



Management Model of the Virtual University – Quantitative Research on the Processes Dimension

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Abstract: Management in the virtual university (VU) entails a series of interventions that the management team can use to anticipate, organize, coordinate, and control each structural dimension, starting with specific educational processes, human resources, technical resources, support services, and organizational structure. The paper aims to provide an overview of the particularities of decision-making projected on VU's processes dimension, which involves online teaching-learning-evaluation, interaction and communication, and the design and development of online courses. The survey findings indicate that managing a VU significantly depends on managerial actions such as planning and organizing online educational processes. The research results on processes highlight the most important managerial actions: prioritizing the actions of the staff involved in the online teaching-learning-evaluation processes in close correlation with a clear definition of their roles, tasks, and responsibilities is crucial. This study aids traditional university management in integrating online approaches and organizing courses in a flexible online environment under the umbrella of the VU model.

1. INTRODUCTION

Romanian universities face several primary challenges: their goal is to draw in a large number of both domestic and foreign students; they strive for modernity, adaptability, and continuous modifications to the educational process to align with societal shifts; they develop educational programs that equip students with skills easily adaptable to the demands of the job market; they ensure quick access to current online learning resources; they foster collaboration and support through the use of online information and communication technologies; and both internationalization and academic performance are on the rise. This study addresses these needs and seeks a practical solution to assist decision-makers in Romanian universities. As a result, it is essential to provide fresh information by looking into and evaluating data related to these problems.

A solution to these challenges and needs for universities are new opportunities offered by the virtual university model, many of which allow traditional universities to expand their coverage and increase the flexibility of the educational offer. These universities offered a kind of non-face-to-face instruction based on distance learning that makes use of multimedia technologies (digital tools, virtual spaces, and platforms) to cover a range of educational levels and, ultimately, to improve the value of human life and the freedom to pursue lifelong learning (Cajahuanca-Loli et al., 2023). This means that the whole set of support activities from academic activities: education and research to administrative and economic are carried out with the immediate support of the ITC (Information and Communication Technology).

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2. A THEORETICAL FRAMEWORK FOR MANAGING VIRTUAL UNIVERSITIES

This paper builds upon the research initiated in a preview work, which established the conceptual model of management regarding virtual university (VU) (Comşa Viorica, 2024).

Researchers know VU as a system that lacks a physical building and serves as a model of a real university in the virtual space (Beilin et al., 2021). It provides all its services and programs to learners in an integrated manner through the Internet, while also offering flexibility in terms of course choice, entry requirements, learning media and approaches, as well as time and place of study (Ibrahim & Dahlan, 2016; European University Association, 2021). From other perspectives, it is referred to as an organization with a role structure that involves people interacting in processes to provide education in a virtual environment, with the help of technological resources, to those who are interested: students and learners whose main objective is to offer virtual education (Comşa & Verzea, 2022). In this research, virtual education refers to the combined use of ICT (Information Communication Technologies) to deliver information for both education and training, specifically academic activities, and the manifestation of support communities, encompassing administrative, economic, human resources, relational, and organizational aspects (Comsa et al., 2021; Safieddine et al., 2017; Griff, 2015; Adam et al., 2017).

In the context of this organization, VU, which is specifically focused on providing virtual education, *the Main Processes are*: Online teaching - learning - evaluation; Online feedback; Online communication and interaction; Design and development of the online programs/courses structure; and Online research (Comşa Viorica, 2024).

Managing a VU requires strategic planning, robust technology, and, at the same time, a very good knowledge, adoption, and manifestation of the generally accepted Functions of management: *PLANNING, ORGANIZING, LEADING, AND CONTROLLING*. These functions collaborate in the creation, execution, and realization of an organization's organizational goals, such as VU, which is summarized in Table 1.

Table 1. The managerial process functions regarding Virtual University (VU)

Management process	Explanations	Dimension of VU
Planning	<ul style="list-style-type: none"> It involves setting goals, policies, and objectives, as well as expected results, summarizing administrative tasks and preparatory actions that involve direct engagement in virtual education. 	<ul style="list-style-type: none"> • PROCESSES • HUMAN RESOURCES • ORGANISATIONAL STRUCTURE • SUPPORT SERVICE • ITC RESOURCES
Organizing	<ul style="list-style-type: none"> It involves assembling resources (human, financial, and informational) and performing activities related to the VU's structural and procedural organization. 	
Leading	<ul style="list-style-type: none"> It entails helping VU members complete tasks, understanding organizational policies, and communicating with academic staff members about their motivation and performance. 	
Controlling	<ul style="list-style-type: none"> It explains how to use control functions to reduce inefficiencies and ensure that virtual education - related activities are carried out in a way that is compatible with scheduled operations 	

Source: Comşa (2024)

In other words, management of VU refers to managerial action above on all five conceptual virtual university dimension knows as *Processes, Human resources, Organizational structure, Support service, ICT resources*, beginning with *planning* and concluding with *controlling*. This means

that it begins with the preparation of virtual education related activities and concludes with an assessment of all actions taken to ensure virtual education (VE) operations.

Human resource refers to: administrative teaching staff with a leadership function; outsourced and own teaching and research staff; auxiliary teaching staff; administrative staff (Comşa & Verzea, 2022). *Support Services* pertains to: online educational services and online administrative services. *Organizational Structure* refers to: specialized structures: centres/departments and virtual university's internal and external relationships. *Technological Resource* refer to: IT Infrastructure. Figure 1 presents all five dimensions of the Model of Virtual University (MUV). (Comşa, 2024)

2.1. Research Model

To understand these managerial actions, a framework model for the management of the VU has been constructed, as summarized in Figure 1 below.

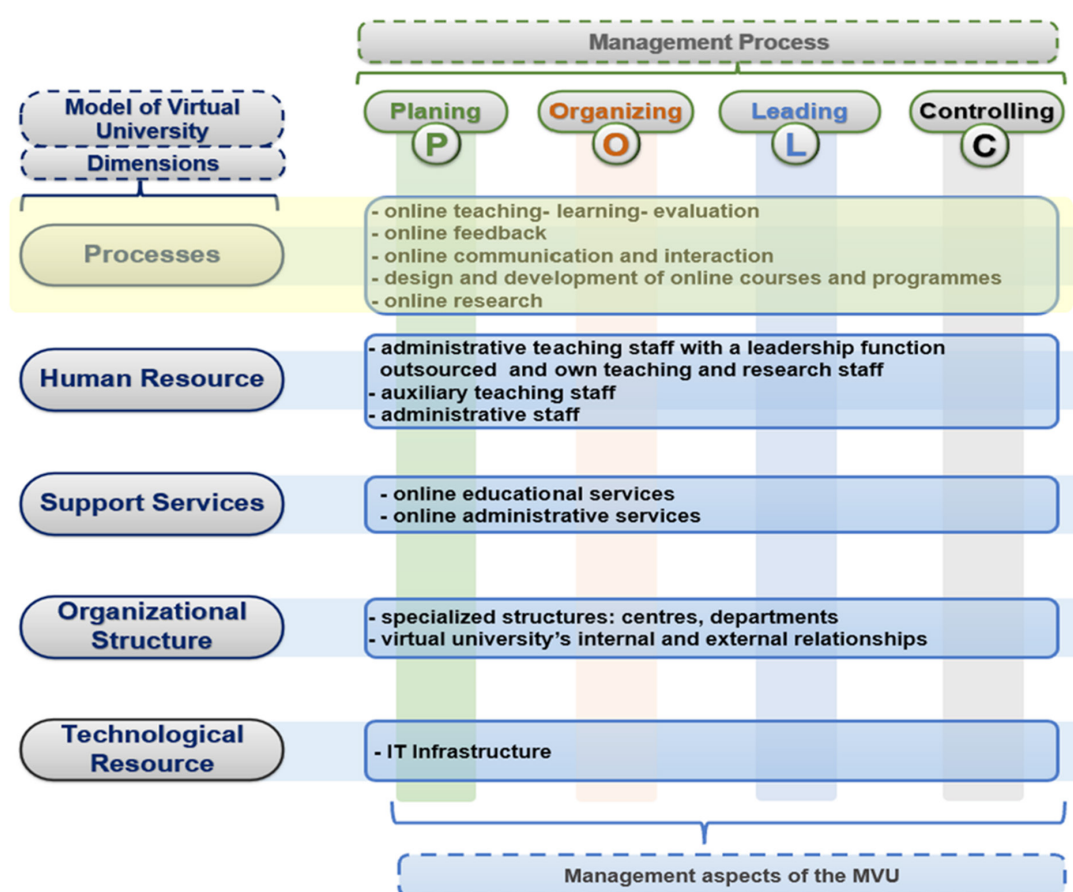


Figure 1. The research model for the management of virtual universities

Source: Own research

This research model was designed to understand the importance of the university management process for the organizational model of the virtual university, to grasp survey participants' perceptions on this aspect and to provide a new management model. The research for this paper only focuses on the *Process Dimension*, which is highlighted in the figure above. The research model framing research questions to be investigated, contributes to investigate the specific management aspects of *PLANNING*, *ORGANIZING*, *LEADING AND CONTROLLING* regarding the main components of the VU Processes.

2.2. Research Methodology Applied in the Analysis of the Processes Dimension

In order to determine the importance level of the management process for a virtual university, the main research technique chosen was the online opinion survey, and the instrument used was the questionnaire (Kittur, 2023). This instrument contains a series of questions (a total of 65 questions) and mental measures given to a group of people as part of a survey to obtain statistical information about the group (Wrench et al., 2008). The survey aims to gather data from a representative sample, enabling generalization to the population from which the respondents originate. During the survey, the researchers collected data by asking questions to describe, compare, or explain attitudes or behaviors regarding the population in question (Eletra S. Gilchrist & Sheldon, 2012).

The empirical data were collected from 195 respondents: of whom 55.2% are undergraduate, graduate, and doctorate students and 44.8% are teaching and research staff, administrative staff, and staff without leadership positions. The questionnaire was distributed to 400 respondents who worked at the 8 romanian universities, contacting them via the email addresses of the universities, by phone, and through the personal email addresses of teaching and research staff, as well as administrative personnel from these institutions. The management aspects related to the *Processes Dimension* were derived from the analysis of responses to the 10 questions in one of the seven sections of the corresponding questionnaire. In this section, the questions were at the interval or ordinal level, assuming an equal distance between data points, such as Likert differential scales. The section on the respondent's socio-demographic data also employed ordinal questions to establish rank orders (Tran, 2024).

The questionnaire used a traditional scale to ask respondents how important or unimportant a certain aspect of the research is. It was a 6-point scale that ranged from „extremely important” to „not all important.” For the evaluation of the management aspects specific to the *Processes Dimension* a score has been assigned to each response option. The option „Extremely important” received 6 points, while the option „not all important” received 1 point. The maximum score is 1170, while the minimum is 195. This scoring served to provide a ranking for the investigated aspects. Descriptive statistics were used as an analysis method for data processing in Microsoft Excel. Frequency tables, distributions, percentages, and graphical presentations were used for the quantitative and qualitative analysis of the data.

3. QUANTITATIVE ANALYSIS OF MANAGEMENT PROCESS WITHIN THE PROCESSES DIMENSION OF A VIRTUAL UNIVERSITY

In the body of this chapter, the results of the quantitative analyses regarding *Processes Dimension* are presented.

An initial step in data processing was to identify and evaluate, based on importance and impact, the processes necessary to ensure the provision of virtual education.

Figure 2 summarizes the obtained results. The analysis of the data regarding the importance of various processes in virtual education reveals the perceptions of survey participants, and the relationship between these processes indicates:

1. Process acceptance in the virtual education system: all components are considered to have at least a high level of importance, with a significant number of respondents rating them as “important” or “very important.” This indicates a recognition of the fact that each process plays a vital role in the virtual educational system, and the success of virtual education may depend on the effective integration of all these elements.

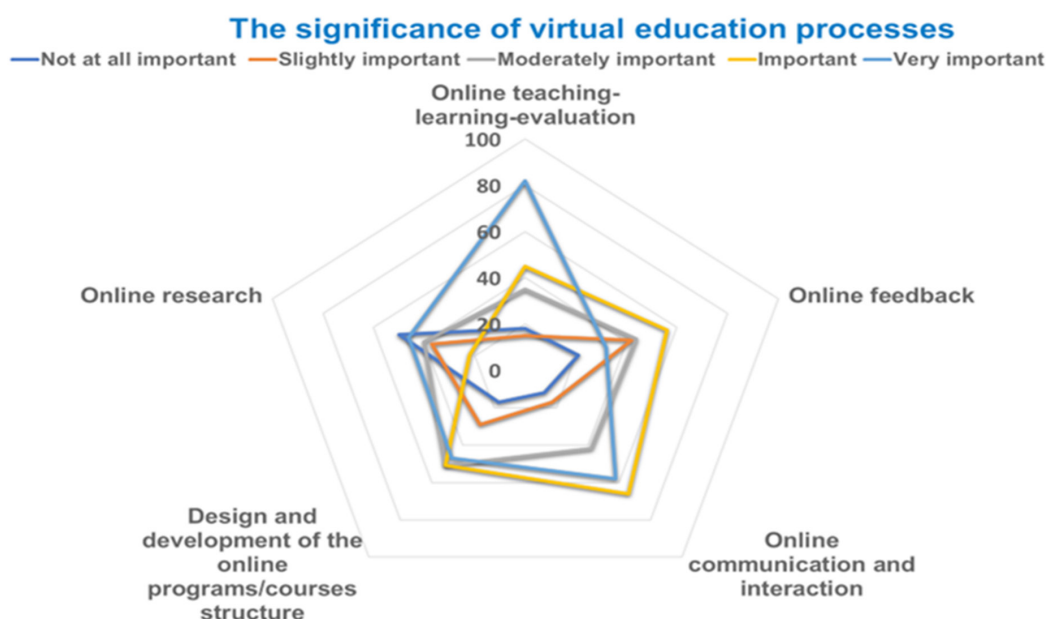


Figure 2. Evaluating the processes required to guarantee the delivery of virtual education

Source: Own research

2. **“Online teaching-learning-evaluation”** and **“Online communication and interaction”** received the most significant responses when it came to the virtual educational system’s process prioritization. This highlights the critical importance of the ability of administrative staff, faculty, and students to access and oversee the educational process in an online setting. In the virtual learning environment and beyond, “online communication and interaction” is crucial. Given the high scores in this category, it appears that participants believe that effective learning requires two-way communication between instructors and students in addition to among other participants (e.g., administrative personnel).
3. **Feedback:** The **“Online feedback”** process is a crucial component of effective learning in the virtual educational process, serving as a complement to the previous process. The high values in this category indicate that participants value the purpose of this process, which is to provide a perspective to both actors in the educational process, thereby assisting them in improving their performance.
4. **The design and development of the online education system:** The high score for **“Designing and developing the structure of online programs,”** which was rated as “important,” highlights the importance of maintaining and enforcing the technological design of courses and programs. This is crucial for supporting the other processes of virtual education.
5. **The integration of the “Online research”** process, despite being regarded as “very important” by fewer respondents, still reflects a high level of appreciation among respondents, indicating an increased capacity within the academic community of students and faculty to conduct research in the online environment. In the current context, where physical access to libraries and laboratories may be limited, online research becomes a key tool in continuing academic activities.
6. The responses in the “not all important” and “slightly important” categories suggest that some respondents may overlook or consider the mentioned processes irrelevant, indicating a slightly negative attitude towards all processes specific to online education.

The second step in the *Processes Dimensions* analysis focused on identifying the most important management aspects that characterize these specific processes in the MVU. This aimed to understand and highlight the academic community’s perception of the importance of the managerial process

projected onto one of the dimensions of MUV. Thus, the analysis focused on the importance of the elements that characterize the *PLANNING*, *ORGANIZING*, *LEADING*, and *CONTROLLING* of specific processes in VE.

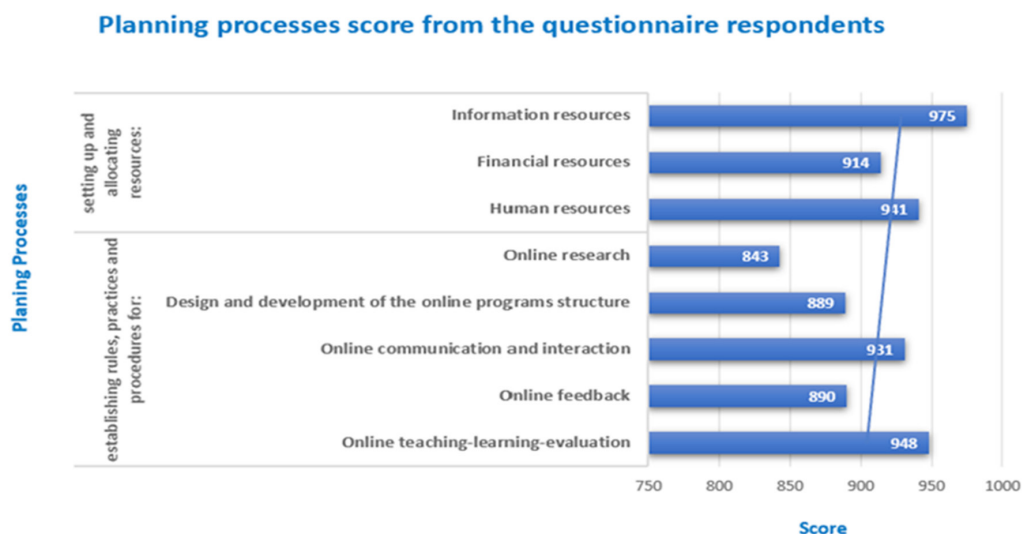


Figure 3. Evaluation of *Planning Processes*. The distribution of responses.

Source: Own processing; Own calculations

The data in Figure 3, which displays the total scores respondents gave to various management issues related to virtual education, can teach us some important lessons about how people think and value things. This is a qualitative analysis of the *Processes Planning* above.

The management aspect of [*Establishing and allocating informational resources*] which received a maximum score of 975 points, in conjunction with the aspect of [*Establishing and allocating human resources*] with a high score of 941 points, highlights the significance of prioritizing the planning of informational resources closely linked to human resources. This underscores the importance of focusing on the primary directions of action for online courses and programs. With a score of 933 points, the aspect regarding [*Establishing and formulating objectives for online teaching-learning-evaluation*] suggests that respondents value the necessity of defining objectives for the most important process specific to virtual education.

The aspect of [*Establishing rules, practices, and procedures for online teaching-learning evaluation*] received a score of 948 points, indicating that respondents place a high priority on developing specific procedures for virtual education.

The findings show that the academic community unanimously agrees on the critical importance of the initial phases of virtual education delivery. The planning of the allocation of informational resources is a predictive endeavor to support any activities and specific actions related to the process of virtual education, and the design and development of objectives, rules, practices, and procedures for online teaching-learning assessment are of essential importance and a valuable tool for decision-makers in universities interested in providing virtual education.

According to the opinions provided by the academic community from the 8 Romanian university centers (students, teaching staff, and administrative personnel with and without decision-making roles), the main managerial actions that can be undertaken regarding the *Organizing Processes* are outlined in the Figure 4.

The data analysis emphasizes the importance of fulfilling management aspects in the organization of processes for virtual education, particularly in Romanian universities, with a focus on specific actions and activities to facilitate online course and program delivery:

- a) The clear delineation of the roles, tasks, and responsibilities of the staff involved in online teaching-learning evaluation processes, online feedback transmission, research, communication, and online interactivity, as well as the design and development of the structure of online programs, is crucial. For all five components of the virtual education process, the investigated aspect received a total of 289 “extremely important” and 291 “very important” ratings.
- b) Depending on the field of study, profile, and specialization, respondents regarded the organization of the virtual educational process as “extremely important,” garnering a total of 255 responses, with 262 expressing the same level of importance. The responses in the “unimportant” and “slightly important” categories for the points investigated above have scores that are almost insignificant compared to the others; this reinforces the necessity and importance given to the organization stage, specifically the management process for a VU.

Organizing processes score from the questionnaire respondents

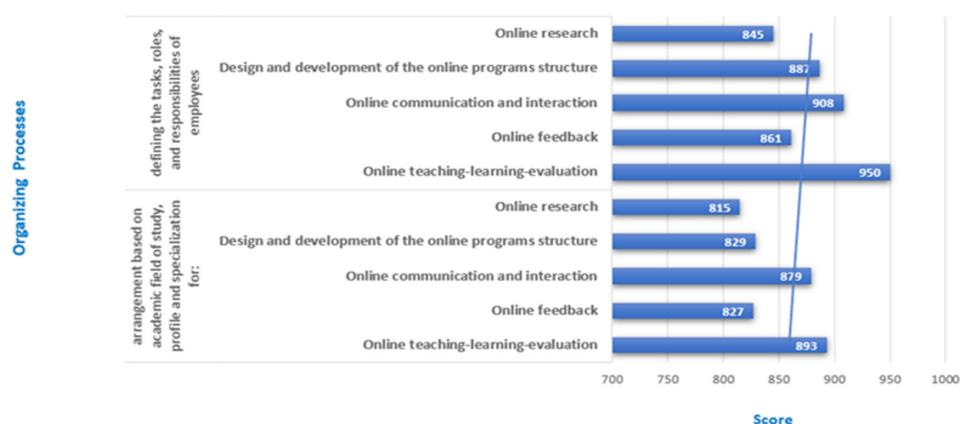


Figure 4. Evaluation of *Organizing Processes*. The distribution of responses

Source: Own processing, Own calculations

Figure 4, which displays the total scores that respondents gave to different management aspects of virtual education, leads to new and important conclusions about how they see and value these things. The aspect pursued regarding [*The defining the roles, responsibilities, and distinct tasks for the personnel involved in online teaching-learning-evaluation*] with a total of 950 points underscores a significant appreciation for the careful organization of the tasks of those involved in ensuring online teaching-learning-evaluation.

The aspect regarding [*The organization of activities based on the field of study, profile, and specialization of online teaching-learning-evaluation*] with a score of 893 points suggests a high level of importance attributed to the necessity of organizing the most crucial process specific to virtual education, depending either on the field of study or on the specialization within the profile.

The findings suggest that the academic community’s perspective underscores the critical importance of organizing processes that bolster the effort to deliver virtual education. As a result, the academic community views the organization of auxiliary teaching activities as the most crucial step in establishing processes specific to virtual education. In *Organizing Processes* necessary to make virtual courses and programs available to interested parties, it is essential to prioritize the

actions of the staff involved in the online teaching-learning-evaluation processes, in correlation with a clear definition of their roles, tasks, and responsibilities.

The stage of statistical analysis regarding *Leading Processes* presents the opinions and perceptions of students, teaching staff, and administrative personnel, both with and without decision-making roles, from the 8 Rumanian state universities, from Iasi, Bucharest, Cluj-Napoca, and Timisoara, regarding other managerial actions that can facilitate virtual education.

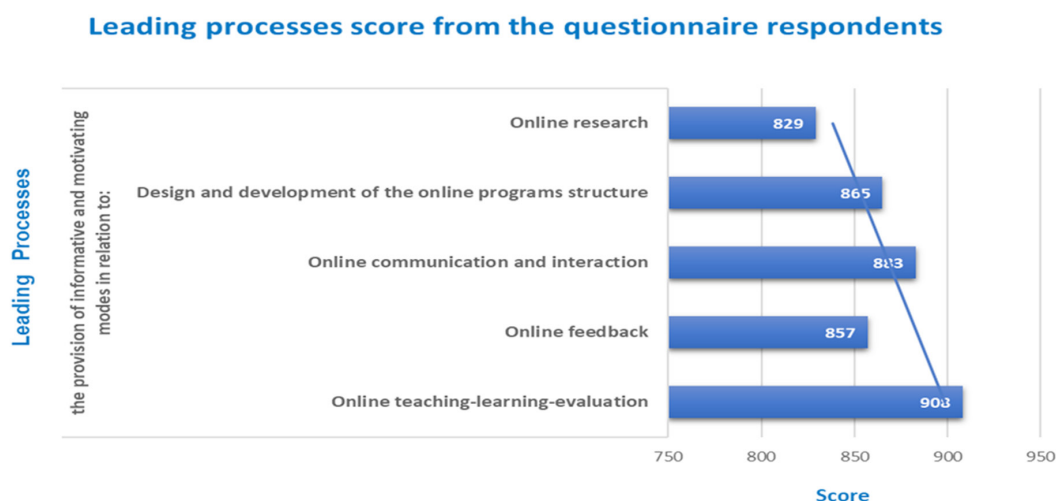


Figure 5. Evaluation of *Leading Processes*. The distribution of responses.

Source: Own processing; Own calculations

According to the respondents' opinions, *leading all processes* necessary for providing virtual courses or programs from universities is another effort deemed "extremely important."

Figure 5 shows the respondents' opinions regarding the most important managerial action to support the coordination of educational processes. The aspect in question, regarding [*Individual or collective information and motivation related to online teaching-learning-evaluation*], was evaluated with 908 points, suggesting that there should be an increased interest in coordinating the efforts of those involved in online teaching-learning-evaluation.

In conclusion, *Leading*, another managerial action on *Processes*, is crucial because it directs all management team efforts, from information and communication to collective and individual motivation, towards achieving the goals related to universities' provision of virtual education.

The academic community at eight Romanian university centres believes that managerial action, from the end of the decision-making process about the *Processes Dimension*, concentrates on their control, leading to the following conclusion: - the *control* of activities and actions concentrated on *all five processes* that support virtual education should be an absolute priority, as it is considered an essential element of the management process for a virtual university, having been assessed as "extremely important."

The management aspect related to [*The actions of evaluation, verification, and the adoption of corrective measures regarding online teaching-learning-evaluation*], which received a total score of 930 points according to dates from Figure 6, demonstrates that preventing dysfunctions, verifying, and evaluating the specific online teaching-learning-evaluation process in accordance with certain methodologies and standards, is an essential action that must be considered in providing virtual education.

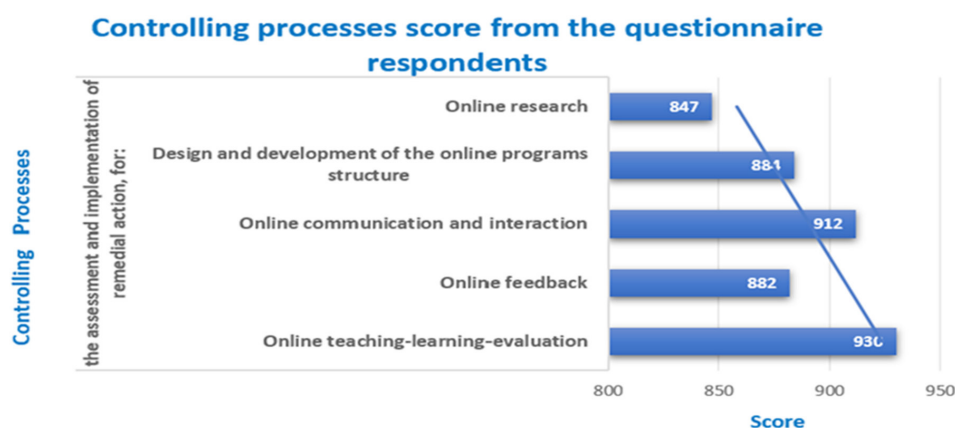


Figure 6. Evaluation of *Controlling Processes*. The distribution of responses.

Source: Own processing; Own calculations

Nevertheless, all respondents agreed that a comprehensive system for monitoring and evaluating all processes is necessary and extremely important. This is because it aims to prevent and assess the outcomes of those involved's efforts to provide courses and virtual programs.

The paragraphs above describe the analysis and evaluation stage of the *Processes Dimension*, which highlights the key components that define the *PLANNING*, *ORGANIZATION*, *LEADING*, and *CONTROL* of particular processes in virtual education. The process of interpreting the respondents' results yields these findings. Therefore, to complete this interpretation of the investigated dimension, the most valued aspects that define the management process were considered based on the five component elements that define processes and which received the highest scores or appreciation from the respondents.

Figure 7 below provides a succinct presentation of the conclusions derived from the descriptive statistical analysis of this dimension of the management model for a VU.

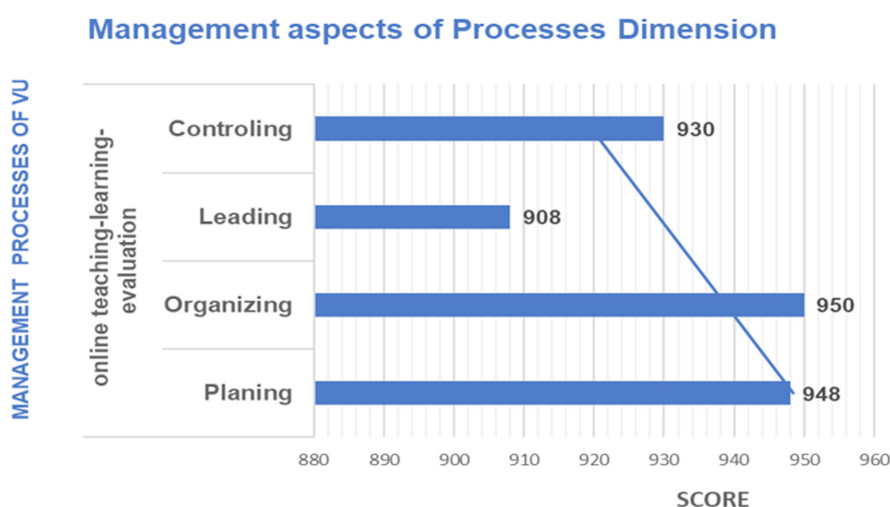


Figure 7. Evaluation of *Processes Dimension*. The distribution of responses.

Source: Own processing; Own calculations

The aspect that characterizes *Planning Processes*, specifically regarding [*The establishment of rules, practices, and procedures related to online teaching-learning-evaluation*], was evaluated by respondents as “extremely important” and received a total score of 948 points.

The aspect that highlights the *Organizing Processes*, specifically regarding [*Roles, responsibilities, and distinct tasks for the staff involved in online teaching-learning-evaluation*], was evaluated by respondents as “extremely important” and also received the highest score of 950 points.

The management aspect concerning *Leading Processes*, indicated by [*Individual or collective information and motivation regarding online teaching-learning-evaluation*], with the lowest score of 908 points, was rated by respondents as “extremely important.”

The aspect indicating *Controlling Processes*, regarding [*The actions of evaluation, verification, and adoption of corrective measures related to online teaching-learning-evaluation*], although evaluated by a small number of respondents as “extremely important,” received a score of 930 points.

Data analysis suggests that the management process, which addresses *PLANNING, ORGANIZING, LEADING*, and *CONTROLLING*, particularly the **Online teaching-learning-evaluation process**, should receive maximum importance in the context of academic activities conducted in a virtual university organizational format, using only tools specific to online interactions.

Supporting the entire set of actions in the management process, which ensures the quality and effectiveness of virtual education delivery in universities, requires increased attention to the necessity of *Organizing Processes*; more specifically, prioritizing the actions of the staff involved in the online teaching-learning-evaluation process in close correlation with a clear definition of their roles, tasks, and responsibilities.

Similarly, in this managerial process that focuses on the *Processes Dimension*, it's crucial to remember the following: - according to the data from Figure 3, respondents evaluated the necessity and importance of planning the *allocation of informational resources* with a score of 975 points. These resources are considered integral and vital parts of a virtual environment that ensures the provision of online educational services.

4. FUTURE RESEARCH DIRECTIONS

In this study, the aspects of the *Management Process*—Planning, Organizing, Leading, and Controlling—for MUV are analysed within a single Dimension: *Processes*. In the future, the authors plan to extend the quantitative analysis of the management process to the other four dimensions—*Human Resources, Organizational Structure, Support Service*, and *Technological Resources*—to provide comprehensive insights into all aspects integrated into the research model presented in Figure 1. Accordingly, the study will aim to create a heatmap illustrating the most significant correlations and distributions of the data obtained, highlighting managerial decisions related to the provision of virtual education at a traditional university in Romania.

5. CONCLUSION

The purpose of this research was to understand how higher education institutions (HEIs) from Romania can migrate physical education and administrative work into a virtual environment specific to the virtual university organizational model. Simultaneously, it aims was to identify the most pertinent management decisions that a university's management team or a faculty within it can implement to enhance information and knowledge management, starting from the identification among the academic community of the most important specific processes.

Quantitative and qualitative research highlights how **respondents** perceive the various processes of virtual education as closely interconnected, with a balanced weight, and they **particularly value online teaching-learning-evaluation as the most important and relevant process specific to virtual education**.

The survey findings indicate that the **ORGANIZING AND PLANNING OF ONLINE EDUCATIONAL PROCESSES are managerial actions that significantly impact managing a virtual university model and should be considered**. Therefore, decision-makers should pay special attention to setting distinct roles, responsibilities, and tasks for each staff member involved in teaching, learning, and evaluation online, as well as establishing the rules, practices, and procedures for all educational processes.

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