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Enterprise resource planning (ERP) in gastronomy education

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ABSTRACT

The primary aim of this research is to examine whether the use of ERP software in specific administrative domains namely communication, coordination, process management, and purchasing within institutions providing gastronomy education can contribute to the improvement of the effectiveness and quality of educational processes. Specifically, the research addresses the following question: To what extent can the implementation of ERP software in administrative domains such as communication, coordination, process management, and procurement improve the operational efficiency and educational quality in gastronomy education institutions?. In this context, the study also examines the potential of ERP systems to support process optimization in practice-based culinary environments, where time, resource allocation, and workflow management are critical to educational outcomes. To explore this question, the study adopts a qualitative case study approach, enabling an in-depth examination of ERP system integration within a specific educational context. The research framework is grounded in the innovation diffusion model, which informed the development of semi-structured interview questions designed to assess the applicability and impact of ERP systems in gastronomy education. The research population comprises institutions providing gastronomy education in Turkey, with the sample focusing on foundation universities located in Istanbul. Data were collected through face-to-face and online interviews conducted with department heads responsible for academic and administrative operations. In total, ten interviews were conducted, recorded, and transcribed for analysis. The collected data were analysed using a systematic coding process and organized through thematic analysis. The findings were categorized under six principal themes: management, procurement, training, motivation, software, and institutional dynamics. Taken together, these themes point to the ways ERP systems influence organizational and educational practices. The results indicate that the integration of ERP systems in gastronomy education institutions facilitates technological transformation, improves administrative coordination, and supports sustainable educational development. The findings also show that ERP systems can contribute to process optimization in teaching kitchens by enhancing scheduling precision, reducing material waste, improving traceability, and aligning operational workflows with pedagogical requirements. The study concludes that ERP implementation can serve as a strategic tool for enhancing institutional performance and educational quality in the field of gastronomy. Overall, the findings suggest that ERP-enabled process optimization has the potential to strengthen both operational efficiency and experiential learning processes in culinary education. Beyond administrative integration, the study frames ERP as a "process layer" that enables measurable improvements in teaching-kitchen workflows through quantifiable KPIs (e.g., yield, waste rate, cycle time, HACCP non-conformities, on-time practical starts, energy intensity). This process-oriented perspective aligns the manuscript with current trends in food technologies and process optimization.

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1. Introduction

Technological and structural developments in industrial production systems have prompted a reassessment of planning, management, and quality concepts not only in industry but also in education. In disciplines based on applied learning, the effective coordination of production-oriented processes is essential for maintaining the sustainability and quality of education. In this context, gastronomy education stands out as a field that requires strategic resource management due to its complex and multi-stakeholder structure.

Gastronomy education involves the integrated management of various operational components, including raw material procurement, production processes, workforce planning, and the maintenance of hygiene and quality standards. Managing these elements demands not only pedagogical oversight but also institutional-level operational planning. Factors such as production and service timelines, cost control, capacity planning, and quality assurance lead educational institutions to adopt planning strategies like those used in industrial enterprises. This need becomes particularly evident in applied education environments that are intensive in both time and materials.

In Türkiye, gastronomy education has attracted growing interest due to its interdisciplinary nature and practice-oriented approach. The integration of diverse fields—such as history, tourism, anthropology, archaeology, economics, chemistry, and health—has positioned gastronomy as a significant academic and professional domain. Since the establishment of the first four-year undergraduate program in 2003, the number of programs has increased rapidly, especially following the transformation of tourism colleges into faculties. As of 2022, 88 universities offer programs in gastronomy and culinary arts, with 61% affiliated with public institutions and 39% with foundation universities (ÖSYM, 2022). However, this expansion has also revealed structural challenges, including a shortage of qualified academic staff, inadequate infrastructure, financial limitations, and the high cost of applied education.

In response to these challenges, the integration of digital systems into educational processes has become increasingly important for enhancing institutional efficiency and sustainability. Enterprise Resource Planning (ERP) systems are comprehensive information platforms that enable the integrated management of all organizational resources. In educational settings, ERP systems support curriculum design, coordination of physical infrastructure, human resources, and material logistics. By synchronizing educational and operational processes, these systems offer data-driven decision-making tools and integrated resource management capabilities. As digital technologies become more prevalent in production planning, their application in education contributes to improved performance and the development of industry-relevant competencies.

ERP systems are widely used in fields such as business, engineering, and healthcare education to enhance students' managerial, planning, and resource management skills. However, their specific application in gastronomy education remains largely unexplored. This gap highlights the originality of the present study and its potential for interdisciplinary contribution.

The primary aim of this research is to examine whether the use of ERP software in administrative domains—specifically communication, coordination, process management, and procurement—within institutions offering gastronomy education can improve the effectiveness and quality of educational processes. The study evaluates the applicability of ERP systems in gastronomy education and investigates their potential impact on institutional performance. By addressing an underexplored area, this research offers a novel contribution to the literature and supports the technological transformation and organizational development of gastronomy education. Given the dynamic and adaptable nature of gastronomy education in response to technological change, the findings of this study may influence both the quality and sustainability of educational practices. Accordingly, the research not only demonstrates the feasibility of ERP implementation in gastronomy education but also lays the foundation for future studies in this area. Furthermore, it contributes to the academic and practical advancement of gastronomy education by promoting innovation and digital transformation.

Although ERP systems have not yet been widely adopted in gastronomy education institutions in Türkiye, this study aims to explore institutional perceptions and readiness for such integration. By focusing on the views of department heads key decision-makers in educational planning the research provides strategic insights into expected benefits, potential challenges, and infrastructural requirements related to ERP adoption. These perspectives offer a foundational understanding for future implementation efforts and contribute to the emerging literature on ERP systems in vocational and applied sciences education.

Emerging food technologies increasingly frame culinary production as an optimizable process rather than a purely artisanal practice. Smart packaging based on carbon quantum dots (CQDs) enhances mechanical and barrier properties and enables fluorescence-based spoilage sensing, extending process control into storage and distribution (Rastegarpour et. al., 2025). In parallel, digital-by-design approaches such as 3D food printing demonstrate how parameterized recipes and model-driven optimization improve repeatability and throughput (Islam et. al., 2025). Across the value chain, robotics and AI consistently deliver gains in workflow efficiency, hygiene, and quality assurance, while traceability tools (IoT, QR, GI) reinforce process transparency in premium dining contexts (Arefin et. al., 2026). Against this backdrop, the present study examines ERP not merely as an administrative tool but as a "process layer" that can standardize workflows and support optimization in teaching kitchens.

2. Theoretical background

2.1. Structural problems in higher education and digital transformation with ERP systems

Over the past decade, Türkiye's higher education sector has experienced notable quantitative expansion. Yet this growth has not been paralleled by qualitative progress. Particularly in practice-based disciplines, systemic issues such as insufficient infrastructure, limited access to qualified academic personnel, financial constraints, and fragmented institutional planning continue to pose significant challenges. These enduring problems emphasize the strategic imperative for a comprehensive digital transformation within the educational ecosystem. However, these efforts are predominantly infrastructure-centric and often lack an overarching strategic framework. This suggests that digitalization in applied fields—such as gastronomy—should be addressed not only through technological implementation but also via pedagogical innovation and administrative restructuring.

In this regard, Enterprise Resource Planning (ERP) systems stand out as a key enabler of digital transformation. These systems facilitate the integrated management of core institutional functions, encompassing student services, human resources, budgeting, inventory, scheduling, and physical resource allocation. As noted by Sholeh, Samodra & Widodo (2025), ERP adoption in higher education contributes to operational cost reduction, enhances decision-making capabilities, and improves overall institutional performance. Nonetheless, successful deployment requires careful attention to challenges such as system complexity, organizational inertia, and technological limitations.

ERP systems are inherently interdisciplinary and have been effectively utilized across various academic domains. In business education, they support simulation-based decision-making; in engineering, they assist with production planning and optimization; and in healthcare, they enhance patient tracking and service delivery. Wijaya (2023) underscores the cross-disciplinary relevance of ERP education, highlighting its successful integration into diverse curricula and its role in fostering digital adaptability among students.

Beyond operational efficiency, ERP systems promote institutional transparency, standardize administrative workflows, and reinforce internal coordination (Ifinedo, 2011). When combined with digital technologies such as big data analytics and AI-driven applications, ERP platforms empower institutions to move from reactive problem-solving toward predictive and strategic planning (Stojanov & Daniel, 2024). This convergence yields a range of benefits, including reduced lead times, optimized inventory control, improved stakeholder satisfaction, and accelerated decision-making (Cotteleer & Bendoly, 2006). Centralizing procurement, supplier management, and inventory processes within a unified system enhances visibility and minimizes errors associated with manual operations (Gupta et al., 2018).

The effectiveness of ERP systems is shaped not only by technological infrastructure but also by organizational readiness, user engagement, training, and change management strategies. In cloud-based environments, factors such as data security, system accessibility, and vendor support are essential for long-term sustainability and user satisfaction. Vendors should be regarded as strategic collaborators rather than mere software providers. Their involvement in software development, requirements analysis, and implementation often mirrors the expertise of internal stakeholders (Boon et al., 2019). Therefore, the quality of post-deployment support and customer service policies should be considered critical criteria in the selection and evaluation of ERP solutions.

2.2. The role of ERP systems in gastronomy education

Gastronomy education is not limited to the transmission of production processes. Rather, it constitutes a comprehensive learning environment in which students are expected to develop sector-specific competencies such as decision-making, planning, cost management, coordination, and process optimization through applied practice (Santich, 2004; Hegarty, 2011; de Tomas, Cuadrado & Beltran, 2021). Within this framework, ERP systems integrated into gastronomy programs do more than digitalize operational tasks. They serve as pedagogical tools that directly facilitate both teaching and learning while connecting operational systems to educational objectives (Cronan & Douglas, 2012). By engaging with real-time inventory movements, production planning outputs, and cost-analysis data from ERP modules, students can enhance their ability to make data-driven decisions. These activities also help develop skills in sustainable menu planning and effective waste management (Camilleri, 2021; Kfouri et. al., 2022). Simulation modules provide students the chance to experiment with production workflows in virtual settings, strengthening their operational reasoning. At the same time, digital inventory tracking allows sustainability-focused course content to be effectively aligned with practical applications (King et. al., 2019; Dunn & Ramnarain, 2020).

When ERP modules are aligned with industry-standard operational systems, students can gain practical experience before graduation. This reduces the time needed to adapt in the workplace and helps strengthen their professional skills. Furthermore, performance data captured through ERP systems enables objective, evidence-based tracking of student skill development. Instructors can use this information to monitor progress more systematically and adjust their teaching strategies as needed (Gupta et. al., 2018; Mangaroska, & Giannakos, 2018). From a sustainability perspective, features such as waste tracking and carbon footprint calculations can be incorporated into sustainable menu planning and resource management lessons. Transparent oversight of purchasing and inventory processes also enhances the educational impact of practical courses, including cost management, operations planning, and resource allocation.

At the institutional level, integrating digital systems across purchasing, storage, and training kitchens ensures continuity of materials in practical classes. It also supports hygiene and traceability standards and contributes to the seamless execution of educational processes (Magalhaes et. al., 2019; Malik, Malik & Gahlawat, 2023). Although ERP systems have been applied in various higher education contexts (Abugabah, Sanzogni & Alfarraj, 2015; Noaman & Ahmed, 2015), there is no documented evidence of their systematic use in gastronomy or culinary-arts programs. This gap highlights the need to conceptualize the pedagogical and operational mechanisms through which ERP can add value in this field. Accordingly, the present study proposes a novel, field-specific framework that demonstrates how ERP integration can concretely enhance educational quality in operational, pedagogical, and sustainability dimensions.

2.3. Analytical framework: innovation diffusion theory (IDT)

The adoption of ERP systems in gastronomy education is analysed through the framework of Innovation Diffusion Theory (IDT), initially formulated by Everett M. Rogers in 1962. IDT has been extensively applied across various fields such as education, healthcare, and technology, providing a systematic and empirically supported model to understand how innovations diffuse within complex social systems. Rogers (1995) defines an innovation as any idea, practice, or object perceived as new by individuals or organizations. The theory identifies five critical attributes influencing innovation adoption: relative advantage (the perceived improvement over current practices), compatibility (alignment with existing values and systems), complexity (ease of understanding and use), trialability (opportunity for experimentation prior to full adoption), and observability (visibility of outcomes and results).

Empirical studies have demonstrated the significance of these attributes in shaping user behavior within educational settings. For instance, Pinho, Franco, and Mendes (2021) revealed that these factors directly affect the acceptance of learning management systems such as Moodle. Similarly, Almaiah et al. (2022) showed that integrating IDT with technology acceptance models provides a robust framework for assessing institutional readiness and user engagement in AI-supported learning environments. Nonetheless, innovation diffusion is influenced not only by individual decisions but also by structural, organizational, and environmental factors, including leadership, institutional culture, and communication networks (Sonis, 2009). These considerations render the adoption process in educational institutions a complex, dynamic, and evolutionary phenomenon. The conceptual model of ERP integration into gastronomy education, based on the IDT, is illustrated in Fig. 1.

When applied to ERP integration in gastronomy education, the five IDT attributes offer a concrete pedagogical and operational perspective. Relative advantage is reflected in ERP modules enhancing students' data-driven decision-making, production planning, cost management, and sustainable menu planning skills. Compatibility manifests as alignment between ERP functionalities and industry-standard practices, enabling students to bridge theoretical knowledge and practical application. Complexity is mitigated through intuitive modules, simulation exercises, and guided workflows that facilitate engagement for both learners and instructors. Trialability is supported by opportunities to experiment with pilot exercises, simulations, and stepwise ERP module implementation, allowing learners to gain experience and receive formative feedback. Finally, observability is ensured by the visibility of ERP outputs—such as production reports, inventory movements, and cost analyses—enhancing instructional effectiveness and institutional transparency.

IDT is particularly suitable for analysing ERP adoption in gastronomy education because it provides a structured lens to understand how a complex technological innovation is embraced in practice-oriented learning environments. Gastronomy programs increasingly rely on digital tools—such as smart inventory management, recipe tracking, and kitchen automation—which require both pedagogical and operational adaptation. By mapping ERP adoption through the five IDT dimensions, the framework captures the motivations for acceptance, potential sources of resistance, diffusion patterns across stakeholders, and perceptions of innovation efficacy. This allows researchers and

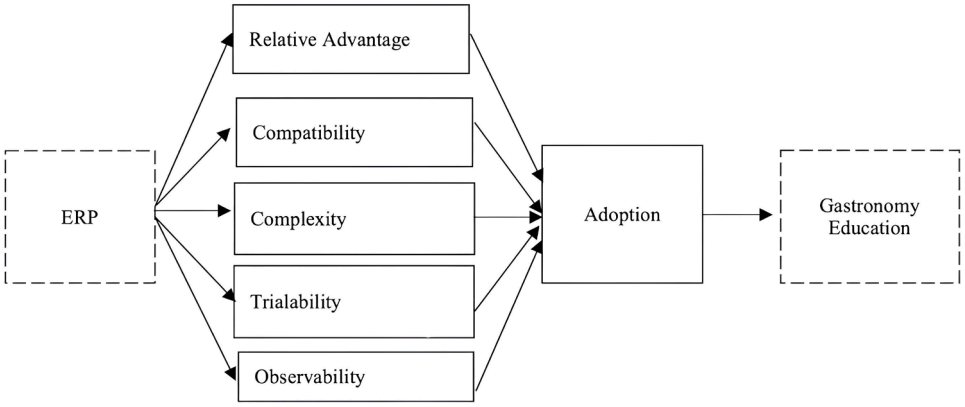


Fig. 1. Integration of ERP systems into gastronomy education with innovation diffusion model.

practitioners to identify not only the critical factors that facilitate ERP integration but also the institutional strategies necessary for successful implementation in culinary education contexts.

3. Material and methods

3.1. Research design and participants

This research was conducted to examine the potential of enterprise resource planning in gastronomy education. The study population was defined as formal education institutions offering gastronomy programs. However, due to certain limitations in accessing the entire population, the sample was narrowed to foundation universities in İstanbul that offer gastronomy education. Interviews were conducted with department heads at these universities. The sampling method employed in this study was purposive sampling, in which researchers use their judgment to select participants who are likely to possess deeper knowledge and insights related to the research topic.

The participants selected for this study were department heads in gastronomy education institutions. While they did not have direct experience implementing ERP systems within their departments, their administrative roles positioned them to provide informed perspectives on institutional needs, strategic priorities, and potential barriers to ERP adoption. The interview questions were designed to elicit these perspectives, focusing not only on whether ERP systems should be integrated, but also on how such systems could impact operational efficiency and educational quality.

The interviews were concluded upon reaching data saturation within the selected sample. In this study, data saturation refers to the point at which no new themes or insights emerged from the interviews. This was determined after conducting ten interviews with department heads, during which responses began to repeat, and no additional themes were identified. Preliminary coding and thematic analysis confirmed consistency in the data and indicated that further interviews were unlikely to yield new findings. In qualitative research, saturation is a key criterion for ensuring the reliability of results. The validity of this study is supported by the clear presentation of participants' views, the alignment of interpretations with existing literature, and the structured, purposeful design of the research. As highlighted by Goodman (2008) and Lewis (2015) validity in qualitative research refers to the credibility of findings, the trustworthiness of interpretations, and the extent to which the study accurately captures the phenomenon under investigation.

3.2. Development of interview guide

In the empirical part of the study, a case study approach, one of the qualitative research methods, was adopted to investigate the question, "To what extent can the implementation of ERP software in administrative areas such as communication, coordination, process management, and procurement improve operational efficiency and educational quality in gastronomy educational institutions?". To examine this question, in-depth interviews were conducted with department heads at foundation universities offering gastronomy programs in Istanbul.

The interview technique was chosen as the most appropriate method for this study because it allows for in-depth and detailed analysis of qualitative data. In such studies, the duration and depth of the interviews are considered more informative than the quantity. A semi-structured interview format was used, allowing the researcher to guide the interview and for participants to freely express additional opinions on the topic. To maintain relevance and maintain focus on the research objectives, participants were encouraged to elaborate on points they considered important during the interviews. At the beginning of each session, a short statement outlining the purpose and scope of the study was read aloud, and verbal consent was obtained. All interviews were audio-recorded, and the collected data was subsequently analysed.

The research questions were developed using the innovation diffusion model, information gathered from relevant literature (Dingfelder and Mandell, 2011; Christiansen, Haddara, and Langseth, 2022).

The interview question, "What do you think about the product procurement process, information flow, and organizational structure for culinary education at your institution?" (Could an ERP system be useful to you at these stages?), was designed as a transition to further explore the concept of "*relative advantage*". To examine the concept of *compatibility*, the question, "Could you provide information about your current system for budgeting and cost calculations for culinary education expenses at your institution?" (Could a well-organized software system adapt to your needs in this process?) was added. To explore the concept of *complexity*, the question, "What challenges do you face when connecting with other units to improve culinary education at your institution? What communication methods or tools do you use?" was added. To address the concepts of *trialability* and *observability*, the question, "Do you have an existing system for improving the quality of culinary education and ensuring enterprise resource planning at your institution? If so, what are the contributions of this system to education?" was added. Other interview questions were also added to develop a topic-specific model and to gain insight into existing systems.

3.3. Data collection and analysis

The interview form prepared for this study was emailed to the relevant individuals in the sample group between January 1st and 15th. Based on the feedback received, interview dates were scheduled with ten department heads. At the time of data collection, none of the institutions included in the study had fully implemented ERP systems. Therefore, the study focuses on the perceived applicability and potential benefits of

ERP systems in gastronomy education, based on the views of department heads.

The data obtained from the interviews was first transferred to a Word document for content analysis and then coded. All coded data was organized in an Excel spreadsheet, with each participant represented in separate columns. Following a clustering process, thematic categories were created. The interview data was analysed using descriptive content analysis, which enables the interpretation of recurring patterns and themes in the responses.

To ensure the validity and reliability of the study, multiple strategies were employed. Coding and categorization were conducted collaboratively by multiple researchers, enabling peer debriefing and minimizing individual bias. The findings were cross-examined and compared with existing literature and expert opinions, contributing to theoretical triangulation. Although member checking was not feasible due to time constraints, the study-maintained rigor through detailed documentation of analytical decisions and the maintenance of an audit trail. These measures collectively enhanced the credibility, dependability, and confirmability of the findings (Lewis, 2015; Christou, 2025).

Codes were generated from the participants' responses, and categories were formed by grouping codes related to the same topic. Hierarchical coding was applied, which involves systematically organizing complex data in line with the study's purpose before forming categories. The use of hierarchical coding in this study supported the identification of data-based differences. After the categories were defined, discussions among coders led to the identification of three overarching themes. One of the key criteria for validity in phenomenological research is intercoder expertise. While some studies demonstrate this through numerical data or evidence, in this study it was achieved through discussions on the meaning of the participants' responses.

As a result of the data analysis, the clusters emerging from participants' responses were generally categorized as follows: education quality, management decisions, traditional software, supply planning, infrastructure issues, perspective, technological developments, personnel knowledge and training, employment, and others. These clusters were then grouped under meaningful themes. In response to the research question, "To what extent can the implementation of ERP software in administrative domains—such as communication, coordination, process management, and procurement—improve the operational efficiency and educational quality in gastronomy education institutions?", six main themes were identified: management, procurement, training, motivation, software, and organizational factors. Each theme encompasses several interrelated clusters.

3.4. Operational definitions and process KPIs

This section outlines key operational indicators commonly used in food production and culinary process management to strengthen the process-oriented dimension of the study and align it with applied gastronomy education. Although the research is qualitative, these indicators provide a conceptual framework for understanding how ERP systems can support process optimization in practice-based learning environments. They also illustrate how operational data typically recorded by ERP systems may inform institutional decision-making once implementation begins.

The following process key performance indicators (KPIs) represent critical elements of teaching-kitchen operations, including material flow, time management, quality assurance, and resource efficiency. Each KPI corresponds to a measurable component that ERP modules such as procurement, inventory, production planning, quality/HACCP, and finance can support or monitor:

- Yield (%): Represents the proportion of usable product obtained from raw materials.

  Formula: (Net edible output / Raw material input) × 100

- Waste Rate (%): Measures the percentage of material lost during preparation and production.

  Formula: (Total kitchen waste / Raw material input) × 100

- Stock-Out Rate: Indicates the frequency of ingredient unavailability at the time of need.
- On-Time Practical Start (%): Measures the proportion of practical sessions that begin at the scheduled time.

  Formula: (Sessions starting on schedule / Total sessions) × 100

- Setup Time (Mise-en-Place Duration): Refers to the time required to complete pre-preparation tasks before instruction begins.
- Lead-Time Variability: Represents fluctuations in supplier delivery times.

  Formula: Standard deviation of delivery times.

- HACCP Non-Conformity Rate: Tracks deviations from food safety standards.

  Formula: (Non-conformities / Number of audits or sessions).

  Energy Intensity (kWh per Session): Measures energy consumption during a single teaching session.
  Cost per Student per Lab: Represents overall instructional cost divided by the number of students.

  Formula: (Total session cost / Number of students)

Although these indicators were not used as quantitative data in the study, they provide a conceptual basis for clarifying which process components ERP systems can optimize in practical kitchens within gastronomy education. Thus, qualitative findings are supported by an operational perspective, making the technical contributions of ERP to process performance more visible. These indicators are adapted from commonly used process metrics in gastronomy applications and were defined by the researcher to create an operational framework, in accordance with the qualitative design of the study.

4. Results and discussion

This study investigates the applicability of enterprise resource planning systems in higher education institutions offering gastronomy programs, focusing on their integration into educational processes and the impact of this integration on quality, efficiency, and sustainability. The research aims to provide an original assessment of the role of enterprise software solutions in digitalized educational environments by examining how ERP systems can be implemented in gastronomy education and how they influence educational outcomes. Since ERP systems were not yet implemented in the departments of the interviewed institutions, the findings of this study reflect stakeholder perceptions and strategic expectations rather than evaluations of actual system performance.

While this may be considered a limitation, it also serves as a strength within the context of exploratory research. Understanding institutional attitudes at the early stages of technology adoption is essential for guiding future implementation efforts. Through the identification of key themes such as infrastructure readiness, staff training needs, and managerial motivation, the study provides valuable insights that lay the foundation for future empirical research and practical ERP integration in gastronomy education.

Beyond general advantages such as efficiency and quality improvement, ERP systems offer distinctive operational and pedagogical benefits tailored to the unique requirements of gastronomy education. For instance, ERP facilitates the planning and execution of hands-on

culinary classes by ensuring timely procurement of ingredients and equipment, reducing disruptions in training sessions. Centralized communication modules enhance collaboration between academic and administrative units, which is critical for scheduling kitchen laboratories, managing internships, and aligning curricula with industry standards. ERP-based financial tools enable institutions to monitor costs associated with imported products and resource allocation, ensuring transparency and sustainability in program delivery. Pedagogically, ERP allows real-time monitoring of student performance and resource utilization, enabling educators to make data-driven decisions that improve learning outcomes. These concrete applications demonstrate that ERP systems are not merely administrative tools but strategic enablers of quality and innovation in culinary education.

Our findings position ERP as a practical enabler of workflow standardization: synchronized procurement with course schedules, reduced setup/changeover, and digital HACCP records collectively stabilize cycle time and yield. This pattern mirrors optimization logics reported in controlled-parameter studies, suggesting that structured factor–response mapping and DOE could further reduce variability. Looking outward, robotics/AI literature indicates additional gains via task decomposition and partial automation (e.g., portioning, splitting) with safety-first cobot design and clear success metrics (financial, ergonomic, yield). Complementary add-ons such as smart packaging and IoT/QR-based traceability would extend process control into storage and service, strengthening quality assurance and transparency across the educational value chain.

A total of ten individuals, all serving as department heads in gastronomy and culinary arts programs, participated in the study. Among the participants, four were female and remaining six were male. Most participants were within the 36-55 age range, whereas two participants were below 36 years of age, and their years of service as department heads varied between 4 and 6 years. Additionally, there is only one head who has less than 4 years of experiment.

Process Optimization Implications for Teaching Kitchens

The interview-based themes indicate that ERP can function as a process layer that standardizes and optimizes teaching-kitchen workflows. In supply planning, reorder points and batch sizing reduce stock-out risk for perishable ingredients while limiting over-procurement and waste. In production planning, standardized recipes (BOMs) and portion controls shorten setup and changeover times between cohorts, stabilize cycle time from mise-en-place to plating, and improve yield consistency. Integration with quality modules enables digital HACCP records, including CCP temperature logs and non-conformity tracking, which shortens feedback loops and supports corrective actions in subsequent sessions. Inventory and lot traceability improve first-in-first-out (FIFO) discipline and enable rapid root-cause analysis when deviations occur. At the pedagogical level, real-time dashboards inform instructors about resource use and student throughput, facilitating station balancing and equitable resource allocation across teams. Collectively, these ERP-enabled mechanisms provide a measurable pathway to reduce waste, variability, and delays in culinary education processes. These operational insights complement the thematic structure of the study, which is illustrated in Fig. 2.

Based on the coding, clustering, and theming analyses applied to the participants' responses, the study identified six main themes and their corresponding subcategories: management, supply, education, motivation, software, and institutional factors. These themes and subcategories were evaluated individually. Above is a visual representation of themes derived from participants' views on ERP systems and gastronomy education (Fig. 2).

From a process-optimization perspective, ERP systems streamline managerial workflows by integrating procurement, budgeting, facility scheduling, and communication into a unified operational layer. Real-time dashboards allow department heads to monitor resource utilization, kitchen occupancy rates, and cost variances, enabling faster corrective action and reducing cycle times in decision-making. Automated approval workflows minimize administrative delays, ensuring that ingredients, equipment, and human resources are allocated in synchronization with teaching-kitchen needs. Furthermore, ERP-based maintenance and asset-tracking modules optimize equipment uptime and reduce unplanned downtime, directly supporting the continuity and reliability of practical sessions. Similar observations on the need to integrate managerial workflows with user readiness and process coordination have been reported by Ghosh et al. (2021), who emphasize that human-factor alignment and process redesign are critical for successful ERP adoption in higher education.

Five categories were identified under the management theme of the research: "management processes", "corporate communication", "employment and training", "physical planning" and "cost and budgeting" (Fig. 3). The findings revealed that management processes in higher

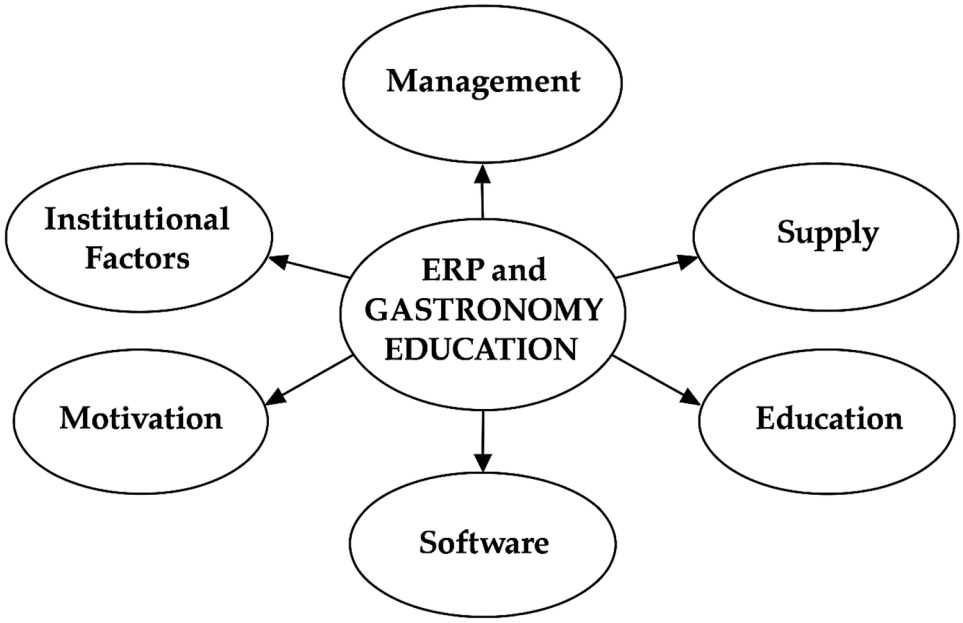


Fig. 2. ERP and gastronomy education themes.

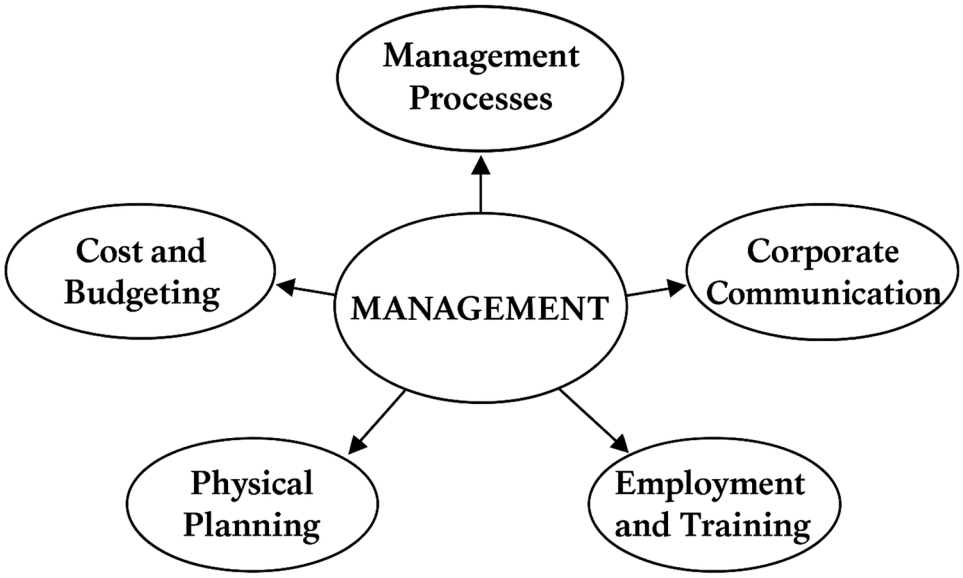


Fig. 3. Management themes.

education institutions offering gastronomy education encompass not only administrative and academic operations but also multidimensional areas such as resource planning, procurement and communication. Participant feedback indicated that digital systems and open communication channels play a crucial role in enhancing the effectiveness of these processes. Specifically, ERP systems can facilitate the coordination of practical kitchen sessions and track student participation and performance, allowing department heads and instructors to make informed pedagogical decisions. However, structural deficiencies and systemic uncertainties were found to undermine the overall integrity of the management process (Noaman and Ahmed, 2015). This situation clearly reveals the need for a sustainable and holistic management system at the institutional level, although individual efforts attempt to compensate for the shortcomings. Especially in gastronomy education programs where practical training is at the forefront, effective communication between academic and administrative units has been shown to play a critical role in the planning, execution and evaluation of educational activities. For instance, Vlachopoulos and Makri (2019) argue that effective communication in higher education should be supported not only by technological tools but also by pedagogical and managerial strategies. On the other hand, the literature also includes various cultural and technological approaches to institutional communication. These findings indicate that ERP integration can strengthen management processes by providing centralized control over communication, budgeting, and physical planning, which are critical for practical gastronomy training Fig. 4, 5, 6, 7.

In addition, while the breadth of employment opportunities for graduates strengthens the sectoral relevance of gastronomy education, it has been understood that the success of this process is largely linked to the professional competence of instructors and the quality of educational environments. ERP-supported management enables the tracking of student progress and resource allocation in practical courses, ensuring that lessons are aligned with both educational standards and industry expectations. It has been determined that strengthening the digital infrastructure, systematically structuring corporate communication, and supporting qualified academic staff in institutions providing gastronomy

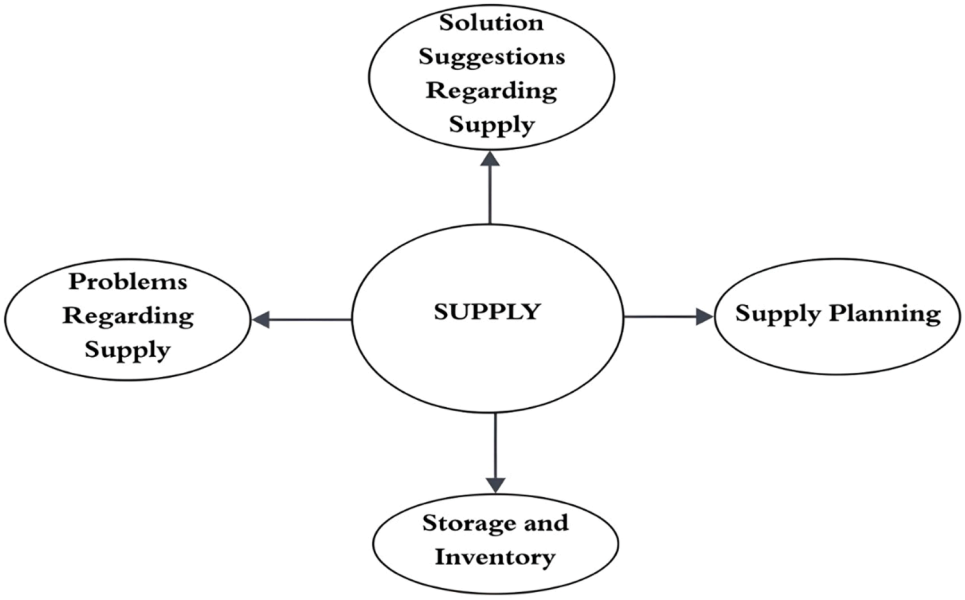


Fig. 4. Supply themes.

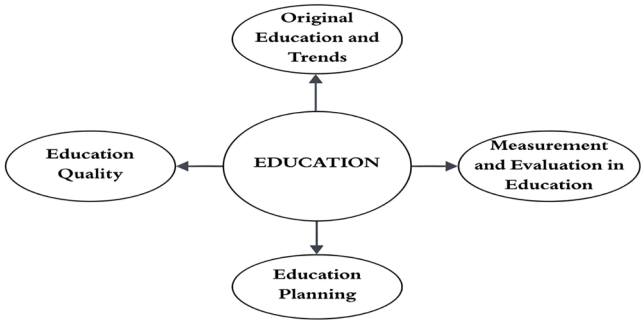


Fig. 5. Education themes.

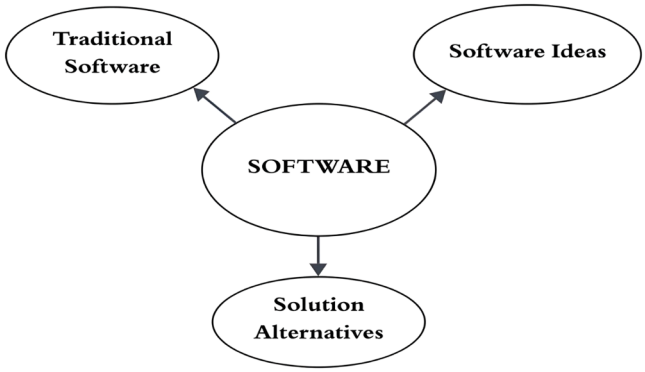


Fig. 6. Software themes.

education are priority requirements for both improving the quality of education and adapting to sectoral expectations. Cost and budgeting; despite the importance of planned and systematic budgeting in gastronomy education, factors such as imported product supply, inadequate use of resources and student fee demands have negatively affected the quality of education. Natow (2015) mentioned in his research that graduation rates in departments are also important in budget and cost planning. According to his findings, annual budgeting allows for better control since expenses are more transparent. Physical planning: it has been determined that the planning of application areas, equipment quality, environmental conditions and physical facilities in institutions offering gastronomy education has a decisive impact on both educational performance and student motivation. ERP systems can provide data-driven insights for optimizing kitchen layouts and scheduling equipment use, directly supporting operational learning and improving students' hands-on experienceTable 1, 2, 4, 5.

Within the supply theme of the research, four clusters were identified: "Supply Planning", "Storage and Inventory", "Problems Regarding Supply" and "Solution Suggestions Regarding Supply". It was revealed that supply planning plays a critical role in gastronomy education, and ERP systems contribute to making the process more efficient. Participant opinions and literature findings indicate that supply processes should be planned in a flexible, holistic and data-based manner to ensure quality and sustainable education. Through ERP-supported inventory management, students can engage with real operational data in applied courses, learning to make informed decisions regarding procurement, storage, and cost management. Participant opinions regarding the categories of this theme are presented in Table 3.

In our context, ERP-driven reorder points (ROP) and safety stocks are calibrated for perishables to minimize stock-outs without inflating waste. Lead-time variability from suppliers is monitored in the purchasing module and used to adjust order cycles. Batch-lot traceability supports FIFO and reduces expiry-related losses. These controls decrease ingredient unavailability and stabilize session starts. Nedzvedskyi et al. (2024) argue that the fixed budgeting approach should be replaced by scenario-based and adaptive models. This would enable more effective and faster responses to uncertainties such as sudden price fluctuations, logistics problems or demand changes. Storage and inventory management involves structural and operational deficiencies in areas such as physical space utilization, access control, and material planning in institutions providing gastronomy education. Both the literature and participant views emphasize that these processes should be integrated with strategic management principles and restructured in line with pedagogical goals. Horng and Hu (2009) are support the findings regarding the impact of logistics problems on learning outcomes. The fragmented execution of purchasing, storage, and distribution processes negatively affects both the quality of education and the efficient use of resources. Sánchez-Jofras and Kuri-Alonso (2018) emphasize that applied learning is critical for the acquisition of not only technical skills but also operational competencies such as business process management and inventory turnover. Supply-related problems that directly affect the sustainability of gastronomy education have been found to stem from multivariable factors such as timing, missing materials and technological infrastructure deficiencies. In this context, the need has emerged for strategic solutions that enhance budget flexibility, consider supplier diversity and are supported by technological systems.

Research findings show that information-based ordering processes, integrated planning, digitalization and flexible communication models are essential for making supply management more efficient. However, bureaucratic obstacles in public institutions and inadequacies in technology adaptation constitute significant obstacles to the implementation of these solutions (Table 3).

Within the education theme of the research, four clusters were

Table 1
Demographic characteristics.

Participant	Gender	Age	Title	Experiment Year
P1	Male	36 - 55	Prof. Dr.	4 - 6 years
P2	Female	36 - 55	Prof. Dr.	4 - 6 years
P3	Female	36 - 55	Prof. Dr.	4 - 6 years
P4	Male	36 - 55	Assoc. Prof.	4 - 6 years
P5	Female	Under 36	Assist. Prof.	4 - 6 years
P6	Male	36 - 55	Assist. Prof.	4 - 6 years
P7	Male	36 - 55	Assoc. Prof.	4 - 6 years
P8	Female	36 - 55	Assist. Prof.	4 - 6 years
P9	Male	Under 36	Assist. Prof.	4 years and less
P10	Male	36 - 55	Prof. Dr.	4 - 6 years



Fig. 7. Motivation themes.

Table 2
Participant quotes related to the theme of management.

Category Name	P. No	Quote
Management Process	P4	"…Every university and every institution have different systems that they run. I believe this shows how useful this system can be when they look at their own systems and how useful it can be in shortening the process."
Corporate Communication	P9	"…I know very well who to contact regarding specific situations and problems in the organization I work for, and I guide my other staff members accordingly. It is important to both improve and use communication within the organization correctly for an effective process."
Employment and Training	P6	"…We want to raise individuals who are well versed in all the processes, from receiving a product when the raw material arrives at your business, to its storage, and from storage to production stages, with all their technology and techniques; and who pay attention to hygiene and sanitation rules."
Physical Planning	P5	"…It becomes difficult to control the process in poorly planned training. For example, problems arise with on-time orders, missing products, and staff searching for immediate solutions to supplies. A well-prepared software infrastructure and a controlled and planned operation will provide benefits in many ways. Firstly, the workforce will be reduced, and one person will be responsible for these orders, eliminating the need for constant monitoring by other personnel. This is what we are trying to achieve here."
Cost and Budgeting	P2	"…We don't decide the budget. To control time, we ask the teachers for a 3-week budget at least 3 weeks in advance. I write my portion in my free time and quickly get it done in a few hours."

Table 3
Participant quotes related to the theme of supply.

Category Name	P. No	Quote
Supply Planning	P4	"…We aren't given a specific budget or cost. This isn't the case at the beginning of the year, or at the beginning of the season. We simply write down the products we need, and they're purchased. Because products are sourced from different companies, this not only wastes time but also often leads to us not being able to access the products we want. Because the person working in this purchasing department isn't very knowledgeable about the kitchen, they struggle to find the right supplier and can't plan."
Storage and Inventory	P1	"…For example, you did cost and such. All the costs of our course are recorded in the system on a per-student, per-instructor, and per-practice course basis, and are displayed. However, without waiting for that and without calculating it, we make the purchases, and the materials arrive at our warehouse."
Problems Regarding Supply	P8	"…When we submit our orders to authorized companies, we sometimes encounter missing products other than those listed. In other words, there are products we can't find. For example, we can also be at a disadvantage by only shopping with one authorized company. When the company simply gives us a clear answer like, 'I didn't have it, I couldn't bring it,' they leave us without a solution when we need the product. Unfortunately, they don't have a system that can identify missing products. Because we rely on them for our business, we encounter these problems. Furthermore, a system that could identify these issues would be very useful for us."
Solutions Suggestions Regarding Supply	P5	"…When we send our seasonal or weekly product lists to those on the purchasing side who understand our products and have excellent product knowledge, we will pay particular attention to weight, preventing over-ordering. By continuing this approach in the kitchens by using only sufficient raw materials, we will also be able to control waste. In other words, the system will continue to function, including order lists, control, and lists sent to suppliers."

identified "original education and trends", "education planning", "measurement and evaluation in education" and "education quality". Original education and trends in gastronomy education aim to provide interdisciplinary knowledge, practical experience and equipment that meet sectoral expectations. Continuous renewal of educational programs, flexible course structures and technology integration ensure that students are raised as creative and competitive individuals. Horng and Hu (2009) emphasize that gastronomy education is reinforced with practical experience rather than theoretical knowledge, and therefore learning processes are more complex and resource intensive. ERP systems can support the planning of applied courses, track student competencies, and provide structured feedback, enabling instructors to adapt lessons to both learning outcomes and operational requirements. This aligns with the findings of Wijaya (2023), who highlights that ERP-supported instructional environments benefit from standardized processes, reduced preparation times, and improved monitoring of student engagement.

In addition, course timetables can be linked to inventory availability and equipment capacity, enabling on-time practical starts and shorter setup times. Standardized BOMs reduce variation in portioning, improving yield and grading fairness. Dashboards displaying KPI trends such as waste levels and cycle times support reflective teaching practices and continuous improvement initiatives, reinforcing the alignment between pedagogical goals and operational performance. However, gastronomy education, which is not limited to content creation; also includes resource management, application coordination and quality assurance cycle, requires a multidimensional educational planning process. In this context, educational planning serves as a strategic tool that increases student success, strengthens institutional efficiency, and creates sustainable learning environments. ERP contributes to educational planning and quality assurance by integrating scheduling, resource allocation, and performance monitoring into a unified digital platform, enhancing both operational efficiency and pedagogical outcomes. In addition, increasing the quality of education requires not only technical equipment but also an educational design based on interdisciplinary understanding, cultural awareness, and sustainability. ERP systems facilitate evidence-based evaluation, allowing instructors to monitor student performance consistently across practical and theoretical modules, thereby linking pedagogical goals with operational execution.

The findings reveal that a multi-layered structure ranging from student qualifications to logistics planning has become the determining factor of quality in gastronomy education. It has been determined that measurement and evaluation processes in gastronomy education should be supported by flexible structures that are not only result-oriented but also have high contextual validity and are process-centred. Quality in gastronomy education can only be sustainable with the effectiveness of evaluation systems that are holistic and compatible with sectoral requirements. It is consistent with the competence-based models proposed by Mulder (2012) that ensure that program outcomes are aligned with sectoral competencies. In this study, "quality of education" refers to the perceived effectiveness of institutional processes such as curriculum relevance, planning, evaluation, student success, and administrative coordination, as expressed by department heads. This definition reflects the qualitative nature of the data and clarifies that the findings are based on stakeholder perceptions rather than objective measurements.

Within the software theme of the study, three clusters called "traditional software", "software ideas" and "solution alternatives" were

Tablo 4
Participant quotes related to the theme of education.

Category Name	P. No	Quote
Oriental Education and Trends	P10	"…Culinary education is a field that is very open to flexible innovations, so it is very possible to use these innovations in kitchen planning at certain stages. We graduate students by adding elective courses within the framework of innovations or current situations or trends, trying to make them competent in many subjects."
Measurement and Evaluation in Education	P4	"…Generally, the disruptions the department experiences throughout the semester affect both the quality of education and our ability to evaluate students. If I'm trying to teach a course without being able to use the product I'm supposed to use in class, I can't expect students to interpret or know what they need to know at exam time. In other words, it wouldn't be appropriate for me to measure or evaluate students' knowledge."
Educaiton Planning	P3	"…We are planning our education within the framework of our mission to raise graduates who meet the expectations of the gastronomy sector with an interdisciplinary approach, a competent academic staff, a well-equipped kitchen and laboratory infrastructure, and who are socially conscious, creative, innovative, solution-oriented, committed to ethical rules and team research in line with universal education standards."
Education Quality	P6	"…We're trying to provide something to our students without letting concerns about the future—climate change, food concerns, drought, and so on—obscure the hedonic aspect of gastronomy. That is, knowing that one day they won't be able to find food, or that one day they'll have to cook insects. We want them to graduate with this awareness. We're training gastronomes who follow new trends. By educating ourselves on these issues, we're also improving the quality of education."

Tablo 5
Participant quotes related to the theme of software.

Category Name	P. No	Quote
Traditional Software	P8	"…There's no separate software. For our weekly shopping expenses, which we call calculation, we report every purchase we make to the purchasing department through our EBYS system. This purchasing also shares it with others. We don't use any separate software anyway, such as budgeting, financial affairs, etc. We use the EBYS system as our software."
Software Ideas	P7	"If there were a program for researching unit prices online, that is, for retrieving information from the internet, this would greatly simplify budgeting and costing. Because prices fluctuate greatly, there might be a single program that calculates the average price, or sets lower and upper limits, or even gives you an estimated inflation rate. It calculates everything, so it itemizes everything individually. I expect the program to include a gastronomy product range, I expect it to be entered individually, including niche products. This way, I can shorten the process as much as possible."
Solution Alternatives	P4	"…From my perspective, enterprise resource planning would definitely be more beneficial. There are already costs for various software programs and other similar programs for various situations. I don't know how much this costs. It's a very high burden, I don't know if it's a burden for an institution or not. Because of this, most institutions might have some difficulty approaching this approach. But there's also the possibility that it could reduce staff numbers. Using this could even lead to a more profitable budget."

reached. It has been determined that although traditional software supports basic operations in higher education institutions, their efficiency is largely shaped by institutional integration and user interaction. Importantly, when ERP software is integrated with pedagogical processes, it enables instructors to plan practical lessons with real-time operational data, monitor student engagement, and provide feedback aligned with both technical and process-based learning outcomes.

Recipe management within ERP acts as the digital twin of the practical process, connecting ingredients, methods, and critical control points. Quality modules record HACCP checks such as hot-hold temperatures, cooling intervals, or deviation reports, and non-conformities automatically trigger corrective actions or training interventions. This level of integration accelerates problem detection, supports food safety assurance in teaching kitchens, and stabilizes process outcomes by linking software performance directly to operational consistency. This observation is supported by Al-Lozi and Al-Qirem (2021), who found that ERP adoption in higher education strengthens data integration, reduces system fragmentation and enhances operational transparency across instructional and administrative units.

Participant experiences reveal that the same software infrastructure varies depending on how it integrates with pedagogical processes in different institutions. In this context, it has been determined that the sustainability of traditional systems will be possible not only with technical competence but also with their structuring compatible with education.

Stefaniak et al. (2025) emphasize that software used in higher education institutions should be structured in a way that supports educational processes, not just data management. Gikandi, Morrow, and Davis (2011) state that despite the potential of digital systems to reduce inequalities in education, there may be significant differences in access and usage levels. ERP systems that align with teaching processes can optimize daily operations and enhance curriculum delivery, allowing students to experience real-world kitchen management while supporting institutional decision-making. Participants also point out that these tools should support not only daily operations but also institutional decision-making and strategic management processes. It is seen that these systems, which accelerate processes and optimize resource use, can increase transparency and strengthen reliability in the institutional structure. However, it has been determined that the effective operation of the systems is directly related to the adaptation of users to the process and the software's ability to respond to sector-specific requirements. It has been determined that institutional software systems alone are not sufficient under all conditions in higher education institutions and that different solution alternatives should be developed according to context-specific needs. The findings show that multivariable elements such as human factor, cost, user competence and ethical sensitivities are the main factors determining the success of technological tools. For this reason, the ability of software systems to be an effective support tool has been linked to the existence of strategic planning, user adaptation and sustainable digital policies. Such integration allows students to interact with digital systems that replicate industry-standard operations, thereby reinforcing applied learning and professional readiness. Benavides et al. (2020) state that digital transformation initiatives in higher education institutions are effective in the areas of time management, process standardization and communication efficiency.

Within the motivation theme of the research, two clusters named "academic and administrative staff", and "perspective" were identified and examined. The factors affecting the motivation of academic and administrative staff in gastronomy education are not limited to individual factors; structural factors such as workload balance, process management and institutional support play a decisive role. Research findings show that this structure, which directly affects the quality of education, can only be made sustainable with clear job descriptions, effective planning and strong support mechanisms. The attitude of academic staff towards change has been identified as a decisive factor in

maintaining their motivation (Table 6). ERP systems that simplify routine administrative and operational tasks can enhance instructor motivation by reducing workload, allowing more focus on teaching, mentorship, and course innovation. This, in turn, positively impacts student learning experiences and practical skill acquisition.

From a process-optimization standpoint, ERP reduces administrative cycle times by automating procurement approvals, classroom scheduling, and inventory checks, allowing instructors to redirect time from bureaucratic tasks to pedagogical activities. Real-time alerts and workflow tracking minimize disruptions in teaching kitchens, reducing the cognitive load associated with last-minute material shortages or equipment unavailability. Standardized digital procedures stabilize operational routines, which increases predictability — an important determinant of both academic and administrative staff motivation. Moreover, analytics dashboards that display workload distribution, resource usage, and performance indicators promote transparency and fairness, further strengthening staff engagement and institutional trust. Ghosh et al. (2021) similarly emphasize that staff motivation, leadership support and change readiness are central determinants of ERP success in higher education settings.

Shaping institutional structures with an open-minded and transformational leadership approach plays a supporting role in the positive evolution of this attitude. Zhu and Engels (2016) revealed that organizational culture in higher education institutions directly affects the attitudes and motivation levels of faculty members towards innovations. Thus, ERP adoption not only improves operational efficiency but also reinforces a culture of continuous improvement and pedagogical engagement among faculty.

Within the theme of institutional factors of the research, five categories named as “procedures and principles”, “sustainability and ethics”, “technological developments”, “economic factors” and “suggestions” were reached (Fig. 8). Procedures and principles applied in higher education institutions are not only administrative frameworks but also strategic tools that shape academic processes. It has been determined that these structures directly affect the motivation of faculty members, institutional efficiency and quality assurance. The centralized structure of ERP systems limits the flexibility specific to the institution; purchasing and quality mechanisms provide discipline but can create bureaucratic burdens. Therefore, when determining the procedures and principles in higher education institutions, the principles of flexibility, applicability and participation should be taken as basis. ERP systems can support institutional decision-making by providing accurate, real-time data on budgets, procurement, and student performance, allowing administrators to align operational efficiency with pedagogical goals. For example, sustainability and ethical tracking modules enable students to learn about responsible sourcing and waste management, directly connecting institutional processes with educational objectives. Moreover, ERP contributes to institutional sustainability and transparency by standardizing procedures, improving cost control, and offering strategic flexibility aligned with educational objectives.

Finance and cost objects within ERP make the cost per student per lab transparent, linking budgeting decisions directly to process efficiency. Energy and material consumption can also be monitored per session, allowing institutions to assess sustainability performance and reduce waste in teaching kitchens. In addition, data governance policies within ERP ensure that process KPIs—such as procurement lead times, operating costs, or resource utilization are consistently captured and reviewed, supporting evidence-based strategic planning.

These institution-level optimization mechanisms form the technical foundation of the themes illustrated in Fig. 8.

The reshaping of gastronomy education with sustainability and ethical values has revealed the need for a holistic transformation in higher education. Participant views reveal that this transformation should be supported by not only environmental but also ethical traceability and accountability mechanisms through institutional systems. It shows that economic uncertainties complicate financial planning processes in higher education institutions and ERP systems offer strategic solutions to these problems. However, it has been determined that the effectiveness of the systems depends not only on the technical infrastructure but also on institutional adaptation and user competence. Chatzoglou et al. (2017) emphasize that when ERP systems are not operated effectively, cost control becomes difficult and decision-making mechanisms become subjective. Moreover, evaluations in the field indicate that ERP systems can streamline operational processes, shorten processing times, reduce manual data entry errors, and provide more timely and accurate responses to changing conditions through improved data integrity. It shows that technological developments trigger not only operational but also pedagogical transformations in gastronomy education. Thus, ERP integration can simultaneously enhance institutional performance and enrich students’ applied learning, linking operational excellence with concrete educational benefits.

The integration of digital systems ensures continuity in education, optimizes resource use and strengthens learning outcomes (Table 7). However, this transformation necessitates institutional support and user adaptation. The resistances encountered in the adaptation process clearly reveal the dependence of technological progress on the human factor. The scalable structure and data management capacity of ERP systems create a strategic advantage not only in the field of gastronomy but also in all higher education institutions. These developments reveal that digitalization is now a necessity rather than a choice. Al-Fraihat et al. (2020), in their research on the acceptance of information systems in higher education, revealed that system and service quality have a direct impact on student satisfaction and success levels. They show that enterprise resource planning systems not only increase operational efficiency in higher education but also play a central role in improving the quality of educational processes and the effectiveness of resource management. Success in system integration is attributed to comprehensive preplanning, flexibility appropriate to user needs, and the adoption of data-based decision support systems. In addition, strong leadership support from top management and continuous training programs for system users enable the sustainability of technological adaptation and the reduction of employee resistance. Not ignoring the human factor and ensuring the active participation of employees in the processes directly affects the rate of adoption of the systems. It has been determined that ERP systems can pave the way for functional innovations in both academic and operational areas by quickly adapting to changing institutional needs thanks to modular structures. Integrating technological developments with institutional culture should be considered as one of the basic elements of digital transformation that increases the competitiveness of higher education institutions. Chatzoglou et al. (2017) mentioned that ERP systems provide significant convenience in the planning and execution of practical courses in vocational education

Tablo 6
Participant quotes related to the theme of motivation.

Category Name	P. No	Quote
Academic and Administrative Staff	P3	“…When this entire process runs smoothly or when people follow their own work in a planned manner, the process is easier. We observe that academic staff focus more on their own work, doing the application, or teaching the course rather than preparing order lists, which increases productivity and, consequently, student satisfaction.”
Perspective	P5	“…We are a good team and we have a high level of adaptability. Therefore, I can adapt to anything with the team I have now. If we think about the administrative side, the administrative side seems more cumbersome. When you say administrative side, it's because the faculty secretariat comes into play first, and then accounting, and all of that.”

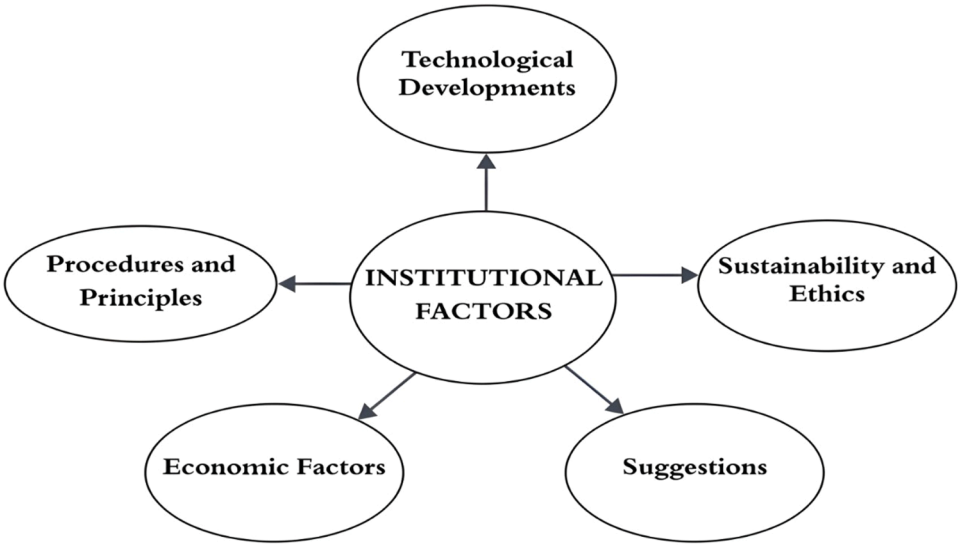


Fig. 8. Institutional factors themes.

institutions.

The Table 8 provides a synthesized overview of the main themes and key findings derived from the interviews conducted with department heads in gastronomy education institutions. Each theme reflects a distinct dimension of institutional readiness and expectations regarding ERP system integration. Rather than presenting measured outcomes, the findings capture stakeholder perceptions related to management efficiency, procurement processes, educational quality, staff training, motivation, and organizational infrastructure. This thematic synthesis offers a structured understanding of how ERP systems are envisioned to contribute to the development of gastronomy education, highlighting both anticipated benefits and potential challenges in implementation. Ultimately, ERP systems represent a transformative approach for gastronomy education by bridging administrative efficiency with pedagogical innovation. Their integration ensures continuity in practical training, optimizes resource use, and strengthens institutional decision-making. By aligning operational processes with educational objectives, ERP systems create a cohesive and sustainable learning environment that meets sectoral expectations and enhances student engagement.

5. Conclusions

This research explored the potential applicability of enterprise resource planning (ERP) systems in higher education institutions offering gastronomy programs, based on stakeholder perceptions and thematic analysis. Gastronomy education involves not only technical skill acquisition but also the development of multifaceted competencies such as hygiene, planning, time management, teamwork, and creativity. In this context, the management of educational environments, effective resource utilization, and the integration of systems aligned with digital transformation are considered essential elements influencing educational quality.

Beyond their role as digital management tools, ERP systems provide mechanisms that can optimize culinary training environments by synchronizing procurement with course schedules, reducing setup and changeover times, supporting inventory traceability, and minimizing disruptions caused by ingredient shortages or equipment constraints. ERP systems offer several tangible advantages for gastronomy programs. They can support the planning of practical courses, facilitate timely procurement of ingredients and equipment, and connect supply chain processes with academic schedules. In addition, these systems enable real-time monitoring of student performance, help manage the budgets required for resource-intensive culinary training, and improve communication between academic and administrative units. Such functions help reduce disruptions in practice-based courses and contribute to a more coordinated and data-informed educational environment.

Findings indicate that ERP-supported planning can improve the efficiency of hands-on culinary courses by enabling timely procurement, standardizing recipes and portion controls, and generating real-time data on resource use. These features contribute to more predictable and consistent practical sessions, reducing waste and ensuring that students interact with stable, industry-aligned production processes. In this context, ERP becomes not only a facilitator of educational quality but also a driver of process optimization within teaching kitchens. The findings, derived from interviews with department heads, suggest that ERP systems may offer strategic support in areas such as academic planning, supply management, institutional communication, and educational quality. The thematic analysis—covering management, supply, education, software, institutional factors, and motivation—indicates that strengthening digital infrastructure, establishing systematic communication models, and developing user-oriented software solutions are perceived as necessary steps by stakeholders.

Participants emphasized that successful ERP implementation depends not only on technical capabilities but also on institutional alignment, user adaptation, and leadership support. Challenges such as the limitations of traditional software, lack of integration with pedagogical processes, and user resistance were highlighted as barriers to effective system adoption. Therefore, ERP systems are viewed as potentially valuable tools, contingent upon strategic planning, flexible structuring, ongoing training, and a human-centred transformation approach.

While the study did not implement or measure ERP systems in practice, the results reflect stakeholder views on potential benefits and challenges. These insights contribute to the literature by offering managerial implications and suggestions for improving digital transformation in gastronomy education. ERP systems are perceived as tools that could enhance efficiency, quality assurance, and sustainability in educational processes, especially in a digital age where competitiveness and adaptability are increasingly critical. In conclusion, ERP systems should be considered not only as administrative instruments but also as potential catalysts for pedagogical and operational improvement. Their integration can support sustainability, transparency, and adaptability in gastronomy education, while aligning institutional processes with sector needs. By enabling data-based decision-making and offering modular flexibility, ERP systems have the capacity to connect resource management with experiential learning and contribute to higher educational

Tablo 7
Participant quotes related to the theme of institutional factors.

Category Name	P. No	Quote
Procedures and Principles	P5	"…There's a spending culture at the institution. There are also the requirements of the Council of Higher Education (YÖK). For example, this institution pays close attention to tenders. They're careful to ensure there's nothing that could get in the way of YÖK inspections. If they're going to buy a pen, they get quotes from three different places and buy from the one that best suits them. The process works this way for our products, too. So, while it might seem like it creates workload, it reduces it. I think it makes us more organized and disciplined. I think purchasing is key in gastronomy."
Sustainability and Ethics	P7	"…So, if this system also measures the amount of waste generated from classes, I'm talking about enabling us to control waste management on a per-course basis. For example, let's say we implement waste management on a per-course basis. Simply weighing the total waste generated in classes and entering it into the system for each class could be valuable data. It could also allow us to see everything on a single screen for annual or course-by-course waste management. We're trying to take measures for sustainability, but at some point, we can't see the results. This could become a system where we can see results."
Technological Developments	P2	"…Although keeping up with and adapting to innovations may be difficult at first, I believe it will make our work easier. In such a system, classes can always run smoothly in a department where product supply is never a problem. Meat isn't requested for the 8:30 class. For example, the meat is ready by 8:00, and students can continue their lessons with quality. Uninterrupted class and no shortage of products motivate the instructor, and students can cover every detail of the intended course, increasing their motivation. Isn't that what we aim to achieve? To provide students with the best possible quality, using a fully equipped kitchen with a competent faculty member."
Economic Factors	P9	"…We now must consider order lists and departmental expenses during the period. It's impossible to buy every product we want at the price we want. In the current economy, you can't buy a product you started at a certain price at the beginning of the year at the same price at the end. We're already a department with significant expenses. Furthermore, if a system were implemented, our costs would likely decrease, both periodically and annually, and we would also reduce warehouse losses due to the products we order."
Recommendations	P3	"…If I were using such a system, I could explain to another professor how beneficial it would be with concrete examples. Because, although it's people-focused, it has the infrastructure to eliminate many problems. For example, I can say that our current system, especially with enterprise resource planning, minimizes friction between units. Academic staff can focus more on their own work, either implementing the application or teaching their courses, rather than preparing these order lists, thus increasing productivity. Of course, I'd also say that student satisfaction has increased at the same level. We work in a department where we absolutely must be open to technological developments, innovations, and suggestions."

Table 8
Summary of main themes and key findings.

Theme	Key Dimensions	Summary of Findings
Management	Administrative coordination, decision-making	ERP is expected to enhance coordination, reduce workload, and improve institutional efficiency.
Supply	Supply planning, inventory tracking	Participants anticipate ERP systems will streamline supply processes and reduce manual errors.
Education	Curriculum relevance, planning, evaluation, quality	Education quality is perceived as a multidimensional concept involving strategic planning, interdisciplinary design, and contextual evaluation aligned with sectoral needs.
Software	Staff readiness, digital literacy	Successful ERP adoption is seen as dependent on staff training and digital competence.
Motivation	Institutional commitment, change management	Managerial motivation and openness to innovation are key factors in ERP readiness.
Institutional Factors	Infrastructure, system integration, institutional culture	Concerns include lack of infrastructure, resistance to change, and the need for long-term planning and support.

quality in a continually evolving digital landscape.

Framing ERP as a "process layer", this study contributes to process optimization in teaching kitchens by specifying measurable KPIs, highlighting parameter–response linkages, and outlining a multi-factor optimization pathway. Future work will operationalize DOE/RSM, incorporate sensor-based monitoring for real-time control, and evaluate partial automation scenarios and traceability add-ons to extend quality assurance beyond production.

Limitations and directions for future research

Face-to-face and online interviews were conducted to obtain research data. Quantitative research can be conducted using the survey technique within the framework of the interview questions used in the research and the findings obtained. The innovation diffusion model, which is the basis of the research, can also be included in the scale development process.

Interviews can be conducted with students, who are the most important part of the education phase, within the framework of the adaptation of technological transformations to the sector. Questions can be created for students based on the innovation diffusion model used in the research and the changes and developments that will occur in such a situation can be evaluated from the perspective of the student.

One limitation of the present study is that the participants had not yet implemented ERP systems in their departments. However, this limitation is also a strength in the context of exploratory research. The findings reflect institutional attitudes and strategic expectations, which are critical in the early stages of technology adoption. By identifying key themes such as infrastructure readiness, staff training needs, and managerial motivation, the study contributes to the groundwork necessary for future empirical research and practical ERP integration in gastronomy education.

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Ethics approval and consent to participate

This study was approved by the Balıkesir University's Social Sciences Scientific Research Ethics Committee (Approval no: E-19928322-050.04-471759, Date: 30.12.2024). All procedures complied with

relevant regulations and institutional guidelines. Written informed consent was obtained from all participants prior to data collection.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the author(s) used M365 Copilot in order to improve language clarity, check grammar, enhance text flow, and verify translation accuracy. After using this tool/service, the author (s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

The authors declare that no experiments were conducted on animals in this research.

Interview questions

The questions for the interview form to be used in the research are listed below (Dingfelder and Mandell, 2011; Christiansen, Haddara, and Langseth, 2022).

- Can you briefly tell us about yourself?
- Can you provide information about the mission and vision of your institution in culinary education?
- What do you think about the process, information flow and organizational structure in product supply for culinary education in your institution? / (Can the ERP system be useful for you at these stages?)
- Can you provide information about your current system for budget and cost calculations for culinary education expenses in your institution? / (At what stages can a well-organized software adapt to you in this process?)
- What are the problems you experience in establishing connections with other units for the development of culinary education in your institution? Can you provide information about the communication methods and communication tools you use to solve the problems?
- Do you have an existing system in your institution to increase the quality of culinary education and ensure corporate resource planning? If so, can I learn your thoughts about the contributions of this system to education?
- How long do you anticipate will be needed to test whether ERP will be beneficial before it is used in your institution?
- What situations do you foresee will occur when introducing a well-planned ERP software to other users?
- What are your thoughts on the possibility of providing enterprise resource planning in culinary education?
- What do you think about enterprise resource planning in general? Is there anything else you would like to add?

CRediT authorship contribution statement

Büşra Meltem Türkmen: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Conceptualization. **Mehmet Sarıoğlan:** Supervision.

Declaration of competing interest

The author declares that he has no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.afres.2026.101876.

Data availability

The datasets and material used and/or analysed during the current study are available from the corresponding author on reasonable request.

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