

EduInspire-An International E-Journal

An International Peer Reviewed and Referred Journal (www.ctegujarat.org)
Council for Teacher Education Foundation (CTEF, Gujarat Chapter)

Patron: Prof. R. G. Kothari

Chief Editor: Prof. Jignesh B. Patel

Email:- Mo. 9429429550 ctefeduinspire@gmail.com

Online Culinary Education: An Institutional Framework for Pedagogical Integrity

Vishal Vishwanath Apte

Lecturer, Macau University of Tourism, Macau SAR, China

Doctoral candidate, School of Education, Global NXT University, Malaysia

aptevishal@live.com

Abstract

(a) Objectives

This paper addresses the challenge of transitioning sensory- and kinesthetic-based disciplines, specifically culinary arts, to online formats. It investigates the critical role academic institutions must play in supporting faculty through this shift to maintain educational rigor and quality.

(b) Methods

A systematic literature review was conducted, supplemented by a comparative case study analysis of two leading online culinary schools: the Auguste Escoffier School of Culinary Arts and Rouxbe Online Culinary School.

(c) Results

The analysis identified three persistent challenges for culinary educators in online environments: pedagogical adaptation, technological integration, and professional isolation. In response, a comprehensive, tripartite framework for institutional support is proposed. This model integrates Pedagogical Innovation, Robust Technological Infrastructure, and the cultivation of a Community of Practice to empower faculty.

(d) Conclusions

A proactive, institutionally led strategy investing in the three pillars of the proposed framework is essential for preserving the experiential integrity and quality of culinary education online. Such support ensures graduates are equipped for success in the evolving industry and is critical for the effective digital transition of practice-based fields.

Keywords: Online Culinary Education, Faculty Development, Institutional Support, Pedagogical Innovation, Technological Infrastructure, Community of Practice

1. Introduction

The global higher education sector is in a state of profound transformation, largely accelerated by the digital revolution and, more recently, the global pandemic (Akour & Alenezi, 2023). Online learning has emerged as a dominant force, celebrated for its ability to transcend geographical boundaries, offer unprecedented flexibility, and cater to a diverse array of learners (Aguilera & Moreno, 2021; Zou et al., 2025). Concurrently, the culinary arts

industry is evolving due to shifting consumer palates, technological advancements in food science, and a sustained demand for highly skilled professionals (Cormier-MacBurnie et al., 2015; Müller et al., 2009). The confluence of these trends places culinary education at a critical crossroads.

While the potential benefits of online culinary education are significant including increased accessibility for non-traditional students and working professionals, reduced operational costs, and the democratization of knowledge the transition is fraught with complexity (Brown, 2005b, 2005a; Li & Irby, 2008; Li & Pang, 2021). The very essence of culinary arts is intrinsically linked to sensory perception, tactile experience, and hands-on skill development, elements that are notoriously difficult to translate into a virtual format (Koerich et al., 2024; Woodhouse & Rodgers, 2024). Consequently, culinary faculty, often masters of their craft in a physical kitchen, find themselves navigating an unfamiliar digital landscape, frequently without adequate support (Misra et al., 2023).

The central research question guiding this paper is: "How can academic institutions develop effective support systems to help culinary faculty adjust their pedagogical methods and leverage technology to enhance the quality and effectiveness of online culinary education?"

This paper discusses that successful integration of online learning in culinary education cannot be an ad-hoc or individual faculty-led endeavor. It requires a deliberate, structured, and holistic institutional strategy. We propose that institutions must provide an encompassing support framework built upon three foundational pillars: fostering pedagogical innovation, providing a robust technological infrastructure, and cultivating a supportive community of practice. This paper will explore this framework through a synthesis of existing literature and an analysis of pioneering institutional case studies.

1.1 The Paradigm Shift to Online Learning in Culinary Arts

The migration of culinary education online is not merely a change of medium but a fundamental paradigm shift. Traditional culinary pedagogy has historically been based on a master-apprentice model, emphasizing observation, imitation, and immediate feedback in a shared physical space (Woodhouse & Ellwood, 2022; Woodhouse & Rodgers, 2024). Online learning disrupts this model, demanding new approaches to instruction, demonstration, and assessment (Natan et al., 2022).

The drivers for this shift are powerful:

- **Demographic Accessibility:** Online programs eliminate geographic constraints, allowing institutions to reach a global student body, including those in remote areas without access to traditional culinary schools (Mejia & Phelan, 2014; Müller et al., 2009).
- **Economic and Logistical Accessibility:** They often present a lower-cost alternative to on-campus programs by reducing tuition fees and eliminating relocation and associated living costs. Furthermore, they offer asynchronous flexibility, catering to a growing population of working professionals, career-changers, and individuals with family

commitments who seek to upskill or pursue a new passion (Mejia & Phelan, 2014; Phelan & Mejia, 2015).

1.2 Persistent Challenges in the Virtual Kitchen

Despite these advantages, the literature reveals significant and persistent challenges that threaten the efficacy of online culinary education if not properly addressed:

- **Replicating Kinesthetic Learning:** The cornerstone of culinary training is "hands-on" experience. The development of knife skills, understanding heat application, and gauging doneness through touch and sight are profoundly experiential. Cormier-MacBurnie et al. (2015) emphasize that this tacit knowledge is best acquired through direct practice and mentorship, posing a fundamental challenge for digital replication (Deutsch, 2018).
- **Combating Isolation and Maintaining Engagement:** Culinary schools are inherently social environments where collaboration, camaraderie, and spontaneous interaction are vital. The online environment can lead to feelings of isolation and disengagement among students. Basar et al. (2021) found that the lack of physical presence can weaken the connection between peers and instructors, potentially hindering the development of a crucial professional network.
- **Reimagining Assessment:** Evaluating practical skills virtually requires a move away from traditional in-person practical exams. Educators must innovate with alternative assessment strategies, such as detailed video submissions, structured peer-review protocols, and virtual simulations, to effectively evaluate technique, creativity, and workflow (Koerich et al., 2024).
- **The Digital Proficiency Gap:** A critical barrier is the varying level of technological comfort and proficiency among culinary faculty. Many expert chefs are digital immigrants who may feel underprepared to teach online, expressing concerns about their ability to use learning management systems (LMS), create digital content, and troubleshoot technical issues (Bolliger & Halupa, 2021; Cawley, 2011; Winanti et al., 2019).

1.3 Emerging Opportunities and Innovations

These challenges, however, are catalysts for innovation. The literature also highlights opportunities unique to the online environment:

- **Advanced Learning Technologies:** Technologies like virtual reality (VR) can simulate kitchen environments, allowing students to practice procedures risk-free. Augmented reality (AR) can overlay digital information onto physical ingredients. High-definition, multi-angle video demonstrations can provide views often impossible in a crowded classroom kitchen (Alcañíz, 2019; Hingston et al., 2021; Ma et al., 2023).
- **Global Classroom and Networking:** Online platforms can dissolve walls, enabling institutions to host guest lectures from world-renowned chefs, organize virtual tours of international food production facilities, and foster global peer-to-peer collaboration,

enriching the student's perspective immensely (Aguilera & Moreno, 2021; Askren & James, 2021).

- **Data-Driven Personalization:** Adaptive learning platforms can track student progress, identify areas of struggle, and provide personalized feedback and supplementary resources, catering to individual learning paces and styles more effectively than in a uniform classroom setting (Ma et al., 2023).

2. Research Objectives and Methodology

2.1 Research Objectives

This study aims to:

1. Synthesize the extant literature to delineate the primary challenges and opportunities facing online culinary education, with a specific focus on faculty needs.
2. Analyze the strategies and outcomes of leading institutions that have implemented online culinary programs.
3. Develop and propose an evidence-based framework for academic institutions to systematically support faculty in the transition to and excellence in online culinary education.

2.2 Methodology

This research employed a qualitative, multi-method approach combining a systematic narrative literature review with an explanatory multiple case study analysis. This design allows for the integration of theoretical concepts with empirical evidence from real-world implementations.

Literature Review: A comprehensive review of academic literature was conducted using databases such as Google Scholar, Scopus, and Web of Science. Key search terms included "online culinary education," "culinary faculty development," "digital pedagogy hospitality," "virtual learning culinary," and "technology in culinary education." The review focused on peer-reviewed journal articles, conference proceedings, and seminal books published predominantly within the last decade to ensure relevance.

Case Study Selection and Analysis: Two prominent institutions were selected as purposefully sampled cases due to their recognized leadership and extensive public documentation in online culinary education:

1. **Auguste Escoffier School of Culinary Arts:** A renowned institution offering extensive online diplomas and degrees.
2. **Rouxbe Online Culinary School:** A pioneer focused exclusively on online culinary education, serving both individual consumers and institutional partners.

Data for the case studies were gathered from publicly available sources, including institutional websites, official program descriptions, annual reports, published interviews with administrators, and third-party media articles reviewing the programs. This data was analyzed using a thematic analysis approach to identify recurring themes related to instructional

strategies, technological tools, support structures, and stated outcomes. The cross-case analysis aimed to distill common success factors and innovative practices.

3. Results

3.1 Case Study 1: Auguste Escoffier School of Culinary Arts

Auguste Escoffier has successfully transitioned its esteemed brand into the digital realm through a carefully structured approach.

- **Strategies:** The school employs a blended learning model, a critical strategy for mitigating the hands-on learning challenge. Students complete theoretical components including history, food science, and business management online through a structured LMS. This is complemented by required practical modules, where students execute techniques in their own kitchens, documented via video submissions for instructor feedback. Their online pedagogy emphasizes interactive learning through live, synchronous cooking sessions with instructors, facilitated discussion forums, and mandatory "knowledge checks" that ensure content mastery before progression (Escoffier Culinary School, 2022; Escoffier Culinary School, 2022; Escoffier Culinary school, 2025).
- **Outcomes and Implications:** This model maintains the institution's brand of rigor while expanding access. It implicitly acknowledges that not all learning must be hands-on in a school kitchen; theory can be effectively delivered online, reserving precious in-person or live-online time for targeted practical application. The key takeaway is the strategic separation and integration of theoretical and practical learning, each delivered through its most appropriate medium.

3.2 Case Study 2: Rouxbe Online Culinary School

As a native online provider, Rouxbe's approach is built from the ground up for the digital environment.

- **Strategies:** Rouxbe's core philosophy is experiential online learning. It moves beyond passive video watching to an active learning model. Its platform is centered on high-production-value video lessons, interactive quizzes embedded within content, and structured, criterion-based peer assessment systems. A standout feature is its emphasis on industry partnership, offering white-label solutions and customized courses for culinary schools, corporations, and hospitality groups. This not only expands their reach but also embeds their pedagogical model within traditional institutions (Rouxbe Online Culinary School, 2025).
- **Outcomes and Implications:** Rouxbe demonstrates that engagement can be engineered into the online experience through quality production, interactive design, and social learning constructs like peer review. Their partnership model offers a viable pathway for traditional institutions to accelerate their online capabilities by leveraging existing expertise. The key takeaway is the primacy of platform design and user experience in

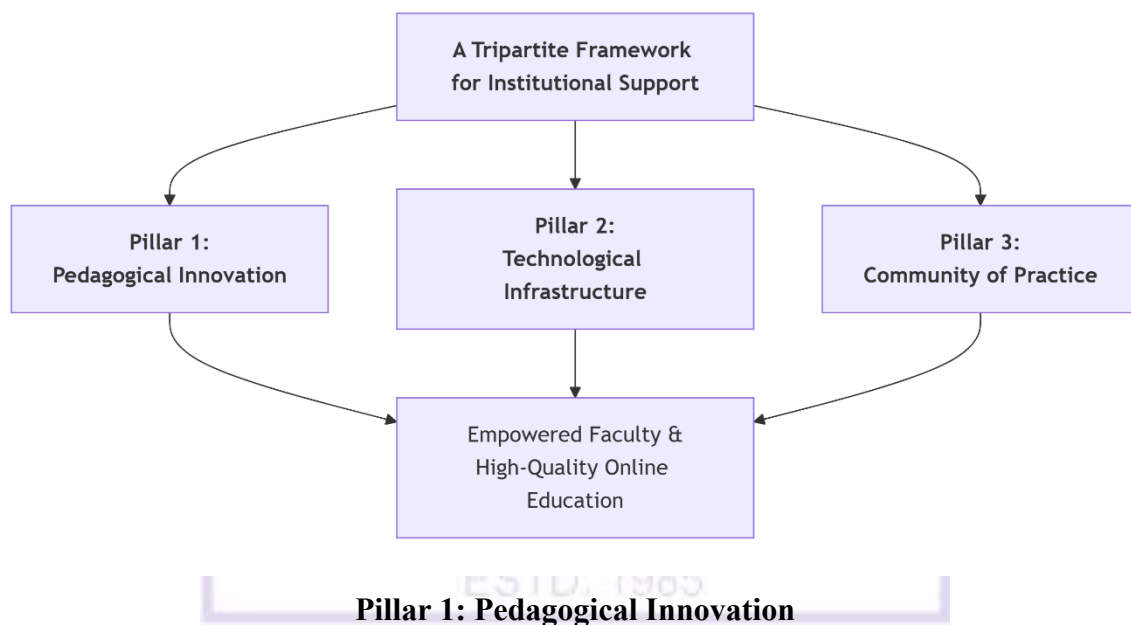
creating an engaging and effective learning environment that can be scaled through strategic collaboration.

Both cases, despite different origins, reveal common success factors: a clear pedagogical model tailored to the online environment, a significant investment in a purpose-built technological platform, and a strong focus on maintaining human interaction and feedback loops. They highlight that success is not about perfectly replicating the physical kitchen online, but about reimagining culinary education for a new medium.

3.3 A Proposed Framework for Institutional Support

The analysis confirms that overcoming the identified challenges requires more than just individual faculty effort. Institutions must act as enablers. We propose a holistic framework where three pillars of support act in concert to empower faculty, as illustrated below.

Figure 1: A Tripartite Framework for Institutional Support of Online Culinary Faculty



This pillar addresses the "how" of teaching by moving beyond content delivery to active learning design.

- **Comprehensive Faculty Development:** Training must extend beyond LMS navigation to include workshops on online course design (e.g., Backward Design), digital pedagogy (e.g., building social presence, facilitating online discussions), and creating authentic online assessments for practical skills (Griffin, 2020; Hundey et al., 2020).
- **Instructional Design (ID) Support:** Institutions should embed dedicated instructional designers who partner with faculty. These experts translate culinary learning objectives into engaging online activities, help storyboard video content, ensure accessibility compliance, and align assessments with outcomes (Bolliger & Halupa, 2021; Cormier-MacBurnie et al., 2015).

- Peer Mentoring and Observation: Establishing a structured program where faculty new to online teaching can observe and be mentored by experienced online instructors demystifies the process and promotes the sharing of best practices in a discipline-specific context (Tang et al., 2022).

Pillar 2: Technological Infrastructure

This pillar provides the foundational tools and support, ensuring technology serves pedagogy, not the other way around.

- Robust and Integrated LMS: The chosen LMS must be reliable and support features critical for culinary education: high-quality video streaming, seamless integration with video conferencing tools (e.g., Zoom), discussion forums, and robust grading tools. It should also allow for integration with specialized culinary software (e.g., nutrition analysis, recipe costing) (Cawley, 2011; Wang, 2019).
- Multimedia Production Support: Institutions must provide faculty with resources to create high-quality content. This includes access to video recording studios, professional editing software, graphic design tools, and, crucially, media production specialists who can assist faculty in creating professional demonstrations and learning materials (Akour & Alenezi, 2023; Zou et al., 2025).
- Dedicated Technical Support: A specialized, readily available IT helpdesk for both faculty and students is non-negotiable. Quick resolution of technical issues is essential to maintaining flow and preventing frustration that can derail the learning experience (Ma et al., 2023; Wang, 2019).

Pillar 3: Community of Practice (CoP)

This pillar addresses the human element, combating the isolation that can accompany online teaching and fostering continuous improvement.

- Faculty Learning Communities (FLCs): Establishing regular, facilitated meetings where culinary faculty can collaboratively solve problems, share successful assignments, and discuss challenges specific to teaching their discipline online (Hundey et al., 2020).
- Expert-Led Workshops and Speaker Series: Bringing in external experts in online education, instructional technology, and even renowned chefs who have successfully engaged digital audiences to inspire innovation and share cross-industry insights (Cormier-MacBurnie et al., 2015).
- Online Collaboration Spaces: Creating informal digital spaces (e.g., Slack channels, Microsoft Teams groups) where faculty can spontaneously ask questions, share resources, and celebrate successes, fostering a sense of ongoing connection and shared purpose (Adachi et al., 2022).

4. Discussion

The proposed framework is not a series of independent interventions but an integrated ecosystem. The pillars are deeply interconnected: Pedagogical Innovation is stifled without

the Technological Infrastructure to execute new ideas. Conversely, advanced technology is pedagogically meaningless without the knowledge to use it effectively. Both pillars risk failure if faculty feel isolated and unsupported; the Community of Practice provides the psychological safety and collaborative environment necessary for experimentation and growth.

This model positions the institution as the key enabler, responsible for creating the conditions for faculty success. It requires a strategic allocation of resources financial, human, and technological. The case studies of Escoffier and Rouxbe provide empirical validation for this approach, demonstrating that institutions that invest in these areas are better positioned to deliver high-quality online culinary education that respects the traditions of the craft while embracing the possibilities of the digital future.

A critical discussion point is the framework's acknowledgment of faculty agency. The model is designed to empower, not dictate. It provides the support, resources, and community, but ultimately relies on faculty to adapt their expert knowledge to the new medium. This respects their professional autonomy while giving them the tools needed to succeed.

5. Conclusion

The transition to online culinary education is a complex but inevitable evolution. This research confirms that the greatest challenges pedagogical adaptation, technological integration, and isolation cannot be solved by faculty alone. Through a synthesis of literature and case study analysis, we have argued that a proactive, institutional-level response is paramount. The proposed tripartite framework of Pedagogical Innovation, Technological Infrastructure, and Community of Practice offers a holistic roadmap for academic institutions to systematically support their faculty. By investing in these interconnected pillars, institutions can bridge the digital divide, ensuring that online culinary education is not a diminished alternative but a rigorous, engaging, and effective modality that prepares future culinary professionals for a dynamic industry.

Implications

- For Institutional Leaders: This study provides a clear blueprint for strategic investment. Leaders must champion this framework, allocating resources for ongoing professional development, instructional design support, robust technology, and the facilitation of communities of practice. This is a strategic imperative for remaining relevant and competitive.
- For Faculty: This framework provides a common vocabulary and a structured model to advocate for the support they need. It encourages faculty to engage as lifelong learners, actively participating in development opportunities and contributing to the community of practice to shape the future of their profession.
- For Future Research: This study lays the groundwork for several important research avenues. Longitudinal studies are needed to assess the impact of such a framework on concrete student outcomes like skill acquisition, retention, and job placement. Further

research could also develop and validate specific assessment rubrics for online practical skills and explore the efficacy of emerging technologies like VR and AI in culinary skill development.

References

- Adachi, C., O'Donnell, M., & Jo, E. (2022). Co-creating a digital learning innovation framework through design thinking approaches. *ASCILITE Publications*. <https://doi.org/10.14742/apubs.2022.140>
- Aguilera, J. M., & Moreno, M. C. (2021). Teaching Engineering and Food: From Traditional Approaches to a Flipped Course on Gastronomic Engineering. In *Food Engineering Reviews* (Vol. 13, Number 4, pp. 916–928). Springer. <https://doi.org/10.1007/s12393-021-09281-0>
- Akour, M., & Alenezi, M. (2023). Digital Transformation Blueprint in Higher Education: A Case Study of PSU. *Sustainability*, 15(10), 8204. <https://doi.org/10.3390/su15108204>
- Askren, J., & James, W. (2021). Experiential Learning Methods in Culinary Course Can Bridge the Gap: Student Perceptions on How Hands-On Curriculum Prepares Them for Industry. *Journal of Hospitality & Tourism Education*, 33(2), 111–125. <https://doi.org/10.1080/10963758.2020.1791134>
- Basar, Z. M., Mansor, A. N., Jamaludin, K. A., & Alias, B. S. (2021). The Effectiveness and Challenges of Online Learning for Secondary School Students - A Case Study. *Asian Journal of University Education*, 17(3), 119–129. <https://doi.org/10.24191/ajue.v17i3.14514>
- Bolliger, D. U., & Halupa, C. (2021). An Investigation of Instructors' Online Teaching Readiness. *Tech Trends*, 66, 185–195. <https://doi.org/10.1007/s11528-021-00654-0/Published>
- Brown, J. N. (2005a). A Brief History of Culinary Arts Education in America. *Journal of Hospitality & Tourism Education*, 17(4), 47–54. <https://doi.org/10.1080/10963758.2005.10696841>
- Brown, J. N. (2005b). Integrating Eisner's Arts Education Philosophy into Culinary Arts Education. *Journal of Culinary Science & Technology*, 4(1), 89–99. https://doi.org/10.1300/J385v04n01_10
- Cawley, R. C. (2011). The Interface of Technology in Culinary Arts Education. *UNLV Theses, Dissertations, Professional Papers, and Capstones*. 1049.
- Cormier-MacBurnie, P., Doyle, W., Mombourquette, P., & Young, J. D. (2015). Canadian chefs' workplace learning. *European Journal of Training and Development*, 39(6), 522–537. <https://doi.org/10.1108/EJTD-01-2015-0003>

- Deutsch, J. (2018). Can Improvisation Save Culinary Education? *Liminalities: A Journal of Performance Studies*, Vol.14,(No. 1), 169–184. <http://liminalities.net/14-1/culinary.pdf>
- Escoffier culinary School. (2022, June 15). *Culinary School Guides, Workbooks & Checklists*. <https://Www.Escoffier.Edu>.
- Escoffier Culinary School. (2022, June 23). *Online Culinary School*.
- Escoffier Culinary school. (2025, March). *Yes, Online Culinary School Works*. <https://Www.Escoffier.Edu/Blog/Value-of-Culinary-Education/How-Online-Culinary-School-Works/>.
- Giglioli, I. A. C., Vidal, C. B., & Raya, M. A. (2019). A Virtual Versus an Augmented Reality Cooking Task Based-Tools: A Behavioral and Physiological Study on the Assessment of Executive Functions. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02529>
- Griffin, W. C. (2020). Hospitality faculty: are we meeting the demands of industry? *Journal of Teaching in Travel and Tourism*, 20(4), 262–283. <https://doi.org/10.1080/15313220.2020.1746225>
- Hingston, P., Garcia-Torres, R., & Mannam, V. (2021). Virtual and in-person teaching and learning activities for core food science courses. In *Journal of Food Science Education* (Vol. 20, Number 2, pp. 72–75). Blackwell Publishing Ltd. <https://doi.org/10.1111/1541-4329.12222>
- Hundey, B., Anstey, L., Cruickshank, H., & Watson, G. P. L. (2020). Mentoring faculty online: a literature review and recommendations for web-based programs. *International Journal for Academic Development*, 25(3), 232–246. <https://doi.org/10.1080/1360144X.2020.1731815>
- Koerich, G., Fernandes, F., Silva, J., & Hack, A. (2024). Learning experiences in the culinary classroom: Identifying barriers and enablers in the practical teaching-learning process in gastronomy. *Journal of Hospitality Leisure Sport & Tourism Education*, 35, 100508. <https://doi.org/10.1016/j.jhlste.2024.100508>
- Li, C., & Irby, B. (2008). An Overview of Online Education: Attractiveness, Benefits, Challenges, Concerns and Recommendations. *College Student Journal*, 42(2), 449–458. <http://lucee.learntechlib.org/p/103183/>
- Li, R., & Pang, L. (2021). *The Construction of Blended Teaching Mode of Cooking Technology Course Under the Background of “Gold Course.”* <https://article.sciencepublishinggroup.com/pdf/10.11648.j.tecs.20210601.14.pdf>
- Ma, C.-Y., Wang, K.-C., Liu, D.-Y., & Lai, T.-C. (2023). Evaluation of the comprehensive thematic teaching effectiveness and technique/technology in culinary vocational education. *Education + Training*, 65(6/7), 795–826. <https://doi.org/10.1108/ET-09-2022-0370>

- Mejia, C., & Phelan, K. V. (2014). Hospitality Instructors' Preference for Blended Teaching: A Bridge to Full Online Course Delivery? *Journal of Teaching in Travel and Tourism*, 14(4), 343–364. <https://doi.org/10.1080/15313220.2014.955304>
- Misra, P., Pandey, A., & Nashier, S. (2023). PARADIGM SHIFT IN CULINARY EDUCATION AFTER COVID-19: A WAY FORWARD. *Journal of Services Research*, 23(1), 13–36.
- Müller, K. F., Vanleeuwen, D., Mandabach, K., & Harrington, R. J. (2009). The effectiveness of culinary curricula: a case study. *International Journal of Contemporary Hospitality Management*, 21(2), 167–178. www.emeraldinsight.com/0959-6119.htm
- Natan, S., Lazebnik, T., & Lerner, E. (2022). A distinction of three online learning pedagogic paradigms. *SN Social Sciences*, 2(4). <https://doi.org/10.1007/s43545-022-00337-4>
- Phelan, K. V., & Mejia, C. (2015). What They Expect and Why We Should Care: Students' Perspectives on Hospitality Faculty Industry Experience. *Journal of Teaching in Travel and Tourism*, 15(1), 1–17. <https://doi.org/10.1080/15313220.2014.999740>
- Rouxbe Online Culinary School. (2025, March). *Rouxbe Learning Platform*. <https://Rouxbe.Com/Learning/>.
- Tang, Y. M., Lau, Y. yip, & Chau, K. Y. (2022). Towards a sustainable online peer learning model based on student's perspectives. *Education and Information Technologies*, 27(9), 12449–12468. <https://doi.org/10.1007/s10639-022-11136-y>
- Wang, Q. (2019). Developing a Technology-supported Learning Model for Elementary Education Level. *Mimbar Sekolah Dasar*, 6(1), 141. <https://doi.org/10.17509/mimbar-sd.v6i1.15901>
- Winanti, Meyliana, Gaol, F. L., Prabowo, H., & Goestjahjanti, F. S. (2019). Exploration of Key Success Factors for Determining Technological Component in Learning at Culinary Community: A Systematic Literature Review. *2019 IEEE International Conference on Engineering, Technology and Education (TALE)*, 1–6. <https://api.semanticscholar.org/CorpusID:224777966>
- Woodhouse, A., & Ellwood, S. (2022). *Pivoting Culinary Arts Education During COVID-19 Part One: Setting the Pedagogic Scene*.
- Woodhouse, A., & Rodgers, L. (2024). Culinary arts education: Unpacking and disrupting its master-apprentice pedagogy. *International Journal of Gastronomy and Food Science*, 35. <https://doi.org/10.1016/j.ijgfs.2024.100898>
- Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1562391>