

# THE VISION OF ROMANIAN STUDENTS FROM THE FACULTY OF ENGINEERING IN RELATION TO DISTANCE LEARNING EDUCATION

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## Abstract

Education is “constantly evolving” to accommodate the “constantly evolving” needs for knowledge of the students. Distance education has made impressive progress during the last few years. It was COVID19 that provided a boost in Distance Education and Online Learning. Available infrastructure, knowledge and experience were used and were streamlined to design and provide more efficient distance education programs. Students and instructors are experiencing a new educational paradigm and reality. The current study presents, analyzes and discusses the views and experience of Romanian students regarding distance education programs. Through a structured questionnaire survey participants described their own views, understanding and perceptions. Participants’ profile was recorded along with their responses regarding distance education efficiency, number of courses with or without tuition fees, level of computer expertise, number of students attending online courses and preference among distance learning and face to face studies. Furthermore, the current research identified learning preferences and teaching preferences and highlighted the most significant ones. Finally, this paper investigates preferences regarding the fellow students and instructors’ attitude towards teaching. It is also worth noting that students stated that they can better conceive the instructional material through performing the practical, experimental and object manipulation via something more of a physical process, either simulated or real. Moreover, students tend to prefer that fellow students conceive instructional material in the same way and at the same time they prefer that fellow students discern the material through watching a demonstrative presentation of the information.

Keywords: Romanian Students, Distance Education, Views, Experience, Questionnaire, Learning Preferences, Teaching Preferences.

## 1 INTRODUCTION

Distance learning was and remains a challenge for all actors involved in this process. Over time, the identification of the best methods was sought for it to take place and develop, and the technological advance brought new, original solutions that gave new values to this type of education. The growth for distance education is also increasing, people trying, in the dynamics of life, to specialize, to complete their studies, or to find new opportunities for development.

The profile of students from technical programs that offer distance education or with reduced frequency has changed fundamentally in the last 10 years, moving from older people who did not have the chance to attend a college when they finished high school, to people who have already completed a faculty of a different profile, some even master's courses, but who, thanks to the economic growth boom and the fact that the engineering profession offers new opportunities and special development chances, felt the need to come to this type of program with distance learning, where the presence and accumulation of knowledge, skills and competences can more easily combine a job, a family and satisfying the need to find a new profession.

The COVID 19 pandemic brought much faster and more brutal technological advances in distance education technology, replacing regular face-to-face meetings with online meetings, using teleconferencing services, and the communication part also moving to platforms parallel or integrated with videoconferencing systems. The adaptation of both teaching staff (teachers, lecturers, tutors) and students was not only necessary but even mandatory for the continuation of the process, and the overall transformation of distance education brought it much closer to the distance concept, teleconference

meetings making it possible for students from any part of the world to participate in courses held within a study program, eliminating travel, but offering almost all the prerogatives of an individual in a classroom, but this time in a virtual form.

Of course, there are also somewhat less positive aspects, those related to human interaction, the feeling of belonging to a group, the creation of an identity of a year of studies, going out with friends, all these giving this system an impersonal and somewhat rigid note from the perspective of human interaction with colleagues or with those who teach.

Starting from all these aspects, it is important to identify and understand the main preferences of students, their way of working, the way they perceive information and structure it, the way they use visual elements in the educational context. Synthesizing the answers received and this information as a kind of feed-back of the overall participation in the distance courses, we can adapt the way of working and teaching methods centred on their needs and wishes. This is what we are trying to extract in this paper and, using this information, we want to continue the study on another level of complexity in future research.

## **2 METHODOLOGY**

This study is part of a much larger research carried out within a cooperation project between six universities in the European space, universities from Greece, Romania, Serbia and Italy, a project that aims to identify ways to optimize distance education at the European level. As part of the project, questionnaires were designed for the students involved in distance learning in the six universities and for their instructors or teaching staff. The questionnaires for the students were distributed using the teaching platforms usually used for teaching and for contact with students from each university, being able to be accessed based on a link where the questionnaire was accessible.

For this paper there were extracted the answers received from the students of the second specialization in the area of engineering from the "Lucian Blaga" University in Sibiu. They are enrolled in the Economic Engineering in the Mechanical Field program at distance learning and the Engineering of Extraction, Transport, Storage and Distribution of Natural Gas program at low-frequency education. The platform used in teaching is Google with the specific elements of Google Classroom and Google Meet. The questionnaire was distributed to the students from both study programs, being accessible in the English version, for all years of study, in this case from the first year to the fourth year, inside Google Meet.

For the most part, the responses to the questionnaires were received between May and July 2023 and then, to increase the number of responses, an investigation session was carried out between October and December 2023.

In this paper are analyzed the frequencies of the answers received from the respondents for a first set of topics addressed, following that in other future papers the analysis will be extended to other topics addressed on a more detailed statistical analysis.

Even in this case, the relevance of the answers is high, and captures some specific elements of a distance education for a technical area, being affirmed teaching values that include sequences of periodic face-to-face meetings, in addition to working systems in variants online, both synchronously in meetings on Meet, and asynchronously through materials and assignments using Google Classroom.

## **3 RESULTS**

### **3.1 Discerning the material through watching a demonstrative presentation of the information**

The vast majority of those surveyed (80%) almost surely better discern the material through watching a demonstrative presentation of the information. For only 4% of respondents, watching a demonstrative presentation of information cannot help them to better discern the material. (see fig. 1).

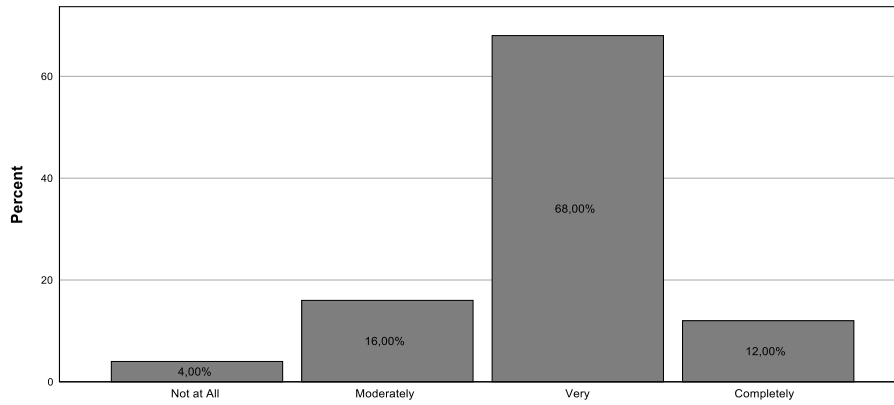


Figure 1. Students that better discern the material through watching a demonstrative presentation of the information.

### 3.2 Understanding the material better through listening and oral teaching methods

40% of respondents clearly believe that they understand the material better through listening and oral teaching methods, with another 40% being moderate in this regard (see fig. 2).

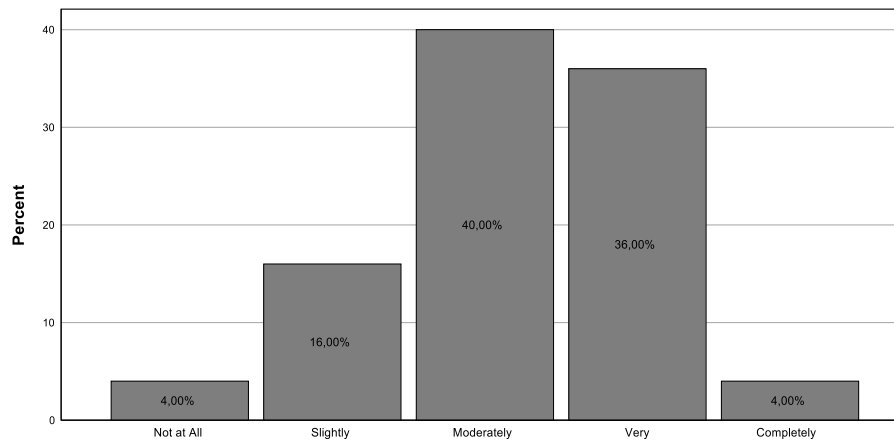


Figure 2. Students that can understand the material better through listening and oral teaching methods.

### 3.3 Learning the teaching materials through taking notes and reading the written contexts and texts

44% of respondents declared that they better learn the teaching materials through taking notes and reading the written contexts and texts, with another 32% being moderate in this regard (see fig. 3).

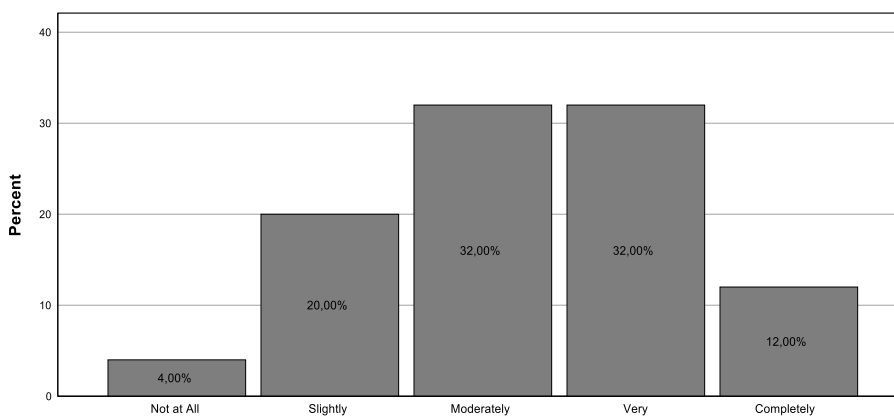


Figure 3. Students that can better learn the teaching material through taking notes and reading the written contexts and texts.

### 3.4 Conceiving the instructional material through performing the practical, experimental and object manipulation via something more of a physical process (simulated or real)

Nearly two thirds of respondents (64%) clearly better conceive the instructional material through performing the practical, experimental and object manipulation via something more of a physical process (simulated or real); also, an important percentage (28%) are moderate in this regard (see fig. 4).

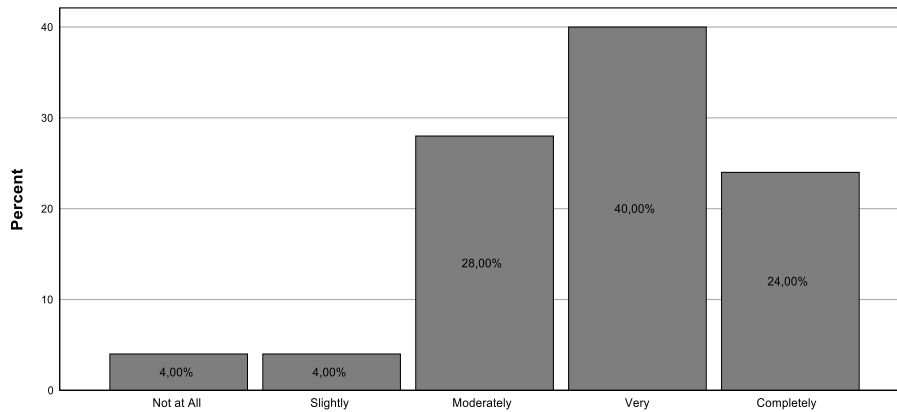


Figure 4. Students that can better conceive the instructional material through performing the practical, experimental and object manipulation via something more of a physical process (simulated or real).

### 3.5 Preference for tasks, projects, and diverse situations

#### 3.5.1 Preference for tasks, projects, and situations that require creation, formulation, planning of ideas, strategies

About three quarters of respondents (76%) said they almost surely have preference for tasks, projects, and situations that require creation, formulation, planning of ideas, strategies. They like to decide what to do and how to do it, rather than to be told (see fig. 5).

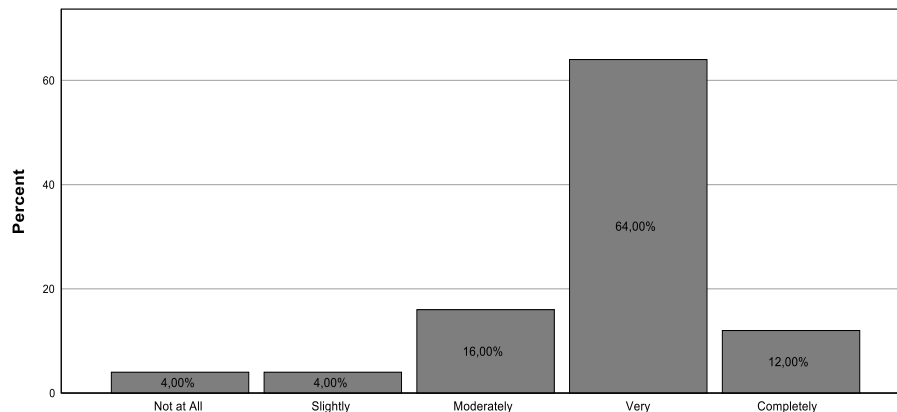


Figure 5. Students that have preference for tasks, projects, and situations that require creation, formulation, planning of ideas, strategies. These students like to decide what to do and how to do it, rather than to be told.

#### 3.5.2 Preference for tasks, projects, and situations that provide structure, procedures, or rules to work with, and can serve as guidelines to measure progress

Nearly two thirds (60%) of the students admitted they almost certainly have preference for tasks, projects, and situations that provide structure, procedures, or rules to work with, and can serve as guidelines to measure progress. They often prefer to be told what to do, and they will then give it their best shot at doing it well (see fig. 6).

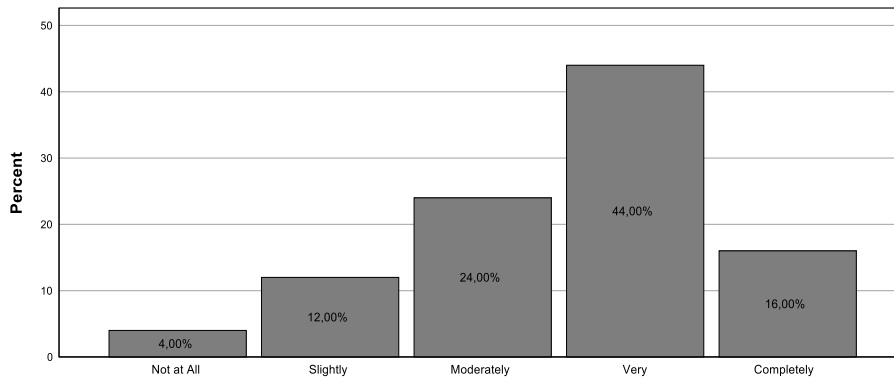


Figure 6. Students that have preference for tasks, projects, and situations that provide structure, procedures, or rules to work with, and can serve as guidelines to measure progress. These students often prefer to be told what to do, and will then give it their best.

### 3.5.3 Preference for tasks, projects, and situations that require evaluation, analysis, comparison–contrast, and judgment of existing ideas, strategies and projects

Well over a half of respondents typically have preference for tasks, projects, and situations that require evaluation, analysis, comparison–contrast, and judgment of existing ideas, strategies and projects. They tend to like evaluative essays, commenting on other people’s ideas, and assessing others’ strengths and weaknesses. Another 28% are moderate in this regard (See fig. 7).

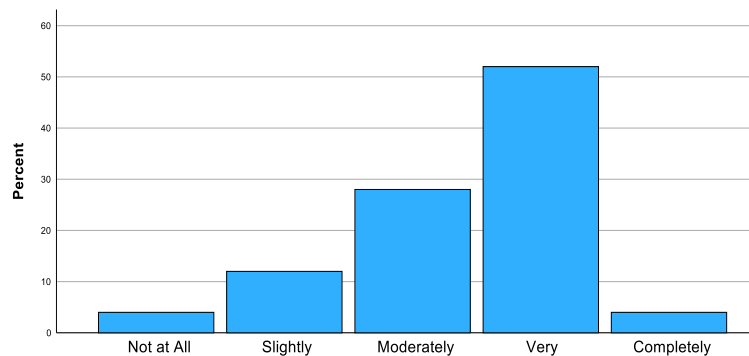


Figure 7. Students that have preference for tasks, projects, and situations that require evaluation, analysis, comparison-contrast, and judgment of existing ideas, strategies and projects. These students tend to like evaluative essays, commenting on other people’s work.

### 3.5.4 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

Nearly half of respondents (48%) have clearly 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. In addition, another 44% believe that they are characterized by such a preference to a moderate extent. (See fig. 8)

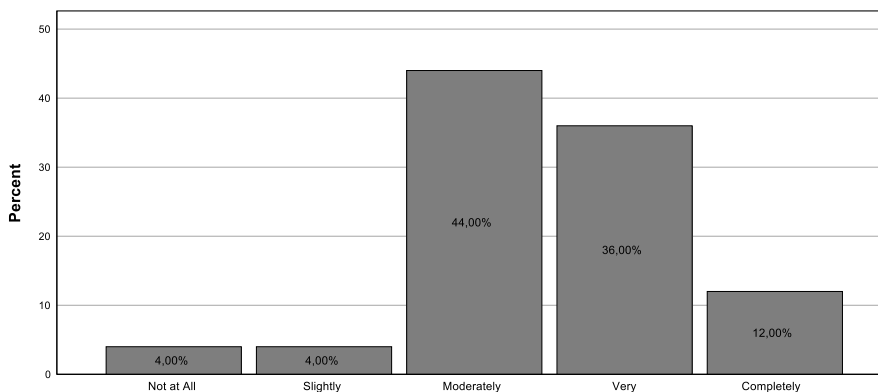


Figure 8. Students that have preference for tasks, projects, and situations that allow focusing fully on one thing or aspect at a time, and staying with that thing until it is completed.

### 3.5.5 Preference for tasks, projects and situations that allow creation of a hierarchy of goals to fulfil

The vast majority of students (84%) have a moderate, high or even a total preference for tasks, projects and situations that allow creation of a hierarchy of goals to fulfil. They will often make lists, and sometimes even lists of lists. (See fig. 9)

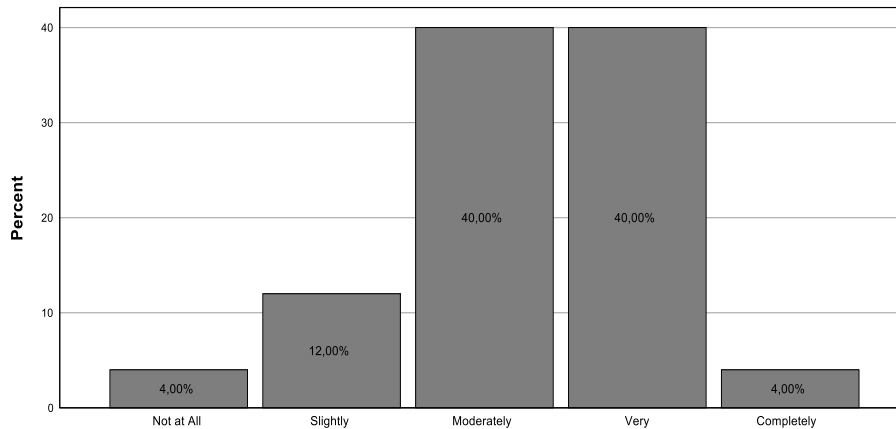


Figure 9. Students that have preference for tasks, projects, and situations that allow creation of a hierarchy of goals to fulfil. These students will often make lists, and sometimes even lists of lists.

### 3.5.6 Preference for tasks, projects, and situations that allow working with competing approaches, with multiple aspects or goals that are equally important

Almost all (96%) of those surveyed prefer, at least to a moderate extent, tasks, projects, and situations that allow working with competing approaches, with multiple aspects or goals that are equally important (see fig. 10).

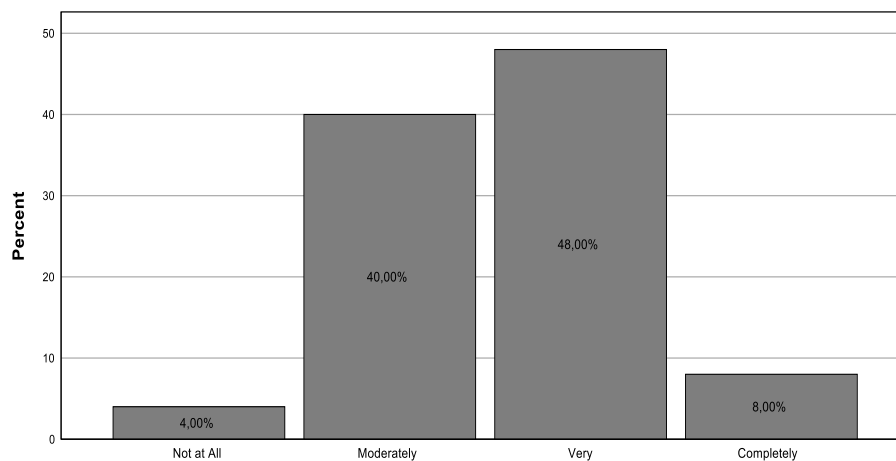


Figure 10. Students that have preference for tasks, projects, and situations that allow working with competing approaches, with multiple aspects or goals that are equally important.

### 3.5.7 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)

When it comes to flexibility, the balance tilts well (with a percent of 20%) in favour of those who prefer 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) (see fig. 11).

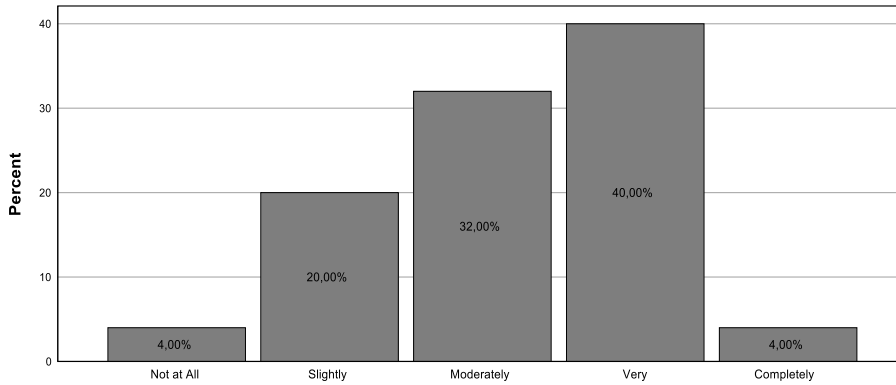


Figure 11. Students that have preference for tasks, projects, and situations that lend themselves to great flexibility of approaches, and to trying anything when, where, and how they please (work asystematic or even antisystematic).

### 3.5.8 Preference for tasks, projects, and situations that require engagement with specific, concrete details

60% of respondents clearly prefer tasks, projects, and situations that require engagement with specific, concrete details. They tend to enjoy tasks that require to keep track of details and to focus on concrete specifics of a situation. (See fig. 12).

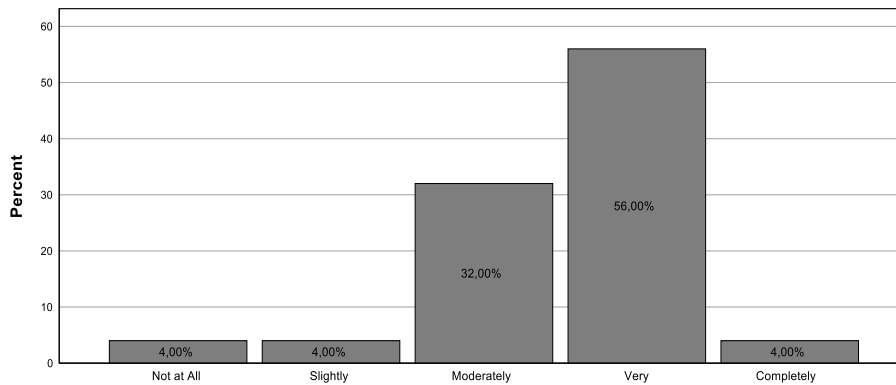


Figure 12. Students that have preference for tasks, projects, and situations that require engagement with specific, concrete details. These students tend to enjoy tasks that require keeping track of details and to focus on concrete specifics of a situation.

### 3.5.9 Preference for tasks, projects, and situations that require engagement with large, global, abstract ideas

The balance tilts (with a percent of 24%) in favour of those who enjoy tasks, projects, and situations that require engagement with large, global, abstract ideas. They like to deal with big ideas, but sometimes they can lose touch with the details. (See fig. 13)

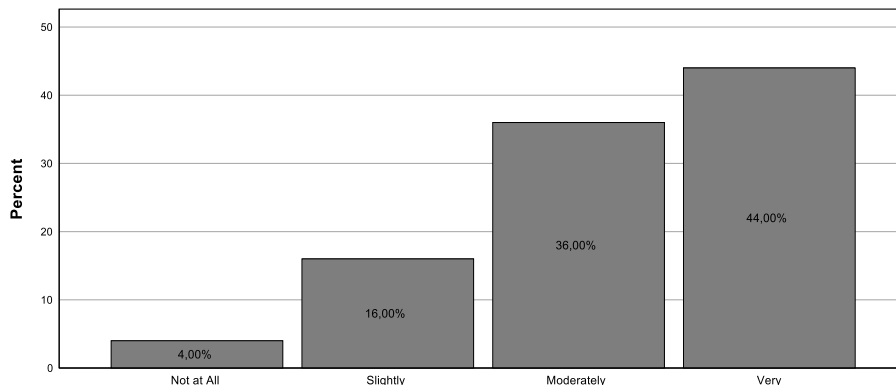


Figure 13. Students that have a preference for tasks, projects, and situations that require engagement with large, global, abstract ideas. These students like to deal with big ideas, but sometimes they can lose touch with the details.

### 3.5.10 Preference for tasks, projects, and situations that allow them to work independently of others

60% of respondents clearly have a preference for tasks, projects, and situations that allow them to work independently of others. (See fig. 14)

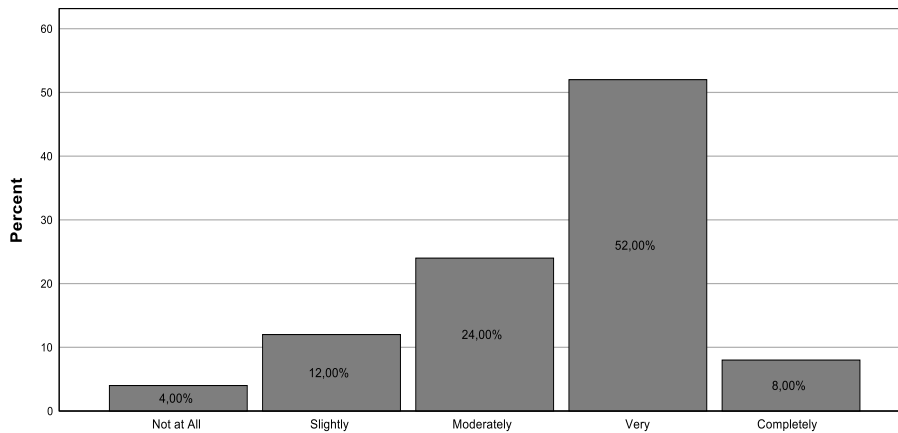


Figure 14. Students that have a preference for tasks, projects, and situations that allow them to work independently of others.

### 3.5.11 Preference for tasks, projects, and situations that allow working with others in a group or interacting with others at different stages of progress

Interestingly enough, the previous result does not match with the one highlighted by figure 15. Thus, a fairly large percentage of respondents (56%) stated that they 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. They do not enjoy working alone (See fig. 15)

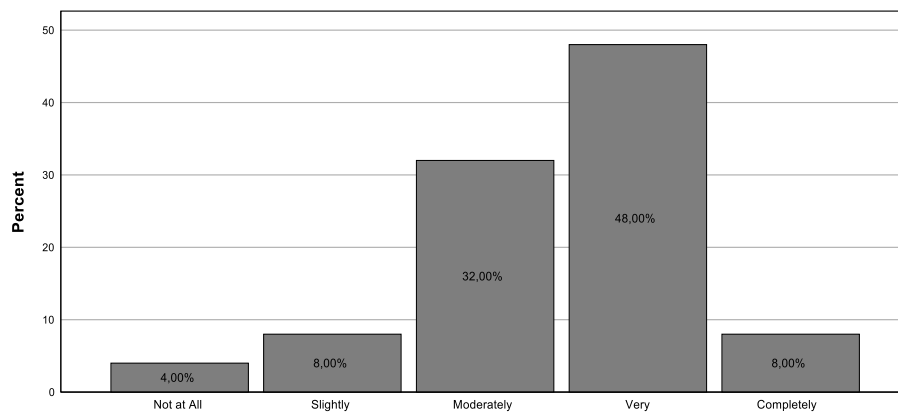


Figure 15. Students that have a preference for tasks, projects, and situations that allow working with others in a group or interacting with others at different stages of progress. These students do not enjoy working alone.

### 3.5.12 Preference for tasks, projects, and situations that involve unfamiliarity, going beyond existing rules or procedures, and maximization of change

44% of respondents have clearly preference for tasks, projects, and situations that involve unfamiliarity, going beyond existing rules or procedures, and maximization of change. They like new challenges and thrive on ambiguity. (See fig. 16)



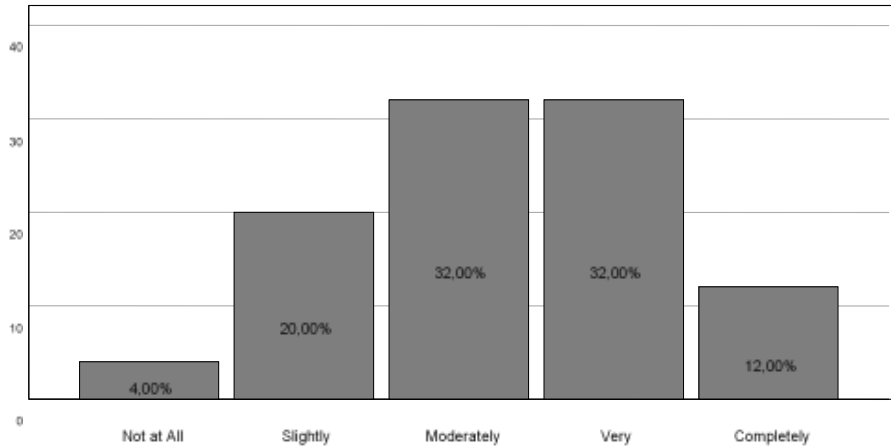


Figure 16. Students that have a preference for tasks, projects, and situations that involve unfamiliarity, going beyond existing rules or procedures, and maximization of change. These students like new challenges and thrive on ambiguity.

### 3.5.13 Preference for tasks, projects, and situations that require adherence to and observance of existing rules and procedures

Also 44% is the percentage of respondents that have a quite clearly preference for tasks, projects, and situations that require adherence to and observance of existing rules and procedures. They like to minimize change and avoid ambiguity. It should be noted that this time only 4% is the share of those who are very determined in this regard. (See fig. 17)

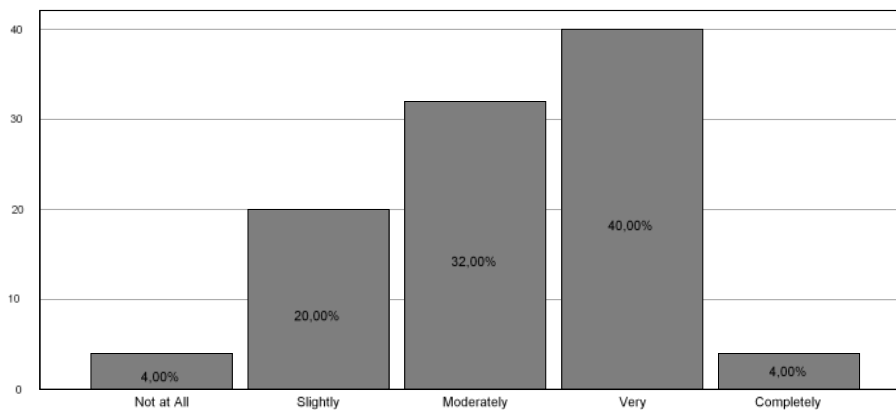


Figure 17. Students that have a preference for tasks, projects, and situations that require adherence to and observance of existing rules and procedures. These students like to minimize change and avoid ambiguity.

## 4 CONCLUSIONS

For a better understanding of the material to be learned, the most convenient way is considered to be that which consists of watching a demonstration of the presentation of information, followed by listening and oral teaching methods. The last option in this regard is for taking notes and reading contexts and written texts.

Also, an overwhelming majority of participants in our research better conceptualize instructional material by performing hands-on, experimental, and object manipulation through a more physical (simulated or real) process.

When it comes to creativity, the scales are tipped in favor of those who like to decide what to do and how to do it themselves, rather than being told by someone else, thus preferring tasks, projects and situations that require creating, formulating, planning of ideas, strategies. At the same time, a tendency to comment on other people's ideas and evaluate their strengths and weaknesses is also quite strong.

Many of the respondents prefer a way of working that allows greater concentration at a given time on a single thing or aspect until it is completed. This is not, however, an obstacle to the willingness to tackle challenges that require competing approaches, with multiple aspects or equally important objectives.

Among those subjected to the study, there is a greater enjoy in facing tasks that require following details and focusing on the concrete specifics of a given situation, being slightly less accepted tasks, projects and situations that require involvement with big, global, abstract ideas.

Respondents seem to prefer tasks, projects and situations that allow them to work independently of others. However, there is also a great willingness to engage in tasks, projects and situations that allow working with others in a group or interacting with others at different stages of progress.

Tasks, projects, and situations that involve unfamiliarity, overcoming existing rules or procedures, and maximizing change are only slightly preferred to the ones that require adherence to and observance of existing rules and procedures.

We are aware of the limitations of the study and the fact that their extrapolation can be considered a little difficult at this point. The fact that the research considered a sample from a single university and that the number of participants is not very large, may represent an impediment in the generalization of these ideas. Based, however, on the experience of teaching in several universities, being part of evaluation commissions for bachelor's or master's programs, having contact in this way with several engineering-specific programs, we can say that many aspects captured in this research are generally valid and can be considered model clichés for engineering distance education in Romania and can be extrapolated at least at the national level. Their true validation comes when these results overlap with the results of the specific studies of the other universities participating in the project, thus receiving a holistic view of the problems and perceptions of distance education at this moment.

## ACKNOWLEDGEMENTS

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