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# Taste as a didactic approach: enabling students to achieve learning goals

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## Abstract

*Teaching does not necessarily condition learning, and specific didactic elements do not necessarily condition the best learning outcome; this also applies to food and cooking lessons in schools. Teachers' didactic reflections usually reflect the content and form of the teaching, as well as a number of expectations regarding students' learning. This article presents the results of a new quantitative study that investigates students' work with taste in relation to their own expected learning in the subject Food Knowledge, viewed in the light of three didactic elements: motivation, student participation and innovation in school. The method involves asking students to complete a questionnaire (N = 769) after competing in a Food Contest, a competition that forms part of Food Knowledge. The connection between taste and learning is a relatively unexplored field, and the analysis in this article indicates that the experience of working with taste in Food Knowledge may have an effect on students' expected learning that is just as positive—or even more positive—as that of known didactic elements like student participation and innovation. Therefore, teachers need to create a balance between didactic elements and remember to incorporate taste as a didactic approach in enabling students to achieve learning goals.*

**Key words:** taste, learning, didactics, Food Knowledge

## Introduction—Food Knowledge

As part of the 2014 reform of the Danish compulsory primary and lower secondary school (*Folkeskolen*), a new subject was introduced called Food Knowledge, which replaced the old subject of Home Economics. Food Knowledge is not just a modern version of the old subject, but a subject with a completely new academic profile, new areas of competence and new goals. Food Knowledge has two academic profiles: firstly, it is a compulsory subject for at least one year between the 4th and 7th grade; secondly, it can be offered as an optional subject in the 8th and 9th grade, building on the compulsory subject and leading to an exam. It is up to the individual school to decide whether the subject should be offered as an optional subject. In both the compulsory and the optional subject, the students work within four areas of competence:

(i) Food and Health;
(ii) Knowledge of Food;
(iii) Cooking; and
(iv) Dining and Food Cultures.

It is not expected that every lesson contains all four areas of competence; rather, they should be selected in relation to the concrete teaching topics and courses (EMU, 2015).

Food Knowledge provides the opportunity for students to work with senses and experiences, and to experiment, create and communicate in relation to food and meals. The students develop their new skills and knowledge through motor skills, cognition and perception. Food Knowledge facilitates various way of strengthening student learning and cognition. There is much to suggest that the one single factor that is most significant if students are to learn something new is that they are able to link something new to something they already know (Kruse, 2007). Therefore, it is important in terms of learning that students' existing skills and experiences are employed in the teaching. The teaching guidance for the subject thus recommends that teachers should take into account the students' prior skills in addition to the formal guidelines for the subject.

Furthermore, in Food Knowledge teachers are encouraged to present their students with the academic intention that teachers and students should formulate common learning goals; and teachers should also explain their teaching choices to the students. It is not enough simply to cook and eat something. In accordance with the subject curriculum and teaching guidance, it is essential that the teaching structure is clear, meaning: a) that there is coherence between process, goals and content; b) that the didactic elements are clearly visible; c) that roles, agreements and rules are clear; and d) that the school kitchen becomes a 'haven'. Further, efforts should be made to establish a stimulating learning environment regarding kitchen layout, aesthetics and useful kitchen utensils (Brønnum Carlsen & Terndrup Pedersen, 2014).

## Competence and learning goals

The conception of competence goals in the Danish school reform is in accordance with the Bologna Process (UFM, 2016), shifting focus from teaching goals to learning goals—in other words, from teacher centring to student centring. Each course relates to at least one competence goal with attached skills and knowledge goals. Teachers should have a main priority within a certain competence area and a clear focus on which learning goals are relevant and achievable for the students.

The inspiration behind this approach is to a great extent John Hattie's meta-study *Visible Learning* (Hattie, 2009). One of Hattie's points is that students should continuously be presented with simple and precise learning goals in order to make their teaching goal clear; this pertains both to extended periods of teaching and, in particular, to individual lessons. The intention is to give students a clear picture of what they need to learn, as well as making them aware of their own learning process through continuous feedback in connection with the learning goals. Such an approach requires teachers to reflect on what signs of learning can be used as indicators, as well as how to define learning goals in such a way that it is clear whether the students have achieved them (Hattie, 2009, pp. 173-178, 246-247).

## The concept of learning

Our research on Food Knowledge focuses on the relation between teaching and students' learning, in particular the forms of cognition linked to taste. In our understanding of

didactics, we distinguish between three central concepts. Firstly, *learning* is the individual process which the individual student goes through in relation to the cognitive work. In terms of learning, a distinction can be made between intended and realised learning. Intended learning includes goals that build on ideals, ambitions or expectations, that is, a teacher or student's goals for a specific pedagogical activity in regard to expected learning. This can be viewed in contrast to realised learning, which indicates a student's actual outcome of a specific pedagogical activity. Whereas intended learning from the teacher's perspective is a generalised ambition linked to the communication taking place in a pedagogical activity, realised learning is an individual and often very different experience, which can be far from or close to the intended learning. However, intended learning is not only the teacher's domain; in our study, we operate with the students' intended learning as an indication of what they expect to learn. This makes it relevant, in relation to validity, to reflect upon what it is that is actually being studied. In this context, we are aware that it is not the students' learning that is studied directly via the questionnaire, but rather their perception of the learning process and what kind of learning they expect to realise as a result of it. However, it could be argued that the students' perception of the characteristics of the learning process should not be seen as separate from realised learning. In order to realise learning through teaching, it is central that the teaching is able to grab the students' attention (Wistoft, 2012, pp. 66-67). The teaching needs to make sense to the students in order to engage them. Thus, students' perception of the teaching is far from insignificant; it contains knowledge about how likely it is that the intended learning is actually realised.

Secondly, *teaching* is a communicative event in which a pedagogical activity takes place; it is not an inner experience but a communicative situation. Teaching can take place without learning, for example, when the intended learning does not become realised learning. Another possibility is that the teaching stimulates a different form of learning than that intended.

Thirdly, *education* is the guiding framework or organisation in which teaching takes place and through which the teaching, both academically and ideologically, must be legitimised (Wistoft, 2009). This study focuses on learning linked to taste education on the courses that are part of the Food Contest project, which has a number of learning intentions. These learning intentions are always guided by specific sets of values reflecting basic pedagogical and ideological ideas, and specific forms of cognition, skill and knowledge are prioritised on the basis of these ideas. It is these sets of values and basic ideas, as well as the learning practices employed in taste teaching in relation to the Food Contest project, which we will analyse and discuss.

## Why study expected learning?

Students' learning expectations can be viewed as a kind of self-reported learning. It is easy to criticise such data with regard to the difference between the respondent's subjective perception of their own learning, and their actual learning in a more objective perspective (provided the existence of such a thing as 'objective learning' is accepted). In addition, there may be a good deal of variation in relation to different respondents' subjective perception of what it means to have learnt something. On a Likert scale, for example, it is highly subjective what the different categories encompass (Babbie, 2013, p. 175). This is due to the fact that

the scale was developed as a research design with a starting point in systems theory, where the basic concept of subject/object is replaced by the theoretical construct of system/environment (Luhmann, 2000). Taking as its point of departure this theoretical perspective on learning, and accepting the limitations it entails (Luhmann, 2006, p. 189), self-reporting is a method to get the respondents to communicate about their own learning. Studies have shown that self-reported learning generally does not differ significantly from realised learning. John Hattie writes: "Children are the most accurate when predicting how they will perform" (Hattie, 2015). He grounds this on five different meta-analyses (Falchikov & Boud, 1989; Falchikov & Goldfinch, 2000; Kuncel, Credé, & Thomas, 2005; Mabe & West, 1982; Ross, 1998), in which students' self-reported achievement levels in a subject were compared to subsequent test results. All five studies conclude unequivocally that the students' assessments of their achievement levels were very close to the level determined via tests. This is not to make an argument for equating self-reported learning with realised learning; however, it can be argued that a method that documents self-reported learning is capable of producing valid indications of realised learning, provided that unavoidable uncertainties are accepted.

## The Food Contest as an empirical field

This article presents the initial results of an ongoing Danish research project carrying out parallel research on an experimental development project in Food Knowledge. The project is called *Food Contest—the Danish Food Knowledge Championship* and was established with the aim of improving the cooking skills of students in schools and strengthening the position of the subject of Food Knowledge in Denmark (Pedersen, 2012). An annual course focuses on one ingredient and one associated theme: these ingredients have included the apple, the carrot, the beetroot and grains; while the themes have included nutrition, food and dining culture, and health. The concept is an annual continuing professional development course for teachers and teacher training students, and provides teaching inspiration in relation to the selected ingredient and associated theme. The idea is that the teachers subsequently bring inspiration to their local schools in order to carry out a course with their students. The philosophy behind this form of teaching is that student participation should be made central, combined with innovative and experimental learning processes in which the students collaborate on developing new dishes with the ingredient in question. Existing research has documented that innovative work and student participation are two didactic elements that are particularly useful in increasing students' learning outcome (Davies et al., 2013; Simovska & Bruun Jensen, 2009). The aim is to engage the students in order for them to realise a greater learning outcome by making the products their own rather than something which is dictated by their teacher. As part of the course, the students document their learning process and send the documentation (descriptions, images, videos, etc.) as an application to enter the competition *Food Contest—the Danish Food Knowledge Championship*. Based on this material, a suitable number of school classes are selected to participate in a local semi-final, the winners of which continue on to the national final. At these events, the students present their dishes and the processes they have gone through. In that sense, the element of competition is essential to the concept. However, the intention behind the Food Contest is not primarily to facilitate a cooking competition. Rather, it is to create the framework for an educational process characterised by students working innovatively with cooking, aiming at a high degree of student participation. These criteria also constitute the starting point for the assessment

of the students' achievements in the competition (Pedersen, 2012). Obviously, taste is essential to the cooking process and the finished products in the Food Contest. However, taste can also be viewed as a theme on which individual teachers can focus to a greater or lesser degree. Our studies show that students have different perceptions of working with taste, in regard to how much priority taste is given in the teaching they have attended. This makes it interesting to analyse how this perception influences their learning. Before that, however, let us turn to the concept of taste.

**Concepts of taste in science**

Taste is often defined differently within different disciplines, for example, physics, pedagogy, anthropology, sensory science and media studies. Formulating an adequate definition of taste can be a difficult task; it typically ends up being either too narrow or too broad, because different disciplines have different understandings of how to define taste (Leer & Wistoft, 2015). Expressed in slightly simplified terms, science primarily focuses on taste as a multisensory process in which the sense of taste is just one of five senses (sight, touch, smell, sound and taste). The sense of taste is described physiologically: we taste via specific stimulation of specific senses and sense receptors, or chemically in the form of the encounters and transformations of various substances.

Various receptors are located in the membranes of the taste cells, and are sensitive towards the five basic tastes: *sour*, *sweet*, *salty*, *bitter* and *umami*. When the taste substances are recognised by—and connected to—the receptors, an electrical signal is triggered via a number of biochemical processes and transmitted to the brainstem and on to the brain (Mouritsen & Styrbæk, 2015, p. 34). However, Mouritsen and Styrbæk emphasise that the taste sensation as seen from a scientific perspective cannot be reduced to this description as the sensation is a result of an integrated multisensory process in the brain that includes taste, smell, mouth-feel, sight and hearing (Mouritsen & Styrbæk, 2015, p. 32). Furthermore, they emphasise that it does not make sense to conceive of the experience of taste as a purely sensory-physiological phenomenon: "it also always includes a social, psychological and cultural dimension, which is related to norms, education and formation, aesthetics, values and identity" (Mouritsen & Styrbæk, 2015, p. 32).

By contrast with the humanities and social sciences, in science there is only one way to understand taste: as a sensory phenomenon that communicates impressions, which are processed in the brain. New insights continuously facilitate understanding of the capacity of receptors and neural pathways, and how a response to an impression can result in a specific taste. According to the scientific understanding, there is a surrounding world in which some molecules exist that are registered by a sensory apparatus, which signals the registered impression to the brain; this leads to a process in which the brain links the response to the sensory impressions to cognitive levels. The fact that there is a consensus on the understanding of taste means that the different scientific disciplines shed light on the same phenomenon, and they all build on each other. The scientific disciplines collaborate, which can be exemplified with a list of five scientific approaches to taste:

(i) Taste in itself, understood in terms of what is sensed directly on the tongue and in the mouth cavity, viewing taste as a chemical-physiological phenomenon mainly

taking place in the almost 9,000 taste buds on the tongue (Mouritsen & Styrbæk, 2015).

(ii) Taste in a sensory-physiological sense, conceiving of taste as an integrated multisensory process that includes chemical taste, smell, mouth-feel and hearing (Shepherd, 2012). Here, taste is a result of the interaction between macro-sensors, that is, the influence of various sensory impressions on taste. The point is that all five senses are in use when we taste (Khandelia & Mouritsen, 2012). Some scientists are particularly interested in mouth-feel, which includes chemical and mechanical reactions that are not part of the primary sensation. Here, it is not the five basic tastes—sweet, sour, bitter, salty and umami—that are central, but chemical or mechanical reactions or bonds to the receptors on the tongue: *chemesthesis*, which describes the sensitivity of the skin and mucous membranes to chemical stimuli that cause irritation, pain or damage to cells and tissue, and *astringency*. Both are mechanical effects on the mucous membranes (Mouritsen, 2014).

(iii) Taste in a neurological sense, taking taste as an effect of the 'image' that appears in the brain when something is tasted. In English, the term *flavour* describes the combined taste impressions; unfortunately, a similar term does not exist in Danish. All the components in flavour employ cranial nerves to communicate with the brain. Mouritsen describes how three cranial nerves in particular—the olfactory nerve, the optic nerve and the trigeminal nerve—play a central role in this flavour communication. He also describes how taste is typically studied within taste neurology as a physical-chemical phenomenon, but also—and especially—in terms of the effect of smell and mouth-feel on the taste impression (Mouritsen, 2014).

(iv) Neurogastronomy, drawing on the above-mentioned neurological realisation that flavour is created in the brain. Here, taste is viewed in relation to emotions, memories, language, learning, consciousness and, accordingly, food preferences (Shepherd, 2012). In this sense, taste becomes significant in relation to eating—why we like the food we like (Prescott, 2012)—and neurogastronomy constitutes a scientific basis for gastronomy.

(v) Gastrophysics, viewing taste in a broad sense as something that springs from the chemical composition, biochemical processes and physical characteristics of the ingredient. Combined with knowledge, and impressions and memories of taste, the broad concept of taste in gastrophysics constitutes a specific approach to learning. Gastrophysics aims to integrate learning and food in creating interest in and motivation for Food Knowledge among children and young people via taste (Mouritsen, 2014).

**Cultural concepts of taste**

A number of culture researchers and sociologists have also contributed to the concept of taste. They focus on the significance and function ascribed to taste in specific contexts, or how taste is part of social and cultural communication systems. One of the most elaborated and widely discussed contributions is without doubt that presented by the French sociologist

Pierre Bourdieu in his book *La distinction* (1979). Bourdieu's original point is that taste does not reflect the individual's unique physiological taste, but rather their social position and background: "Taste classifies and it classifies the classifier" is a slogan that encapsulates the essence of Bourdieu's analysis (Bourdieu, 1979, vi). Hence, taste is an art of differentiation in which taste—and not least distaste—functions distinctively within classes, in a social process where the different classes distinguish themselves from others as their anti-models, creating a collective identity within the group through cultivating specific taste ideals. Such distinctive taste communities always function negatively; as Bourdieu emphasises: "social identity is defined and asserted through difference" (Bourdieu, 1979, p. 191), and taste is precisely a central marker of difference. According to Bourdieu, food culture is an extremely rich field for such taste and distaste constructions. Food is used as a medium for groups to distinguish themselves from others through different culinary ideals.

Bourdieu's analysis has been criticised for being too rigid, as his position does not leave much room for change, individual agency and mobility (Warde, 1997, pp. 5-21). Several contributors to post-Bourdieusian discussions on taste have also pointed out that the distinctive practices can no longer only be understood on the basis of (economic) class, claiming that the taste ideals rather function as entry tickets to various ad hoc communities (Povlsen, 2007, p. 47). Already in 1988, the French sociologist Michel Maffesoli wrote about *neotribalism*, that is, a society in which various new taste tribes occur around current brands and trends, which means that the foundation of the idea of distinction must be reconsidered, given that the Bourdieusian class distinction cannot account for these new social group formations (Maffesoli, 1988, p. 24). Apparently, Maffesoli does not reject the idea of social identity being constructed through difference; rather, he views Bourdieu's class distinction as one of many, contending that, especially in the middle classes, a number of new tribes exist that are equal in a class perspective while being distinct from one another, for example, based around slow food, a Paleo diet, raw food, and so on. However, it is worth keeping in mind that food culture still contains a class perspective, as these distinctive groups primarily 'recruit' people who have the financial and cultural wherewithal to be part of such food and dining communities.

Teachers and researchers with a background in pedagogy, sociology and cultural sciences, on the other hand, seem to have a much broader concept of taste, regarding it as something that is rooted in cultural and sociological processes, created through interplay between individual memory or experience and collective structures (Leer & Wistoft, 2015). However, those within both science and the humanities can often see that their descriptions alone are inadequate. Nevertheless, it is difficult to describe precisely the interaction between the two different views on taste, and how they can work together. Reaching a common definition of taste is therefore not an easy task. The matter is further complicated by the fact that taste—unlike other scientific terms—is also an everyday word, used without much consideration in a number of different meanings in general communication. For these reasons, we have chosen not to restrict ourselves to a specific definition. Instead, we aim to understand taste as a didactic theme whose values can be defined and clarified in relation to different forms of Food Knowledge teaching. Hence, the article does not employ a consensus-orientated, stable and precise concept of taste, but rather views taste as a value and context-defined, didactic

theme. All of the above-mentioned concepts and understandings provide the framework with regard to analysis of the collected empirical data.

## Method and analytical strategy

It should be acknowledged that in a research perspective, it is difficult to ensure direct insight into the students' realised learning on the basis of the contextual definition of learning—especially in relation to a subject like Food Knowledge and the Food Contest project, where testing is not an obvious option. On the other hand, it is possible to observe communicative signs of learning; therefore, we opted for a questionnaire to gain insight into which expectations the students have realised with regard to the overall learning goals of the project and, further, to study students' perception of the different didactic elements included in the Food Contest project. On an analytical level, it is the relation between learning expectations and the different didactic elements that is being explored.

On the concrete level, a questionnaire was developed containing a total of 34 questions. The questionnaire only applies point 6 answers on the Likert scale, addressing the following constructs:

- Expected learning (7 items; α = .78)
- Experience of working with taste (3 items; α = .77)
- Experience of working innovatively (3 items; α = .72)
- Experience of student participation (3 items; α = .70)
- Experience of collaboration (3 items; α = .60)
- Experience of the element of competition (1 item)
- Students' well-being (3 items; α = .59)
- Motivation for food and dining (3 items; α = .75)
- Involvement in food and dining in everyday life (5 items; α = .49)

All the questions were subsequently recoded as variables in accordance with the constructs studied. With an eye to further analysis, the following background variables were collected:

- Gender (1 item)
- Age (1 item)
- Geography (1 item)
- Grade (1 item)

The study was carried out with 769 respondents, the total number of students participating in the Food Contest semi-finals 2015. When the students at the event were not cooking or competing, different workshops were held to ensure their time was spent productively. One of the workshops involved answering the questionnaire. This took place one class at a time, and all answering sessions were supervised by the author. The respondents represented 42

school classes, mainly 6th and 7th grade. Six geographical regions of Denmark were represented, distributed across the country.

**Correlations**

The reliability coefficients (α) between the tallied tables are generally more than .70, meaning that the correlations are acceptable and indicating that the questions measure the intended construct (Field, 2009, p. 679). However, regarding *collaboration* and *well-being*, the coefficients are only .60 and .59, which indicates poor correlation. Nevertheless, the variables are correlated, albeit to a low degree. Regarding the students' involvement in food and dining in general, the reliability coefficient is .49, which is so low that the construct has not been included in the further analysis.

**Dependent and independent variables**

With an interest in the cognitive element as a point of departure, the constructed variable *expected learning* is used as a consistent, dependent variable, while other variables are used in the analysis as independent variables. This approach, however, may appear linguistically problematic.

The questionnaire study is designed as an observational study. Therefore, it is not possible to control the independent variables the way it is done in experimental research designs, where the aim is that independent variables are only manipulated one at a time (Kent, 2015, p. 280). In an experimental design, it makes sense to define variables as either dependent or independent, because the effect of one variable (independent) on another (dependent) can be observed explicitly. However, in the present observational design, things are not quite as simple. It is possible to control for factors that the researcher is aware may influence the dependent variable, but it is not possible to control for factors the researcher is unaware of (Luhmann, 2000, p. 221). Based on this theoretical and philosophical point, it can also be argued that hoping to seize control of all the variables that may affect a given dependent variable is utopian. This would be too complex an operation because the cognitive interest focuses on students' learning expectations. Further, it can be misleading to characterise students' learning expectations as dependent on specific variables, because this may entail causal associations. Nevertheless, the terms dependent and independent are still used because this terminology is dominant in the literature describing the methodology of quantitative research. However, it needs to be acknowledged that students' learning expectations are influenced by a variety of factors that are impossible to observe in isolation.

**Multiple regression analysis**

How great is the effect of different variables on *expected learning*, and what difference is there between effects? In answering, we have opted for a multiple regression analysis. One of the challenges of this analysis is that the different variables are constructed on the basis of a varying number of questions, which are answered on different scales. Therefore, all variables in the multivariate analysis have been standardised. When the regression analysis is carried out, the coefficient expresses how many standard deviations the dependent variable will change as a consequence of an increase of 1 standard deviation in the independent variable. This facilitates comparison across variables that have been measured on different scales.

Multivariately, it is possible to combine and analyse the variables in 78 combinations. In the analytical phase of this research process, all these combinations were tested and analysed. Out of consideration for the scope of the present article, it is not possible to present all results. Furthermore, not all results are deemed to be worth mentioning. Instead, the results that are considered most noteworthy in relation to this article have been selected for presentation (see Table 1).

In Table 1, the variable *expected learning* is continuously analysed as a dependent variable, while the constructed variables and background variables function as independent variables in the analysis. The independent variables are presented in the first column, while the subsequent columns present the results of the different analyses. In the column named *Bivariate regression*, a linear regression analysis has been carried out *between expected learning* and the variable in question in the same row. In this context, control has not been made for other variables. In the columns named *Step 1*, *2*, *3*, *4* and *5*, the number of variables used in the analysis increases stepwise. The different steps must be regarded as five different analyses, while the independent variables included are those for which results are included in the column.

**Table 1** **Regression analysis of expected learning as a dependent variable and a variation of independent variables**

| | Bivariate regression | Multiple Regression | | | | |
|---|---|---|---|---|---|---|
| | | Step 1 | Step 2 | Step 3 | Step 4 | Step 5 |
| Motivation | .44‡ | .25‡ | .17‡ | .16‡ | .16‡ | .16‡ |
| Innovation | .48 | .28‡ | .14† | .14† | .14† | .14† |
| Participation | .40‡ | .12‡ | .14* | .10 | .09 | .12 |
| Collaboration | .38‡ | | -.03 | -.01 | -.02 | -.02 |
| Taste | .51‡ | | .26‡ | .24‡ | .25‡ | .25‡ |
| Competition | .32‡ | | | .04 | .05 | .04 |
| Well-being | -.14‡ | | | -.06* | -.07* | -.07* |
| Region | .06 | | | | -.02 | -.04 |
| Grade | .10† | | | | .08 | .09 |
| Gender | .05 | | | | | -.09* |
| Age | -.08* | | | | | -.03 |

*‡ p = <0.001 † p = <0.01 * p = <0.05*

## Analysis and discussion of empirical findings

The first row in Table 1 shows the correlation between the standardised variable for *motivation* and the standardised variable for *expected learning*. The coefficient for this is consistently relatively high, which emphasises that motivation and expected learning are two phenomena with a mutual linear positive correlation—a correlation that has also been documented in other research (Schunk & Mullen, 2013). The correlation between *motivation* and *expected learning* is therefore not a surprising result, but it is arguably a good starting point for comparing the correlation of other variables with *expected learning*.

Focussing on the Step 1 analysis, it is noteworthy that the students' experience of working innovatively has the highest coefficient, 0.28, which is .03 standard deviation higher than the experienced motivation. The data thus indicates that the experience of working innovatively has a particularly positive effect on the students' expected learning. At the same time, it is noteworthy that the students' experience of participation has a coefficient of .12, much lower than the experience of innovation when only these three variables are analysed. All three variables have a positive correlation with *expected learning*, but in relation to the Food Contest project it is striking that the effect of *innovation* on the students' expected learning is more than twice the effect of *participation*, considering that the project gives more or less equal weight to the two didactic elements, aiming to aid students in achieving learning goals.

In the Step 2 analysis, the variables *collaboration* and *taste* have been added. Here, it is clear that *collaboration* has a negative coefficient of -.03. It should be added that the result is not significant and might therefore be random. In the bivariate regression analysis, the coefficient is .38 with a strong, significant p-value. It is considered more reliable that the experience of collaboration has a positive correlation with expected learning, but the data does not facilitate any concrete assertion regarding the effect in relation to the other variables analysed. In the Step 2 analysis, it is more interesting to focus on *taste*, where the result is strongly significant, the coefficient being .26. In all five steps of the analyses, *taste* has the highest coefficient, and the result remains strongly significant in Step 3, 4 and 5. In addition, the change in coefficient is insignificant when controlling for other variables, which indicates a reliable result. At the same time, it is noteworthy that the coefficient is remarkably higher than that of both innovation and participation—the founding didactic elements in the Food Contest project. Generally, the coefficient for *taste*, compared with the coefficient for *motivation*, is also noteworthy. All results for both variables are strongly significant, and *taste* is consistently .09 standard deviation above *motivation*, except in the Step 3 analysis, where the difference is .08. Hence, the data indicates a positive linear correlation between the students' experience of working with taste and their learning expectations. Among all the factors investigated, the effect of taste is the highest, which is a clear indication that it is relevant to include taste as a didactic element in reflections on teaching Food Knowledge.

Focussing on the Step 3 analysis, the students' experience of the element of competition and their well-being have been included in the analysis. The bivariate analysis displays a strongly significant result, which indicates that the students' experience of motivation as a result of the element of competition affects their learning expectations with a coefficient of .32. This result is lower than those related to *motivation, participation, innovation, taste* and *collaboration*. It can therefore be assumed that the element of competition may have a positive correlation with the students' learning expectations, but that the effect is smaller than that of other variables studied. Furthermore, it is clear that the effect is very minimal compared to the other variables when they are analysed multivariately. However, the results pertaining to competition in the Step 3, 4 and 5 analysis are not significant and might, therefore, be randomly generated.

*Well-being* appears in the Step 3 analysis with a negative operational sign. This is not an indication that well-being as a phenomenon has a negative effect on learning, but is rather a

result of the answer scales for the three questions that constitute the variable being reversed in relation to the other variables, in the sense that the lower the students' response on the scale for well-being, the more it expresses their well-being. As such, the result should be interpreted 'upside down'. The coefficient in the bivariate analysis therefore indicates that the variable *well-being* has a negative correlation (in a mathematical sense) with *expected learning*, the coefficient being -.14. In other words, the more well-being that students experience, the higher their expectations of realising their own learning expectations. The coefficient is relatively low compared with coefficients for other variables. In the Step 3, 4 and 5 analyses, the effect of well-being is very limited, and the results for this variable are significant in all three analyses. Well-being thus has an effect on the students' expected learning in the Food Contest project, but the effect is relatively small compared to other variables.

In the Step 4 and 5 analyses, the background variables *region*, *grade*, *gender* and *age* have been added. Only one result is significant: gender. However, the coefficient is relatively small, and therefore gender is not regarded as having any great impact in relation to *expected learning*. What is noteworthy in the Step 4 and 5 analyses, on the other hand, is that the above-mentioned coefficients for other variables do not change remarkably. The results for *motivation* and *taste* are still strongly significant, and the results for *innovation* and *well-being* are still significant. The Step 4 and 5 analyses therefore function as a control of the correlations interpreted earlier, indicating that the controlled background variables have an insignificant effect on the assertive strength of the analyses. The background variables can also be analysed in Bourdieu's theoretical perspective, viewed as markers of difference between respondents and thus factors that should classify the students participating. In this perspective, the background variables should have significant influence on the correlation between *taste* and *expected learning*. However, that is not the case in our analysis, which indicates that the effect of working with taste is not limited to specific groups of students, but is rather a didactic element that can benefit all students in working to achieve learning goals.

## Conclusion

This article demonstrates correlations between students' learning expectations and their experience of different didactic elements in the subject Food Knowledge in the Danish primary school. The results pertaining to most elements can be viewed as being expected, given that existing research has already demonstrated similar correlations. However, the correlation between taste and learning is a relatively unexplored field, and the analysis in this article indicates that the experience of working with taste within Food Knowledge may have an effect on students' expected learning that is just as positive as—or even more positive than—that of known didactic elements like student participation and innovation. This might be seen as self-evident, given that taste cannot be ignored when people deal with food and dining. Nevertheless, even though it is self-evident, it is important to emphasise that the students apparently have many different experiences of the extent to which they have dealt with the theme of taste in the teaching they have attended. This indicates that teachers have devoted different importance to the theme and thus prioritised taste differently as an active component in their teaching. Our study shows that the teaching in relation to the Food Contest project is highly varied and broad-ranging; for instance, it is to a large extent

characterised by student participation and innovative work. Other studies have documented that these approaches are useful in increasing learning outcome and achieving learning goals (Davies et al., 2013; Simovska & Bruun Jensen, 2009; Wistoft, 2013), and this is reaffirmed in our study. Nevertheless, prioritising participation and innovation, for example, entails the risk that learning and work regarding taste are thrust into the background behind these didactic priorities. If this happens, it would mean—in relation to our results—that students would not achieve the positive effect that working with taste can yield. We do not mean to argue that teachers should not include innovation and student participation in their didactic reflections; however, our observations indicate that taste is a crucial factor in relation to expected learning. Therefore, teachers need to create a balance between didactic elements and remember to incorporate taste as a didactic approach to aiding students in achieving learning goals.

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