Chapter 6
Education and Innovation in Gastronomy: A Case Study of Culinary Art School in Tijuana, Mexico

Jorge Francisco Sánchez-Jofras and Ingrid Kuri-Alonso

Abstract The purpose of this study is to explore the content of innovative culinary competence, through the educational model of Culinary Art School, which is based on learning-by-doing practices. A qualitative research strategy was implemented, including in-depth interviews with school directors and faculty. This chapter examines how the school has provided a space for the development of innovative culinary competence, demanding high standards from students, building a close relationship with industry professionals, and providing learning opportunities in real work scenarios. Taking into account the relationship between creativity and innovation, this gastronomy school takes advantage of its location in a very dynamic region in the border state of Baja California, Mexico. The educational model analyzed is based on hands-on experience, and at the same time culinary competence is acquired in real work scenarios. Considering the creative aspect of this industry, there is always an element of knowledge grounded in the social and cultural environment. The study was conducted in one particular school and was based on the curriculum and visions of directors and faculty. Based on an analysis of categories, the education model addresses key competencies in the culinary profession such as the development of culinary skills, creativity in culinary education, and the school as a space for the development of culinary innovation.

Keywords Border · Chef · Competence · Creative process · Creativity · Culinary arts · Educational model · gastronomy · Innovation · Learning-by-doing · Mexico · Networking · Professional practices · Region · Traditional techniques · Tendencies · Tijuana · Training · Vocational education · Workplace

J. F. Sánchez-Jofras (✉) · I. Kuri-Alonso
College of Social Science and Humanities, CETYS Universidad, Tijuana, Mexico
e-mail: jorgefrancisco.sanchez@cetys.mx; ingrid.kuir@cetys.mx

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6.1 Learning-by-Doing: The Hands-on Method

Schools are undergoing radical changes. Teaching-learning models based on knowledge through traditional teaching are giving way to experiential learning, which should be relevant and practical, and not just theoretical and passive in its approach. According to Horng and Hu (2009), a discussion of education and innovation in schools involves two approaches. They argue that, at the most abstract level, it is possible to teach students through problem-solving or brainstorming, but at the most concrete level, a creative discipline or art requires constant practice. This is the case with gastronomy, in which future chefs practice on-site.

Theoretical knowledge is associated with intellectual skills, as opposed to practical skills. In this regard, Gustafsson (2004) notes that knowledge derived from action is known as pragmatism. John Dewey (1916) represents this philosophy, and coined the expression *learning-by-doing*.

In the mid-1990s, Schank (1995) claimed that practical learning was not the mainstream teaching method for training due to the possibility of mistakes, fear of failure, the lack of equipment to realistically implement practical activities in a classroom environment, and naturally, educators and psychologists had not really understood why learning-by-doing works. However, the same author states that learning-by-doing works because it teaches implicitly instead of explicitly. Things learned implicitly should only be experienced in the right way at the right time. To turn classrooms into practical learning experiences, students should be placed in situations relevant to their interests. In academic training in culinary arts, students require practical and cognitive skills, meaning that tacit and scientific knowledge should be integrated into practice.

In line with Bound and Lin (2013), competence development in the gastronomy industry requires continuous learning and is expressed in a dynamic process of improvement and refinement. Competence is not an independent attribute existing in isolation; rather, it is the product of collective learning within educational and working environments. A comprehensive vision of the reality of work considers the importance of situated knowledge, both practical and technological, and interaction between trainees and experts in professional activities. For these reasons, vocational education—as found in the gastronomy industry—requires direct contact with the workplace, or better still, a complementary relationship between the classroom and the kitchen.

It is known that apprentice chefs train in classrooms before going out into restaurants. However, competence is not the result of a mechanical process that adds together school and work activities, but rather an integration of knowledge, skills, and attitudes constructed in learning environments that enact situations from the workplace. In other words, the development of culinary competence requires enacting real-life work scenarios in their full social, economic, and cultural complexity. Through an enacted workplace pedagogy, it is possible to integrate theory into practice, both in an academic setting and in the workplace.

According to Chau and Cheung (2017), active learning in professions in the hospitality industry supports educational components associated with the pursuit of knowledge and enhancement of skills. At the same time, this approach fosters students' interest and participation in learning processes.

From a behavior perspective, the relationships between the cognitive and procedural facets of competence are complementary. Knowledge acquisition implies revising the level of achievement, considering what the student already knows, in accordance with the precepts established by Ausubel (1968) in educational psychology. At this level, Chau and Cheung (2017) suggest designing cognitive experiences or situations aimed at exploring and experiencing the real world. Together, they recommend enhancing learning processes with co-curricular experiences that develop skills, for example by designing menus or providing customer service. These activities integrate both components of education and at the same time create opportunities to assess learning outcomes.

6.2 The Creative Process and Education

Execution in the kitchen is regarded as the result of a creative process that begins in the professional's mind before creation and draws from prior knowledge, processes and subprocesses, as well as interaction between these thoughts and the sociocultural context. In this sense, the educational process in creativity stresses both theoretical and practical teaching, with a creative, open-minded teacher who implements practices and procedures that support students' creative expressions in the classroom, with students taking the intellectual risk of expressing their creativity (Horng & Hu, 2009).

Horng and Hu (2008) point out that in the French culinary tradition, creativity meant refining classic or traditional culinary arts. Today, continuous learning of culinary traditions and the desire to share and listen to new ideas offers an academic balance between tradition and new trends.

A creative culinary process involves working on ideas, incubating and developing them. In the words of Csíkszentmihályi, creativity is "any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one" (1997, p. 28). In this sense, Stierand, Dörfler, and MacBryde (2009) agree that creativity means the creation of a new idea, but this should be distinguished from Creativity (with a capital "C"), which deals with the realization of a new value, or in other words, the successful innovation of the idea.

For Ottenbacher and Harrington (2007), the creative process entails learning culinary practices that can benefit flexible thinking and creativity in general.

Various authors mention that the nature of the creative process, as a sequence of ideas that materialize as products, has been studied since the last century. One of the first proposals was put forward in 1926 by Wallas, who posited four phases in the creative process: preparation, incubation, illumination, and verification. By 1957, Rhodes had laid out the so-called 4 P's creativity model: Person, Process, Product,

and Press (the physical and social environment). Around the 1990s, Finke, Ward, and Smith present the Geneplore model, an amalgam of the words *generate* and *explore*, as an interactive model that alternates between two processes, known as generative and exploratory (Sainz de Vicuña, 2006; Horng & Hu, 2008, 2009).

6.3 Innovation in Culinary Arts

Innovation is an intellectual dimension that offers many benefits, the greatest of which is becoming more competitive (Ottenbacher & Gnoth, 2005). Indeed, there is ever-increasing competition in the hospitality and gastronomy industry. Chefs working in the industry must be able to remain innovative in their creations to attract new consumers and respond to the growing demand for culinary experiences. More than ever before, today diners demand a constantly changing market offering new culinary creations, which has resulted in a highly competitive environment in which chefs must be innovative and creative to achieve success both in the short and long terms. Such is the challenge of culinary education.

Culinary innovation is considered a multidimensional reality; in other words, its meaning approximates the complexity of fundamental actions and interactions that construct and explore the field of the gastronomy industry, meaning that it ties food in with intellectual discourse and broadens the act of cooking to include theoretical codes, categories, and practices (Stierand & Lynch, 2008).

Harrington and Ottenbacher (2013) add that innovation is a continuous process of creative destruction, and therefore is applicable to both new products and services. In this discussion, Stierand and Lynch (2008) revisit work by Rehn (2006), who adds to the debate on innovation of the manipulation of history, as when ways of thinking change, it is possible to create new forms of culinary innovation. In the same spirit, the authors include new technologies as an aspect that has an impact on innovation, as they affect both the learning and practice of culinary arts.

In line with Stierand, Dörfler, and MacBryde (2009), the innovation process can be expressed through two heuristic scenarios. On the one hand, there is the creative problem-solving process, in which students realign knowledge to find a solution and validate their idea with a network of experts as an intersubjective testing mechanism, and on the other hand, they pitch an idea that seeks to prove its worth among experts, who act as co-creators upon validating and promoting it.

Consequently, Stierand and Lynch (2008) propose five dimensions raised by the phenomenon of innovation: artistic aspiration; learning and networking; adoption and diffusion; continuous and discontinuous conditions; and lastly, perceived newness and change. Meanwhile, Ottenbacher and Harrington (2007) propose an innovation development process from the perspective of Michelin-starred chefs, following four phases: innovation formulation, innovation implementation, evaluation and control of the innovation, and innovation introduction.

This study draws from these dimensions to explore the academic proposal by Culinary Art School (CAS) based on the learning-by-doing method and determine

the educational model's impact on the development of culinary competence, creativity, and innovation. At the same time, learning processes were considered holistically, specifically through a pedagogy enacting the realities of the workplace as faithfully as possible.

6.4 Methodology

As an exploratory study, the research plan was to conduct interviews with directors and scholars at CAS in Tijuana, Baja California, Mexico, to better understand the underlying academic factors and dimensions that describe practices aimed at developing innovation and creativity processes in students of the bachelor's degree in culinary arts. We decided that the most appropriate methodology would be to collect qualitative data through semi-structured interviews with (a) the director of the school, chef Javier González; (b) the academic director, chef Ana Laura Martínez; and (c) teacher, chef Ofelia Núñez. In the interviews, we sought to explore the complexity of innovation and creativity development through the learning-by-doing method.

The qualitative method enables researchers to ask additional questions to gain a deeper insight into complex problems, thus generating new knowledge. Qualitative research is appropriate when the research problem is exploratory and intuitive, and focuses on social processes rather than social structures. As a result, in May 2018, semi-structured interviews were conducted in person with key informants. These interviews lasted between 30 and 120 min each.

To research teaching, this study took the phenomenological approach to in-depth learning, defined by scholars of the Scandinavian tradition like Säljö, Marton, and Booth, and summed up by Ortega (2007), as a readiness to recover the essence of learning situations through a clear and holistic delineation of the phenomenon, recording representations of the subject of the study while paying close attention to its details and characteristics. As a representation of the world of education, phenomenography is based on the reconstruction of sensory experience by recording words and images, with a special focus on education.

Phenomenography was used to analyze data and describe concepts used in practice by the educational model at CAS in Tijuana. The analysis categories were derived from the literature review described in the first part of this paper. Based on these categories, an analysis was performed by transcribing the interviews at length and the case was described qualitatively. To ensure credibility, participants offered additional information on the school and biographical sketches, which are important for triangulation.

The interviews were conducted on the CAS premises, located at Paseo del Río 7126, 3era. Etapa Zona Río, Tijuana, Baja California, Mexico. CAS is the first school specializing in culinary arts in northwestern Mexico. It began operations in 2003 in Tijuana, a city on the border with the United States of America and near the wine-growing region of Ensenada, where over 90% of Mexican wine is produced. Its teaching system is based on the modular specialized immersion system, which

supports the development of skills, abilities, habits, and organization in students through a high-performance teaching process based on the learning-by-doing educational model, with 70% practical content and 30% theory (Culinary Art School [CAS], 2016).

The analysis began during the interviews themselves and continued during the transcription and transcript analysis to code and identify emerging topics in the discourse. A dialogue was encouraged between actors of the education process and researchers, and the transcript made it possible to uncover the meaning of words and understand them in light of the literature review.

The semi-structured interview facilitated the reconstruction of the teaching-learning process throughout the bachelor's degree program in culinary arts. This technique enabled us to monitor the learning processes of future chefs and explore key points in time, particularly practical subjects and internships. Teachers' narratives enabled an understanding of the educational processes by which culinary competence is developed through the learning-by-doing method, and at the same time, made it possible to explore how the school supports innovation and creativity processes in students. On the basis of this information, the educational model used at CAS was analyzed.

6.5 Regional Context: Baja California

Professional cuisine in Baja California is rooted in the early experiences of casinos, restaurants, and bars set up on Mexico's northern border during the enforcement of the National Prohibition Act. Between 1920 and 1933, the production, sale, and transportation of alcohol was prohibited in the United States of America. This led to the creation of gambling establishments in cities like Tijuana, Mexico, and from that point the city became an entertainment destination for international tourists, who demanded quality experiences in line with the economic growth experienced by the neighboring state of California. In this regard, chef Javier González (2018) notes the influence of French cuisine in the lavish Casino de Agua Caliente, with regional ingredientes like lobsters and oysters.

During the years of the free zone, from 1933 to 1991—with the occasional hiatus—European imports of watches, jewelry, and fashion items continued to attract international tourists into Baja California. At the same time, cross-border workers, who enjoyed the economic advantages of being located on the border, raised awareness of the culinary traditions of the region, especially those of Mexican origin. Also noteworthy are the restaurants that sprang up in Tijuana at that time to offer international cuisine, such as Reno and Boccaccio's, in addition to nightclubs and bullrings. Chef Ana Laura Martínez (2018) remarks that other culinary traditions present in the region include Mediterranean and Asian cuisine, in particular Chinese.

This movement by chefs is recent but has been recorded in the culinary history of the state, which has taken advantage of the region's assets, the variety of fresh

seafood and produce like baby vegetables, which are exported. Most of the chefs who supported this movement were trained abroad, and others revived family traditions and the culinary profession. This occupation, along with related services, is a substantial source of employment in the state. Experts and specialists in food and drink production have come hand in hand with this development. The clearest example of this is the regional wine industry, in Valle de Guadalupe in the municipality of Ensenada, which is the largest in the country in terms of quality and production. These factors led to the birth of the Baja Med culinary project. As Millán (2017, p. 283) points out, "Understanding the ingredients produced in the region and how to work with them was what defined this movement and ensured all chefs involved benefitted from the brand that is Baja California cuisine."

6.6 Results and Discussion

This section presents some insights from key informants and their portrayal of culinary and educational facilities. Some comments have been quoted verbatim and others have been paraphrased to provide support to arguments about how, through the CAS educational model, they develop innovation and creativity processes, understood as complex sociocultural phenomena rather than processes with a flat, linear structure. The discussion is structured around categories: the CAS academic model; the development of culinary competence; creativity in culinary education; and the school as a space for the development of innovation in gastronomy.

6.6.1 The Culinary Art School Academic Model

The study program for the bachelor's degree in culinary arts at CAS runs for nine terms, meaning it is completed in a little over 3 years. Most classes focus on practical aspects and are structured based on the learning-by-doing model, which implies a willingness to learn via a hands-on approach in courses split into 30% theory and 70% practical classes, providing a more realistic setting.

The curriculum includes eight fields of knowledge, namely economic and administrative; service and enology; cuisine; pâtisserie; languages; applied sciences; humanities; and internships.

Early terms focus on developing culinary competence at a basic level with basic cooking and pâtisserie techniques, administration, hospitality, hygiene, communication, and professional demeanor. This prepares students for their fieldwork and first real experiences in a kitchen.

According to Tyson (2016), vocational education requires genuine training situations alongside a well-organized curriculum.

On that basis, chef Ofelia Núñez reports that:

> Theoretical subjects encompass several disciplines; the economic and administrative aspect is fundamental; the subjects are geared toward culinary mathematics, calculating quotes for events, banquets, expenses… finances are focused on projects for cooks, accounting is taught with a focus on restaurants, which puts it into a real-life scenario. All cases are practical and industry-focused (Núñez, 2018).

This explains how students experience their first hands-on practice during theoretical training in the bachelor's degree program.

The CAS study program is based on active learning in modules that alternate theory and practice. The learning-by-doing method is key for the development of culinary competence. To that end, the school has laboratory practice areas for different cooking and baking methods, and food preparation, table dressing, and service areas. At the same time, the school maintains ties with food producers and restaurants, with the aim of supporting learning in real situations right from the earliest modules and paving the way for students' professional internships.

The theoretical and practical focus of the CAS educational model is realized through classroom sessions and workshops that last for periods of 2, 3, or 5 weeks at most, and students alternate between the two. A third dimension is provided in that students must complete 9–12 weeks of internships: the first period in Mexico, the second at an international level, and the third is a professional internship strictly speaking, in Mexico or abroad, and varies depending on the student's interests and desired level of specialization. In all cases, internships are evaluated like any other subject and play a fundamental role in strengthening skills acquired in the school, which are put into practice in real-life settings. Of the 200–220 students enrolled at CAS, about 110 are currently in an internship (CAS, 2018a). In the interview Núñez (2018) stated that "from May to August most students are away".

Students have the opportunity to show their work to their peers and professional cooks both during their internships and in competitions and events organized by the school, which students participate in depending on their level of expertise. During the final semesters, the aim is for groups of students to serve a full menu to the school community and expert guests. This module has been shaded, along with the internships, in Table 6.1.

Lastly, it should be noted that the school also encourages activities supporting the less advantaged. As far as values are concerned, "Social responsibility means sharing my work with the community. For example, during the 15 sessions of the baking module, the product is tasted, reviewed, corrected, adapted, and the students take whatever is produced to communities in need, such as community breakfast halls, or wherever the students themselves suggest. This seeks to raise students' awareness and share their work" (Núñez, 2018).

6.6.2 Developing Culinary Competence

The development of culinary competence means integrating a range of knowledge, skills, and attitudes associated with culinary creation. The curriculum (Table 6.1) shows fields of knowledge and procedures associated with the culinary profession.

Table 6.1 Curriculum for the term-based bachelor's degree in culinary arts

Term/fields of knowledge	**First**	**Second**	**Third**	**Fourth**	**Fifth**
1.1. Economic and administrative	Administration in culinary arts	Accounting		Costs and budgeting	
	Culinary mathematics				
2. Service and enology	Hospitality			Banquets and events	Enology
3. Cuisine	ABCs of cuisine	Culinary techniques	Meats	Old World cuisine	Mediterranean cuisine
4. Pâtisserie		ABCs of pâtisserie		Baking	Confectionery, chocolate-making and dessert and pastry cooking
5. Languages		Culinary French			
1.6. Applied sciences	Food hygiene			Principles of nutrition	Healthy eating
	Risk prevention			Food chemistry	
7. Humanities	Communication	Research methodology			
8. Internships		Professional demeanor	National internship		
Term/fields of knowledge	**Sixth**	**Seventh**	**Eighth**	**Ninth**	
1.1.1. Economic and administrative		Procurement, marketing and sales		Business workshop	
		Human resources		Introduction to finances	
		Project diagnosis, design and assessment		Food administration	
2. Service and enology		Service management		Bartending and cocktail-making	
3. Cuisine	Fish and seafood	Culinary arts	American cuisines		
			Culinary trends		
4. Pâtisserie		Classic and contemporary cake-making		Plated desserts	
5. Languages					

(continued)

Table 6.1 (continued)

6. Applied sciences		Equipment and maintenance		Institutional production
7. Humanities			Education and training in culinary arts	Sustainable cuisine and social responsibility
8. Internships	International internship			Professional internship

Source: Culinary Art School

This section focuses on attitudinal aspects of culinary competence, which concern generic and specific skills. It is worth highlighting that in culinary education, apprentice chefs are socialized and trained in accordance with the demands of the professional workplace, both in academic settings and in specialized immersion experiences.

The enacted workplace pedagogy is facilitated by having teachers who also work in the field. For example:

"In subjects categorized as theoretical, such as service management, a specialist comes to teach the class and then goes back to his or her place of work. We don't have any permanent teachers (…) The class is evaluated using real-life scenarios, not just from a theoretical perspective, and students apply the topics they are studying" claimed Núñez (2018).

The teaching methods used at CAS to enact real-life situations include case studies, project-based learning, and problem-solving. Martínez (2018) reported that "students learn by doing, from the very first subjects, using problem-solving and developing projects."

By way of example, she mentioned that it was common to see restaurants with very small kitchens, so as to free up more space for the dining area. So "how do you cope? How much space is required to meet the demand of the restaurant? So you look at the burner capacity, the storage capacity, and sometimes you have to ask the owner for more space, even if it means sacrificing a couple of tables, because I might need a storage area, a new facility or piece of equipment, meaning that [by having these scenarios presented to you] you're stepping into the real world" (Martínez, 2018).

Another example is given in professional internships:

> There, they work in real kitchens, where they have to produce reports, identify areas for improvement and develop proposals (…) for example, I've noticed that sanitation could be improved here, so I draw up a sanitation program. In another place, there's a problem because patrons receive their food cold, so I suggest installing a heat lamp or bell. Sometimes they're simple things that people don't see due to workplace blindness, but when you bring in a new vision you can contribute a lot (Martínez, 2018).

Attitudes associated with hospitality and service are of the utmost importance in the bachelor's degree in culinary arts:

> [Attitudes] are entirely oriented toward providing table service. You're a cook but also a waiter. I'm trained to be a great cook, but also provide excellent table service. This service dignifies the profession, and is such a basic yet essential part of the dining experience… Students know that technical execution is just as important as hospitality and service (Núñez, 2018).

One of the most important skills that chefs must master is adapting to change. In the professional world, gastronomy is constantly changing, due to new trends but also changes in supplies, with seasonal produce for instance. Furthermore, it is necessary to adapt to diners' profiles, who demand new experiences and have specific needs. This means creating menus with different choices, including options for people with dietary restrictions. For example, "chocolate-making includes subspecialties, which might mean catering for those who are lactose-intolerant or preparing desserts for diabetics" (Martínez, 2018).

Generic skills include teamwork, given that gastronomy is a collective activity. Professional cuisine requires establishing relationships based on cooperation and respect. There are hierarchies in kitchens, and all the links of the service chain are constantly assessed by diners who demand quality service. In senior chef positions, leadership is key, since they must boost the team's strengths to achieve shared goals. This activity "cannot be envisaged from the perspective of one genius working alone; in gastronomy you need your coworkers, both in the kitchen and the dining area (service staff); it's teamwork" (Martínez, 2018).

6.6.3 Educate for Creativity in the Gastronomy Industry

Ottenbacher and Harrington (2007) pointed out that the creative process requires learning and practice in kitchens. CAS strives first to provide students with knowledge of basic techniques, both in international and in Mexican cuisine. At the beginning, students take subjects that teach the ABCs of cuisine, and in which students begin to familiarize themselves with, execute and practice techniques, on their own and in combinations, which do not necessarily lead to an organized menu but do provide future chefs with a basic grounding.

In this sense, CAS promotes the exploration and development of creativity in students through practice underpinned by previously acquired knowledge and skills. In this regard, Núñez (2018) states:

> We don't believe in giving imagination free rein when you don't have the building blocks to support it. In cuisine, cake-making and baking, we don't visualize the creative process from the beginning; we visualize it and put it into practice halfway through or towards the end of the course. In cuisine, it is our firm belief that you can't create anything if you don't know the basics, if you aren't able to execute perfectly the basic techniques that will be required of you anywhere in the world, no matter where you might complete your internships.

This is exemplified by teachers who systematize to guide students' creative process, which starts with a deductive approach and leads to the cooking process,

implemented through techniques, work on textures, specific ingredients and guided risks, breaking new ground, fostering capacity in a real-life setting by executing a menu through trial and error until students are able to serve a dinner taking into account culinary trends, putting into practice a theoretical basis at all times. At the end, the student's creative process receives objective criticism from professionals who experience the meal as diners but also act as judges to evaluate courses. Students experience a real-life setting, from creation right through to execution.

Another aspect that boosts creativity is identifying techniques from international cuisine. Students work from a general understanding of professional cooking techniques, but these are combined with regional knowledge. Chef Martínez remarks that rice can be cooked Mexican-style, with tomatoes and vegetables; as risotto, which is Italian; or in Spanish paella. In other words, "it's just one ingredient that grows differently and can be used in different ways depending on the place of origin" (Martínez, 2018), considering the varieties of the grain.

One virtue appreciated by hotels and restaurants that receive interns is that students arrive with a fresh set of eyes and are able to identify some of the bottlenecks and opportunity areas in these places. The inertia of professionals immersed in their daily routine and industry-established systems means they are liable to fall victim to workplace blindness as they stop calling into question their methods and processes. In gastronomy education, creativity plays a key role in problem-solving; chefs trained in an enacted workplace draw from their knowledge of industry standards and processes and their professional experience to identify and develop proposals for improvement.

Part of the canon of gastronomy education is learning the conceptual foundations and techniques of professional cuisine, in addition to becoming familiar with and masters of cooking ingredients. Education for innovation at CAS includes both traditional and state-of-the-art cooking techniques. This mindset can be seen both in the cooking techniques and in the fittings and appliances, such as the revival of the pre-Hispanic nixtamalization[1] technique to produce *masa* (corn dough), using volcanic rock for grinding, which offers many possibilities, both traditional uses and new combinations. This is also noticeable in the range of ovens in the workshops, which include charcoal ovens with air vents to control heat, and gas ovens with digital sensors and programming functions, for more precise cooking.

In the creative process under the Geneplore model (Finke, Ward, & Smith, 1992), new concepts are generated from preinventive structures recorded in prior knowledge, such as the cooking processes required for culinary competence, in addition to sociocultural and idiosyncratic knowledge. This functions in conjunction with the exploratory and interpretative structure to enable the manipulation and combination of elements.

As generative and exploratory structures, the directors of CAS stress the importance of knowledge and "mastery of cuisine per se" (Martínez, 2018). This cuisine

[1] According to Paredes, Guevara, and Bello (2009, p.63): "From the náhuatl *nixtli*, ashes, and *tamalli*, corn dough; the nixtamalization process has been passed on from generation to generation in Central America, and is still followed like in pre-Hispanic times".

is defined by specific characteristics linked to geography, biodiversity, and culture. Many of the culinary creations tested in the school make use of traditional techniques in Mexican culture, which includes huge regional diversity, and are also based on an anthropological appreciation that seeks to revive methods, documents, and instruments in gastronomy in the border region where the program is offered.

The exam in culinary trends, which is taken in the last year of the degree, offers a unique opportunity to prepare new culinary concepts. The goal of this exam is to "create an authentic menu for a group of diners made up of chefs, journalists, businessmen, and other important figures from Mexico and abroad" (CAS 2018c). The most recent exam, which took place at the school, included dishes made from regional ingredients like fish and seafood, seaweed, Mexican cheeses, raw vegetables, ripe fruit, and lamb. These ingredients were used to prepare a six-course banquet including desserts. The culinary creations, which were remarkable for their novelty, included vegetable aguachile,[2] *tostadas*[3] *raspadas*[4] made with toasted, degrained corn. The full menu can be found at CAS (2018c).

Students from the basic and intermediate stages of the degree also benefit from this opportunity as they are able to sign up to support the teams who will demonstrate their culinary competence by preparing new concepts: "they participate in events all throughout their degree" (Núñez, 2018). The chef remarked:

> In the fourth term each year there is a date set aside for the trends exam. I help them in the kitchen and sign up to experience what the others experience, take part in the service and see what awaits me. [For the students] it's a privilege to participate in events before getting to that final moment in the degree. [They] spread the word and a dynamic is created that begins by asking who will be invited – for example, renowned chefs who share their ideas and content. For the students it's [a chance to find out] what to expect (Núñez, 2018).

6.6.4 CAS: A Space for Educational Innovation

As a higher education institution, CAS seeks to transform society by training professionals committed to their profession and the community they work in, through a consolidated, nationally and internationally renowned study program that is investing in innovation. About 30% of students cross the border every day from San Diego, California, USA, to attend class (González, 2018).

As previously mentioned, innovation is a multidimensional reality in which fundamental actions and interactions in the gastronomy industry are constructed, intertwining intellectual discourse with the practices and theoretical codes that structure

[2] According to the Dictionary of the Royal Spanish Academy (DRAE in Spanish), in Mexico *aguachile* is a watery broth with chili pepper, tomato, shrimp, and spices. The new twist in this menu was preparing it with vegetables instead of seafood.

[3] In Mexico, *tostadas* are corn tortillas that are toasted until they are hard, and serve as a base for other ingredientes mounted on top.

[4] According to the DRAE (2017), a *tostada* is toasted corn in Bolivia, Ecuador, and Nicaragua; and *raspada*, in México and Peru, means *scraped* or *scraping*.

the field. In this sense, CAS emerges as an innovative institution in aspects that range from the way its physical space is designed to teaching practices and assessment methods, as well as the experiences that shape students' professional training.

In this regard, Núñez (2018) remarks that:

> … the building, by its very nature, is the reflection of an innovative dynamic through its creative aspects and the way it was constructed – for example, the materials used. Spaces are shared, so the facilities themselves support integration activities. Kitchen workshops are not designed for large areas, and a maximum of 16 students work in the kitchen at a time. This makes it possible to work in teams of 4, and work on activities with the stove, induction griddles, with a 2-door refrigerator where whatever's in it today is there to be used today – in other words, fresh ingredients, produce that has just come in, which will be transformed and then come out. There is no cold store.

This enables CAS to forge in its students an optimal approach to work, lesson planning, and inventory turnover to avoid waste and be creative with what is available.

Moreover, keeping on top of current trends in gastronomy means working within continuities and discontinuities (Stierand & Lynch, 2008), adapting learning to current trends, and consequently major equipment at CAS offers students state-of-the-art technology. This includes Josper charcoal ovens, a high-quality combination between a grill and an oven; digital ovens that can be programmed depending on the technique use; and tools and utensils to revive traditional techniques (currently in vogue) or use chemistry in the kitchen, like food hydrogenation. Generally speaking, it is about breaking new ground, taking guided risks, and experimenting to continue acquiring new knowledge in a changing, unpredictable world.

All of this allows students to develop artistic inspiration (Stierand & Lynch, 2008), which is empirically displayed in a vast world of institutionalized gastronomy. As Núñez (2018) recounts:

> Students soak up information for themselves [trends, haute cuisine chefs, etc.], which begins to open their eyes to the big picture, and one thing leads to another: who do you follow? This tells you where I want to intern. Students leave and open doors for other students. For instance, right now we have one former student working with chef Gaggan Anand[5] in Thailand.

In keeping with the dimensions proposed by Stierand and Lynch (2008), CAS distinguishes itself by offering its students learning and networking. Learning ranges from traditional knowledge to the social environment that influences the process. This means it goes from the basics—becoming familiar with and executing techniques like making stocks, sauces, and identifying techniques for preparing hot food, such as roasting, stewing, sautéing, and combining techniques—to designing, executing, and serving an organized menu, including plated desserts and considering culinary trends.

[5] Chef Gaggan Anand's restaurant in Bangkok has been considered the best restaurant in Asia for three consecutive years and was ranked seventh in The World's 50 Best Restaurants 2017a. EFE (2017) reported that the restaurant was also awarded two Michelin stars that year.

On the other hand, CAS is also committed to developing networking. Stierand and Lynch (2008) use the term "learning communities" to describe institutional networks that offer their members cohesion and benefits. At CAS there are institutional networks established through agreements with hotels, restaurants, and chains where students complete national, international, and professional internships. Núñez (2018) notes that:

> The most important prerequisites for any establishment before we consider entering into an agreement for internships include having a menu that exhibits different techniques, meaning that it shouldn't just offer soups or sandwiches, but should offer a menu that is substantial enough to put into practice several of the techniques learned […] It should have a perfectly structured team, a clearly defined human resources department that assigns the tasks the student is to carry out […] It should have a wine list, even though it may be short, so students gain access to wines, the way they are stored, and the people in charge; we look for places with table service so students may share in table-dressing, activities, tips, server organization, the relationship with the food and beverage manager, etc.

For all these reasons, each establishment is reviewed one by one by a committee made up of CAS management, teacher-chefs, and teachers in the hospitality, service, and wine fields, who make an assessment and determine whether it is viable or not to sign an agreement.

In turn, CAS offers students a network of providers who are a permanent part of all modules, and providers who offer demo classes or showcase their products so students may cook with them and identify opportunities and options in the market. In any event, the school promotes a relationship between students and providers from the beginning of the degree program. This allows students to compare prices, estimate costs, and above all gain awareness of providers' work. They also learn to value seasonal produce, which will then make it possible to plan menus based on the time of year (Núñez, 2018).

Regarding the adoption and diffusion dimension, Stierand and Lynch (2008) explain that it is a balancing act between sophistication and the popularity of a new idea. Voices have been raised resisting change, when they have found stability, as the social system is generally selective and rejects counter-culture innovation. In this sense, CAS students explore culinary trends that range from the basics of cooking, such as using charcoal, to reviving the nixtamalization process, which starts with choosing the corn and ends with making the tortillas that will be used in plating the food. Nuñez (2018) emphasizes the revival of Mexican techniques, bringing back traditional Mexican charring (*tatemado*), ember-roasting (*rescoldo*), and combined or steam cooking techniques. "Trendiness takes you back to basics […] Slow cooking, traditional processes are the trend. Leaders are following this trend, for example Molino "El Pujol", run by chef Enrique Olvera,[6] who should be followed" (Núñez, 2018).

[6]The Pujol restaurant, run by Enrique Olvera, is considered the best restaurant in Mexico and ranked 20th in the world and fourth in Latin America according to The The World's 50 Best Restaurants 2017b. Moreover, his restaurant Cosme in New York has been ranked 96th in the world.

The perception of novelty and change mentioned by Stierand and Lynch (2008) is associated with the notion of adoption and diffusion, as these are relevant in considering an innovation as something new. This last dimension is based on the reasoning that any innovation should be perceived as such by the external social system. In this sense, and in line with Stierand, Dörfler, and MacBryde (2009), innovation passes through a creative process to solve problems, in which students readjust their knowledge to find a solution and validate their ideas with a network of experts as an intersubjective testing mechanism, and on the other hand, an idea is pitched that acquires value as an innovation. A good example of this dimension is provided by CAS student Leonardo E. Cañedo García, who, with his shrimp and portobello mushroom al pastor sope, won the Duelos de Sazón competition organized by the Fiesta Americana hotel chain to add a new dish to their hotel menu (CAS, 2018b).

6.7 Conclusions, Scope, and Recommendations

The study is exploratory in scope and was confined to researching how the academic model at CAS encourages innovation and creativity processes in its students while developing culinary competence. The study was mainly geared toward understanding these processes from the implementation of the curriculum, which envisages intensive training through the learning-by-doing model. The theoretical and methodological approach includes an interpretative and sociocultural analysis based on enacted workplace experiences. Thus, participants in the study offer their interpretation based on their position and role as teachers.

The study identifies some overlaps between the literature reviewed and the results obtained. Some parallels can be drawn, but the findings are contingent on the context and conditions of the school under analysis. Since this is a single case study based solely on the perspective of teachers, it is not possible to apply or generalize the results in other contexts and training programs. Nonetheless, it has been broadly shown that training for future chefs requires the development of culinary skills, which can be acquired through educational models geared toward learning by doing.

From this perspective, the development of culinary competence is grounded in practice, interaction between all actors involved in culinary practices and the culinary system (operations, service, and the supply chain), knowledge of food preparation techniques, and the exploration of new possibilities in fields that are independent of gastronomy.

This study also analyzes environmental factors in culinary education, including professional standards in school and real work scenarios. Creativity skills are also studied, establishing links to social and cultural environments that are conducive to new culinary concepts.

Social and cultural knowledge in gastronomy education are conducive to creativity and the development of new culinary concepts. Since knowledge is integrated into context, culture, and social relations, it constitutes a bank of socially shared

knowledge from which it is possible to create something new. At the same time, knowledge is mediated by relationships and contexts, which give culinary practices particular meanings. In this sense, competence is both an individual and collective attribute and is acquired by interacting with people involved in the profession and preparing food as socially and culturally shared productions.

The development of culinary competence includes a contextual component that relates to the world of work and the broader social context, in this case the world of cuisine on a global scale.

CAS is presented as an academic environment in which innovation and creativity are developed based on an educational program that supports practice and puts students in direct contact with the workplace. This dynamic allows future chefs to acquire knowledge and develop skills, meaning it offers tacit and scientific training integrated and immersed in the practice of culinary arts.

The creative process is encouraged during the course of students' education, but not from the outset as firstly they must acquire knowledge and learn cooking practices, as argued by Ottenbacher and Harrington (2007). Rhodes' 4 P's process is reflected in culinary trends assessments, where students draw from the culinary competencies they have acquired to prepare ideas that are then processed in the kitchen, and the final product—an organized menu—is presented and served in a physical, sociocultural environment where ultimately it is evaluated.

The proposal made by Horng and Hu (2008) regarding education and innovation in schools is reflected at CAS by the fact that students face real problems, which are first addressed in theory, and develop solutions through constant practice in real scenarios. These enacted scenarios turn classrooms into practical learning experiences where the innovation circle begins by transforming ideas into creations, which, once validated by specialists, become innovations.

In this respect, the dimensions analyzed in light of work by Stierand and Lynch (2008) tie in with the space, forms, meta-cognitive processes, practices, relationships, and guided risks that affect the continuities and breaks that interviewees agree are fundamental for the education of future chefs.

This study analyzed culinary education through a program that prioritizes the learning-by-doing model. The findings from this study have implications for scholars of culinary and hospitality arts and industry professionals. Knowledge in this field of education and the research agenda may both be furthered by studying the perspectives of teachers from different areas of the culinary and hospitality arts, in addition to those of students and graduates in the field, in order to improve recognition of the innovation and creativity processes in providing culinary products and services and managing the hospitality industry. This will allow new studies to crystallize knowledge of the processes identified.

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