



Integrating sociocultural perspectives into a university classroom: A case study of students' experience

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ABSTRACT

Sociocultural theory (SCT) is one of the most important theories to explain children's cognitive development; however, till now few discussions have been made on the feasibility of applying the concepts of SCT to course design and delivery in higher education. To fill this gap, this study used a food science-related broadening course, whose course design and delivery were guided by the concepts of SCT, provided by a university in China as a case study. Data were collected through 10 in-depth semi-structured interviews performed at the end of the course. The purpose of this study was to examine the perception and feelings of students who participated in the course so as to understand the learning experience of students who had been exposed to teaching practices, as well as the course design, informed by the SCT at the tertiary education level. Results of this study demonstrated the potential use of the SCT in facilitating teaching and learning in higher education through enhancing students' learning experience. Concepts of the SCT, therefore, warrant further studies as frameworks for future course development in higher education.

1. Introduction

Over the years, different theories have been postulated to explain the process of learning and development. One example is Piaget's cognitive development theory [1,2], which posits that intelligence grows and develops through a series of stages, including the sensorimotor stage, the preoperational stage, the concrete operational stage, and the formal operational stage. According to this theory, an individual takes an active role in the learning process and is fueled substantially from within. Another example is Freud's psychoanalytic theory, which states that behaviors undertaken by human beings are largely motivated by inner, unconscious forces, conflicts and memories [3–5]. This theory offers educators practical insights into the role potentially played by unconscious feelings in motivating some behaviors of students. Building upon Freud's theory of psychosexual development is the psychosocial theory of development postulated by Erik Erikson [6], who has proposed eight stages of individual human development. Each stage arises when an individual grows and encounters turning points during childhood, adolescence, and adulthood. This theory provides insights into the conflicts (and challenges) potentially encountered by students at different ages and hence offers a framework for adjustment of teaching approaches in response to the needs of different student populations. Besides the aforementioned examples, there are many other theories (such as nativism and behaviorism) proposed to explain the nature of development and learning [7], with debate about nature of learning and development ongoing till now.

Among different theories of learning and development, the sociocultural theory (SCT) is one of the most researched theories to

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explain cognitive development among children [8]. Implications of the SCT have been extensively adopted in exploring educational practices [9–12]. While most of the discussions in the literature on the SCT focus on early childhood education, the SCT has been used in the literature in the context of adult learning. For example, Alfred held that the SCT embraces conventional theories that dominate the field of research in adult learning, and believed that the theory can democratize adult education [13]. The SCT has also been reported to be able to expand the theory and practice of adult education by distinguishing the ways in which learners are historical and cultural agents consisted of (and embedded within) tool-mediated activity and social relationships [14,15]. Despite the extensive efforts paid to explore the SCT in educational practices, ranging from early child development [9–12] to teacher education [16,17], till now little discussions have been made on how the SCT can be adopted in course design in higher education. This study fills this gap by using a food science-related broadening course as a case study to examine the perception and feelings of students so as to understand the learning experience of students who are exposed to teaching practices, as well as the course design, informed by the SCT at the tertiary education level.

2. Historical overview of theories underlying curriculum development

The designing of courses inevitably involves the cultural values, beliefs, assumptions, and languages of the course developer. This is not simply an issue of identifying the content to offer to students, but also a process that is loaded with cultural values and theoretical constructs. Over the years, Piaget's cognitive constructivist view and Vygotsky's sociocultural theory (SCT) have emerged as some of the important theories explaining human development and learning [18], influencing greatly the development of curricula in early childhood education. For example, Piaget's genetic epistemology influenced the 1987 version of the curriculum guidelines known as Developmentally Appropriate Practice (DAP) [19], which advised developers of early childhood education curricula to provide children with the chances to construct their own knowledge. In other words, course developers were encouraged to offer young children with learning experiences that target the children's current developmental abilities [18]. This idea largely emerged from Piaget's belief that knowledge acquisition comes from assimilation and accommodation of information. As suggested by the guidelines, the most effective way to perform early childhood education was to have the educational practice *appropriate* for the *development* of the children. This ideology, however, was later criticized when scholars started to doubt the methodology utilized by Piaget in developing the theory of genetic epistemology and hence in describing the different stages of intellectual development [20]. For example, in the book *Children's Minds* [21], Donaldson argued that children had the potential of operating at a higher level of cognitive function than delineated in Piaget's description.

While the use of Piaget's ideas for development in early childhood education was bring criticized, Vygotsky's theory on human development started to gain acceptance and was thought to be able to address the criticisms leveling against Piaget's theory. According to Vygotsky, development is a process at both interpersonal and intrapersonal levels. It is a result of social interaction contextualized by the cultural setting to which the children are exposed. In other words, while Piaget believes that a child's exploratory behavior in the outside environment is crucial to development, Vygotsky views social interaction as a major factor driving the process of child development. Since the turn of the last century, the sociocultural perspectives have exerted influence on curriculum development in high schools, even though the validity of the SCT in contexts other than child education has yet to be confirmed. Such influence is demonstrated by Cliff [22]'s study, which examined the discursive tensions and organizational constraints that serve as impediments to a curriculum change in health and physical education (HPE) at the St Anne's Catholic girls' high school and the Waterside public high school in the Australian state of New South Wales. The study reported that HPE teachers in high schools in Australia tended to value objective and rational knowledge derived from science; they aimed at offering factual knowledge to young people, and ensuring young people could reproduce the pattern about how one should live one's life. Cliff held that such an existing teaching approach ends up with marginalizing any opportunity for making a sustained focus on the cultural and social factors that persistently exert influence on how one lives [22]. He, therefore, proposed that having the sociocultural perspective and related discipline knowledge better represented in pre-service teacher education programs would be crucial to facilitating the integration of the SCT into changes in the HPE curriculum in high schools.

The SCT has been adopted to guide teachers through the use and integration of instructional technologies in professional development schools. This has been reported by Whipp and colleagues [23], who revisited their experience with teachers in two professional development schools (*viz.*, Woodrow Wilson School and Adlai Stevenson Middle School) that had participated in a four-year Preparing Tomorrow's Teachers in Technology (PP) project in the US. Based on their observations, three "activity systems" (one system for preservice teachers, another for practicing teachers, and the third for both preservice and practicing teachers) were described in the study. The study revealed how sociocultural perspectives could be integrated into the strategic structuring of professional development activities for both practicing and preservice teachers on technology use and integration. Although the validity and generalizability of the SCT in non-children populations has not been corroborated, some of the implications and insights gained in that study about using the SCT in the design of activities for non-children populations could still be useful. The possible use of the SCT in teaching practice in higher education would be discussed in the subsequent parts of this article.

3. Methodology

This study aimed to examine the learning experience of university students participating in a course in which course design and teaching practices were guided by the SCT perspectives. By using a food science-related broadening course as a case study, the purpose of this study was to address the following three questions:

- How do students feel about the design of a SCT-guided food science-related broadening course?
- What is the experience of students when participating in a food science-related broadening course taught by using SCT-guided teaching approaches?
- To what extent can students be satisfied when SCT concepts are integrated into the assessment of a food science-related broadening course?

SCT concepts were integrated, based on the theoretical foundations delineated in the preceding section, into the design and delivery of my broadening course relating to food product development provided by a university in China. The total number of students taking the SCT-guided broadening course was 49. A number of strategies were incorporated into the course design to enhance the variations in learning activities, offer different levels of assisted performance, and establish a collaborative and supportive learning culture.

As stated by Gay, Mills, and Airasian [24] using interviews as a way of data collection not only allow interviewers to continuously explore the response of interviewees, but can also enable them to effectively collect data regarding the interviewees' practical experience and personal feelings. Because of this, the interview method was adopted in this study to explore the learning experience and perceptions of students towards the course design, which was loaded with SCT perspectives, and to elicit their opinions, thoughts, and attitudes towards the SCT-guided course design and teaching practices in greater details. Ten students (around 20% of the total number of students) were invited, by convenience sampling, to attend an in-depth 1-h individual interview which was conducted in a private room. All interviews were conducted in a semi-structured manner so that interviewees could freely express themselves without constraints. Interview guides were established according to the purpose of research, and there were three main questions:

- How do you perceive the learning experience provided by this course?
- How do you think about the design of the course? How would you describe the similarities and differences, if any, between this course and other courses you have taken?
- How do you feel about the methods of assessment adopted in the course?

Probing questions were adopted to draw out more in-depth and complete information from the interviewees. In order to ensure that the interview data were collected and analyzed without distortion, permission was sought from the interviewees to have the entire interview process recorded. The data collected were first transcribed verbatim, then translated into English for further analysis. Students were asked to sign a consent form to express that their participation in this study was totally on a voluntary basis. Students were informed of their rights to withdraw from the study before the in-depth interview was conducted. They were also provided with the objective of this study. In order to protect their anonymity, a research code was assigned to each of the students to represent their identity. Ethical approval to commence this study was granted by the Human Ethics Committee of the Hong Kong Polytechnic University (HSEARS20221117003) prior to data collection.

Table 1
Translation of some SCT concepts into course development practices.

Implication	Expected outcomes	Actions taken
Enhancing the variations in learning activities	The effectiveness of the course can be increased by increasing students' interest. Students become active but not passive agents during the learning process	• Design the course content to make it more relevant to the culture and day-to-day experience of the students • Introduce different learning activities (ranging from individual mini-projects to group presentations) into the course design • Incorporate videos and animations to enhance students' understanding and learning effectiveness
Offering different levels of assisted performance	The learning process of students with different backgrounds and at different levels can be facilitated by both psychological and physical tools	• Design the assignments to make them more exploratory in nature • Adopt innovations and technologies to facilitate students' learning • Hold tutorials in a small-class setting to provide more assistance and guidance to students based on their specific needs • Build an online group using social media to enhance students' peer interaction
Establishing a collaborative and supportive culture	Students' learning is enhanced by learning from the "more knowledgeable other" and by exposure to a series of designed course components that enable assisted performance	• Incorporate group tasks as part of the assessment so that a collaborative and supportive learning environment is created • Introduce problem-based learning in routine teaching • Encourage students' participation and interaction in class by using online surveys and tools

4. Results

4.1. SCT-guided course design and students' feedback

To integrate SCT perspectives into the course design and teaching practices in the broadening course, some of the SCT concepts were translated into some actions (Table 1). As stated by neo-Vygotskian researchers, a student should serve as a “natural” agency of learning rather than a passive agent [25]. Students are supposed to make decisions (e.g., what content to learn, who to interact with, and what learning activities to attend) during the learning process. Therefore, during the designing of the course, the variations in learning activities were enhanced so that students with different backgrounds could benefit from the course. Topics relevant to students' daily life were covered to encourage proactive learning. One student mentioned that *“the course covers different topics that are relevant to our daily life”*. Another student said that *“after taking the course, many things I learn can be applied in real life”*. Such feedbacks indicate that shortening the distance between the course content and students' daily life could help enhance their interest and thus they are more likely to be active learners.

4.2. SCT-guided teaching approach and students' feedback

As far as SCT is concerned, mediation plays an important role in leading to cognitive change [26]. In fact, the concept of mediation appears in a large number of studies inspired by the Vygotskian SCT [27–29] and also in those inspired by Feuerstein's theory of Mediated Learning Experience [30–32]. During course design, different activities, technologies and innovations were incorporated into the lessons so that students with different backgrounds and learning needs could master the course contents and receive different levels of assistance during their learning process. Over 70% of the students interviewed indicated that the lessons were “versatile” and the learning activities were “diverse” and “non-boring”. One student said, *“I used to believe that attending a lecture only involved listening, but now I see that it can be much more than that”*. Another student opined that *“participating in different learning activities could make the learning process less monotonous and made me enjoy more”*.

The traditional teacher-fronted teaching practice is still the most prevalent one in higher education institutions in China [33]. Incorporating technological innovations into course design can potentially facilitate the establishment of more social-interactional and student-centered learning. In this SCT-guided broadening course, technological innovations were incorporated in three ways. The first one was the use of videos and animations to help students visualize abstract concepts such as the process of digestion. The second one made use of e-surveys by means of various online tools to enhance teacher-student interactions during the class. The last one was an online platform where students could interact freely and engage in more contextual and collaborative interactions with their peers. This helped create a collaborative and supportive environment for students to learn from one another.

4.3. SCT-guided assessment plan and students' feedback

The performance of the students in this course was assessed by a written assignment, a final examination and a group project. In terms of the group project, students were divided into groups of 4–5 and each group was required to design a food product. During the process, students were expected to encounter various technical problems, ranging from proper selection of ingredients to the need of enhancing the sensory attributes of the product. Students were encouraged to collect information by themselves and look for solutions. Meanwhile, each group was provided with a 30-min consultation session, in which the students shared their difficulties and latest progress with the teacher and the teacher provided guidance to students to continue to look for solutions. This arrangement was guided by the notion that students' learning occurred in the zone of proximal development. The group work setting would allow students to receive dialogic assistance within the zone of proximal development via learner-to-learner interaction as reported by previous studies in the context of second language acquisition [34,35].

Furthermore, by offering a 30-min consultation session to students each week, students were expected to be able to move from their current proficiency level to a higher level and eventually possess the competence to tackle the problem independently. The assessment tools adopted in the course were well accepted by the students. During the in-depth interview, one student stated, *“I have no clue about food additives because my major is not a science one ... because my groupmates are from different backgrounds, each of us contributed our subject knowledge to propose solutions when we encountered problems”*. A similar idea was raised by another student, who mentioned that *“the group work setting allowed non-science majors and science majors to work together ... if we were asked to do a project individually, I would not be able to complete it”*.

5. Discussions

Vygotsky's theory has gained acceptance in curriculum development and some studies have even adopted it to guide curriculum development for adolescents or even adults. As evidenced by the findings of this study, the integration of the SCT into course design could be achieved in multiple levels. In particular, the potential influence of the SCT could be achieved in (1) enhancing the variations in learning activities; (2) offering different levels of assistance; and (3) establishing a collaborative and supportive culture.

5.1. Enhancing the variations in learning activities

Vygotsky holds that learning takes place in a social context (in which the learner obtains, in their “zones of proximal development”,

support from their peers or more knowledgeable others) where guided participation is attained [36]. By taking part in a shared activity in a specific context, a learner's knowledge and skills can be enhanced, leading to the possibility of properly functioning within their sociocultural community [37,38]. Taking this into consideration, in order to ensure a student in higher education can be fully developed in multiple areas of competencies, it is important to establish a learning environment with a diversity of activities targeting different areas of development. In fact, students in the same class may have different backgrounds, and hence "zones of proximal development". Therefore, the learning efficiency of students participating in the same set of learning activities may not be the same. This is particularly true in a broadening class, in which students have different majors and different stages of "proximal development". It is, therefore, important that educators can understand this and provide extra support for those whose pace of learning is lagging behind. In this study, the variations in learning activities were enhanced by designing contents that were relevant to the culture and day-to-day experience of the students. Videos and animations were incorporated to enhance students' understanding and learning effectiveness. Different learning activities (ranging from individual mini-projects to group presentations) were introduced into course design. As demonstrated by students' feedback, shortening the distance between the course content and students' daily life helps enhance students' interest to make students behave more like active learners. In addition, enhancing the diversity of activities used in the class could help meet the needs of different students who are currently at different stages of "proximal development", thereby challenging students at different levels to grow and develop.

5.2. Offering different levels of assisted performance

The SCT regards "assisted performance" as an important element of learning [39,40]. For this, students should be able to access help and support from the more knowledgeable others when they perform a task. Here the support they receive should not be simply evaluative and directive in nature. Instead, it should be well-planned and should involve a combination of modelling, feedback, instruction and questioning so that the learner can acquire the skills and knowledge to independently perform the task after the process of "assisted performance". In order to offer different levels of assisted performance to students, in this study the assignments were designed to be more exploratory in nature. Innovations and technologies were adopted to facilitate students' learning. Tutorials were held in a small-class setting to provide more assistance and guidance to students based on their specific needs. Furthermore, an online group was built using the social media to enhance students' peer interaction.

In fact, as suggested by the SCT, learning is a process in which members of a community get involved in a structured dialogue in which the less able ones can progress to a higher level of competency via the assistance and support provided by the more capable partners. Gaining autonomy is, therefore, the ultimate goal of learning. The term "scaffolding" actually did not come from Vygotsky. Instead, it originated from an article published by Wood, Bruner and Ross [41], who examined the role of tutoring in problem solving among children. Scaffolding, according to Van Lier [42], can be performed based on the following six principles: (1) providing a context support in which learners can make mistakes in a safe environment, with their mistakes expected and accepted as part of their learning process; (2) encouraging intersubjectivity; (3) enabling a complex of actions to be repeated over time; (4) allowing communication between members of a community made in a natural way but not in a forced manner; (5) keeping the scaffolded assistance provided to the learners flexible in a way that the support received by the learners can be adjusted consistently based on the learners' actual needs; and (6) closing the "zone of proximal development" when the learner attains the required knowledge and skill to perform the task independently.

Here it is worth noting that, upon the availability of scaffolding, understanding has to be constructed. As a matter of fact, without having the understanding appropriated, it is not possible for learning to occur [43]. In other words, the learning process is complete only when the learner refers the meaning and use of a new concept to their underlying frame of reference followed by successfully shifting the concept from the external social plane to the internal personal plane. Such an internalization process very often exists as a private speech, though in some occasions the learner may vocalize the mental process. The latter makes the process of internalization audible. After a concept is appropriated, it is converted to the learner's personal understanding. Since different people may have different underlying frames of reference, the understanding of the same concept sometimes could be very different among people. To ensure that the learners understand a concept correctly, educators may consider using different forms of assessments (such as tests, projects, quizzes, and essays) to determine how well the students can master the meaning and use of the concept, and provide feedback accordingly if there is a discrepancy between the learner's personnel understanding and the true meaning of the concept.

5.3. Establishing a collaborative and supportive culture

Regarding the role played by "assisted performance" in learning, in order to facilitate students' acquirement of new knowledge and skills, it is important to establish an environment in which students can persistently obtain guidance from the more knowledgeable ones so that they can grow in their "zones of proximal development". To achieve this, this study incorporated group tasks as part of the assessment so that a collaborative and supportive learning environment can be created. Problem-based learning in routine teaching was introduced. Students' participation and interaction in class were encouraged by using online surveys and tools. As revealed by the findings of this study, when designing a course, it is advisable to consider the class as a community fostering a culture of collaboration rather than a culture of isolation. Under the collaborative culture, members of that community, as stated by Tharp & Gallimore [44] (pg. 191), should "*share common goals, work at relevant instrumental tasks, and interact in particular ways that reduce anxiety, encourage persistence in the face of difficulty, and employ all the means of assisted performance*". In addition, since the community members have different backgrounds and hence expertise in different areas, each of them can also serve as the "more knowledgeable others" for someone in some areas of competency while receiving support from others in their own "zone of proximal development". Such a

collaborative culture, therefore, enables the formation of a continuum of support and learning opportunities for members with different knowledge and skills. This culture, in fact, can be easily established in universities by intentionally generating both formal and informal opportunities for different members (including students, teaching staff, research staff, and even technical staff) to participate in some shared activities and projects. The feasibility of this has been partially demonstrated by Hughes and Ooms [45]'s longitudinal case study of a content-focused technology inquiry group in Halverson Community School. The study reported a possible role of facilitation and collaborative support in learning. The establishment of such a collaborative and supportive culture for facilitating professional development of individuals has also been reported in online forums and discussions [46], online master's programs [47] and curriculum development projects [48].

6. Concluding remarks

The SCT is one of the most important theories to explain children's cognitive development [49]. In this study, the integration of SCT perspectives into course design and teaching practices in the context of higher education was explored. Based on the data collected from students via in-depth interviews, it could be concluded that the learning experience of students tends to be positive. In-depth interviews were adopted in this study as the only means of data collection. The accuracy of the data collected might be compromised if false or vague memories occurred at the time when the interviewees recalled their experience. Therefore, interviews were conducted shortly after the end of the course to minimize the impact of false or vague memories. In addition, this study adopted a broadening course related to food science provided by a university in China as a case study. Due to the comparatively small and non-representative sampling of students used in this study, findings were, therefore, largely context-dependent. They may not be generalized to other courses in food science, to a university in a different country, or even to a different university in China. Moreover, while the subjective learning experience of students was examined by using in-depth interviews, formal analysis of changes in students' learning outcomes was not conducted. Future studies can be performed to analyze this area so that the effectiveness of the SCT-driven approach in course design in enhancing students' learning can be better determined. More efforts should also be made to examine the integration of SCT concepts in course design and development in other disciplines under other cultural backgrounds. Nevertheless, the feasibility of integrating the SCT in course design for non-children learners is well-supported by the results of this study. The potential impact of the SCT in facilitating teaching and learning is demonstrated in the context of higher education, and warrants further studies as frameworks for future course design and delivery.

Author contribution statement

Wing-Fu Lai: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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