

# Learning Styles and Teaching Strategies in Gastronomy: Kolb theory applied to students and teachers of the University Center Senac Campus Águas de São Pedro

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**ABSTRACT:** Learning can be defined as a process of creation and incorporation of knowledge through the transformation of experience. It is through the combination of apprehension experience that learning occurs, i.e., through transformative experience and by understanding information. This study is based on Kolb's theory, which defines four cyclic stages that exemplify learning modes. This article investigates the learning styles of undergraduate students of the higher education course in Gastronomy Technology of the SENAC University Center of the Águas de São Pedro campus, aiming to verify the preferences for the methodologies applied in the unit, and the relationship between the learning styles of the students and those of their teachers. This is an exploratory and descriptive study, based on bibliographic research. It is also quantitative, as it uses a standardized test/structured questionnaire for the data collection. Results were obtained from a sample of 115 students, mostly demonstrating convergence in terms of learning styles and preferred methodologies, preferring, in the latter case, technical visit, experimentation and dialogued exposure. Among the sample of teachers, comprising 22 respondents, the accommodating learning style was prevalent. Based on these results, it was concluded that the students' predominant learning style differed from that of the teachers, presenting teachers with a challenge to apply the best teaching methodologies and bring quality teaching.

**Keywords:** Gastronomy; learning-teaching; Kolb; learning styles.

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## INTRODUCTION

Investigating the multiple ways in which people learn can provide an important diagnosis for teachers and agents working in the field of Education. This type of information also can be used to plan strategies aimed at improving the teaching-learning relationship (Asunción & Viana, 2020). Valente, Abib and Kusnik (2007) corroborate this view, arguing that having a knowledge of learning styles enables the teacher to select the most appropriate teaching methods, and to mediate the learning of complex problems, making this an important element for promoting changes and improvements to curricular and disciplinary programs. There is an urgent need to make the educational process more efficient, and to be able to align profiles with teaching methodologies and strategies.

Learning styles, therefore, provide a useful analytical tool that considers the particularities of adult students in the internalization of knowledge through experience (Mpwanya & Dockrat, 2020). There have been several research papers worldwide that focus on the theme of learning styles as the central epistemology; e.g., with focus on language learning behavior (Oxford, Holloway and Murillo (1992)); in the identification of "success cases" of selected students from a university center in Sri Lanka (Jayakody, 2021); and in the examination of the effects of the use of learning styles among chemistry students (Sudria et al., 2018) among others.

Experiential Learning Theory (ELT) is the epistemology that guides learning styles; briefly, it seeks to understand the different ways in which the adult student appropriates knowledge, regulates their learning and makes decisions for problem solving. It is assumed that learning will consist of a "process through which knowledge develops through experience" (Kolb, 1984, p. 132). From this perspective, learning is the product of the combination of experience, and permeates understanding and transformation (Prado et al., 2021).

Although Kolb's theoretical framework contains main elements that are also present in other major learning theories, such as those of Rogers, Singer and Flavell, the role of experience in ELT is the main mechanism in the construction of knowledge. Therefore, Kolb's epistemology is based on the continuous transformation of perception and experience, combined with its understanding and transformation through reflection (Hydrie & Naqvi, 2021; Prado et al. 2021).

The abovementioned authors also mention that experiential learning is guided to support practices that are aligned with the construction of students' knowledge, through the identification of structural and dominant traits in each learning style. Thus, it is noted that the construction of knowledge presupposes individual characteristics, and that the institution involved should consider teaching strategies aligned with learning

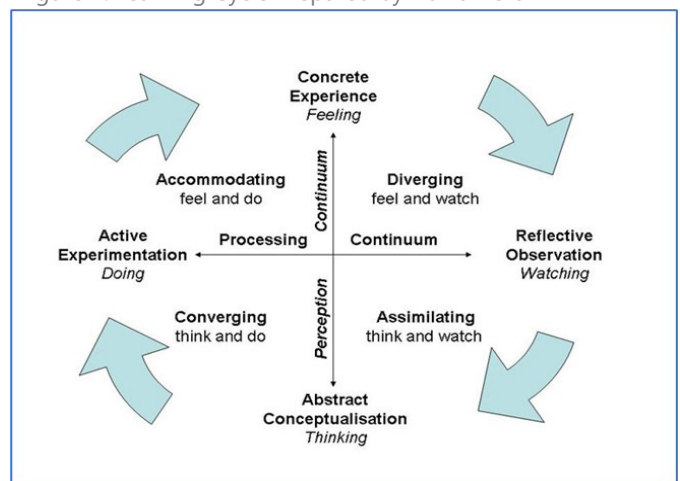
styles (Barreto, 2016).

Abreu et al. (2020) defines learning styles as the ways in which individuals process information and feelings when faced with learning contexts, in a unique way and guided by subjective facilities in the internalization of knowledge.

Learning styles are defined based on the Learning Style Inventory (LSI), a questionnaire that provides an educational tool for improving an individual's understanding of their individual learning preferences, and enables them to learn and investigate unique characteristics of each learning style, aimed at providing a diagnosis that can help improve and align learning teaching strategies (Idkan & Idris, 2021). In other words, the instrument identifies how an individual learns best, and allows the teacher to reflect on pedagogical practice in order to contemplate all the students' learning styles (Fry & Kolb, 1979; Azevedo & Zampa, 2021).

Kolb (1984) proposes a model that explains how its way of functioning and organization will define the learning style (LS) and occurs cyclically, they are: concrete experience, which involves direct action when faced with a learning situation; reflexive observation, aimed at inner reflection in order to understand the relationships and effects of the learning situation; abstract conceptualization, involving the complex formation of more elaborate and abstract concepts, rules and principles of generalization; and active experimentation, involving action focused on the external, through the practical application what has been learned.

Figure 1. Learning Cycle Prepared by David Kolb



Source: David Kolb (1999)

From this cycle emerges the four main learning styles: diverging, converging, assimilating and accommodating. The diverging style learns by experimenting, creating, observing, listening and relating knowledge to experience; this group tends to consist of people with good creative capacity, and the ability to analyze situations and problems from multiple points of view.



The converging style learns through the practical application of ideas and theories, which denotes skill in problem solving and decision-making. The accommodating profile tends to learn in new situations, applying the experience and technical knowledge acquired. Finally, assimilating learns through reflection and formulation, with less need to apply the learning in practical ways (Kolb, 1984; Prado et al., 2021).

## INVESTIGATION

According to Kolb (1984), students are more demanding when they enter higher education and undergo constant changes, with a need to continually adapt along the way. Thus, according to Ikeshoji and Terçariol (2020), teachers should adjust their educational strategies to suit their students, and not simply base their teaching on their own preferred style. In view of this, it is necessary to develop strategies, for both teaching and learning, so that the content can be understood more effectively. The focus of the teaching-learning process should be on the student; therefore, the teacher must be receptive to new suggestions offered by students, giving them the confidence to learn (Innocent; Wüst & Castaman, 2016).

However, the teacher must master the content in order to be able to transform it and integrate it with what the student has already learned, leading to a better understanding (Cerqueira, 2006). But, according to Silva (2006), just as students have their preferred learning style, teachers also have their preferred teaching style, and tend to teach according to it. A common mistake is for teachers to assume that students learn in the same way that they do.

Therefore, it is important to observe the influences and relationships that the teacher's learning style brings to the development of students' learning.

According to Silva (2006), when a teacher focuses exclusively on a single teaching style, this can prevent students from developing independent ways of thinking and learning and, consequently, from reaching their full potential for academic and professional achievement. Therefore, it is important for the teacher to stimulate students' educational process, proposing activities that will strengthen the weaker skills and competencies. According to Cerqueira (2006), the challenge facing the teacher is to analyze his or her own teaching style, to determine which learning style it relates to and to be able to adapt his or her teaching methods and practices.

Stefanello et al. (2020) argues that active learning methods can promote better academic performance of the student, besides considering the unique characteristics that derive from the learning styles. These strategies encourage students to identify and build alternatives, enabling them to quickly solve problems using

multiple perspectives and methods. Thus, the students gradually become protagonists of their own education, with the teacher acting as a mediator in this process.

The objective investigation of this work is to determine which learning styles, if any, are more prevalent, as well as to investigate where there is correspondence between the styles of students and teachers of the Gastronomy course at the Centro Universitário Senac campus Águas de São Pedro (SP). It also aims to identify the methodological teaching preferences applied in the unit, based on the central characteristics of the learning styles, and through this, to gain an overview of the best methods to be used in order to promote meaningful learning.

This research is justified by the possibility of increasing the sieve of assertiveness in the teaching methodologies adopted at the institution – coming from the Senac Teaching-Learning Strategies Bank. It is also considered pertinent to guide the study in the epistemology of experiential learning, which considers that regardless of the context in which the adult student is inserted, there is a whole cultural background that learners carry with them as a result of their experiences. For learning to be meaningful, these experiences must be properly articulated with teaching methods and strategies that enable a connection to be made between theoretical knowledge, and practical and experiential learning.

Thus, learning leads to the development of autonomy, innovation and reflexive critical thinking, providing the learner/professional with greater dexterity to deal with a world that requires continuous transformation (Prado et al., 2021).

## METHODOLOGY

In this research, we aim to investigate the learning styles of undergraduate students of the higher education course of Gastronomy Technology of the SENAC University Center of the Águas de São Pedro campus, and to verify the preferred teaching methods applied in the unit, and the relationship between the main learning styles of the students and teachers. To achieve this goal, this study adopted a mixed methodology. It was structured at two different moments. First, qualitative research was conducted, through a bibliographic review, to examine Experiential Learning Theory based on the perspective of Kolb (1984). Searches were performed on the indexing portals: Scholar Google, Scientific Electronic Library Online (SciELO) and Microsoft Academic Search, using the following descriptors: "learning styles", "Kolb test", and "learning styles Kolb". The surveys were conducted between January and April 2021. Articles addressing Experiential Learning Theory (Kolb, 1984) were selected in a theoretical and empirical way.

This research is also quantitative, as the data collected in the field research is numerical (Gatti, 2004), and was collected in two stages. In the first stage of the field research we conducted a survey, based on a structured questionnaire, called the Learning Style Inventory, created by Kolb (1984) and adapted by the Federal University of Paraíba (UFPB). The purpose of this questionnaire is to identify the interviewee's learning style: accommodating, assimilating, converging or diverging. In the Likert scale used for the questionnaire, 1 denoted - Totally disagree; 2- Disagree; 3- Agree; 4- Totally agree. The adoption of a four-point Likert scale is widely used in the area of education (e.g. Gianini et al., 2016; Trojan & Sipraki, 2015). We emphasize that scales of up to four points are validated by the studies by Loke, Pirie, Virning and Salmon (1994) and Taherdoost (2019). The survey questionnaire was applied from April 26, 2021 to May 3, 2021, with: a) 115 students of the undergraduate in Gastronomy of the Centro Universitário Senac de Águas de São Pedro/SP; b) and 22 undergraduate professors of the Bachelor degree programs in Gastronomy and Hospitality of the same institution. The questionnaires were applied digitally to both samples.

After the first stage, the participants (both teachers and students) were then asked to answer a second survey, with control variables [age, sex, course shift (daytime/evenings), semester and degree (for the teachers)]. The respondents were also asked to specify which teaching and learning methodologies they most identified with. The methodologies adopted were based on the studies of Carvalho (2014), Miacci and Pereira (2018), Miacci and Daloia (2022), Gonçalves (2021) and Mendes and Faleiros (2013). Table 1 shows the teaching and learning methodologies that were mentioned by the interviewees as their preferred styles.

Table 1 - Teaching and learning methodologies listed in the questionnaire

Teaching and Learning Methodologies
Brainstorming
Flipped classroom
Group dynamics
Debate
Dialogued exhibition
Simulation/experimentation
Video presentation and discussion
Search/reading texts
Projects
Technical visit

Source: The authors

Over the last ten years, we have seen that undergraduate courses in both hospitality and gastronomy have grown rapidly in Brazil (Cabral et al., 2017). With face-to-face, semi-face-to-face and on-line courses, undergraduate gastronomy courses have gained prominence as a choice for students seeking a higher education degree (Rubim & Rejowski, 2013). Studies have also shown that the curricula of these courses comprises various practical disciplines (e.g. Brazilian cuisine, Mediterranean cuisine, Asian cuisine, practical studies on beverages) as well as theoretical disciplines (e.g. management and entrepreneurship, nutrition, events) and that most of them use active experimentation teaching-learning methodologies (Barreto, 2016, Eister & Rejowski, 2013). However, although there has been a growth in the number of students in the field of Gastronomy and Hospitality, few studies have sought to investigate the students' learning styles, or to align these styles with the most appropriate teaching methodology for these students.

Based on Kolb's model of learning styles, we argue that gastronomy students tend to prefer two of the four learning styles, while students of higher education in gastronomy seek a course that is linked to active experimentation (Schmitt & Domingues, 2016). In this field, the vast majority of the students of higher education courses in gastronomy has their focus in some circumstances, such as: a) the converging style, whereby individuals learn better through active experimentation and abstract conceptualization and; b) the accommodating style, represented by individuals who learn best through active experimentation and concrete experience, with greater ease in problem solving and performing tasks. We believe that for both profiles, active experimentation is the main means of acquiring knowledge, while knowledge is better acquired through continuous processes of experimentation, i.e., putting the theory into practice (Andrade et al., 2020).

On the other hand, the concentration of theoretical and practical disciplines also influences the profile of the student, who tends to seek higher education courses that offer a curricular structure that aligns practice and theory. Moreover, both students with a preference for the accommodating or converging styles tend to choose teaching methodologies that give an opportunity for active experimentation, in order to acquire and develop new knowledge. According to the findings of a study by Miacci and Daloia (2020), higher education students in gastronomy tend to have a profile focused on practice, i.e., they prefer to acquire knowledge through active teaching-learning methodologies. Therefore, we can deduce that:

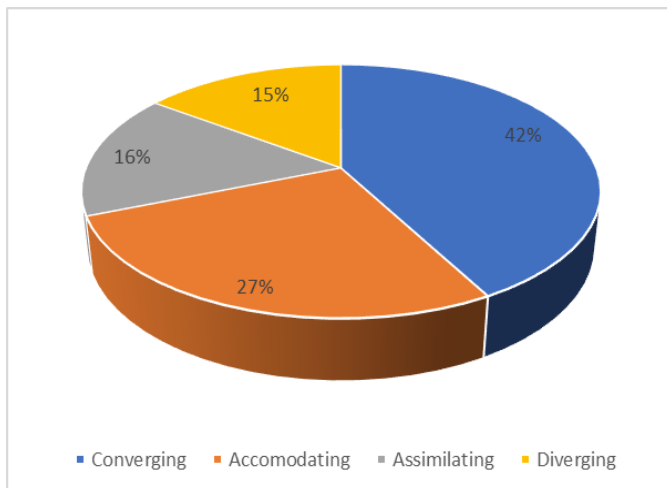
H1: Students with the accommodating style and those with the convergent style share similar preferences when it comes to learning-teaching methodology.

## RESULTS AND DISCUSSION

Data were processed to select the sample of this research. First, we used descriptive statistics to understand the characteristics of the sample (Dalfovo et al., 2008).

During the period of application of the lean version of the Learning Style Inventory, a sample universe consisted of 115 students, 62% of whom were aged between 17 and 22 years, with a predominance of females (55%). Of the respondents, 45% studied in the evening, 32% in the night and 23% in the mornings, 40% were in their fourth semester of the course, 26% in the first semester, 22% in the third, and 12% in the second. In terms of the students' learning styles, 42% showed a preference for the converging style, 27% for the accommodating style, 16% for the assimilating, and 15% for the diverging, with a standard deviation of 14.43.

Graph 1. Students' Learning Styles



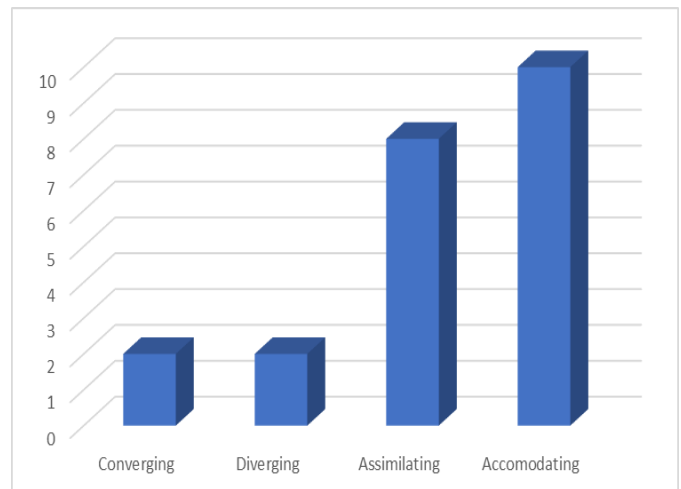
Source: The authors.

There were three methodologies that were predominantly preferred by the students; technical visit - 21%; experimentation - 17%; and dialogued exhibition - 10%.

The teachers' responses are demonstrated in the form of graphs, for better analysis, in order to examine the relationship between learning style and teaching methodology, and between this and the students' learning styles.

The sample universe of the questionnaire applied to the teachers was composed of 22 respondents, aged between 29 and 60 years: 12 males and 10 females. Of these, 2 teach the gastronomy course and 9 the hospitality courses.

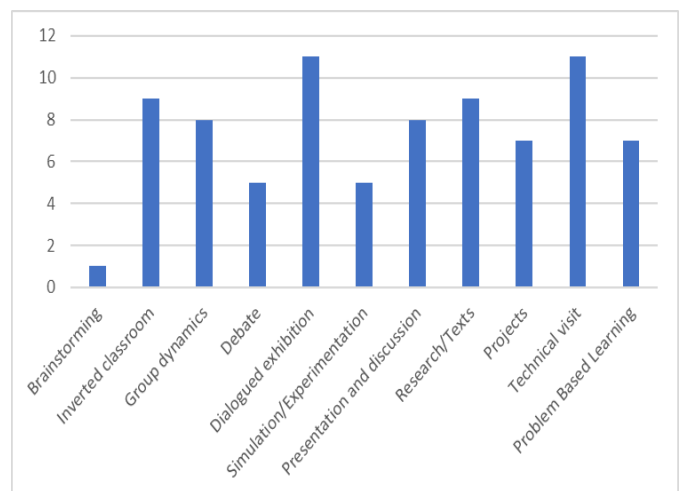
Graph 2. Teachers' Learning Styles



Source: The authors.

From Graph 2, it was observed that the most common learning styles among the teachers of Gastronomy and Hospitality of the Águas de São Pedro campus were the accommodating (10 responses, or 46%) and assimilating (8 responses, or 36%), followed by converging (2 responses, or 9%) and divergent (2 responses, or 9%).

Graph 3. Methodologies used by teachers of the Águas de São Pedro campus

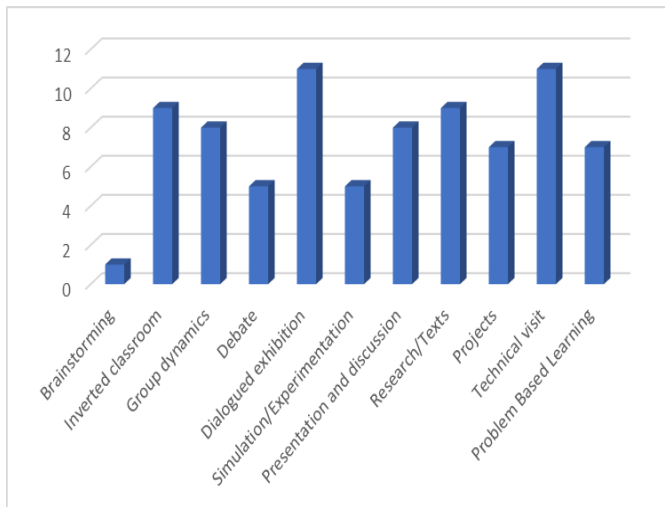


Source: The authors.

Among the methodologies most frequently used by the teachers, we highlight dialogued exhibition (19 responses, or 20%), Group dynamics (12 responses, or 13%) and flipped classroom (11 responses, or 12%). These results are shown in Graph 2.



Graph 4. Effective methodologies for students' learning



Source: The authors.

Graph 4 presents the effective methodologies for learning students, i.e., those which teachers believe lead to the best learning outcomes. Thus, the most positive ones were Technical Visit (11 responses, or 14%), dialogued exposure (11 responses, or 13%), flipped classroom (9 responses, or 11%) and research/reading of texts (9 responses, or 11%).

Analyzing Graphs 2, 3 and 4, it can be seen that the accommodative and assimilating styles were more prevalent among the teachers, corroborating Kolb's theory, while the accommodating profile was identified with practical experiences, since most of the professors of the Centro Universitário Senac campus Águas de São Pedro had, themselves, studied Gastronomy and/or Hospitality. The assimilator profile is more common among those who prefer to reflect on ideas, without necessarily needing experimentation.

Considering the three methodologies most used by teachers, and the most effective ones, it was noticed that Group Dynamics was more used, although less effective than the first three elected. Research/reading of texts was considered one of the most efficient, but was not the most widely used, while Technical Visit was seen as more effective but was less used.

After this initial phase of the research, we found that most of the students interviewed (76 out of 115) had either accommodating or convergent styles, as would be expected. Thus, the profiles with the most representativity in the independent samples were selected: the convergent profile (48) and the accommodating profile (31).

Based on this initial selection, we sought to verify the normality of the independent samples. The Shapiro Wilk (Sig.) test was applied, to determine the normality of the samples, with  $n < 50$ . The result indicated a  $p$ -value  $< 0.05$ ; thus, the samples do not have normality.

To test the hypothesis, we used the Mann Whitney-u nonparametric statistical technique. This technique is

indicated for studies that have two independent samples, and that do not have normality, aiming to test a hypothesis in which we seek to compare and verify whether the medians of the two groups are similar or not (Carvalho et al., 2019). Thus, the statistical Mann Whitney-U test was applied, with a resulting  $p$ -value of  $< 0.05$ . Based on this result, we can say that there are indications to reject the hypothesis raised (Komatsu, 2017).

## DISCUSSION OF THE RESULTS

The predominance of the convergent and accommodating styles in the gastronomy course is supported by the theory proposed by Kolb, as the convergent profile is characterized by individuals who excel in the practical application of ideas, decision making and problem solving (Pimentel, 2007). Likewise, the accommodating profile stands out for its preference for activities of a practical nature, to the detriment of theoretical ones.

Thus, it can be inferred that the data represent convergence with the profile of the Gastronomy course and with the proposals of the Political Pedagogical Project of the course (PPP), such that the data reflect a significant portion of the activities developed by the course, since there is a large load of practical classes that aim to simulate professional actions so that knowledge from experience can be built more securely (BRESOLIN, 2020).

Among the conceptual definitions, Kolb (1984) argues that individuals on the accommodating spectrum tend to learn through feelings, while those of the convergent profile combine abstract thinking (abstract conceptualization) with the practical application of ideas.

The hypothesis test aimed to analyze the two medians of the largest populations in the sample universe, to determine whether they are equal and thus prove the initial hypothesis. The data show that the convergent style has less predilection for the methodology of experimentation when compared to the accommodating, although both styles have a certain conformity, and there is a difference in the use of feelings due to the individuality and personality of each student.

In view of the above, it is considered crucial, following the survey of learning profiles of the student body of the course, for teachers to be more assertive when proposing active teaching-learning methodologies, as the data demonstrate a greater propensity and preference of students to learn through these methodologies. (Point out which other authors say this). It is worth mentioning that the Political Pedagogical Project of the course is guided by a Bank of teaching-learning Strategies (SENAC, 2015), and the document also includes a series of active teaching methodologies, which are highlighted in the methodology section and within the questionnaire itself, structured in the form of a survey.

However, among the strategies to facilitate the learning process, it is considered important to use those that help develop a greater understanding of the theoretical content of the course.

## FINAL CONSIDERATIONS

This work fulfils its objective of finding out the predominant learning styles of undergraduate students of the higher education course of Gastronomy Technology of the SENAC University Center of the Águas de São Pedro campus, the preferred teaching methodologies used, and the relationship between the learning styles of the students and the teachers.

The results of this research will provide a resource for the campuses to improve teaching methodologies, in order to provide quality teaching aligned with students' profiles. For further research, a new data survey is suggested, with a larger sample population from the Hospitality course of the Campus Águas de São Pedro and the gastronomy course of the Campos do Jordão campus, analyzing the relationship between the campuses and evaluating the results of the methodologies applied. Another suggestion for continuing this research is to increase the number of HEIs with the same courses, to determine the student profiles and generate more robust proposals.

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