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# **Logistics education for business management students: a learning-doing and service-learning approach**

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## **Abstract**

This article develops a teaching methodology in logistics for students of business administration programs to solve real problems in companies and integrate the knowledge acquired in logistics management courses. The methodology integrates project management tools with the support of MSExcel and promotes the elaboration of managerial reports according to the requirements of working environments. The methodology generates high satisfaction in the students, to the extent that it allows them to know in depth the logistic system of a company, identifies opportunities for improvement and proposes solutions based on technical and economic aspects. Likewise, the methodology allows the students to have contact with the directives of a real company and supports the improvement of logistics processes based on qualitative and quantitative information.

**Keywords:** business administration, logistics, teaching methodology, higher education.

# Educación en logística para estudiantes de gestión empresarial: un enfoque de aprendizaje-aprendizaje y servicio-aprendizaje

## Resumen

Se desarrolla una metodología de enseñanza en logística para estudiantes de programas de administración de empresas para resolver problemas reales en empresas e integrar los conocimientos adquiridos en cursos de gestión logística. La metodología integra herramientas de gestión de proyectos con el soporte de MSExcel. Promueve la elaboración de informes gerenciales conforme con los requisitos de los entornos de trabajo. La metodología genera una gran satisfacción en los estudiantes, en la medida en que les permite conocer en profundidad el sistema logístico de una empresa, identifica oportunidades de mejora y propone soluciones basadas en aspectos técnicos y económicos. Asimismo, permite a los estudiantes tener contacto con las directivas de una empresa real y apoya la mejora de los procesos logísticos basados en información cualitativa y cuantitativa.

**Palabras clave:** administración de empresas, logística, metodología de enseñanza, educación superior.

## 1. INTRODUCTION

Higher education faces the challenge of training professionals with the skills and competencies demanded by the labor market. The logistics sector is no stranger to this, so the education courses in logistics management should be adjusted to business requirements (Ślusarczyk & Kot, 2011; Smoąg et al., 2015; Tong, 2011). Accordingly, business managers are called to lead logistics processes

because management skills are essential for successful logistics management (Thai et al., 2012).

Therefore, students of business management programs should incorporate the knowledge and case studies seen in class in virtual learning environments (modeling and simulation), or real environments (business approach), through the learning-by-doing experience, enabling to evaluate the specific learning and solutions that the students generate (Neumann, 2008). Likewise, higher education is changing to encourage students to be protagonists in the learning process and encouraging teachers to assume an accompanying role (Nussbaum & Diaz, 2013), all of this to increase the absorption of graduates into real companies (Yuni & Siti, 2019).

To achieve this, teachers must have adequate learning mechanisms and teaching methods to stimulate the acquisition and retention of knowledge in students (Lu et al., 2013), such as projects in companies, which strengthen the construction of a solid concept of logistics management through the visualization of how logistics work in a business reality (Yang et al., 2011). This approach narrows the gap between companies and universities because employers and educators often have different approaches to critical skills and topics that need to be prioritized in a business logistics curriculum (Niine & Koppel, 2015), and promotes the development of creative skills in students (Jarrah & Al Majali, 2019).

As such, education in logistics management is called to create courses where students develop logistics solutions for inbound logistics, internal logistics, outbound logistics and reverse logistics (Hummel et al., 2015), to provide a service to the companies under study, offering possible solutions and tools to improve their processes (Goffnett et al., 2013; Lu et al., 2013), and creating strategic alliances and incorporate logistical systems (Gviliya et al., 2018). Based on the abovementioned, this article aims to develop a teaching methodology in logistics for students of business administration programs to solve real problems in companies and integrate the knowledge acquired in logistics management and other subjects of business administration.

## **2. METHODOLOGY**

The proposed teaching methodology intends that working teams of 4-6 business administration students, can characterize the logistics processes of companies, have the competence to identify the main opportunities for improvement, and can propose projects to improve the productivity and business competitiveness through logistics processes. It is recommended to implement the methodology in the middle of the course to allow students to develop sufficient knowledge related to logistics management.

The main stages of the methodological approach for the improvement of logistics process are 1) Company selection; 2) Logistics assessment; 3) Selection of the process/operation to improve; 4) Improvement project; 5) Final report. All these stages are guided by the professor ensuring an effective learning process.

For the selection of a company, it is recommended to select a company of any size and sector, but the main requirement is that the company must provide complete information about the logistics processes. Initially, students describe the mission, vision, values, customers, the portfolio of products and services of the company.

At the stage of logistics assessment, logistics processes and operations are described in detail, and also improvement opportunities are proposed for each logistic operation. The logistics processes to be assessed are logistics planning, procurement and purchasing, inventory management, warehousing, distribution and transport, and reverse logistics. These logistics processes may vary according to the academic content included in each logistics management course. Figure 1 shows an example of the MSExcel template designed for logistics assessment.





Likewise, the logistics assessment assigns scores (rating on a 0 to 5 scale) to the logistics operations of each logistics process. Based on these values, the score of each logistics process is computed as the average of logistics operations scores. Similarly, the total score of logistics management is computed as the average of logistics processes, and this can be achieved with simple averages or through a hierarchical weighting process (Cano et al., 2017). Accordingly, performance measures can be grouped facilitating the improvement and decision-making on business and logistics processes (Gómez et al., 2016).

Thus, based on quantitative values it is possible to assess the logistics management in the company under study, and it facilitates the selection of the process to be improved. Therefore, the students must select the logistics process with the lowest score, and within this process, they must select the logistics operation with the lowest score. Then, some elements such as indicators, information systems, resources, flowcharts, images, layouts, videos of the operation, other supporting documentation are described in-depth for the selected logistics operation. Even, a SIPOC matrix can be applied to describe the objective, scope, suppliers, inputs, activities, outputs and suppliers of the selected operation (Salazar et al., 2017).

Once the details of the selected logistics operation are thoroughly understood, a proposal for improvement is made based on techniques, models, and methodologies seen in the course of logistics management. Alike, solutions from bibliographic sources can be

applied to solve the main issues of the logistics operation. Additionally, the improvement project must be based on a technical analysis, supported by indicators, information systems, resources, flowcharts, images, layouts, videos of the operation, and other information that shows the detail of the improvement proposal and justify the benefits of its implementation.

Accordingly, the methodology has an MSExcel template for a Gantt chart, as shown in Figure 2, to set the schedule of the improvement project. The schedule the improvement project implementation consists of activities, responsible, results and the time required for each activity. Due to the scope of the improvement projects, students are advised to use weeks as periods. As a result, the completion time of the last activity in the Gantt chart determines the required time to implement the improvement project.

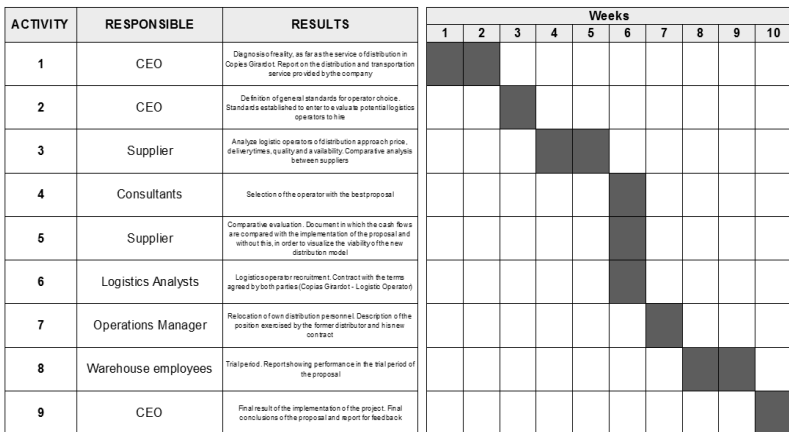


Figure 2. Gantt chart for the implementation of the project

Furthermore, an economic analysis gives greater validity to the improvement project to the extent that it measures the sustainability of the project over time. For this, students calculate in period 0 the initial investment, which is derived from the activities outlined in the Gantt chart, i.e., the activities required to start up the improvement project. From period 1, the students calculate the incomes and expenses of the improvement project, which gives the net profit in each period. Once the net profits are obtained in each period, the financial indicators of net present value (NPV), internal rate of return (IRR), and the payback period (PP) are calculated in the MSExcel template shown in Figure 3.

	MONTHS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
	<b>INCOMES</b>												
INCOMES AND SAVINGS 1	\$ -	\$ -	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333	\$ 333
INCOMES AND SAVINGS 2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400
INCOMES AND SAVINGS 3	\$ -	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300	\$ 300
<b>TOTAL</b>	\$ -	\$ 300	\$ 633	\$ 633	\$ 633	\$ 633	\$ 633	\$ 1,033	\$ 1,033	\$ 1,033	\$ 1,033	\$ 1,033	\$ 1,033
	<b>EXPENSES</b>												
EXPENSES AND INVESTMENTS 1	\$ -	\$ 167	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 167
EXPENSES AND INVESTMENTS 2	\$ -	\$ -	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ 83	\$ -
EXPENSES AND INVESTMENTS 3	\$ -	\$ -	\$ 833	\$ 833	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EXPENSES AND INVESTMENTS 4	\$ -	\$ -	\$ -	\$ -	\$ 583	\$ 583	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EXPENSES AND INVESTMENTS 5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 667	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EXPENSES AND INVESTMENTS 6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 167	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EXPENSES AND INVESTMENTS 7	\$ 263	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EXPENSES AND INVESTMENTS 8	\$ -	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138	\$ 138
<b>TOTAL</b>	\$ 263	\$ 305	\$ 1,055	\$ 1,055	\$ 805	\$ 805	\$ 1,055	\$ 221	\$ 221	\$ 221	\$ 221	\$ 221	\$ 305
<b>NET PROFIT</b>	\$ (263)	\$ (6)	\$ (421)	\$ (421)	\$ (171)	\$ (171)	\$ (421)	\$ 812	\$ 812	\$ 812	\$ 812	\$ 812	\$ 729
<b>RETURN INVESTMENT RATE</b>		1%	Monthly										
<b>NPV</b>		\$ 2,913											
<b>IRR</b>		16%											
<b>PP</b>		7											

Figure 3. Economic analysis template for the improvement project

The last stage of the methodology is the preparation of a written management report where all stages of the proposed methodology are documented, and the benefits of the improvement proposal are highlighted to be implemented in the study company. Equally, the students must perform an executive talk in the classroom to share with

other classmates the challenges and solutions of the business improvement project.

After socializing the results of improvement projects, working teams receive feedback from the professor, and based on this, details of the improvement project are corrected so that a report can then be sent to the company that provided the information to carry out the study. Thus, the university-company relationship is strengthened, where students learn from real working environments, the companies benefit from a characterization of their logistics processes and from a feasible improvement project which is validated technically and economically.

### **3. RESULTS AND DISCUSSION**

In order to validate the contribution of the proposed methodology to the learning process of business management students, a survey in Google Forms was applied to 247 students. The students were consulted about their satisfaction, benefits obtained and suggestions for improvement for the proposed methodology.

As a result, students express great satisfaction with the methodology, with an average of 4.4 on a scale from 1 to 5 (1: definitely not satisfied; 5: very satisfied). These results are obtained after 96% of students express great satisfaction with the methodology (117 students with the satisfaction of 5 and 121 students with the

satisfaction of 4). Therefore, it indicates that students perceive that the methodology contributes to its professional training process in logistics management.

Regarding the benefits of the methodology, Figure 4 demonstrates that the methodology allows the students to have contact with the directives of a real company, and allows them to know in depth the logistic system of a company. Likewise, the methodology identifies improvement opportunities based on technical and economic aspects and supports the improvement of logistics processes based on qualitative and quantitative information. These benefits are also derived from project-based learning, which is based on active and cooperative learning of the students, who become protagonists of their learning. It is clarified that the percentages in Figure 4 do not have to add 100% because several benefits can be chosen by the students.

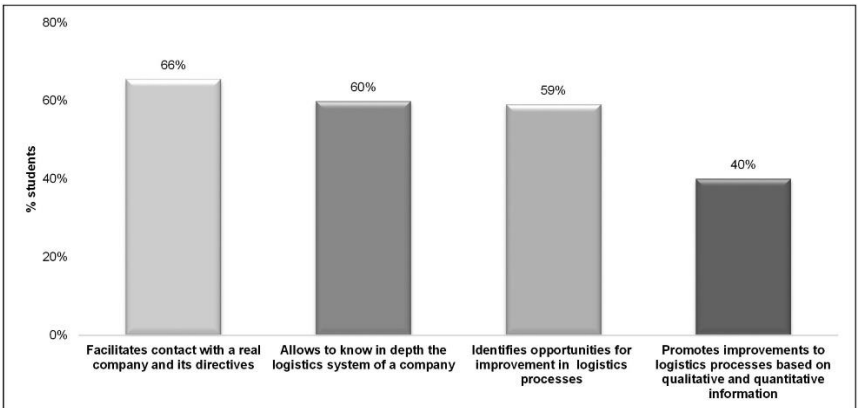


Figure 4. Benefits of the methodology in logistics management training

Intending to improve the proposed methodology, Figure 5 illustrates the main suggestions to improve the results of the methodology, which are related to advising the establishment of working teams and implement the methodology from the beginning of the course. Likewise, it is suggested to support students in the search and selection of companies.

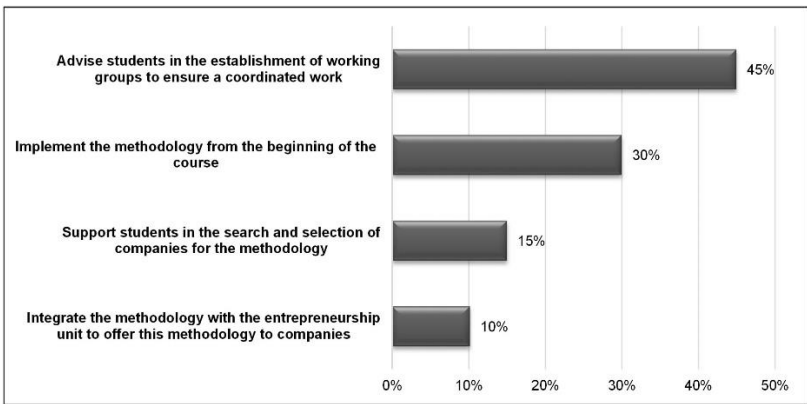


Figure 5. Suggestions for the improvement of the methodology

Therefore, heterogeneous working teams can improve the performance of students, avoid the creation of unbalanced teams (Oakley et al., 2004), and for this can be applied existing methods for assigning members to work teams (Layton et al., 2010).

Finally, the proposed methodology proves to be efficient for logistics management training in students of business administration, approaching students to real work environments and encouraging them to propose improvement project that can enhance the logistics performance in real companies.

#### **4. CONCLUSIONS**

This paper investigated a teaching methodology in logistics for business administration students to solve real problems in companies and integrate the knowledge acquired in the logistics management course. The methodological proposal presented in this study is pertinent and consistent with the professional practice of business managers, allowing them to consolidate and implement in a real case a set of knowledge, skills and business tools acquired in the course of business logistics and other subjects of the business administration program.

As an implication for practice, the methodology allows business administration students to systematically identify improvement opportunities in logistics processes, and to sustain them technically and economically. Furthermore, the methodology aims to close the gap between universities and companies, making the training process more efficient and effective.

Finally, the methodological proposal is pertinent and consistent with the professional practice of business managers, allowing them to consolidate and implement in a real case a set of knowledge, skills and business tools acquired in the course of business logistics and other subjects of the business administration program. For future research, it is recommended to implement the methodology in operations management and supply chain management courses, adapting the processes and operations of each course in the assessment stage.



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