Academic project management: Lean Thinking applied in a higher education department in the city of Puebla, an approach for efficiency and quality

Jorge Rosete-Espinosa, Crishelen Kurezyn-Díaz, & Giovanni Chávez-Melo

Universidad Popular Autónoma del Estado de Puebla, Puebla, México. jorge.rosete@upaep.mx, crishelen.kurezyn@upaep.mx, giovanni.chavez@upaep.mx

Abstract

Bureaucracy in university management has led to a concentration of processes and excessive controls, resulting in delays in decision-making and increased workload for academic staff. This organizational complexity creates communication gaps between departments, raising operational costs and compromising customer satisfaction. This study demonstrates that implementing Lean methodology within a university department's project management program yields tangible improvements in response times, reduces operating costs, lowers employee stress levels, and enhances educational service quality. Based on a literature review of higher education management and Lean principles, this research provides practical application in an academic department, with results compared to existing literature. The findings indicate that Lean Thinking facilitates a more effective educational experience by minimizing bottlenecks and redundant processes, enabling the reallocation of human and material resources toward activities that genuinely add value to students.

Keywords: project management; lean thinking; lean management; lean university; academic processes.

Gestión de proyectos académicos: Pensamiento Lean aplicado en un departamento de educación superior en la ciudad de Puebla, un enfoque para la eficiencia y la calidad

Resumen

La burocracia en la gestión universitaria ha conducido a una concentración de procesos y controles excesivos, generando retrasos en la toma de decisiones y un incremento en la carga laboral del personal académico. Esta complejidad crea brechas de comunicación entre departamentos, aumentando los costos operativos y comprometiendo la satisfacción del usuario. Este estudio demuestra que la implementación de la metodología Lean dentro del programa de gestión de un departamento universitario produce mejoras tangibles en los tiempos de respuesta, reduce costos operativos, mejora el ambiente laboral y mejora la calidad de los servicios educativos. Basado en una revisión de literatura sobre gestión de educación superior y principios Lean, esta investigación proporciona una aplicación práctica en un departamento académico. Los hallazgos indican que el Pensamiento Lean facilita una experiencia educativa al minimizar cuellos de botella y procesos redundantes, permitiendo la reasignación de recursos hacia actividades que agregan valor a los estudiantes.

Palabras clave: gestión de proyectos; pensamiento lean; gestión lean; universidad lean; procesos académicos.

1. Introduction

In the realm of higher education, universities face mounting pressures to enhance operational efficiency and service quality [1]. These challenges arise from a confluence of factors: escalating demands, resource constraints, and the need for responsiveness [2]. Unfortunately, traditional bureaucratic structures often impede agility, hindering timely decision-making and effective coordination [3]. As a result, innovative approaches are essential to streamline processes and optimize outcomes.

According to Höfer and Naeve, the implementation of Lean Thinking in academic management processes enables universities to reduce the time spent on administration and

support services. Moreover, it facilitates a more effective educational experience centered around students by identifying bottlenecks, eliminating redundant processes, and strategically reallocating human and material resources toward academic processes that genuinely enhance student value [4]. Delays in meeting deliverables or instances of complete failure in their delivery often stem not from personnel inefficiencies but rather from inadequately structured, occasionally narrow, and insufficiently systematized processes [4].

This paper delves into the potential of Lean Thinking as a transformative methodology within the context of academic project management [5]. By adopting Lean principles, universities can address these challenges head-on, fostering efficiency, effectiveness, and continuous improvement [6].

Simultaneously, this study addresses the following hypothesis: The implementation of Lean Thinking within a project management model at the Dean's Office of Creative Sciences at UPAEP (Universidad Popular Autónoma del Estado de Puebla) yields several benefits, including enhanced operational efficiency, optimized resource utilization, waste reduction, and improved quality of academic services.

The study begins with a literature review where a brief analysis of relevant articles on the topic of Lean Management in Education is conducted. Subsequently, a bibliometric analysis is carried out using the SCOPUS database, searching for the terms "Education" and "Lean Management," which yielded a list of 900 documents. Upon refining the search, 99 documents applicable to the theme of agile management of educational spaces are obtained. Following this, a search is conducted using the terms "lean" and "Education," resulting in 193 outcomes. This list serves as a reference for the subsequent analysis. The data is then validated, correcting import, spelling, and grammatical errors, to construct tables and graphs that appropriately present the information.

The search conducted spans from 1970 to 2022 to clearly identify research trends on the specific topic. The most significant results obtained from the literature review are summarized as follows:

The application of Lean Management in universities is relatively recent [7] and has its roots in the late 20th century [8] when higher education institutions began recognizing the need for more efficient approaches to address administrative and educational challenges [3]. Despite its proven effectiveness in improving processes and eliminating waste in other industries, awareness and study of Lean management in higher education remain relatively low [7]. However, universities are increasingly facing pressures to adapt to a changing global market with declining student numbers and a wide range of educational offerings [9].

Institutions such as Michigan Technological University (MTU) and Massachusetts Institute of Technology (MIT) have successfully implemented Lean principles to improve administrative processes and enhance student satisfaction [2]. For instance, MTU focused on identifying and eliminating non-value-added activities [3], resulting in streamlined enrollment processes and improved resource management [10]. Similarly, MIT adopted Lean principles across various areas, including project management, quality improvement, and human resources, leading to enhanced efficiency and productivity.

In Mexico, universities like Universidad Autónoma del Estado de México (UAEM) and Universidad Autónoma de Nuevo León (UANL) have begun implementing Lean Six Sigma methodologies to optimize processes and improve the student experience [11]. UAEM's adoption of Lean Six Sigma resulted in reduced administrative processing times and improved accuracy in information management. On the other hand, UANL implemented Value Stream Mapping to visualize workflow and identify areas for improvement, leading to increased efficiency and productivity [12].

These examples highlight the tangible benefits of Lean management in higher education, including improved process efficiency, reduced wait times, and enhanced quality of services [13]. Moreover, the cultivation of a culture of continuous improvement and the provision of training programs have facilitated the successful adoption and sustainability of Lean practices within universities [11].

With the information gathered from the literature review, an exhaustive diagnosis of the current state of the Deanery of Creative Sciences at UPAEP was developed through a combined analysis of quantitative and qualitative data [14], aiming to thoroughly understand the functioning of this Deanery, its organizational climate, the perceptions of its members, and above all, the efficiency of its processes. Through this evaluation process, it is expected that this Deanery can identify areas for improvement, leverage its strengths, and lay the groundwork for continuous growth [15]. The literature review reveals a clear opportunity to integrate manufacturing-derived methodologies into academic processes, particularly in the context of course scheduling and resource allocation. This integration requires a structured framework that addresses the specific challenges of academic environments while maintaining the rigor of established methodologies.

2. Methodology

The methodology outlines the research approach adopted in this study, incorporating both theoretical analysis and practical application [15]. As seen, systematic literature review is conducted to identify key concepts and principles of Lean management applied at universities, followed by a case study approach to implement Lean methodologies within a selected university department. The methodology highlights the iterative nature of the research process, emphasizing data collection, analysis, and reflection. The Qualitative Phase of the research was approached using semi-structured Interviews [16] that were conducted with participants using a previously designed question script. These interviews focused on qualitative aspects related to organizational climate, job satisfaction, interpersonal relationships, leadership, organizational culture, and other relevant topics [17].

- The Quantitative Phase: Institutional Indicator Review: Quantitative data from programs were collected from institutional indicator dashboards available at UPAEP [14]. These indicators include metrics to identify process efficiency, quality, and accuracy of academic activities as a reflection of academic administration.
- Data Analysis: An integrated analysis of qualitative and quantitative data was performed, involving comparison and triangulation to obtain a holistic view of the Deanery's situation [18].

- Interpretation of Results: Findings were interpreted based on the research objectives, identifying the strengths, weaknesses, opportunities, and threats of the Deanery of Creative Sciences.
- Report Development: A diagnostic report was drafted, including a detailed description of findings, conclusions, and recommendations [19].

The analysis and interpretation of qualitative and quantitative data obtained was presented using "ANDON," which, within the context of Kaizen, is considered an essential tool for fostering continuous improvement [20]. By providing a clear visualization of problems through color-coded lights, Andon helps engage collaborators in identifying and solving problems, contributing to the continuous improvement process in the organization [8]. The color-coding system follows a standardized risk assessment approach where red indicates critical indicators falling below acceptable thresholds, representing immediate operational risks that require urgent intervention. Yellow signifies potential medium-term risks (within 1-2 years) if corrective actions are not implemented, while green denotes processes meeting or exceeding performance indicators with no identified risks. This tricolor classification was applied across the six academic programs within UPAEP's Creative Sciences Deanery: Architecture, Advertising, Visual Design and Innovation, Digital Communication and Media, Animation, and Film and Audiovisual Production. This systematic application enables a comprehensive assessment of operational performance across all departments while maintaining consistency in risk evaluation and visualization principles as shown in Fig. 1 below. [21]

The image summarizes the status of the deanery, presenting the six schools that comprise it and the five strategic aspects that were measured, providing a general overview of the areas of opportunity.

As can be observed, the area requiring the most attention is related to management processes, as the semaphore is yellow in 3 out of the 6 programs, implying short-term attention, and red in another 3 programs, necessitating immediate action. This makes this area an opportunity common to all programs.
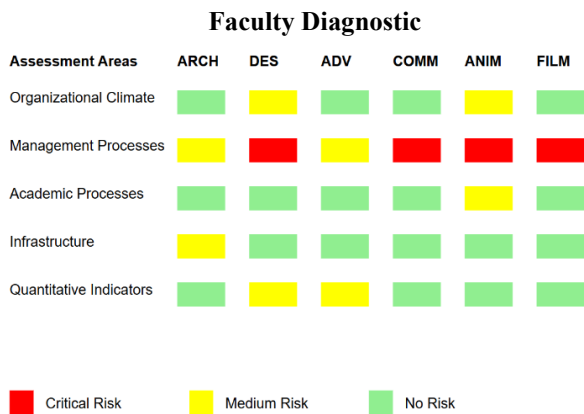

Figure 1. Diagnostic Findings
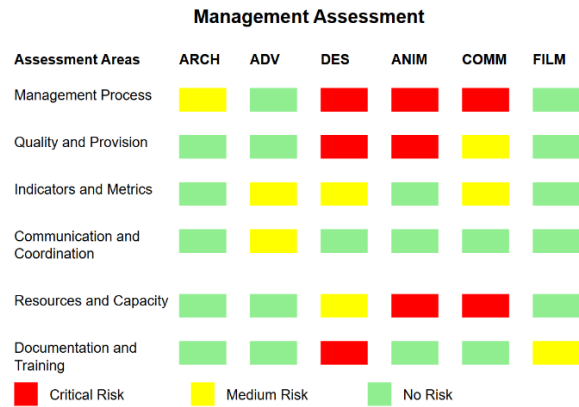Source: Own work 2024

Figure 2 Management Assessment.
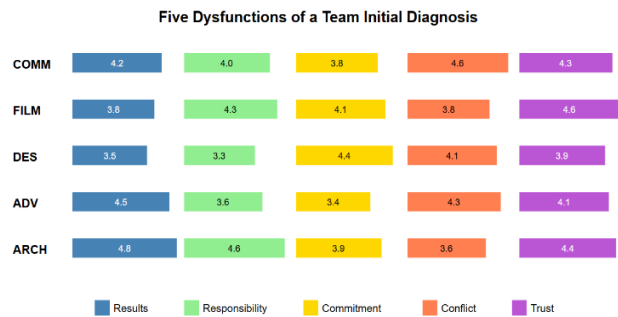Source: Own work, 2024

Figure 3. Five Dysfunctions of a Team Initial Diagnosis.
Source: Own work 2024.

Furthermore, by double-clicking on the general category of management processes, the efficiency of these processes is identified as a priority area of attention Fig 2. Among the measured processes, the course offering is highlighted as the most complex management process and the one that demands the most time from the directors. Therefore, it is chosen as the ideal topic for implementing a lean oriented project management within the deanery.

Moreover, with the intention of diagnosing the organizational culture and climate of the deanery this research draws upon the work of Patrick Lencioni, who since 2002 in his publication "The Five Dysfunctions of a Team," identifies the main barriers preventing teams from reaching their full potential: lack of trust, fear of conflict, lack of commitment, avoidance of accountability, and inattention to results. To identify these dysfunctions within the Creative Sciences Deanery at UPAEP, data extracted from the survey is used to assign values between 1 and 5 to the aspects of trust, conflict, commitment, accountability, and results, based on the colors of the cells (red, yellow, green). The results are as follows:

- **Trust Levels:** While some faculties exhibited high trust levels (green), others required immediate attention (red), indicating a need for targeted interventions to build and maintain trust.
- **Conflict Management:** Conflict was prevalent in

certain faculties, signaling the necessity for improved conflict resolution strategies and communication channels.

- **Commitment and Responsibility:** Variability was observed in commitment and responsibility, with some faculties demonstrating lower engagement levels, impacting overall performance.
- **Results Orientation:** Differences in results orientation were noted, with some faculties achieving their targets more consistently than others.

The initial diagnostic information regarding the five dysfunctions of a team is synthesized in Fig. 3.

3. Application and Results

The implementation of Lean thinking principles in academic administration integrates three complementary methodologies: Lean Thinking as the foundational philosophy, Andon as the visual management system, and Poka-Yoke as the error-proofing mechanism. This systematic approach focuses on three core elements: value stream mapping, waste identification, and continuous flow implementation. After identifying the target process and assessing the organizational culture, the analysis phase employed three key tools: stakeholder identification, process mapping, and activity flow, as shown in Fig. 4. These tools enabled a comprehensive understanding of organizational activities and highlighted potential areas for improvement, creating a robust framework for academic process enhancement while maintaining clear methodological connections. [13].

The result of the process diagnosis shows the following findings:

1) The stakeholders involved in the process are numerous, as shown on Fig.5. While the primary responsibility of the process lies with the faculty directors, the administrative and support areas add individuals and verification steps, slowing down the activity's progress. Moreover, with so many areas and people involved in the process, communication and decision-making become challenging [22] Although student satisfaction with scheduling is indeed a crucial consideration, students are not direct stakeholders in this specific scheduling process. While program directors take into account student requirements, course sequencing, and general student feedback in a preliminary phase, this occurs in a separate process that precedes the actual scheduling operation. The process itself is primarily determined by the university's available infrastructure and specialized classroom equipment. Student interaction resumes later during the course registration phase, which is a subsequent process to the scheduling operation being analyzed here. This separation exists because the scheduling process begins after the course offering has been determined and focuses specifically on the logistical aspects of room and time allocation.
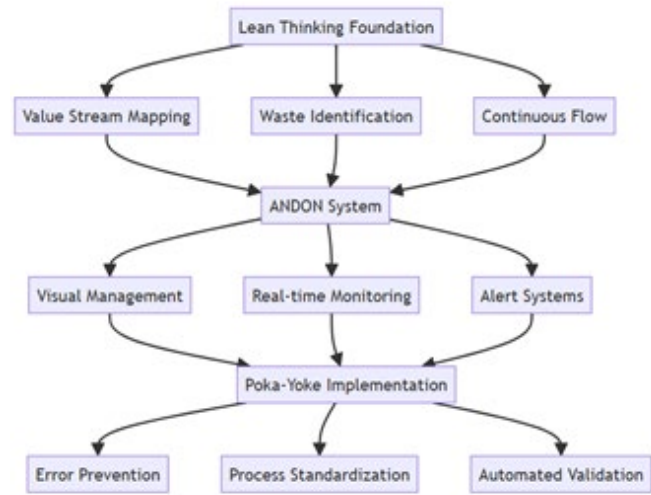
Systematic Approach

Figure 4. Systematic Approach.
Source: Own work 2024

Figure 5. Course offering Stakeholders
Source: Own work 2024.

2) The process itself is complicated, requiring numerous steps to finalize the opening of a course. Furthermore, as can be observed in Fig. 6, the process exhibits evident bottlenecks that impede workflow and make decision-making complex due to circles of sub process repetition with unclear and unverifiable information in real-time. [23].
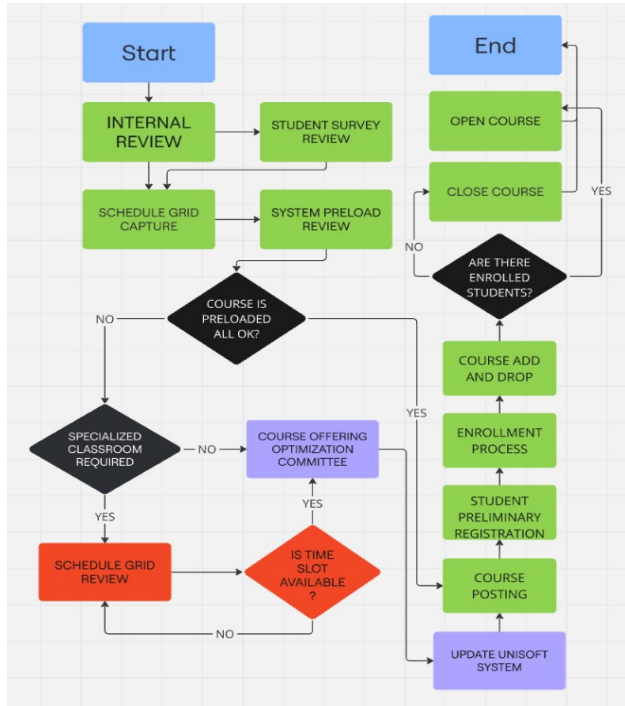
Figure 6. Course offering process map.
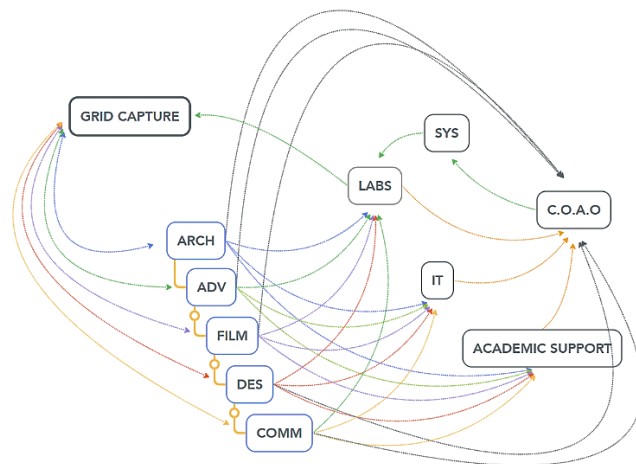Source: Own work 2024.

Figure 7. Course offering flow chart.
Source: Own work 2024.

3) As can be observed in Fig. 7, the flow of the process is intricate, as the main administrators of academic spaces do not share real-time information. This necessitates constant individual interactions between faculty directors and their peers, without guaranteeing the quality of information exchange [24].

3.1. Intervention

As a result of the diagnosis, an intervention model was designed based on the principles of lean project management, with the following desired objectives:
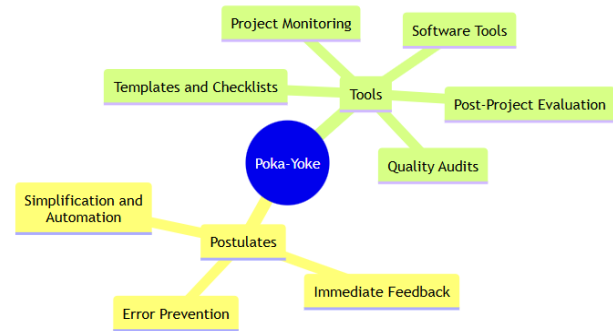

Figure 8. Intervention Design framework.
Source: Own work 2024.

• Reduced Response Times through the optimization of the chosen process that allows for agile decision-making and reduces compliance times.
• Decreased Operating Cost by eliminating waste and operational inefficiency.

The design of the intervention is based on three principles of Poka-Yoke, as expressed in Fig. 8.

3.2. Specific action

The application of the intervention consisted of conducting a workshop for the construction of the academic offering, in which all the stakeholders with an interest in the process were gathered in a physical space of the university. In it, all the academic spaces available for the teaching of courses for the deanery were placed on flipcharts and displayed on partitions throughout the place, with the description and equipment of each one of them as well as the available spaces.

Each faculty director then had the opportunity to visualize in real time the characteristics of all the classrooms and schedule the courses in the best available place, while their academic peers did the same. This allowed to avoid overlaps in the schedule of the classrooms since in case these existed, the interested parties were physically present and could negotiate with their counterpart.

On the other hand, the administrators of the classrooms and laboratories were able to take note in real time of the proposed occupation for the academic program´s offer and thus give priority to them at the time of reflecting it in to the system, which ensured that the specialized spaces are used for the courses that will make the most of them.

The workshop was held in two sessions of five hours in March 2024, to which the administrative director and the academic secretary of the deanship also joined. They were able to follow up on the economic amount required for the payment of the professors who will teach the offered courses, ensuring that while building the academic offer, the deanship's fee budget was also prepared.

After the workshop, the academic secretary held an additional one-hour meeting with each academic program director to verify that the information worked on in the workshop was reflected in the school administration system,

concluding the exercise.

- Enhanced Employee Satisfaction by directly involving them in decision-making and reducing administrative burden, which would increase team morale and reduce stress levels [25].
- To quantify the above, three main indicators were determined:
- Cycle Time Reduction in which the time dedicated to it is compared before and after the implementation of lean management actions. This will be quantified in man-hour [26].
- Cost savings, which will measure the operational cost associated with the process and its variation before and after the intervention. This item will be presented in Mexica pesos
- Employee engagement, with which the level of participation of each staff member will be identified, as well as their level of satisfaction with the improved process. This will be reflected though a satisfaction survey.

The Poka-Yoke applied to the Creative Sciences Dean's scheduling workshop is structured around several key principles:

Error Prevention: Actions include downloading all courses from current study plans with equivalencies, ensuring all subjects are considered. This is supported by templates and checklists. Standardizing and printing the weekly schedule format for each available space, in line with institutional blocks, ensures standardized information sources, complying with institutional rules through software tools. Describing the physical and technical capacities of each available space in the schedule format optimizes physical resource allocation. Color-coded trays by faculty facilitate immediate user identification.

Simplification and Automation: Actions involve standardizing criteria for naming courses, practices, and activities, thus clarifying space requirements with the aid of software tools. Visualizing the schedule for all available spaces enables optimal space selection, ensuring academic needs are met, supported by templates and checklists. Unifying information flow into a single spreadsheet, fed by the system based on the physical schedule, creates a unique information source, facilitated by software tools.

Immediate Feedback: Peer review by directors, team validation (four faculties), technical review (academic secretariat), space review (academic spaces, CETEC, computing centers), and general validation by the dean ensure information accuracy. This process, supported by project monitoring and evaluation tools, allows for real-time corrections, reducing errors in subsequent decision-making.

3.3. Results

Once the intervention Project Management was carried out, the results were documented in terms of the indicators previously described for this purpose. To determine whether the intervention meets the desired parameters, the results obtained from the same process for the 2023-2024 planning period, in which no action had been implemented, were compared with the 2024-2025 period in which the action took place. The results are synthesized in the Fig. 9.

SUMMARY TABLE OF RESULTS												
	TIME										COST	
	ACADEMIC DIRECTORS				ACADEMIC SECRETARY			DEAN					
	HRS.	DAYS	HOURS/PEOPLE	EMPLOYEES	SUBTOTAL	HRS	DAYS	SUBTOTAL	HRS.	DAYS	SUBTOTAL	INVESTED HRS	ACADEMIC PERSONAL AV. COST	TOTAL COST
BEFORE	3	17	54	5	272	3	15	45	8	1	8	325	$554.35	$180,163.75
AFTER	5	2	18	5	90	5	4	20	4	2	8	118	$554.35	$ 65,413.30

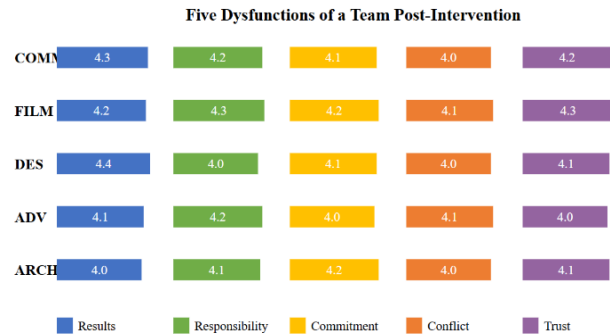Figure 9. Application report
Source: Own work (2024)

Figure 10. Five Dysfunctions of a Team Post-Intervention.
Source: Own work 2024.

After the intervention, a functional team diagnosis was conducted by an external consultant to measure its impact on the dean's office organization, based on the previously described functional team dysfunctions. The same data collection and processing methodology was used to ensure the comparability of results. The findings are summarized in the Fig. 10:

The pre-post intervention comparison of organizational climate and studied variables reveals significant improvements. Pearson correlations showed strengthened relationships between metrics such as "Results" and "Trust", suggesting that improvements in one metric are more strongly related to improvements in other metrics after the intervention. This indicates a more cohesive organizational environment and an increase in employee trust and commitment.

4. Conclusions

The results are divided into two main items that measure the time invested in the process and its cost. In the case of the former, only the academic actors involved attached to the Dean's Office of Creative Sciences, the faculty directors, the academic secretary, and the dean himself are considered.

It can be observed that in the planning period 2023-2024, without the implementation of the project, the directors dedicate an average of 54.4 hrs. to the process that is carried

out in fragmented times over 17 days. Once the intervention action is implemented, a drastic reduction in time is observed, going only to 18 hrs., this considering the two workshop sessions of five hours each, the review with the academic secretary, and allocating seven additional hours for the realization of minor adjustments. As for the academic secretary, a reduction in the time dedicated to the process is also observed, going from 45 hrs. in 2023-2024 to 20 hrs. in 2024-2025. On the other hand, the time of the Dean involved in supervision and review tasks remains the same. As secondary results derived from the exercise in terms of time, a considerable reduction was also observed in the number of days that academic authorities dedicate to the process [27], this because it was previously addressed in a disorganized manner and for a few hours a day, by concentrating the activity the time lost in resuming the thread of the activity, as well as interruptions are eliminated, making the task more efficient. On the other hand, for the economic indicator, an average parametric costing of the payroll amount of the officials involved was carried out, this average cost is multiplied by the total number of hours invested identifying an amount of $180,163.75 in 2023-2024 and $65,413.00 in 2024-2025, which represents a saving of 63.69%.

As for the third indicator, employee commitment, the satisfaction survey showed that the directors, when taken into account in the design of the workshop, felt more committed to the task. 80% of them indicated that they perceived a considerable improvement in the wear and tear that the process represents, and only one indicated that she did not observe any improvement against the previous procedure.

Upon observing the results of the indicators, which show a significant reduction in the time dedicated to the chosen process, a decrease in the economic resources allocated for this purpose, and an increased commitment from the collaborators, we can conclude that the implementation of Lean Thinking within a project management model at the Dean's Office of Creative Sciences at UPAEP (Universidad Popular Autónoma del Estado de Puebla) has yielded several benefits. These include enhanced operational efficiency, optimized resource utilization, waste reduction, and improved quality of academic services. Therefore, the hypothesis is confirmed and suggests that the adoption of Lean Thinking can be an effective strategy for improving project management in academic contexts.

References

[1] Forget, P., Samson, G., Thibodeau, S., Cloutier, M., and Luckerhoff, J., Démarche d'implantation de l'approche lean dans la gestion de l'éducation: vers de meilleurs services á moindres coûts?. Canadian Journal of Education, 37(2), pp. 1-24, 2014.

[2] Kozyrev, M.S., Bogacheva, T.V., Jukova, E.E., and Palekhova, P.V., Analysis of management of higher education institutions. European Journal of Contemporary Education, 8(4), pp. 801-809, 2019. DOI: https://doi.org/10.13187/ejced.2019.4.801

[3] García, G.G., Administración y gestión en institución de educación superior. Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 7(13), pp. 590-606, 2016.

[4] Höfer, S., and Naeve, J., The application of lean management in higher education. International Journal of Contemporary Management, 16(4), pp. 63-80, 2017. DOI: https://doi.org/10.4467/24498939IJCM.17.038.8261

[5] Zighan, S., and EL-Qasem, A., Lean thinking and higher education management: revaluing the business school programme management. International Journal of Productivity and Performance Management, 70(8), pp. 875-703, 2021. DOI: https://doi.org/10.1108/IJPPM-05-2019-0215

[6] Fernández, Z.H.T., and Marina, C.L., Estado de la cuestión. Lean aplicado a los procesos de las universidades en Colombia. Universidad Santo Tomás, Bogota D.C., Colombia, 2021.

[7] Ito, J.Y., Silveira, F.F., and Akkari, A.C.S., Lean-Agile Education: a bibliometric analysis. smart innovation, Systems and Technologies, 207, pp. 378, 2021. DOI: https://doi.org/10.1007/978-3-031-04435-9_38

[8] Helmond, M., Kücük-Yilmaz, A., Flouris, T., Winner, T., Cvetkoska, V., and Dathe, T., Lean management, Kaizen, Kata and Keiretsu. In: Lean Management in Higher Education (LHE). Springer, pp. 229-238, 2022. DOI: https://doi.org/10.1007/978-3-031-10104-5

[9] Sremcev, N., Lazarevic, M., and Krainicovic, B., Improving teaching and learning process by applying Lean thinking. In: 28th International Conference on Flexible Automation and Intelligent Manufacturing, Columbus, 2018.

[10] Gajendragadkar, S., Pinder, D., Rounsaville, T., and Wright, J., Building operational excellence in higher education. McKinsey & Company Education, 2019.

[11] Muñoz, H., La burocracia universitaria. Revista de la Educación Superior ANUIES, [online]. 48(189), 2019. Available at: https://www.scielo.org.mx/pdf/resu/v48n189/0185-2760-resu-48-189-73.pdf

[12] Gil-Vilda, F., and Yagüe-Fabra, J.A., From Lean Production to Lean 4.0: a systematic literature review with a historical perspective. Applied Sciences, 11(21), art. 110318, 2021. DOI: https://doi.org/10.3390/app112110318

[13] Kaizen Institute. Operational Excellence: a comprehensive guide towards organizational improvement, [online]. 2023. Available at: https://kaizen.com/insights/operational-excellence-organizational-improvement/

[14] Chin, G.L., A mixed-methods investigation of evidence-based Lean Thinking practice to Kaizen. University of Northampton, 2021.

[15] Carrillo, P.M., Leyva-Moral, J.M., y Medina, M.J.L., El análisis de los datos cualitativos: un proceso complejo. Index de Enfermería, 20(1-2), pp. 96-100, 2011. DOI: https://doi.org/10.4321/S1132-12962011000100020

[16] Vargas-Macías, R., Gestión y entrevista por competencias. Conexiónesan, 2021.

[17] Díaz-Bravo, L., Torruco-García, U., Martínez, M., y Varela, M., La entrevista, recurso flexible y dinámico. Investigación en Educación Médica, 2(7), pp. 162-167, 2013. DOI: https://doi.org/10.1016/S2007-5057(13)72706-6

[18] Ibarra, S.M., González, E.A., y Rodríguez, G.G., Aportaciones metodológicas para el uso de la entrevista semiestructurada en la investigación educativa a partir de un estudio de caso múltiple. Revista de Investigación Educativa, 2(41), pp. 501-522, 2023. DOI: https://doi.org/10.6018/rie.546401

[19] Godet, M., La caja de herramientas de la prospectiva estratégica, 4ta ed., Laboratoire d'Investigation Prospective et Stratégique, Paris, Francia, 2000.

[20] Chicano, T.E., Método de Kaizen. Mejora continua hacia la excelencia. Revista Digital INESEM, 2016.

[21] Suárez-Barraza, M.F., and Miguel-Dávila, J.Á., Implementación del Kaizen en México: un estudio exploratorio de una aproximación gerencial japonesa en el contexto latinoamericano. Innovar, [online]. 21(41), pp. 19-37, 2011. Available at: https://www.redalyc.org/articulo.oa?id=81822806003

[22] Singletary, L., Koebele, E., and Evans, W., Evaluating stakeholder engagement in collaborative research: co-producing knowledge for climate resilience. Socio Ecol PractRes, 4, pp. 235-249, 2022. DOI: https://doi.org/10.1007/s42532-022-00124-8

[23] Gallardo, J., Identificación de cuellos de botella en las organizaciones. Una ventana de oportunidad para formular y evaluar nuevos proyectos de inversión. Ciencia Económica, 8(14), pp. 55-67, 2019. DOI: https://doi.org/10.22201/fe.24484962e.2019.8.14.4

[24] Briceño, P., and Yraima, N., Las organizaciones educativas inteligentes: una indagación de sus aspectos funcionales. Revista

Arbitrada del CIEG - Centro de Investigación y Estudios Gerenciales, (48), pp. 219-231, 2021.

[25] Correa, R.F., Desarrollo económico de Japón: de la génesis al llamado milagro económico. Revista Facultad de Ciencias Económicas, 25(1), art. 2654, 2017. DOI: https://doi.org/10.18359/rfce.2654

[26] Dudek-Burlikowska, M., and Szewiwczek, D., The Poka-Yoke method as an improving quality tool of operations in the process. Journal of Achievements in Materials and Manufacturing Engineering, 36(1), pp. 95-102, 2009.

[27] Bin Che Ani, M.N., and Bin Shafei, M.S., The effectiveness of the single minute exchange of die (SMED) Technique for the productivity improvement. Applied Mechanics and Materials, 465-466, pp. 1144-1148, 2013. DOI: https://doi.org/10.4028/www.scientific.net/AMM.465-466.1144

J. Rosete-Espinosa, is a distinguished Architect and educator with a comprehensive academic background. He holds a BSc. in Architecture from Universidad Iberoamericana Puebla, a MSc. in Human and Educational Development from UPAEP, and a PhD. in Organizational Management from the same institution. Currently, he serves as the Dean of Creative Sciences at UPAEP, having previously held roles such as Academic Secretary of Arts and Humanities and Academic Director of the Architecture Faculty. His professional involvement includes significant roles in various organizations, such as a member of the Citizen Council for the Historic Center of Puebla, the Certification Council of the College of Architects of Puebla, and the Academic Council for the EGEL CENEVAL in Architecture. He also participated in the Metropolitan Dialogues for Puebla and the University Liaison Council of the Mexican Chamber of the Construction Industry, Puebla.
ORCID 0009-0008-7819-1675

C. Kurezyn-Díaz, holds a BSc. in Psychology, a MSc. in Organizational Psychology, and a PhD. in Organizational Management from UPAEP, with a PhD stay at Oklahoma State University (OSU). She is currently the Academic Director of the MBA and Doctoral Programs in Organization Management at UPAEP and a Member of the National System of Researchers (SNI) in Mexico. Crishelen has authored several articles in internationally recognized journals and is a professor, researcher, and speaker on management, organizational culture, life motivation, and sustainability. She is a Professor Ambassador for AIM2Flourish and is part of the Global B Corp Academic Community (B Academics). Additionally, she is a certified consultant by the National Council for Standardization and Certification of Labor Competencies (CONOCER). She holds certifications in "Remote Work Revolution for Everyone" from Harvard University and "Project Management" from Google.
ORCID 0000-0003-3902-9209

G. Chávez-Melo, BSc. in Computer Science from the Benemérita Universidad Autónoma de Puebla (BUAP), he earned a MSc. in Information Technology from the Universidad Popular Autónoma del Estado de Puebla (UPAEP) and a PhD. in Systems and Learning Environments from BUAP. As a member of UPAEP's Educational Technology Research Group, he is the Academic Director of the Master's Program in Educational Technology and a full-time professor in postgraduate education studies at UPAEP. He also serves as an external advisor for higher education institutions on technology integration in educational processes. With over 20 years of experience in educational management, teaching, consulting, and project development from preschool to postgraduate levels, his research focuses on teachers' digital competencies, virtual learning environments, open educational resources, and disruptive technologies in education and society.
ORCID 0000-0001-7363-2445