Investigating EFL Learners’ Perceptions of Critical Thinking Learning Affordances: Voices From Chinese University English Majors

Xiaoshuang Du¹ and Lian Zhang²

Abstract
Affordances are action possibilities provided by the environment. This study investigated university EFL learners’ perceptions of the critical thinking learning affordances in their course learning environment. The participants were a cohort of 156 fourth-year English majors from a Chinese university where the English department was under a curriculum reform to promote students’ language learning and critical thinking development. The instrument of this study was the Learning Environment Affordance Survey_Critical Thinking (LEAS_CT) with a set of multiple-choice questions. The data analysis methods used in the study included descriptive statistical analysis, factor analysis, and MANOVA tests. The results showed that the English majors had strongly positive perceptions of the critical thinking learning affordances, which included four types: Rich Resources, Interactive Negotiation, Quality Task, and Community Culture. The results also revealed that high-achieving students had significantly better perceptions of the critical thinking learning affordances than lower-achieving students. Responses to the multiple-choice questions indicated that the English majors considered content-rich materials, teacher-facilitation, and small-group/peer learning benefited them most in terms of critical thinking development. Factors that influenced their perceptions of learning affordances and implications concerning integrating critical thinking into the tertiary EFL curriculum were discussed.

Keywords
learning affordances, critical thinking, EFL learners, curriculum reform

Introduction
Affordances refer to the perceived action possibilities provided by the environment (Gibson, 1979; van Lier, 2006). The notion implies actor-environment mutuality, which means the actor and the environment are interdependent. In terms of applying the notion affordances to learning studies, it’s argued that the utility of the notion affordances in explaining learners’ behavior depends on their perception (Aronin & Singleton, 2010). In other words, learning affordances exist relative to the actor’s capacity to perceive them, and this perceivability contributes to a better understanding of both learning and the learner. In addition, learners’ perceptions of the learning environment can be an important indicator to evaluate the quality of educational interventions (Taylor et al., 1997). Therefore, learners’ perceptions of a certain learning environment and its affordances remain an important issue yet to be explored (Jiang & Zhang, 2019; Menezes, 2011).

This study was part of the evaluation of the curriculum reform in the tertiary English as a foreign language (EFL) program in a prestigious Chinese university. In the domain of tertiary foreign language education, the “two-tiered curriculum” has been a debated issue for years. It means language courses at the lower level of the curriculum tend to be instrumental and content-indifferent and courses at more advanced stages often follow the cultural and literary traditions (Urlaub, 2017). There was a call for a unified language-and-content curriculum across the four-year university study in foreign language departments (Byrnes et al., 2010; Geisler et al., 2007). Underlying this debate are divergent views of language and language learning, one of which is to consider language as an instrument for daily communication and another is to view language as a vehicle for thought processes and self-expression (Geisler et al., 2007). As Bernhardt (1998)
described, there has long been a tension “between the traditional, humanities-based, reading-oriented study of belles lettres and views advocating functionality and oral proficiency” in foreign language departments (p. 51). To reinvigorate the foreign language departments as academic institutions central to the humanities and to the missions for higher learning, a more coherent and integrated curriculum is needed for the concurrent development of students' foreign language competence, advanced cognitive capacities, and intercultural competence. In China, similar debates have been going on in the past 10 years and there is growing awareness of the need to promote the advanced literacy skills and cognitive capacities through the integrated curriculum in university language programs (Li & Zhang, 2020; Zhang et al., 2013; Zhang & Sun, 2014). To achieve this goal, Byrnes (2006) further argued that university foreign language departments should “foreground language use in a specific socio-cultural context, adopt cognitive approaches than theories of language and language learning and take a textual orientation that emphasizes meaning-making over sentence-level structural properties” (p. 2), which pointed out the directions for curriculum reform in university foreign language programs. In the English department where the present study was conducted, the curriculum reform of this kind started more than ten years ago. The goal of the curriculum reform was the coordinated development of students’ foreign language competence and advanced cognitive capacities. The new curriculum was officially implemented in 2016, and the development of critical thinking was put forward as an explicit and specific objective in curriculum design, material development and classroom pedagogy. Accordingly, the language and critical thinking integrated teaching (henceforth, LaCTIT) was launched as the new approach to tertiary EFL education. As the first batch of students were approaching graduation under the new curriculum in 2020, a large-scale curriculum evaluation project was conducted covering aspects such as the effects of the curriculum design and the implementation of LaCTIT, students’ experiences with textbook use and students’ perceptions of the learning environment. One particular aspect of this kind of integrated curriculum was the provision of ample action opportunities, or affordances, for students’ critical thinking development. Students’ perceptions of these affordances will generate valuable insights on the effectiveness of the curriculum and instruction and, more importantly, the quality of learning experience. As part of the larger project, the present study focused on students’ perceptions of the affordances for critical thinking development provided by the learning environment.

**Literature Review**

**Affordances in Foreign Language Learning**

The widely cited definition of affordance was by Gibson (1979), who said that “the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill” (p. 127). Today researchers have moved far beyond this original definition and, among the various understandings, the core meaning of affordance is the reciprocity between the actor and the environment. As Gibson (1979) stated, “an affordance cuts across the dichotomy of subjective-objective; it is equally a fact of the environment and a fact of behavior” (p. 129). To put it simply, affordances mean not only the objectives or physical features of an environment but also how the person perceives or recognizes the intended meanings provided by the environment (Owen, 2009, cited in Aronin & Singleton, 2010, p. 114). Withagen et al. (2012) also argued that the environment not only provides action possibilities but it also invites behaviors, for example, attracting or repelling certain behaviors after the actor perceives the affordances. For the purpose of this study, the term affordances is defined as the potentials or opportunities that learners perceive in a particular environment to support their learning.

Compatible with the postmodern approaches such as socio-cultural theory, the ecological perspective, and complexity theory, the application of the notion affordances in language learning studies has been vibrant and fruitful in recent years (Kramsch, 2003; Lantolf, 2000; Larsen-freeman, 2011; van Lier, 2000). Empirical studies have pursued different facets of affordances to address the problems related to language learning and teaching. Some studies investigated how language learning affordances played out in the interface of technology and users, such as teachers and students (Jin, 2018; McNeil, 2014), or in the context of multilingualism (Henry, 2016; Kordt, 2018; Singleton & Aronin, 2007) or in pedagogical interactions (Thoms, 2014). Many studies classified affordances into different categories, such as linguistic affordances, literacy affordances, cognitive affordances and social affordances, to name just a few, and examined how these affordances arose in specific pedagogical activities, such as L2 collaborative reading (Thoms & Poole, 2017), the written corrective feedback (Han, 2019), and others. These studies have pushed forward the idea of the learner-environment interdependence and found that properties of learning environments, such as technology, multiple languages, learning tasks and a particular kind of milieu, may support learning in different ways.

**Learners’ Perceptions of Affordances in Learning Environments**

Learning was defined as “the education of intention and attention” and learners can be “tuned” to perceive aspects of their environment that they otherwise might not notice (Young, 2003, p. 172). On one hand, learners were agents who perceive, interpret, select, and utilize the affordances provided by the environment under specific circumstances, and on the other, learners’ attention could be attuned to particular aspects of the environment by a range of factors, including external and internal factors, individual and cultural factors. For example, Rama et al. (2012) investigated
the affordances of online gaming environments for second language learning and socialization and found the game, the participant, and the cultural factors combined to shape the affordances for second language learning. Jiang and Zhang (2019) found that students’ own motivation, English use in the academic environment and the collaborative learning culture meditated learners’ English learning agency and hence affected students perceptions and their use of various English learning affordances in Hong Kong English-medium-instruction context. Withagen et al. (2012) posited that affordances also depend on “the amount of effort it takes to utilize the action possibility” (p. 256). In other words, they believe the match-up between the learners’ capabilities and the affordances available should be taken into account. Moreover, Zhu et al. (2009) mentioned culture and personal history as relevant factors and explained that particular responsiveness to certain affordances in the environment might be a result of culture or individual prior experiences. Another study on Chinese EFL learners found that students with different learning histories set different goals and intentions for their learning (e.g., passing the exam, improving communicative skills) and hence affected their perceptions of learning affordances (Qin & Dai, 2015). In sum, based on the interplay between the actors and the environment, the perceivability and utility of the affordances largely depend on the relationship between the properties of the person (e.g., goals, interests, capabilities, experiences and culture) and those of the environment.

**EFL Students’ Perceptions of Affordances for Critical Thinking Development**

Critical thinking is considered as integral to the 21st century skills (Binkley et al., 2012). Critical thinking generally means making active, reasonable, and self-regulatory judgments (Fisher & Scriven, 1997). It’s a key element of complex argumentation, deep analysis, and other professional behaviors (Kuhn, 1999; Walton, 1989). In this study, critical thinking is defined as the ability to employ a certain level of content-specific knowledge with a flexible use of higher-order cognitive skills (e.g., analyzing, interpreting, categorizing, and evaluating). Although the integration of language learning and critical thinking is not new in the English language teaching (ELT) field (see Ten Dam & Volman, 2004 for a review), it’s still the most significant part of the curriculum reform in the English department as described above. In an integrated curriculum where the LaCTIT approach was launched, the learning environment provided a manifold of opportunities for for university EFL learners which included “goal affordances” for language acquisition and “happening affordances” for knowledge and cognitive competence (Scarantino, 2003, pp. 958–960). Critical thinking development was among the “happening affordances” provided by the EFL program of the present study. Affordances of this kind manifested themselves in written and oral interactions among teachers and students and in their experiences with cultural products (e.g., books, materials, and tasks).

Learners’ perceptions of these affordances can be affected by a wide range of factors. First of all, the designed environmental properties directly influence learners’ perceptions. When curriculum are designed, lessons are taught, relationships are built in a certain way to promote EFL learners’ critical thinking, this environment offers resources or opportunities that make critical thinking development more likely to happen (Li & Zhang, 2020; Liaw, 2007; Yang & Gamble, 2013). What students perceive in their learning context is a direct reflection of how both the curriculum and pedagogy are supportive and how the environment is conducive for a particular kind of learning.

Moreover, individual factors including learners’ goals, identities, and capabilities affect their perceptions of affordances for critical thinking development. In the EFL context, some learners may fail to see the potential of language learning in transforming their intellectual consciousness and hence transforming their life and haven’t recognized the need of integrating language learning and critical thinking development. The critical awareness concerning language learning might be resulted from the socialization of the language learners throughout their personal language learning history. As Menezes (2011) explained, people perceive things in accordance with the way how they relate to them and how their identity is shaped. Arguably, language learner identity associated with the way they are socialized into the activities of language learning has an impact on how they perceive the affordances available for them. Besides, it’s notable that language learners’ capabilities, especially their language proficiency, can also be a crucial factor that enables or constrains their perceptions of affordances for aspects other than language learning itself.

Last but not least, as was argued by Atkinson (1997), teaching and learning critical thinking are culturally complex. A certain group of learners may share certain socio-cultural patterns in thinking and learning, which would interfere with the way they interact with the external environment, so as to affect how they perceive and utilize the environmental affordances for critical thinking development. Therefore, in a specific context, environmental properties as well as learners’ individual and group features may influence learners’ perceptions and utilization of affordances for critical thinking development.

The present study investigates how English majors from a Chinese university EFL program perceived the affordances for critical thinking development in their course learning environment. The study aims to answer the following research questions:

1. How did Chinese university English majors perceive the affordances for critical thinking development in their course learning environment?

2. Specifically, what in the learning environment provided affordances that benefited their critical thinking development?
Methods

Research Context

This research was conducted in a Chinese university EFL program where the curriculum was reformed and the LaCTIT approach was implemented to promote English majors’ language learning and critical thinking development. The objectives of the new curriculum were pluralistic, including developing students’ language ability, content knowledge, and critical thinking. The curriculum, course materials, classroom pedagogy, and instruction evaluation were designed and implemented with an orientation to these objectives. In the first two years, the students received content-based language instruction with much emphasis on critical thinking skills. Afterwards, they were enrolled into separate tracks of subject areas for deeper study, namely, literature or translation studies. The textbooks Think & English series offered both formal disciplinary content and high-quality language sample to expand students’ linguistic and cognitive repertoires. Classroom learning activities included critical reading, discussion/debate and writing tasks where learners used English as “pushed output” and “medium of meaning-making” (Swain et al., 2015) to engage with meaningful and content-intensive learning. In the classroom, the teacher designed the course learning blueprint, gave lectures, and acted as the leader and facilitator in classroom discussion. Meanwhile, cooperative learning and group work, peer negotiation, teacher-student communication were highlighted and facilitated through active learning communities. It can be seen from the above description that certain course learning conditions were created for students’ English language development, content learning, and critical thinking development. The present study mainly focuses on students’ course learning experiences and their perceptions, and other extra-curriculum activities or off-campus experiences are beyond the scope of this study.

Participants

The simple random sampling method was used in the study. A cohort of 175 English major undergraduates who were approaching the end of their full-time 4-year EFL program were invited to participate in the study and 156 students responded to the questionnaire. All of the participants are native Chinese speakers and medium-high proficient English learners. Most of them have learned English for 5 to 10 years before they entered the university. All of them have received formal university English education with an emphasis on critical thinking development for four years since they were admitted to the program in 2016. The information of the participants is shown in Table 1.

Table 1. Demographic Information of the Participants.

| Demographic characteristics | N   | %   |
|-----------------------------|-----|-----|
| Gender                      |     |     |
| Male                        | 22  | 14.1|
| Female                      | 134 | 85.9|
| Experience of English-medium education |     |     |
| ≥ 10 years                  | 52  | 33.3|
| < 10 years                  | 104 | 66.7|

The table shows that most of the participants are female students (85.9%), which is a reflection of the gender ratio of enrolled students in many Chinese university EFL programs. Moreover, one-third (33.3%) of the participants have more than 10 years of experience of English-medium education and two thirds (66.7) of them have less than 10 years of such experience. English-medium education includes both the learning of English language skills and all forms of content learning through the medium of English.

Instrument

The Learning Environment Survey_Critical Thinking (LES_CT). This survey was originally developed by Taylor et al. (1997) which was later adapted by Cheng and Wan (2017) under the title of Classroom Learning Environment Survey-Liberal Studies (CLES_LS). The purpose of the survey was to investigate Chinese university EFL learners’ perceptions on the critical thinking learning affordances in their course learning environment. The original survey included five dimensions: Personal Relevance, Uncertainty, Skeptical Voice, Shared Control, and Student Negotiation. The CLES_LS was adapted from the original survey to measure the effects of the learning environment on Hong Kong learners’ critical thinking skills (Cheng & Wan, 2017). The researchers added two new dimensions (Challenging Task and Multiple Perspectives) and reduced the number of items for each dimension from six to three. Therefore, the CLES_LS included seven dimensions: Student Negotiation, Challenging Task, Multiple Perspectives, Critical Voice, Shared Control, Personal Relevance, and Uncertainty. These two instruments were further adapted to fit the foreign language learning context in the present study. The adaptation included adding one more dimension and aggregated some dimensions into a single one. For example, Multiple Perspectives, Critical Voices, and Shared Control were aggregated into one dimension: Community Culture; moreover, Personal Relevance, Uncertainty were congregated into Challenging Task, reformulated as Quality Task, because all of them were related to high-quality learning tasks. All these being done, another dimension, Rich Resources, was added because a rich and resourceful learning environment is necessary for students to explore ideas with target language and is beneficial for critical thinking development and language learning. Therefore, the new instrument Learning Environment Survey_Critical Thinking (LES_CT) for the present study included four dimensions: Rich Resources, Interactive Negotiation, Quality Task, and Community Culture. The four dimensions
constitute four sub-scales, with each scale containing three to six items. Table 2 describes what each scale measures and presents a sample item for each scale in the study:

All these items were written in Chinese and answered by using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) indicating the degree of agreement with each statement by the participants.

**Measurement of students’ academic performance.** Students’ academic performance in this study was a general indicator of how well the students learned critical thinking skills and English language together. It was represented by their course scores, which were based on their final term grades and the teacher’s assessment of their performance in course learning activities (e.g., oral presentations, reading reports, and classroom discussions). Students were asked to report their course score ranks (percentiles) as a measurement of their academic performance. As the survey was administered as part of a larger-scale project of the department, students’ self-reported scores were reliable.

The multiple-choice questions. Altogether five multiple-choice questions were asked. These questions were designed to answer the second research question. In this study, the learning environment may have provided the students with multiple resources, tasks, interactions, and communities, which could be perceived as learning affordances. Corresponding to the four sub-scales, Questions 1, 2, 3, and 4 were formulated as “What kind of resources/tasks/interaction/community benefited you most in terms of critical thinking development?”

For all the questions, students were offered more than eight items to choose from. For instance, for Question 1, the format and content of the question were as follows:

**Question 1** Among all the learning resources in your context, which do you think benefited you most in terms of critical thinking development? (You can choose more than three items)
- Textbook (Think & English series)
- Reading materials recommended by teachers
- Slides on course content shared by teachers
- Writing samples offered by teachers

Lecture notes
- Oral presentations from classmates
- Classmates’ writing work
- Mid-term tests
- Published research papers
- Crash courses online

**Data Analysis**

First, the statistical analyses of the Likert-scale data were done using the IBM SPSS Statistics 26. The questionnaire data was imported into the SPSS software and the answer for each item was transformed into numerical form with “strongly agree” given 5 points, and “strongly disagree” given 1 point. The purpose of the statistical analysis was to describe general patterns shown by the number and spread of the scores. Descriptive statistical analyses were done to find students’ general perceptions of the critical thinking learning environment. Moreover, factor analysis was conducted to reduce the items into discrete dimensions. Then, MANOVA tests were conducted to look for variance in students’ perceptions among different groups concerning different types of affordances. Second, the multiple-choice question responses were analyzed. They were arranged in order according to their frequencies. Patterns were found based on students’ responses and their frequencies.

**Results**

**Validation of the Learning Environment Survey—Critical Thinking (LES_CT) in the EFL Context**

Principle component analysis followed by varimax rotation of the 25 Likert-scale questions of the LES_CT was performed on the data gathered from the 156 participants. An examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was factorable (KMO=0.912). Four factors were recognized. Three items in the survey were deleted because of insufficient factor loading. Altogether 22 items from the LES_CT were retained.

The results of the final factor analysis are presented in Table 3, which shows that every item in the refined version
of the LES_CT has a factor loading larger than 0.40 on its own scale. As is shown at the bottom of Table 3, cumulatively 66.145% of the variance could be accounted for by the four factors, with the percentage of variance for each factor ranging from 13.676% to 19.278%.

The refined LES_CT was further validated in terms of internal consistency. The Cronbach’s alpha reliability coefficients were calculated. The Cronbach’s alpha for the LES_CT was .944 and it confirmed the sound reliability of the LES_CT in the EFL context.

### Students’ General Perceptions of the Critical Thinking Learning Environment

Descriptive statistics showed students’ perceptions of the critical thinking learning environment were strongly positive, indicating that a learning environment conducive for critical thinking learning was created and perceived favorably by the participants. Table 4 shows the item mean score and standard deviation for each factor.

The results showed that the students had strongly positive perceptions of the critical thinking learning environment ($M=4.24$). A Wilcoxon Signed-Ranked Test revealed that it was significantly higher than the median 3 (Wilcoxon $W=12,086.00$, $Z=10.794$, $p<.001$), indicating the strong positive attitudes of the participants. The mean scores for the four aspects of the environment ranged from 4.11 to 4.5, with the mean scores for Community Culture ($M=4.5$) and Quality Task ($M=4.32$) being higher than the other two types, Interactive Negotiation ($M=4.12$) and Rich Resource ($M=4.11$), indicating students had stronger perceptions of the community culture and high-quality tasks in their course.

### Table 3. Results from a Factor Analysis of the LES_CT.

| Factor 1: Rich resources          | RR  | IN  | QT  | CC  |
|----------------------------------|-----|-----|-----|-----|
| Resources for language learning  | 0.771|     |     |     |
| Resources from different sources | 0.694|     |     |     |
| Resources for content learning   | 0.689|     |     |     |
| Resources in different models    | 0.663|     |     |     |
| Resource for critical thinking   | 0.660|     |     |     |
| Resources from different points of view | 0.634|     |     |     |

| Factor 2: Interactive negotiation| RR  | IN  | QT  | CC  |
|---------------------------------|-----|-----|-----|-----|
| Authentic and meaningful communication with peers | 0.750|     |     |     |
| Interactive classrooms           | 0.732|     |     |     |
| Peer negotiation on complex issues | 0.713|     |     |     |
| Sustained discussion after class | 0.686|     |     |     |
| Authentic and meaningful communication between the teacher and students | 0.681|     |     |     |
| Teacher-student negotiation on complex issues | 0.539|     |     |     |

| Factor 3: Quality task           | RR  | IN  | QT  | CC  |
|---------------------------------|-----|-----|-----|-----|
| Learning tasks relate to real life experiences | 0.771|     |     |     |
| Learning tasks require in-depth inquiry | 0.709|     |     |     |
| Learning tasks build on prior knowledge | 0.655|     |     |     |
| Learning tasks connect different courses | 0.643|     |     |     |
| Learning tasks come in various types | 0.545|     |     |     |
| Learning tasks aim at open-ended problems | 0.522|     |     |     |

| Factor 4: Community culture      | RR  | IN  | QT  | CC  |
|---------------------------------|-----|-----|-----|-----|
| Students and teachers forming a learning community | 0.779|     |     |     |
| Common practice of sharing in the community | 0.679|     |     |     |
| Common goal of learning critical thinking and English language in the community | 0.639|     |     |     |
| Having opportunities to listen to each other in the community | 0.571|     |     |     |

Note. RR = rich resources; IN = interactive negotiation; QT = quality task; CC = community culture. Cumulative percentage of variance = 66.145. Cronbach’s alpha = .944.

### Table 4. Item Mean Score and Standard Deviation for Students’ Perceptions of Critical Thinking Learning Environment.

| Students’ perceptions         | M   | SD  |
|-------------------------------|-----|-----|
| General perception            | 4.24| 0.50|
| Community culture             | 4.50| 0.49|
| Quality task                  | 4.32| 0.52|
| Interactive negotiation       | 4.12| 0.71|
| Rich resource                 | 4.11| 0.58|

Note. 1 = strongly disagree; 2 = disagree; 3 = uncertain; 4 = agree; 5 = strongly agree.
Differences in Students’ Perceptions Among Different Groups

Significant differences of students’ perceptions of critical thinking learning environment were found between different groups of students. A one-way MANOVA was conducted by using the academic performance level (low, medium, and high) as the independent variable and the item mean scores on the four sub-scales (CC, QT, IR, and RR) as the dependent variables. Significant differences of student perceptions were found among the three groups of different academic performance levels on the general scale and the four sub-scales (Table 5).

As Table 5 shows, there was a significant effect of the academic performance on students’ perceptions of critical thinking learning environment at the \( p < .05 \) level for the three groups \( (F=3.00, p < .05) \). High achievers’ perceptions of critical thinking learning environment are significantly better than those of low achievers.

More specifically, there was a significant effect of the academic performance on students’ perceptions of the Community Culture scale at the \( p < .05 \) level for the three groups \( (F=5.068, p < .05) \). Post hoc comparisons using the LSD test indicated that the perceptions of the high-achievers \( (M=4.6, SD=0.44) \) were significantly better than those of the medium-achievers \( (M=4.42, SD=0.48) \), and also better than those of the low-achievers \( (M=4.25, SD=0.67) \). No significant differences were found between the medium-achieving group and the low-achieving group.

There was also a significant effect of the academic performance on students’ perceptions of the Quality Task scale at the \( p < .05 \) level for the three groups \( (F=3.604, p < .05) \). Post hoc comparisons using the LSD test indicated that the perceptions of the high-achievers \( (M=4.39, SD=0.49) \) were significantly better than those of the low-achievers \( (M=4.03, SD=0.67) \). However, the perceptions of the medium-achievers \( (M=4.28, SD=0.49) \) did not significantly differ from those of the high-achievers or the low-achievers.

Students’ Responses to Multiple-Choice Questions: What Provided Affordances for Critical Thinking Development

The multiple-choice questions are concerned with what provided affordances for critical thinking development. In terms of Resource, Task, Interaction, and Community, the affordances were manifested in different forms. Responses to the questions are presented in Table 6. The frequencies mean the number of students who chose the item.

In terms of learning resources, 120 students out of total (156) chose “textbooks (Think & English) series” (120, 76.92%), “published research papers” (113, 72.44%), and “course reading package” (108, 69.23%) as most beneficial for learning critical thinking. In the EFL context oriented for critical thinking development, students were provided with ample learning materials that conveyed content knowledge through the medium of target language, such as the Think & English series. Notably, the published research papers with academic content were also useful resources for them. Moreover, the course reading packages usually were materials closely related to the content of the lessons and may provide new perspectives on the issues discussed in class.

In terms of learning tasks, most students students chose “teacher-led text analysis” (119, 76.28%) as most beneficial for their critical thinking development. Many students chose course lectures (110, 70.51%) and oral presentations (108, 69.23%) as useful affordances. In this context, students benefited greatly from the three academic tasks: conducting detailed critical analysis of the texts with the facilitation of teacher, attending course lectures, and giving oral presentations.

In terms of interaction, most students students chose “whole-class interaction” (135, 86.54%) as most beneficial for their critical thinking development. A large number of students chose “discussion for oral presentations” (125, 80.13%) and “small group discussions” (118, 75.64%). The whole-class interaction happened between the teacher and all students in the classroom and the teacher acted as the facilitator who posed questions or gave feedback. This type of interaction was conducive for critical thinking because teachers’ talk may scaffold students’ higher-order thinking.

Table 5. Mean, Standard Deviation, and \( F \) Value for Academic Performance Differences for Students’ Perceptions of Critical Thinking Learning Environment.

| Students’ perceptions | Item mean ± SD | Post hoc test | \( F \) |
|-----------------------|----------------|--------------|------|
| General perception    |                |              |      |
| Group 1               | 3.97 ± 0.69    | 4.23 ± 0.49  | 4.29 ± 0.45 | 3.00*  | 3 > 1 |
| Community culture     |                |              |      |
| Group 2               | 4.25 ± 0.65    | 4.42 ± 0.48  | 4.6 ± 0.44 | 5.068* | 3 > 1, 3 > 2 |
| Quality task          |                |              |      |
| Group 3               | 4.03 ± 0.67    | 4.28 ± 0.49  | 4.39 ± 0.49 | 3.604* | 3 > 1 |
| Interactive negotiation |              |              |      |
| Rich resource         |                |              |      |

Note. Group 3 = high-achieving group; Group 2 = medium-achieving group; Group 1 = low-achieving group.

\(*<.05\).
The other two types of interaction, which happened among peers, benefited critical thinking development because of the features of peer negotiation and co-construction of knowledge.

In terms of learning communities, most students chose “oral presentation groups” (144, 92.31%), a great majority of students chose “small-groups in class” (126, 80.77%), and “the whole class” (126, 80.77%). Students were often asked to form in small groups to do oral presentations. This kind of learning community usually had clear goals for problem-solving, equal relationships and open space for negotiation throughout the project. This might create optimal conditions for students to listen to each other and reconcile multiple perspectives for a common goal, which is a prerequisite for critical thinking. The discussion groups and the class as learning communities may also provide space for negotiation, dialogic inquiry, and opportunities for co-constructing knowledge.

**Discussion**

**Students' General Perceptions of the Affordances for Critical Thinking Development**

First, students had a general positive perception of the critical thinking learning environment, which was an important indicator of the quality of educational interventions. This result echoes many previous studies which reported the successful integration of critical thinking in EFL classroom instructions elsewhere (Liaw, 2007; Yang & Gamble, 2013). According to this study, the curriculum and pedagogy successfully created an environment conducive for critical thinking development: it provided affordances that fell into the categories of Community, Task, Interaction, and Resource. The results showed that the teacher-student learning community and high quality of learning tasks were prominent features of the learning environment.

Second, high-achieving students had better perceptions than low-achieving students. It indicated that the same environment had no equal effects on students’ learning achievement, and high-achievers benefited more from the learning environments in the present study. One possible reason is that high achievers had greater motivation, more learner autonomy, and therefore had better perceptions of learning opportunities. As indicated by previous studies, learner agency is a prominent factor that affects learners’ perceptions of environmental affordances (van Lier, 2000; Withagen et al., 2012). This finding corroborates the views of Jiang and Zhang (2019) that high-achievers displayed a stronger sense of agency and motivation and thus creating more learning affordances for themselves. Moreover, the distinction between the higher-achieving and lower-achieving students in terms of the perceptions of environmental affordances might be an

---

**Table 6. Students’ Perceptions of the Affordances in Specific Manifestations.**

| Resource                              | Frequencies | Task                      | Frequencies | Task                      |
|---------------------------------------|-------------|---------------------------|-------------|---------------------------|
|                                       | N           | %                         | N           | %                         |
| Textbooks (Think & English)           | 120         | 76.92                     | 119         | 76.28                     |
| Published research papers             | 113         | 72.44                     | 110         | 70.51                     |
| Recommended readings by teacher       | 108         | 69.23                     | 108         | 69.23                     |
| T-S classroom discourse               | 107         | 68.59                     | 80          | 51.28                     |
| Course-related materials              | 97          | 62.18                     | 73          | 46.79                     |
| Online crash courses                  | 64          | 41                        | 70          | 44.87                     |
| Writing samples by classmates         | 42          | 26.92                     | 50          | 32.05                     |
| Course learning notes                 | 39          | 25                        | 44          | 28.21                     |
| Quizzes                               | 13          | 8.33                      | 26          | 16.67                     |
|                                       |             |                           | 16          | 10.26                     |
|                                       |             |                           | 8           | 5.13                      |

| Interaction                           | Frequencies | Community                | Frequencies | Community                |
|---------------------------------------|-------------|---------------------------|-------------|---------------------------|
|                                       | N           | %                         | N           | %                         |
| Whole-class interaction               | 135         | 86.54                     | 144         | 92.31                     |
| Discussions for oral presentations    | 125         | 80.13                     | 126         | 80.77                     |
| Small-group discussions               | 118         | 75.64                     | 126         | 80.77                     |
| Teacher written feedback              | 111         | 71.15                     | 100         | 64.10                     |
| QA sessions after presentations       | 100         | 64.1                      | 75          | 48.08                     |
| Peer feedback                         | 84          | 53.85                     | 60          | 38.46                     |
| Individual conferences                | 80          | 51.28                     | 38          | 24.36                     |
| Tutorial sessions                     | 28          | 17.95                     |             |                           |
| Interaction with TAs                  | 14          | 8.97                      |             |                           |
indicator of how the two groups conceived the value of English higher education for their life and how they pursued their goals in their university study accordingly. To draw on the insights of affordances, the higher motivation of higher-achieving students is not a stable personal trait but resulted from the on-going interactions with the environment. Young (2003) explained that “high motivation would result from either adopting goals that are afforded by the present learning context or finding a learning context that affords progress toward one’s adopted goals” (p. 173). In this case, due to personal values or prior learning histories, an outstanding group of English majors might have recognized the deep value of learning English for their cognitive development, and accordingly adjusted their learning goals. These goals and accordingly the learning actions were afforded by the present learning environment, which was designed for synchronized development of language, literacy skills, and critical thinking abilities. Another reason could be students’ different levels of language proficiency. Although the program was highly selective and most students’ proficiency in general language use was high-medium or above, individual differences did exist in terms of their academic language proficiency. If students had difficulty in using academic language in tasks such as analyzing problems or critiquing about real-life situations, they were less likely to have positive perceptions of affordances for critical thinking development—language challenges may constrain content learning and also learning of thinking skills (Llinares et al., 2012).

Learners’ perceptions of the learning affordance revealed not only the properties of the environment but also the quality of learning experience from the students’ perspective. According to the meaning of affordance, whether learning actually takes place does not depend on the learning environment or the learners, and it is not possible to clearly distinguish between their respective contributions; learning depends on their mutual interdependence and interaction (Young, 2003; Singleton & Aronin, 2007). Therefore, their positive perceptions of the learning affordances reflected a beneficial relationship between these EFL learners and the particular course learning environment in terms of critical thinking development. As Wenger (1999) argued, “learning cannot be designed: it can only be designed for—that is, facilitated or frustrated” (p. 229). This understanding of the learners and their learning is of great value to the effective design and implementation of tertiary EFL education programs and instructional interventions.

**Affordances for Critical Thinking Development in Different Manifestations**

The learning environment described above provided affordances for critical thinking development in all manifestations. According to students’ responses to the survey questions, they seemed to have benefited most from content-rich materials, teacher facilitation in high-quality tasks, and small-group/peer learning. These findings were resulted from multiple factors, including the nature of learning foreign language and critical thinking together and the culture of learning shared by this group of Chinese students.

**Content-rich materials.** Students’ responses showed that they perceived the content-rich textbooks, research papers, and course materials as beneficial for learning critical thinking. These findings contributed to the understanding of the nature of learning critical thinking and English language together. First of all, these materials are generated by outside authoritative sources, either classic essays or published articles. Students need these high-quality language samples to expand their linguistic repertoire and benefit their language use, such as accuracy and appropriateness, which are key aspects to gauge the success of language acquisition. Apart from high-quality language samples, these materials provide rich academic content in specific domains, which is significant for students’ critical thinking development. As Brown (1997) argued, critical thinking skills should be taught in the context of specific subject matter and these skills should be transferrable. In other words, critical thinking is rooted in content understanding and once acquired can be applied to different subject areas. Moreover, the textbooks, research papers, and course materials share the common features of providing academic language. With these materials, students would have ample opportunities to be exposed to academic language and improve their academic language competence. According to Cummins (1980), learners’ academic language competence is closely related to students’ critical thinking abilities such as analyzing, reasoning, arguing, evaluating and reflecting. Hence, students’ choices were strong evidence that content learning and academic language use are prominent features of a tertiary EFL curriculum that aims to foster students’ critical thinking abilities.

**Teacher facilitation.** As the results showed, the teacher was considered as a major source of affordances for critical thinking development. Students seemed to benefit much from tasks, interactions, and the learning communities where teacher facilitation played a significant role.

The significance of teacher facilitation in this context can be explained by the following two reasons. The first reason could be the process of teaching and learning of critical thinking skills. Critical thinking is a form of higher-order thinking, which is usually cultivated through formal education where abstract concepts and reasoning skills are introduced through goal-directed learning activities. In this context, teacher facilitation played out in these three aspects: (1) demonstrating appropriate use of language to conceptualize or reason; (2) scaffolding the cognitive process from lower-order thinking to higher-order thinking; (3) motivating students to think critically and creatively. Within a
particular program, the quality of teachers is considered as the greatest factor in improving student academic achievement. In relation to critical thinking, it is the teacher who should help students to analyze instead of recall, to justify instead of define, and to categorize instead of list. In the learning environment where critical thinking development was one of the main objectives, as the context in the present study, teachers should consciously provide opportunities for students to develop ideas for their own meaning-making and self-expression. Another reason might be related to the Chinese learning culture. Jin and Cortazzi (1998) described that Chinese language teachers tend to scaffold dialogues and collective thinking through interactions with the whole class, which is believed to be a secret of the success of Chinese large classes. This culture of learning can also explain the results of this study that most Chinese EFL learners perceived the whole-class interaction as one type of the most beneficial affordances for their learning.

Small-group/peer learning. Small-group/peer learning means learning through peer negotiation within small groups. The data showed that a large majority of students chose small-group/peer learning as beneficial affordances either in the Interaction type or in the Community type. It indicated that this cohort of students perceived small-group/peer learning as an effective way to improve critical thinking skills while learning English.

The preference of the small-group/peer learning style was partly due to cultural influences. Previous studies on Asian students reported peer negotiation had positive impact on critical thinking development and consequently academic achievement (Chiong & Fraser, 2009; Wan & Cheng, 2019), compared with the negative effects of peer negotiation reported by studies on American students (Wolf & Fraser, 2008). Therefore, it was argued that the shared features of Asian learners may be due to the collectivism of Asian society, which emphasizes equal contributions and mutual interdependence among group members (Wei & Li, 2013). This study supported these views and found that the participants showed an obvious preference for small group learning and peer negotiation. It is also noticeable that “oral presentations groups” as a type of peer learning community provided considerable learning opportunities for the students. Oral presentation is a typical and widely adopted mode of group learning in EFL/ESL educational contexts. Researchers argued that students’ linguistic, cultural, and thinking capacity are likely to be promoted by using the target language and joining the problem-solving activities in a specific socio-cultural setting (Swain et al., 2015). For most EFL learners, oral presentation is considered as the catalyst for critical thinking development, because it is active learning with intensive meaning negotiations and definite goals for production and creation (Kobayashi, 2016). In students’ group oral presentations, nevertheless, teachers’ role cannot be underestimated, because “teachers’ attention to the accuracy of the final product subsequent to the completion of collaborative activities are potentially critical aspects of student learning” (Swain, 1998, p. 80). This study corroborated these findings from the students’ perspective because students showed a strong positive attitude towards the effect of group oral presentations in enhancing their critical thinking abilities.

Conclusion and Implications

This study explored English majors’ perceptions of the critical thinking learning environment where critical thinking was integrated into language education in a Chinese university. The first finding was that students generally had positive perceptions of the critical thinking learning affordances which fell into four categories: rich resources, quality tasks, interactive negotiation, and community culture. The second finding was that higher-achieving students had better perceptions of the critical thinking learning affordances than lower-achieving students. The third finding was that students benefited most from content-rich materials, teacher-facilitated learning activities, and the small-group/peer learning in terms of specific manifestations of critical thinking learning affordances.

The study had implications for both foreign language pedagogy and curriculum development in relation to integrating critical thinking development and language learning. Firstly, to create more opportunities for critical thinking development of foreign language learners, the preferable pedagogical principles may include incorporating content-rich materials, valuing teachers’ role in scaffolding high-order thinking in task designs and classroom interactions, addressing cultural influences on learning, such as small group learning culture, among others. When some students, due to their own goals in language learning or inadequate academic language proficiency, may fail to integrate critical thinking development and language learning, teachers should let them recognize the deep purpose and inherent value of language learning for critical awareness and meaning-making, or to increase linguistic assistance to students who may find that the content-intensive texts are loaded with too difficult syntax and semantics. Secondly, during curriculum reforms the interaction between the curriculum designers, instructors, and students should be taken into account to allow for the emergence of learning affordance. On the one hand, curriculum reformers or designers should try to create a particular learning context that provides students with the broadest possible range of learning affordances, and on the other hand, instructors need to do more to tune students’ attention to specific learning opportunities and induce students to adopt new goals for learning. Students themselves also need to exercise their agency to draw on and activate the affordances embedded in the environment. With a conducive learning environment being created and rich learning affordances being offered, perceived, utilized, and recreated,
foreign language learners may be empowered to seek out more opportunities to improve language use and critical thinking skills in their life leading to the future.

Given that the focus of this study is Chinese university language learners’ perceptions of critical thinking learning affordances in a particular EFL program, the findings are not intended to be generalizable, but may generate insights for similar contexts where critical thinking is explicitly integrated into language education. Some related issues, such as the relationship between students’ perceptions, their learning actions, and their actual critical thinking development, or the process of students’ perceiving and acting upon the learning affordances may be interesting topics to be further explored in the future.

Acknowledgments
The author would like to express her sincere gratitude to the participants of the study. The author is also very grateful to the anonymous reviewers for their comments on the manuscript.

Declaration of Conflicting Interests
The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The study is supported by BFSU Landmark Research Projects for “Double-First Class” Construction—A History of Applied Linguistics with Chinese Characteristics and Innovations in Applied Linguistics Knowledge System (Grant No. 2022SYLZD009).

ORCID iD
Xiaoshuang Du https://orcid.org/0000-0002-1420-7665

References
Aronin, L., & Singleton, D. (2010). Affordances and the diversity of multilingualism. International Journal of Sociology of Language, 2010(205), 105–129. https://doi.org/10.1515/ijsl.2010.041
Atkinson, D. (1997). A critical approach to critical thinking in TESOL. TESOL Quarterly, 31(1), 71–94. https://doi.org/10.2307/3587975
Bernhardt, E. B. (1998). Sociohistorical perspectives on language teaching in the modern United States. In H. Byrnes (Ed.), Learning foreign and second languages: Perspectives in research and scholarship (pp. 39–57). Modern Language Association of America.
Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining twenty-first century skills. In P. Griffin, B. McGaw, & E. Care (Eds.), Assessment and teaching of 21st century skills: Methods and approach (pp. 17–66). Springer.
Brown, A. (1997). Transforming schools into communities of thinking and learning about serious matters. American Psychologist, 52(4), 399–413. https://doi.org/10.1037/0003-066X.52.4.399
Byrnes, H., Maxim, H. H., & Norris, J. M. (2010). Realizing advanced foreign language writing development in collegiate education: Curricular design, pedagogy, assessment. The Modern Language Journal, 94(Supplement), 1–235. http://www.jstor.org/stable/40985261
Byrnes, H., Weger, H. D., & Sprang, K. A. (Eds.). (2006). Educating for advanced foreign language capacities: Constructs, curriculum, instruction, assessment. Georgetown University Press.
Cheng, M. M. H., & Wan, Z. H. (2017). Exploring the effects of classroom learning environment on critical thinking skills and disposition: A study of Hong Kong 12th graders in liberal studies. Thinking Skills and Creativity, 24, 152–163. https://doi.org/10.1016/j.tsc.2017.03.001
Chionh, Y. H., & Fraser, B. J. (2009). Classroom environment, achievement, attitudes and self-esteem in geography and mathematics in Singapore. International Research in Geographical and Environmental Education, 18(1), 29–44. https://doi.org/10.1080/10382040802591530
Cummins, J. (1980). The cross-lingual dimensions of language proficiency: Implications for bilingual education and the optimal age issue. TESOL Quarterly, 14(2),175–187. https://doi.org/10.2307/3586312
Fisher, A., & Scriven, M. (1997). Critical thinking: Its definition and assessment. Edgepress. https://lib.ugent.be/catalog/rug01:000438708
Geisler, M., Kramsch, C., McGinnis, S., Patrikis, P., Pratt, M. L., Ryding, K., & Saussy, H. (2007). Foreign languages and higher education: New structures for a changed world: MLA ad hoc committee on foreign languages. Profession, 234–245. http://www.jstor.org/stable/25595871
Gibson, J. J. (1979). The ecological approach to visual perception. Houghton Mifflin.
Han, Y. (2019). Written corrective feedback from an ecological perspective: The interaction between the context and individual learners. System, 80, 288–303. https://doi.org/10.1016/j.system.2018.12.009
Henry, A. (2016). Enablements and constraints: Inventorying affordances associated with lingua franca English. International Journal of Bilingual Education and Bilingualism, 19(5), 488–510. https://doi.org/10.1080/13670050.2015.1014465
Jiang, L., & Zhang, L. J. (2019). Chinese students’ perceptions of English learning affordances and their agency in an English-medium instruction classroom context. Language and Education, 33(4), 322–339. https://doi.org/10.1080/09500782.2019.1578789
Jin, L. (2018). Digital affordances on WeChat: Learning Chinese as a second language. Computer Assisted Language Learning, 31(1–2), 27–52. https://doi.org/10.1080/09588221.2017.1376687
Jin, L., & Cortazzi, M. (1998). Dimensions of dialogue: Large classes in China. International Journal of Educational Research, 29(8), 739–761. https://doi.org/10.1016/S0883-0355(98)00061-5
Kobayashi, M. (2016). L2 academic discourse socialization through oral presentations: An undergraduate students’ learning trajectory in study abroad. Canadian Modern Language Review, 72(1), 95–121. https://doi.org/10.3138/cmlr.2015.1578789
Kordt, B. (2018). Affordance theory and multiple language learning and teaching. International Journal of Multilingualism, 15(2), 135–148. https://doi.org/10.1080/14790718.2016.1223081
Kramsch, C. (Ed.). (2003). Language acquisition and language socialization: Ecological perspectives. Continuum.
Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher*, 28(2), 16–46. https://doi.org/10.3102/0013189X028002016

Lantolf, J. P. (Ed.). (2000). *Sociocultural theory and second language learning*. Oxford University Press.

Larsen-Freeeman, D. (2011). A complexity theory approach to second language development/acquisition. In D. Atkinson (Ed.), *Alternative approaches to second language acquisition* (pp. 48–72). Taylor & Francis.

Li, D., & Zhang, L. (2020). Exploring teacher scaffolding in a CLIL-framed EFL intensive reading class: A classroom discourse analysis approach. *Language Teaching Research*, 26(2), 333–360. https://doi.org/10.1177/1362168820903340

Liaw, M. L. (2007). Content-based reading and writing for critical thinking skills in an EFL context. *English Teaching and Language Learning Research*, 27(3), 285–304. https://doi.org/10.1080/03055698.2018.1446331

Li, D., & Zhang, L. (2014). Exploring teacher scaffolding in a CLIL-framed EFL intensive reading class: A classroom discourse analysis approach. *Language Teaching Research*, 26(2), 333–360. https://doi.org/10.1177/1362168820903340

Liang, M. (2007). Content-based reading and writing for critical thinking skills in an EFL context. *English Teaching and Language Learning Research*, 27(3), 285–304. https://doi.org/10.1080/03055698.2018.1446331

Li, D., & Zhang, L. (2020). Exploring teacher scaffolding in a CLIL-framed EFL intensive reading class: A classroom discourse analysis approach. *Language Teaching Research*, 26(2), 333–360. https://doi.org/10.1177/1362168820903340

Lian, A., Morton, T., & Whittaker, R. (2012). *The roles of language in CLIL*. Cambridge University Press.

Menezes, V. (2011). Affordances for language learning beyond the classroom. In P. Benson & H. Reinders (Eds.), *Beyond the language classroom* (pp. 59–71). Palgrave Macmillan.

McNeil, L. (2014). Ecological affordance and anxiety in an oral asynchronous computer-mediated environment. *Language Learning & Technology, 18*(1), 142–159. http://llt.msu.edu/issues/february2014/mcneil.pdf

Qin, L., & Dai, W. (2015). Investigating affordances in college English learning environment from an ecological perspective. *Modern Foreign Languages*, 38(2), 227–237.

Rama, P. S., Black, R. W., Van Es, E., & Warschauer, M. (2012). Affordances for second language learning in World of Warcraft. *ReCALL: The Journal of EUROCALL, 24*(3), 322–338. https://doi.org/10.1017/S0958344012000171

Scarantino, A. (2003). Affordances explained. *Philosophy of Science, 70*(5), 949–961. https://doi.org/10.1086/377380

Singleton, D., & Aronin, L. (2007). Multiple language learning in the light of the theory of affordances. *International Journal of Innovation in Language Learning and Teaching, 1*(1), 83–96. https://doi.org/10.2167/illt44.0

Swain, M. (1998). Focus on form through conscious reflection. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 64–81). Cambridge University Press.

Swain, M., Kinnear, P., & Steinman, L. (2015). *Sociocultural theory in second language education: An introduction through narratives*. Multilingual Matters.

Taylor, P. C., Fraser, B. J., & Fisher, D. L. (1997). Monitoring constructivist classroom learning environments. *International Journal of Educational Research*, 27(4), 293–302. https://doi.org/10.1016/S0883-0355(97)90011-2

Ten Dam, G., & Volman, M. (2004). Critical thinking as a citizenship competence: Teaching strategies. *Learning and Instruction, 14*(4), 359–379. https://doi.org/10.1016/j.learninstruc.2004.01.005

Thoms, J. J. (2014). An ecological view of whole-class discussions in a second language literature classroom: Teacher reformulations as affordances for learning. *The Modern Language Journal, 98*(3), 724–741. https://doi.org/10.1111/modl.12119

Thoms, J. J., & Poole, F. (2017). Investigating linguistic, literary, and social affordances of L2 collaborative reading. *Language Learning & Technology, 21*(2), 139–156. https://doi.org/10.10125/44615

Urlaub, P. (2017). Second language literacy research and curriculum transformation in US postsecondary foreign language education. In N. van Deusen-Scholl & S. May (Eds.), *Second and foreign language education* (pp. 137–150). Springer.

Van Lier, L. (2000). From input to affordance: Social-interactive learning from an ecological perspective. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 254–269). Oxford University Press.

Van Lier, L. (2006). *The ecology and semiotics of language learning: A sociocultural perspective*. Kluwer Academic Publishers.

Walton, D. N. (1989). Dialogue theory for critical thinking. *Argumentation*, 3(2), 169–184. https://doi.org/10.1007/BF00128147

Wan, Z. H., & Cheng, M. H. M. (2019). Classroom learning environment, critical thinking and achievement in an interdisciplinary subject: A study of Hong Kong secondary school graduates. *Educational Studies*, 45(3), 285–304. https://doi.org/10.1080/03055698.2018.1446331

Wei, X., & Li, Q. (2013). The confucian value of harmony and its influence on Chinese social interaction. *Cross-Cultural Communication, 9*(1), 60–66. https://doi.org/10.3968/j.ccc.1923670020130901.12018

Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.

Withagen, R., De Poel, H. J., Araújo, D., & Pepping, G. J. (2012). Affordances can invite behavior: Reconsidering the relationship between affordances and agency. *New Ideas in Psychology, 30*(2), 250–258. https://doi.org/10.1016/j.newideapsych.2011.12.003

Wolf, S. J., & Fraser, B. J. (2008). Learning environment, attitudes and achievement among middle-school science students using inquiry-based laboratory activities. *Research in Science Education, 38*(3), 321–341. https://doi.org/10.1007/s11165-007-9052-y

Yang, Y. T. C., & Gamble, J. (2013). Effective and practical critical thinking-enhanced EFL instruction. *ELT Journal, 67*(4), 398–412. https://doi.org/10.1093/elt/ctc038

Young, M. (2003). An ecological psychology of instructional design: Learning and thinking by perceiving-acting systems. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp.169–177). Taylor & Francis.

Zhang, L., Wu, Y., Jin, L., Sun, Y., & Zhou, Y. (2013). The construction of an interactive mechanism between English major’s curriculum reform and teacher education: A case of the English department in BFSU. *Foreign Languages and their Teaching, 3*, 30–33.

Zhu, C., Valcke, M., & Schellens, T. (2009). Cultural differences in the perception of a social-constructivist e-learning environment. *British Journal of Educational Technology, 40*(1), 164–168. https://doi.org/10.1111/j.1467-8535.2008.00879.x