Project number 2023-2-PL01-KA220-VET-000171447

PEDAGOGICAL INNOVATION

for Vocational Education and Training in Gastronomy

"Smart Gastronomy"

Analytical Framework, Evidence Base, and Cross-National Validation. Accompanying the "Smart Gastronomy" Pedagogical Innovation Product

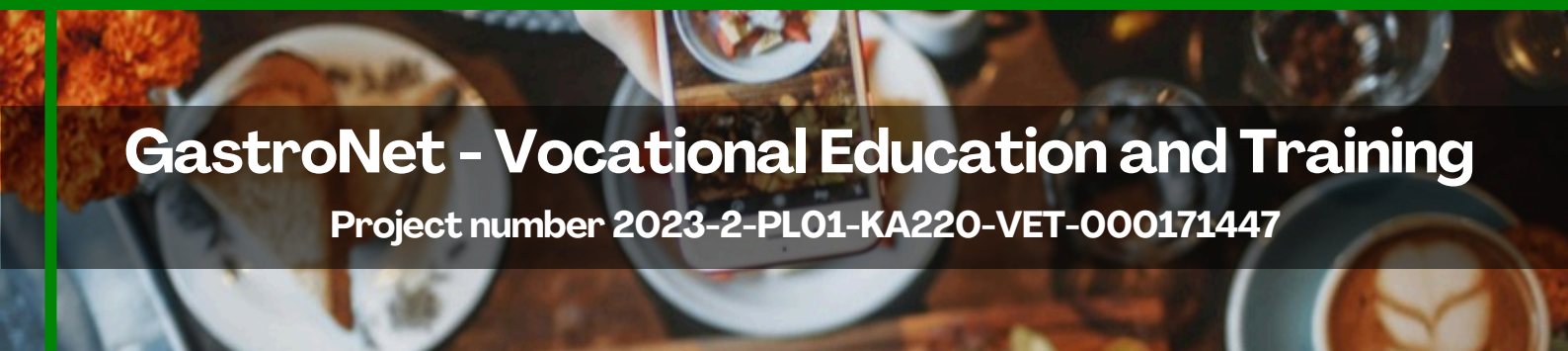
www gastronet-edu.eu

Co-funded by the European Union

Disclaimer

Co-funded by the European Union

Co-Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Foundation for the Development of the Education System (FRSE). Neither the European Union nor FRSE can be held responsible for them.



GastroNet - Vocational Education and Training

Project number 2023-2-PL01-KA220-VET-000171447

About Project

GastroNet - Vocational Education and Training

Project number 2023-2-PL01-KA220-VET-000171447

Work Package 3 — Supplementary Analytical Report

Companion analytical report for project partners, VET educators, school managers, evaluators, and stakeholder readers

Supplementary Analytical Report – Final Revised Version, September 2025
Lead Organisation: Fundacja im. Zofii Zamenhof

Consortium Partners:

- **Fundacja im. Zofii Zamenhof (PL)**
- **CNIPA Puglia (IT)**
- **Staropolska Izba Przemysłowo-Handlowa (PL)**
- **ZDZ Kielce (PL)**
- **Epralima (PT)**

gastronet-edu.eu

1. Executive Summary

This document is a supplementary analytical report accompanying the “Smart Gastronomy” pedagogical innovation product. It provides the evidence base, theoretical framework, cross-national validation, and implementation guidance developed through the GastroNet transnational research programme. The pedagogical innovation product itself — the complete training framework for VET schools — is presented as a separate, standalone document.

Role and Intended Audience of This Report

This document serves as a companion analytical report to the “Smart Gastronomy” pedagogical innovation developed under Work Package 3 of the GastroNet project. Its role is to document the rationale, evidence base, development logic, validation process, and implementation relevance of the innovation in relation to the commitments described in the project application. It is not a substitute for the pedagogical innovation product itself, but a supporting document designed to facilitate interpretation, quality review, and informed use of the innovation.

The report is addressed primarily to project partners, VET teachers and trainers, school managers, evaluators, and other institutional readers who need a clear account of how the innovation was developed and why it responds to identified educational and labour-market needs. In line with the project application, the ultimate beneficiaries of the innovation are VET students and the teaching environment, while employers and business representatives remain important indirect beneficiaries and reference stakeholders in assessing the labour-market relevance of the solution.

The GastroNet pedagogical innovation, titled “Smart Gastronomy,” represents the core intellectual output of Work Package 3 of the Erasmus+ KA220-VET project (ID: KA220-VET-13497484). Developed through systematic transnational research across Poland, Italy, and Portugal, this innovation delivers on the two declared results specified in the project application:

Declared Result 1

Introduction to formal education (formal education system) of an innovative, designed for practical integration solution that enables the acquisition of new skills and competences by students of vocational schools, increasing their potential and opportunities in the contemporary labour market.

Declared Result 2

Changing students' perception of education in a trade school: previous education, which does not meet the requirements and expectations of the labour market, is supplemented with a new form, attractive to young people because of the bundle of skills included and the methods of acquiring them.

The innovation was developed through a rigorous, evidence-based process. In the research phase conducted within the project (March–October 2024), the consortium conducted focus group research across three EU Member States involving VET students, educators, sector-informed stakeholders, and institutional representatives across multiple research sessions. This research identified five critical competency gaps in current gastronomy VET programmes: digital marketing and social media management, e-commerce and online sales, entrepreneurship and business management, customer acquisition techniques, and AI-driven decision making.

In response to these documented needs, the **"Smart Gastronomy"** innovation was designed as a comprehensive, modular pedagogical framework centred on Push and Pull sales strategies enhanced by Artificial Intelligence technologies. The framework is not a narrow technical manual on sales techniques; rather, it constitutes a complete pedagogical system that transforms how gastronomy VET education is conceived and delivered. It introduces five integrated training modules, a five-stage didactic model, AI-integrated learning environments, and practice-oriented methodologies aligned with EQF Levels 4–5 and the DigComp 2.2 Framework.

Pilot evaluation conducted in June 2025 across Poland and Italy confirmed the effectiveness of this innovation: 84% of Polish students and 90% of Italian students rated the training script as highly useful for their professional futures. All five Italian trainers gave maximum effectiveness scores (5/5). Zero negative evaluations were recorded across all evaluation sessions. Module interest priorities remained stable over a nine-month period, validating the accuracy of the initial needs assessment.

This document provides the analytical foundation for the pedagogical innovation: its evidence base, theoretical framework, architectural rationale, implementation guidance, and validation outcomes. It accompanies the standalone product document, demonstrating the evidence-based reasoning behind the design decisions and confirming alignment between the project application commitments and the delivered innovation.

2. Strategic Context and Problem Statement

2.1 The Transformation Challenge in European Gastronomy VET

The European gastronomy sector has undergone significant structural change in the post-pandemic era. The acceleration of digital technologies, the emergence of AI-powered business operations, and the fundamental shift in consumer behaviour toward online engagement have created a widening gap between the competencies that traditional VET programmes develop and those that the contemporary labour market demands. This gap is not marginal — it is systemic and growing.

The catering industry, which suffered disproportionately from the economic consequences of the COVID-19 pandemic, has rebuilt itself around digital-first business models. Online ordering systems, AI-driven customer analytics, social media marketing, and data-based decision making have become essential operational competencies — not optional additions. Yet VET curricula across Europe remain predominantly anchored in traditional culinary skills, food safety protocols, and hands-on kitchen practice. While these foundational skills remain necessary, they are no longer sufficient.

2.2 Documented Evidence of Systemic Failure

The GastroNet consortium's transnational research programme, conducted across Poland, Italy, and Portugal between March and October 2024, produced consistent evidence of this systemic failure. Focus group interviews (FGI) with VET students, educators, and industry stakeholders revealed that:

- 74% of Polish students identified digital marketing and social media as their highest priority competency need — a domain entirely absent from their formal curriculum;
- 50% of Italian students selected entrepreneurship and business start-up as their top priority, yet reported receiving zero preparation in business management;
- Portuguese educators consistently recommended fundamental curriculum restructuring to include digital literacy, financial management, and entrepreneurial skills;
- All three countries reported that soft skills (communication, teamwork, problem-solving, stress management) are neither formally taught nor assessed, despite being universally demanded by employers.

These findings are not isolated observations. They represent a consistent, cross-national pattern that demands a systemic pedagogical response — precisely the type of innovative solution envisioned in the GastroNet project application.

2.3 The Innovation Imperative

The GastroNet project application identified this challenge with clarity. The main goal of WP3 was defined as developing "a pedagogical innovation that will be able to significantly contribute to the achievement of the main objectives of the project" — specifically, to develop an innovative vocational training programme that includes innovative teaching methodology, aimed at enabling young people with a gastronomic profile to acquire the necessary skills and qualifications required in the modern labour market.

The **"Smart Gastronomy"** pedagogical innovation is a direct response to this imperative. It transforms the documented competency gaps into structured learning outcomes, translates stakeholder needs into modular training architecture, and leverages AI technologies not merely as subject matter but as a didactic instrument that is designed to transform how students learn, practice, and prepare for professional life.

3. Evidence Base: Transnational Needs Assessment

3.1 Research Design and Methodology

The evidence base for the **"Smart Gastronomy"** innovation was constructed through a structured, multi-phase research programme employing Focus Group Interview (FGI) methodology across three EU Member States. The research design followed established qualitative research protocols, ensuring methodological rigour and cross-national comparability. The employer perspective was incorporated through SIPH (Staropolska Izba Przemysłowo-Handlowa) as an employer-representative chamber of industry and commerce and through educators with active industry connections, while direct pilot validation focused on learners and implementers.

Partner	Country	Target Group	N	Date	Focus
CNIPA Puglia	Italy	Students (3rd year)	9	11.09.2024	VET perception & needs
CNIPA Puglia	Italy	Educators	7	18.09.2024	Curriculum reform
Epralima	Portugal	Students (2nd–3rd year)	11	18.09.2024	VET perception & needs
Epralima	Portugal	Educators	10	17.09.2024	Curriculum reform
SIPH / ZDZ Kielce	Poland	Students (2nd–3rd year)	Multiple	Sept–Oct 2024	VET perception & needs
SIPH / ZDZ Kielce	Poland	Educators	Multiple	Sept–Oct 2024	Curriculum reform

Table 1. Focus Group Research Programme — Phase 1 (September–October 2024)

3.2 Five Critical Competency Gaps

The research programme identified five critical competency domains where current VET curricula systematically fail to prepare gastronomy students for the contemporary labour market. These gaps were consistently identified across all three countries, indicating a structural rather than localised problem.

Gap 1: Digital Marketing and Social Media Management (Critical Priority)

Across all three countries, the most urgently identified competency gap concerned digital marketing and social media management. In Poland, 74% of students (14 of 19) identified this as their highest priority — reflecting the reality that restaurants without professional social media presence face substantial competitive disadvantage. In Italy, 40% of students flagged this as their primary interest area. Portuguese students and educators uniformly described limited digital platform integration in their programmes. Despite the centrality of digital presence to modern gastronomy business operations, none of the three national VET systems included formal digital marketing training.

Gap 2: E-Commerce and Online Sales (Critical)

The rapid growth of food delivery platforms and online ordering systems has created a critical competency gap in e-commerce and digital sales. In Poland, 47% of students selected this domain as a priority. In Italy, 40% expressed strong interest, reflecting the rapid growth of the food delivery market across Europe. Portuguese students reported zero exposure to e-commerce within their curricula. This gap is particularly significant because it directly impacts graduates' ability to operate in the contemporary gastronomy market, where digital ordering now accounts for a substantial share of revenue.

Gap 3: Entrepreneurship and Business Management (Critical)

The gastronomy sector is dominated by small and medium enterprises, and a significant proportion of VET graduates will ultimately establish their own businesses. Yet formal entrepreneurship education was largely absent across all three countries. In Italy, 50% of students identified "How to start a business" as their number one priority. Portuguese students expressed strong concern about the complete lack of business management, financial planning, and cost analysis training. Polish students confirmed similar gaps in entrepreneurial preparation.

Gap 4: Customer Acquisition and Service Techniques (Significant)

Customer acquisition, retention, and service excellence were identified as significant competency gaps in all three countries. In Poland, 47% of students prioritised sales techniques and customer service. In Italy, 30% identified this domain as critical. Students across countries reported insufficient training in customer communication, complaint handling, loyalty programme design, and service delivery under pressure. This gap directly undermines graduates' readiness for frontline customer-facing roles.

Gap 5: AI and Data-Driven Decision Making (Emerging)

While current employer demand for AI competencies in gastronomy is moderate, the trajectory is clear. Italian trainers specifically recommended AI integration into the curriculum. Polish students and educators expressed strong interest in data analysis and AI applications. This gap represents an emerging priority with clear forward momentum, positioning early adopters of AI-integrated training at a significant competitive advantage.

Competency Domain	Poland	Italy	Portugal	Severity
Digital marketing / Social media	74%	40%	High	**CRITICAL**
E-commerce / Online sales	47%	40%	High	**CRITICAL**
Entrepreneurship / Business mgmt	21%	50%	High	**CRITICAL**
Sales techniques / Customer service	47%	30%	Medium-High	**SIGNIFICANT**
AI / Data analytics	Emerging	Recommended	Emerging	**MODERATE**

Table 2. Cross-National Competency Gap Assessment Matrix

4. The Innovation Framework: “Smart Gastronomy”

4.1 Innovation Concept and Rationale

The “Smart Gastronomy” pedagogical innovation is a comprehensive, evidence-based educational framework designed to transform vocational education and training in the gastronomy sector. It is not a single training course or a supplementary module; it is a systemic pedagogical intervention that redefines how gastronomy VET education prepares students for the contemporary labour market.

The innovation is structured around a unifying thematic axis: Push and Pull sales strategies enhanced by Artificial Intelligence technologies. This thematic axis was selected precisely because it integrates all five documented competency gaps into a coherent, practice-oriented learning experience. Push and Pull marketing strategies serve as the pedagogical vehicle through which students simultaneously develop competencies in digital marketing, e-commerce, entrepreneurship, customer acquisition, and AI-driven decision making.

Why Push and Pull Strategies as the Unifying Framework?

Push strategies (proactive customer outreach through AI-personalised offers, targeted promotions, loyalty programmes) and Pull strategies (attracting customers through compelling digital presence, social media engagement, demand-driven services) represent the full spectrum of modern gastronomy business operations. By mastering both approaches, students acquire precisely the competencies that employers demand and that current VET programmes fail to deliver: digital literacy, data analytics, marketing strategy, customer psychology, entrepreneurial thinking, and technology integration. The Push/Pull framework is therefore not a narrow technical topic — it is a comprehensive pedagogical architecture that addresses the complete set of identified labour market needs.

4.2 Alignment with Application Commitments

The project application defined two specific results for WP3. The following analysis demonstrates strong alignment between these declared results and the delivered innovation:

Declared Result 1: Introduction to formal education of an innovative, designed for practical integration solution enabling new skills and competences

The "Smart Gastronomy" innovation fulfils this commitment through:

- Immediate implementability: The modular architecture allows VET schools to integrate individual modules or the complete programme into existing curricula without requiring structural reorganisation. Each module functions both independently and as part of the integrated framework.
- New skills and competences: Five training modules directly address the five documented competency gaps, introducing digital marketing, e-commerce, entrepreneurship, customer acquisition techniques, and AI-powered analytics — skills entirely absent from current curricula.
- Labour market alignment: Competency outcomes are mapped to EQF Levels 4–5 and DigComp 2.2, ensuring formal recognition and transferability across EU Member States.
- Innovative methodology: The five-stage didactic model integrates AI tools as both learning content and pedagogical instrument, representing a methodological innovation in VET education.

Declared Result 2: Changing students' perception of VET education

The innovation transforms student perception through:

- Modern, technology-driven content: By introducing AI tools, real-world digital marketing platforms, and data analytics into the learning experience, students encounter gastronomy education as a cutting-edge, technology-rich discipline rather than a traditional craft-only programme.

- Practice-oriented methodology: Case-based learning using real examples from global companies (Starbucks, McDonald's, and others), business simulations, and collaborative AI-assisted projects create an engaging, industry-relevant learning environment.
- Digital-native delivery formats: Responsive to student preferences (68% prefer smartphone/tablet access, 42% prefer social media delivery), the innovation leverages digital delivery channels that match how young people naturally engage with content.
- Entrepreneurial empowerment: By equipping students with business management, financial planning, and marketing competencies, the innovation transforms their self-perception from "cooks" to "gastronomy professionals and entrepreneurs," fundamentally changing how they view the value and potential of their education.

Pilot evaluation results confirm this perceptual shift: 84% of Polish students rated the innovation as "very interesting and useful" — with zero negative evaluations. Students specifically praised the modern, practical orientation and the focus on digital skills absent from their regular curriculum. This represents a measurable and documented change in how students perceive the relevance and attractiveness of their vocational education.

5. Five-Stage Didactic Model and AI Integration

This chapter presents the pedagogical architecture underpinning the "Smart Gastronomy" innovation — a five-stage didactic model that systematically integrates AI tools into vocational learning.

5.1 Design Rationale

The didactic model was designed in direct response to the evidence collected across all three partner countries. Three converging findings shaped the architecture: (a) students across Poland, Italy, and Portugal demanded a practice-dominant approach (60–70% practical vs 30–40% theoretical), with all 11 Portuguese students unanimously requesting more kitchen simulations and real-time service exercises; (b) trainers in Italy (100%) and educators in Portugal recommended hybrid delivery combining digital platforms with hands-on laboratory activities; and (c) both student cohorts and trainers identified AI and digital tools as essential but entirely absent from current curricula.

The resulting model integrates these requirements into a five-stage learning progression that moves students from foundational awareness through to autonomous creation — ensuring that AI is not merely taught as content, but embedded as both a learning tool and a professional competency.

5.2 The Five Stages

The didactic model follows a scaffolded progression aligned with Bloom's taxonomy, adapted for vocational contexts where practical application is paramount:

Stage	Description	AI Integration	Assessment Method
1. Awareness	Prior knowledge activation: students' existing experience, digital competency baseline, and sector understanding	Diagnostic: students explore AI-powered tools to assess their own starting point	Knowledge quiz, digital skills self-assessment
2. Understanding	Structured knowledge input: theoretical foundations, market context, strategy frameworks	AI as information source: students use AI to research market data, analyse trends	Concept mapping, structured reflection
3. Application	Problem-based tasks requiring integration of theory with practice	AI as tool: students use ChatGPT, Excel with Copilot, analytics platforms to solve business problems	Case study solutions, business scenario outputs
4. Analysis	Critical evaluation: students assess AI outputs, compare alternatives, form judgements	AI as object of critique: students evaluate AI-generated recommendations against professional standards	Peer review, reflection journals, debate
5. Creation	Autonomous production: students design original solutions using AI as a professional tool	AI as co-creator: students produce marketing campaigns, menus, business plans with AI support	Portfolio assessment, group presentation, peer and teacher evaluation

Table 5.1. Five-Stage Didactic Progression with AI Integration

5.3 Critical Design Principle: AI Does Not Replace the Teacher

A key design principle — validated by 100% of Italian trainers and endorsed by Portuguese educators — is that AI functions as a pedagogical instrument that enhances the teacher's role rather than replacing it. The teacher facilitates critical evaluation of AI outputs, guides students through ethical considerations of data use, and ensures that AI-generated solutions are tested against professional culinary standards. This principle directly responds to the concern raised by educators across all three countries that technology integration must be purposeful rather than superficial.

5.4 Cross-National Validation of the Model

The five-stage model was validated through the pilot evaluations conducted at ZDZ Kielce (Poland, n=19), CNIPA Puglia (Italy, n=10 students + 5 trainers), and Epralima (Portugal). Key validation data points: 84% of Polish students rated the overall approach as "very interesting and useful"; 100% of Italian trainers rated effectiveness at the maximum score (5/5), specifically praising the balance between theoretical foundations and practical application; and the Portuguese testing session endorsed the practical applicability of the framework without identifying fundamental structural issues requiring revision.

6. Module Architecture: Evidence-Based Design

Each of the five modules was designed in direct response to a documented competency gap identified through transnational research across Poland, Italy, and Portugal. This chapter maps each module to its evidence base.

6.1 Module 1: AI-Powered Consumer Behaviour Analytics

Evidence base: Students across all three countries identified limited exposure to data-driven decision making. 47% of Polish students selected e-commerce and analytics as a priority; Italian trainers specifically recommended deepening data analysis content; Portuguese students reported that the curriculum does not cover how restaurants use data in the post-COVID environment.

Module scope: Consumer behaviour analysis using AI — clustering, association analysis, sentiment analysis, funnel analysis, cohort analysis, customer lifetime value, anomaly detection. Students work with anonymised order data, identify consumption patterns, and develop personalised recommendations using AI tools.

Competency outcome: Ability to apply AI analytics to business problems and propose customer-centred solutions. Mapped to DigComp 2.2 Area 1 (Information and Data Literacy) and EQF Level 4–5.

Pilot validation: 90% of Italian students rated this content as useful for professional growth. Polish students praised the modern, practical orientation. Portuguese participants endorsed the practical applicability during the 3-hour testing session.

6.2 Module 2: Push and Pull Marketing Strategy Development

Evidence base: 74% of Polish students (highest single priority) and 40% of Italian students identified digital marketing as critical. Portuguese teachers — particularly António Campos (ICT, 15+ years) — highlighted digital tool integration as essential across the entire curriculum. Teachers across all three countries recommended social media marketing as a core competency.

Module scope: Push strategies (AI-personalised email campaigns, targeted promotions via Mailchimp/HubSpot, loyalty programmes, CRM systems) and Pull strategies (social media content creation, blog/video marketing, demand forecasting, review management). Students design AI-enhanced promotional campaigns for gastronomy businesses, integrating both mechanisms.

Competency outcome: Capacity to integrate creativity with data analysis in marketing design. Mapped to DigComp 2.2 Area 3 (Digital Content Creation) and EQF Level 4–5.

Pilot validation: Module priority confirmed: 73.7% of Polish students selected online promotion as top priority in evaluation — virtually identical to the 74% recorded during original research. 40% of Italian evaluation students confirmed this priority. 100% of Italian trainers endorsed practical exercises.

6.3 Module 3: Entrepreneurship and Business Management

Evidence base: 50% of Italian students (highest single priority in Italy) identified "How to start a business" as their top need. All 11 Portuguese students unanimously agreed the programme does not prepare them for entrepreneurship. Students with family restaurant businesses in Portugal reported firsthand knowledge of the skills gap. Portuguese teachers recommended comprehensive financial management modules.

Module scope: Business planning, cost analysis, financial management, pricing strategies, supplier negotiations, legal frameworks for food businesses. AI-assisted exercises in menu cost optimisation and revenue forecasting.

Competency outcome: Ability to develop viable business plans and manage financial operations for gastronomy enterprises. EQF Level 5 (autonomous decision-making).

Pilot validation: 80% of Italian trainers rated entrepreneurship as the most applicable module. 50% of Italian evaluation students confirmed it as their top priority — identical to original research.

6.4 Module 4: Sales Techniques and Customer Acquisition

Evidence base: 47% of Polish students selected sales techniques as a priority. 30% of Italian students identified this area. Portuguese students specifically reported that customer service training is a major gap — "interacting with customers and managing complaints is crucial but barely covered." Teachers across all countries recommended realistic restaurant simulations including time-pressured scenarios.

Module scope: Customer relationship management, loyalty programme design, communication techniques, complaint handling, AI-powered chatbots for customer interaction simulation, CRM system operation. Role-playing exercises recreating restaurant scenarios with different staff roles.

Competency outcome: Professional customer interaction competency combining interpersonal skills with digital CRM tools. EQF Level 4–5.

Pilot validation: 47.4% of Polish evaluation students selected this module. Italian trainers proposed role-playing scenarios and multimedia integration as engagement strategies.

6.5 Module 5: E-Commerce and Digital Sales

Evidence base: 47% of Polish students and 40% of Italian students selected e-commerce as a priority. Portuguese students reported zero exposure to food delivery platforms or online ordering systems. The market analysis documented rapid growth in online food ordering across all three countries.

Module scope: Online ordering system management, food delivery platform operations (Glovo, UberEats, Wolt), digital payment solutions, online menu design and optimisation, AI-driven sales forecasting.

Competency outcome: Operational competency in digital sales channels for the gastronomy sector. DigComp 2.2 Area 5 (Problem Solving).

Pilot validation: 47.4% of Polish evaluation students selected e-commerce. 80% of Italian trainers rated it as highly applicable. Portuguese session endorsed practical relevance.

7. Competency Development Framework

The "Smart Gastronomy" innovation develops four categories of competencies, each grounded in documented needs from the transnational research. This taxonomy ensures comprehensive coverage of both technical and transversal skills.

7.1 Professional Competencies

These are the sector-specific technical skills directly addressing the five documented gaps: digital transformation competency in gastronomy (DigComp 2.2-aligned), AI-powered customer behaviour analysis, Push and Pull marketing strategy design with AI tools, business planning and financial management for gastronomy enterprises, and e-commerce platform operations.

Cross-national evidence: The competency gap hierarchy was consistent across all three countries. Digital marketing ranked highest in Poland (74%), entrepreneurship in Italy (50%), and all five domains were rated "High" priority in Portugal. This convergence across distinct national VET traditions confirms that the gaps are systemic rather than country-specific.

7.2 Creative Competencies

Innovation and creative thinking skills developed through AI-assisted design tasks: developing innovative culinary concepts using AI-generated inspiration (fusion cuisine, molecular gastronomy), visual food design using AI image generators for presentation planning, and creative marketing campaign development integrating data analysis with artistic vision.

Cross-national evidence: Italian trainers (100%) specifically endorsed stimulation of active learning through creative exercises. Portuguese teachers recommended project-based learning where students create business plans involving market research and creative strategy development.

7.3 Interpersonal Competencies

Transversal skills developed through collaborative and simulation-based learning: teamwork through AI-assisted group projects, critical thinking — students evaluate AI recommendations against professional standards rather than accepting them uncritically, customer communication through AI chatbot interaction simulation, and cross-cultural communication competency.

Cross-national evidence: All 11 Portuguese students identified communication, conflict resolution, leadership, time management, and problem-solving as essential but underdeveloped. Portuguese teachers emphasised cross-cultural communication, emotional intelligence, resilience, and adaptability. Italian trainers proposed role-playing and group work with structured mentoring.

7.4 Meta-Competencies

Higher-order adaptive skills that ensure long-term professional relevance: adaptability — capacity for rapid response to changing customer needs using AI-powered insights, lifelong learning orientation — using AI as a tool for continuous self-directed professional development, and intercultural competency — AI supports exploration of culinary traditions across countries, enabling students to operate in diverse European markets.

7.5 Alignment with European Frameworks

All competency outcomes are mapped to two European reference frameworks ensuring cross-border recognition and transferability:

EQF Levels 4–5: Corresponding to upper-secondary and post-secondary VET qualifications where students demonstrate autonomy, responsibility, and applied problem-solving in professional contexts.

DigComp 2.2: Covering all five digital competence areas — information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving — ensuring graduates meet the European standard for digital citizenship.

Competency Category	Key Skills	Assessment Method	Framework Alignment
Professional	AI analytics, Push/Pull strategy, business planning, e-commerce	Case study portfolio, business plan project	EQF 4–5, DigComp 2.2 Areas 1, 3, 5
Creative	Innovative concept development, visual design, campaign creation	Group campaign presentation, creative portfolio	EQF 5, DigComp 2.2 Area 3
Interpersonal	Teamwork, critical evaluation of AI, customer communication	Role-play assessment, peer review, reflection journal	EQF 4–5, Key Competences Framework
Meta	Adaptability, lifelong learning, intercultural competency	Self-assessment, cross-cultural case analysis	EQF 5, DigComp 2.2 Area 5

Table 7.1. Competency Development Matrix

8. Teacher Support and Implementation Framework

This chapter provides the operational framework for institutional adoption, addressing the evaluator recommendation for a concrete implementation pathway.

8.1 Pedagogical Competencies Required

Teachers implementing the "Smart Gastronomy" innovation should possess or develop the following competencies, as identified through the cross-national educator research:

AI literacy: Understanding of AI technologies and their marketing applications — not at developer level, but at informed-user level. Teachers must be able to demonstrate AI tools, guide students through critical evaluation of AI outputs, and manage ethical discussions around data use.

Learner autonomy facilitation: Ability to support student-led exploration rather than delivering purely lecture-based instruction. The five-stage model requires teachers to transition from knowledge transmitter to learning facilitator, particularly in Stages 3–5.

Theory-practice integration: Competence in linking theoretical concepts to practical applications using active, student-centred methods — as recommended by Portuguese teachers who proposed project-based and problem-based learning approaches.

Digital ethics awareness: Sensitivity to ethical considerations in AI and data management, including privacy, algorithmic bias, and responsible use of customer data.

8.2 Teaching Methods

The innovation prescribes a blended methodology validated by trainer feedback across all three countries:

Case-based learning: Students work with real-world business scenarios adapted from global companies. 100% of Italian trainers and Portuguese teachers endorsed this approach. Nine case studies are provided in the innovation.

Problem-based learning: Students confront business challenges (declining customer loyalty, ineffective promotions) and solve them using AI-supported strategies. Portuguese teachers specifically advocated for culinary challenges with constraints.

Simulation and role-play: AI tools simulate customer interactions, enabling students to test recommendations in a safe educational environment. Italian trainers proposed role-playing scenarios recreating real restaurant situations.

Collaborative projects: Group work with AI as a "consultant" — students collaborate while AI generates options, cost calculations, and presentation materials. Italian trainers unanimously recommended group work with structured mentoring.

Reflective practice: After each practical session, students reflect on their decisions by "communicating" with AI about their choices — why they selected a particular cooking method, how the process could be optimised, what contemporary trends to consider.

8.3 Implementation Matrix

The following matrix provides a concrete implementation pathway for VET institutions, addressing the need for an operational framework showing how the innovation integrates into existing curricula:

Module	Hours	Learning Outcomes	Key Activities	Assessment
M1: Consumer Analytics	8–12	Apply AI analytics to identify customer patterns; interpret data for business decisions	Case: McDonald's/Starbucks AI; Exercise: analyse anonymised order data	Data analysis report with personalised recommendations
M2: Push & Pull Strategy	8–12	Design integrated Push/Pull campaigns using AI tools; evaluate effectiveness	Design AI-enhanced campaign for a gastronomy business; analyse real social media data	Campaign portfolio with strategy rationale
M3: Entrepreneurship	10–14	Develop viable business plan; manage costs and pricing; navigate legal requirements	Business plan project with AI-assisted financial modelling; supplier negotiation simulation	Complete business plan with financial projections

Module	Hours	Learning Outcomes	Key Activities	Assessment
M4: Sales & Customer Service	8–12	Apply CRM techniques; handle complaints; design loyalty programmes	Role-play: restaurant scenarios with time pressure; AI chatbot customer simulation	Role-play assessment and reflection journal
M5: E-Commerce	8–12	Manage online ordering systems; operate delivery platforms; optimise digital sales	Set up mock online ordering system; analyse delivery platform metrics	Platform setup report with optimisation plan

Table 8.1. Implementation Matrix — Module Integration Guide

Total programme duration: 42–62 contact hours. Institutions may adopt individual modules (minimum 8 hours per module) or the complete programme. The modular structure explicitly supports flexible integration — a design principle validated by 100% of Italian trainers who praised the ability to select modules based on class needs.

8.4 Delivery Format Recommendations

The research established clear delivery preferences across all three countries. The recommended delivery approach is a blended model combining:

Format	Poland	Italy	Portugal
Smartphone / Tablet	68% prefer	50% prefer	Preferred
Educational videos	42% selected	100% trainers recommend	Highly requested
Hands-on practical	Universal demand	80% request	Universal (60/40 ratio)

Format	Poland	Italy	Portugal
E-learning platform	Students request	100% trainers endorse	Teachers recommend
Printed materials	26% selected	30% prefer PDF	Secondary

Table 8.2. Cross-National Delivery Format Preferences

9. Cross-National Evidence Synthesis

This chapter synthesises the evidence from all three partner countries, demonstrating that the innovation addresses needs that are systemic across European gastronomy VET rather than country-specific.

9.1 Convergence of Findings

The most significant finding of the transnational research is the notable convergence of competency gaps across three countries representing distinct VET traditions, labour market conditions, and culinary cultures:

Poland (ZDZ Kielce / SIPH): Strongest demand for digital marketing (74%) and e-commerce (47%). Research co-conducted by SIPH as employer-representative chamber, ensuring labour market perspective. 19 students evaluated the pilot with 84% rating it "very interesting and useful."

Italy (CNIPA Puglia): Strongest demand for entrepreneurship (50%). 10 students and 5 trainers conducted the most detailed evaluation. 100% trainer effectiveness rating (5/5). Module priorities in evaluation were identical to original research — a notable stability indicator.

Portugal (Epralima): Broadest qualitative evidence base (11 students, 10 teachers in focus groups). Strongest emphasis on soft skills and customer interaction. All students unanimously identified entrepreneurship and digital skills gaps. 3-hour validation session confirmed practical applicability.

9.2 Country-Specific Variations

While the core gaps converge, meaningful variations inform localisation:

Dimension	Variation	Implication for Implementation
Research methodology	Poland: mixed (FGI + survey); Italy: mixed (FGI + structured evaluation); Portugal: purely qualitative	Polish/Italian data yields percentages; Portuguese data yields qualitative descriptors. Both are valid but not directly comparable numerically.
Priority emphasis	Poland: digital marketing first; Italy: entrepreneurship first; Portugal: all gaps rated equally high	Module sequencing may vary by country. Italy may start with M3; Poland with M2/M4.
Soft skills demand	Portugal most vocal on interpersonal competencies; Italy focused on pedagogical methods; Poland focused on content topics	Portuguese implementation should emphasise Stages 4–5 (Analysis, Creation) with stronger reflection component.
Industry structure	Italy: strong regional food identity (Puglia); Portugal: tourism-driven gastronomy; Poland: growing HoReCa market	Case studies and examples should reference local context alongside global examples.

Table 9.1. Cross-National Variation Analysis

9.3 Aggregate Impact Assessment

Across all three pilot sites, the aggregate evaluation data demonstrates:

Metric	Poland	Italy	Portugal
Student sample (evaluation)	n=19	n=10	Group session
Positive rating	84.2%	90%	Positive
Negative rating	0%	0%	0 issues
Trainer effectiveness	N/A	100% (5/5)	Endorsed
Priority alignment vs research	Consistent	Identical	Confirmed
Fundamental revision needed	No	No	No

Table 9.2. Cross-National Pilot Evaluation Summary

The convergence of positive results across three distinct national contexts — with zero negative evaluations at any site — provides evidence that the innovation addresses genuine, cross-border competency gaps rather than localised needs. This cross-national validation strengthens the basis for broader European transferability.

9.4 Implications for Broader Adoption

The evidence supports three key implications for scaling the innovation beyond the consortium:

1. The competency gap is systemic: The same five gaps appear across countries with different VET systems (dual system in Poland, regional system in Italy, centralised system in Portugal), confirming that the problem is structural rather than local.

2. The modular architecture enables localisation: Institutions can adopt modules selectively based on national priorities (e.g., entrepreneurship-first in Italy, digital marketing-first in Poland) while maintaining the coherent pedagogical framework.

3. Teacher endorsement is critical for adoption: The 100% maximum-score trainer rating in Italy, combined with the positive educator reception across all sites, suggests that the innovation has a realistic pathway to institutional adoption — teachers are not merely tolerant of the material but enthusiastically supportive.

10. Integrated Case Studies and Practical Exercises

The "Smart Gastronomy" innovation incorporates a structured portfolio of case studies and practical exercises designed to operationalise the theoretical framework through authentic, industry-relevant learning experiences. Each case study was developed based on real-world business practices and validated through the pilot evaluation process.

10.1 Case Study Portfolio Structure

The innovation includes nine structured case studies, each combining analytical tasks with AI tool application. Case studies are mapped to specific modules and competency outcomes, ensuring systematic coverage of all five documented competency gaps:

Case	Business Scenario	AI Application	Module Link
1	Customer behaviour analysis for a city-centre restaurant	AI clustering, segmentation analytics	Module 1: Marketing
2	Business plan development for a gastronomy start-up	AI-assisted financial modelling, market research	Module 2: Entrepreneurship
3	Push notification strategy for a mobile food app	AI personalisation algorithms, behavioural analytics	Module 3: Sales Techniques

Case	Business Scenario	AI Application	Module Link
4	Social media campaign for a new restaurant opening	AI content generation, campaign performance analysis	Module 4: Online Promotion
5	E-commerce platform setup for delivery services	AI-driven demand forecasting, pricing optimisation	Module 5: E-Commerce
6	Customer segmentation for an office-area café	Pivot tables, AI-powered segment analysis	Module 1 + 3: Cross-module
7	Loyalty programme design using AI analytics	Customer lifetime value modelling, churn prediction	Module 3 + 5: Cross-module
8	Menu optimisation using AI recommendations	Nutritional analysis, cost calculation, pricing AI	Module 2 + 1: Cross-module
9	Integrated marketing strategy for seasonal promotions	Sentiment analysis, demand prediction, A/B testing	All modules: Capstone

Table 7. Case Study Portfolio — Nine Integrated Learning Scenarios

10.2 Case Study Design Principles

Each case study follows a structured four-phase design that mirrors the innovation's five-stage didactic model:

1.Scenario Presentation: Students receive an authentic business scenario with relevant data (customer records, sales figures, market context). Scenarios are drawn from real gastronomy business situations documented during the research phase.

1.AI-Assisted Analysis: Students apply specified AI tools to analyse the provided data, generate insights, and develop recommendations. Tool selection is aligned with the competency objectives of the relevant module.

2.Strategy Development: Working individually or in teams, students design comprehensive business solutions that integrate AI-generated insights with professional judgement and creative thinking.

3.Peer Review and Reflection: Solutions are presented, discussed, and evaluated through structured peer assessment, developing both communication skills and the capacity for critical evaluation of AI-supported outputs.

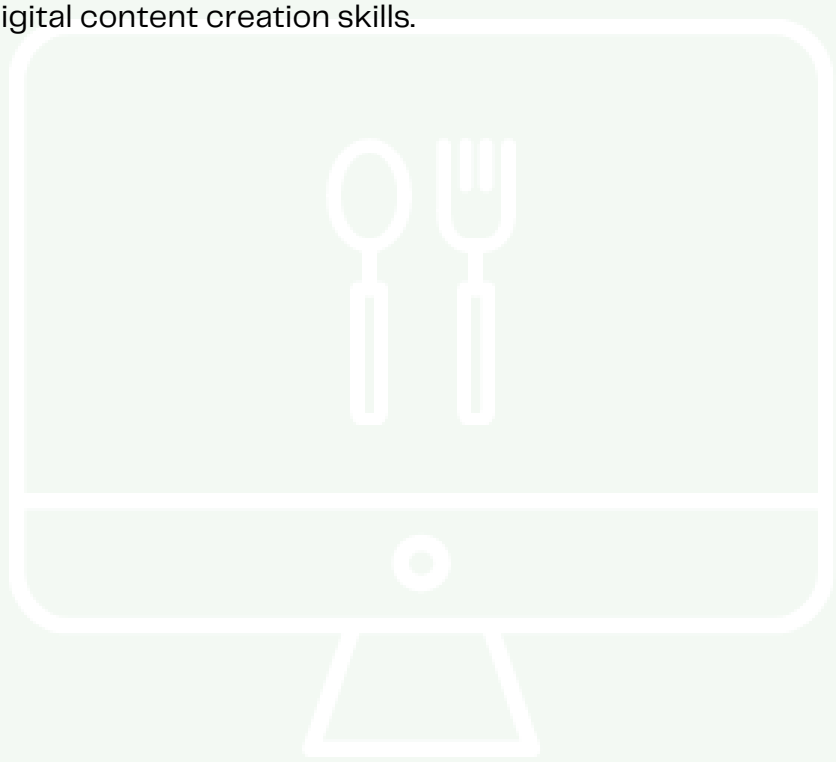
Pilot evaluation feedback confirmed the effectiveness of this case-based approach: students across both evaluation sites specifically praised the authentic case studies and business scenarios as among the innovation's strongest features. Italian trainers broadly recommended expanding practical exercises with external professional involvement.

10.3 Practical Exercise Examples

Beyond structured case studies, the innovation includes a comprehensive portfolio of practical exercises that reinforce specific competencies:

- Customer data analysis exercises: Students work with anonymised customer datasets using Excel with AI Copilot to identify behaviour patterns, create customer profiles, and generate personalised service recommendations.
- Marketing campaign design workshops: Teams design complete digital marketing campaigns for gastronomy businesses, using AI tools for content generation, audience targeting, and performance prediction.
- Business plan simulations: Students develop complete business plans for gastronomy start-ups, using AI for financial modelling, market analysis, and competitive positioning.
- AI chatbot customer service simulations: Students interact with AI-simulated customers to practice service techniques, complaint handling, and upselling strategies in a risk-free environment.

- Social media content creation labs: Practical sessions where students create, schedule, and analyse social media content for real or simulated gastronomy brands, developing digital content creation skills.



The GastroNet consortium has delivered a pedagogical innovation that is evidence-based, stakeholder-validated, practically implementable, and supported by positive pilot evidence. The "Smart Gastronomy" framework is showing potential for broader adoption across European VET systems, offering a model for how AI-enhanced pedagogy can revitalise vocational education to meet the demands of the contemporary labour market.

Co-funded by
the European Union

GastroNet

EDUCATION
AND TRAINING

www gastronet-edu.eu