.00
Mode	5	5	5	5	5

that a number of commonly used educational approaches are identified from the majority of students and instructors, but there are a number of other (especially) learning preferences that are directly associated with the profile of the group of students and their profession and field of work.

This is one basic reason that makes the need for ODLEP a critical one in the educational process. It is able to succeed in providing the proper group of students and assign them to the optimum instructor. This is evident by the scores assigned by both students and instructors in the questions regarding communication and cooperation that indeed received the best scores.

Regarding the scores of students assigned to "Learning Methods", it becomes clear that the scores at the evaluation stage are significantly depended on the nature and content of the course. Courses that are theoretical exhibit significantly different scores in comparison to more practical experimental courses that apply specific rules for the solution of problems and include a plethora of exercises.

The following Table 4 provides an overview of the students' evaluation with emphasis on three pillars, course understanding, communication and cooperation among them.

Based on Table 4, there are three courses that according to the scores seem to have an exceptional performance. The course from University of Macedonia, the course from the University of NIS and the course/workshop from the Aristotle University of Thessaloniki. It is obvious that all of them have in common the fact that the attributes considered for the matching in the ODLEP platform included learning and teaching preferences and in addition personality traits. It is proposed that all three design pillars should be used to create successful groups of students and assign them to the proper instructors.

Conclusions and further research

The implementation verified the dynamic nature of the educational process and the reliability and effectiveness of the ODLEP approach. The three-pillar approach to grouping students and assigning them to instructors was the most successful course of action. Therefore, it is proposed that the attributes that should be considered in creating the appropriate groups and assignments should be based on teaching and learning styles and additionally personality traits.

Regarding the implementation of best practices, there are a number of significant aspects that can be addressed in future efforts. The questionnaires should be disseminated after the project introduction within the class activities. In the case where the questionnaires are left to

Table 4. A synopsis of students' evaluation

Institution/course	Degree postgraduate (P) undergraduate (U)	Method	Type of course	Attributes learning L teaching T personality P	Communication score Median/Mode	Cooperation Median/ Mode	Overall understanding Median/ Mode
UOM	P	Distance Learning	Compulsory	L,T,P	5/5	4.5/5	4.5/5
UOI	U	In Person	Compulsory Specialization Course	L,T,P	4/4	4/4	4/4
UNIS	U	In Person	Elective	L,T,P	5/5	5/5	5/5
ULBS	U	In Person	Compulsory	P	4/4	Four-fifths	5/5
Telematica Degli Studi (IUL)	U	Distance Learning	Compulsory	L,T,P	Three-fourths	4/3	Four-fifths
AUTH/TS2200	U	In Person	Compulsory	L,T,P	4/4	Four-fifths	4/4
AUTH/TS1400	U	In Person	Compulsory	L,T,P	Four-fifths	Four-fifths	Four-fifths
AUTH/TE0800	U	In Person	Compulsory	L,T,P	4/4	4/4	Four-fifths
AUTH/SSEA03	P	Distance Learning	Compulsory	L,T,P	Four-fifths	5/5	4/4
AUTH/PPVA03	P	In Person	Compulsory	L,T,P	5/4	4/4	5/4.5
AUTH/GE1400 Workshop	U	In Person	Compulsory	L,T	5/5	5/5	5/5

be answered outside the class, the response rate decreases. It is important to mention that the role of instructor is a core parameter for the success of the course, especially, his or her personality. It became obvious from the discussion with the students that personality is a critical success factor.

It should also be mentioned that students develop an attitude toward the course which is influenced by the degree of difficulty associated with the specific course as communicated to them by students of greater years of study. This fact influences all the students' attitude toward the course and eventually the provided evaluation.

Cooperation with the students for the implementation of the ODLEP approach is of utmost importance and at the same time the administrative support and the support of the head of the department so as to successfully implement the project. Proper and detailed information regarding the project goals and aims should be communicated to all stakeholders and it is very useful to obtain cooperation. Special help was provided by the instructors participating in the project. They continuously reminded the students to respond to the questionnaires.

Along with the personality of the instructors, one other parameter associated with the scores assigned by the students is the difficulty of the course that also affects the responses' metrics. The more difficult the course, the lower the scores usually assigned at the evaluation part.

In the context of collecting the responses from the evaluation questionnaires, it is essential to continuously remind the students to answer the questionnaires. Instructors are generally more cooperative. The time is very precious and critical so as to obtain the initial responses from students and create the initial grouping and start the "ODLEP" approach for courses.

The learning methods are completely aligned with the nature and content of the course. The students within courses dealing mainly with solving problems and exercises assign greater scores to the common learning approaches:

(1) Listening and oral teaching methods

(2) Taking notes and reading the written contexts and texts.

Therefore, in these cases the initial grouping could focus more to these attributes.

Courses that combine theory and exercises assign higher scores to more learning approaches. Furthermore, courses that are mostly focused on theory assign greater scores to the least common learning processes, the ones that try to challenge the mainstream theories. Courses which are mainly experimental assign greater scores to learning processes that deal with object manipulation and experimentation.

The experience from ODLEP implementation shows that students like very much the QR Codes as a mean to obtain the link and access to the Google forms of the questionnaires either the initial ones (profile making questionnaires) or the evaluation ones. More particularly, the easiest way to collect responses is when the QR code can be used through a mobile phone and the answers should be structured in such a manner that with a few clicks the responses could be recorded. In all courses taking place within the Aristotle University of Thessaloniki and the University of Ioannina, students received the questionnaires via QR codes.

The difficulty of obtaining the responses in some cases was due to the fact that a number of students had second thoughts and thus hesitated, regarding their personal data management. It is imperative for the students to be introduced to the details of the project. This has a double benefit. The project becomes known to participants and at the same time students understand their contribution and role to the project.

The students' participation is a critical aspect of the ODLEP implementation. The participation of students seems to be influenced by the year of studies. The students within the first years of studies were not very enthusiastic to participate. Receiving responses from them was really challenging. Therefore, it is proposed that the effort of implementing ODLEP would have higher success rates in more advanced years of studies and it will also run smoother. The role of institution administration is pivotal. If the administration includes the ODLEP approach within its policies, then implementation will be extremely easy.

Implementation of the ODLEP approach in postgraduate programs was a lot easier, especially in the case of collecting responses to the questionnaires. All students and instructors found extremely interesting the part of the initial questionnaire that evaluated personality.

One very sensitive and critical aspect is the profile of the participants. Students were asked to fill in a "username" at the initial questionnaire. It is imperative that the username selected will be one that the students will remember, especially when the process reaches the stage where the evaluation questionnaire will be completed. If the procedure, is based on the Google forms, then one critical option will be to collect emails, with the consent of the participants.

As mentioned earlier, smaller groups make the teaching process more effective, thus more material can be covered. The students feel good to participate in Erasmus + innovative projects and it strengthens their bonds with the university. Regarding the evaluation survey, the latter should occur during the last lecture so that all students answer and provide their opinions.

The consideration of Table 3 with focus on the number of instructors may uncover another significant aspect of success. The availability of a greater number of instructors provides better matching opportunities for the ODLEP approach and thus better educational outcomes. At the same time, it became also clear that smaller groups of students appear to have a better performance.

Finally, a number of associations as recorded by considering the students' responses and were statistically identified could be summarized below and could help researchers and educators design and implement ODLEP in the best possible way:

(1) "Online" course delivery is associated with a success in effectively addressing problems and questions during the course.

(2) Within "Online" course delivery the training aligned with the students' initial expectations.

(3) On the other hand, "In person" course delivery is correlated with the response "moderately" regarding the degree that the training aligned with the students' initial expectations.

(4) "Online" course delivery completely gains from case studies and exercises in helping students grasp the practical aspects of the course.

(5) "In person" course delivery is correlated with the response "moderately" regarding the usefulness of the case studies and exercises in helping students grasp the practical aspects of the course.

(6) "In person" course delivery is correlated with the response "moderately" regarding how well the provided training materials support students' learning and enhance their understanding.

(7) "Online" course delivery is correlated with the response "completely" regarding the usefulness of the listening and oral teaching methods.

(8) "In person" course delivery is correlated with the response "moderately" regarding the usefulness of the listening and oral teaching methods.

(9) "Online" course delivery is correlated with the response "very" regarding the usefulness of the learning approach described as: "Tasks and projects that involved unfamiliarity, went beyond existing rules or procedures, and maximization of change."

As part of the future research efforts, it is proposed that the approach should focus on the type of educational material, specific scientific field of study and the consideration of the cognitive abilities by both students and instructors.

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