

English Grammar Automatic Output Model under Non-native Environment

Xiaohong Du

Foreign Languages School, Zhengzhou University, Zhengzhou 450001, China

Abstract—In China, there has been a common phenomenon in English grammar teaching that much emphasis has been laid on the input of students' English grammatical knowledge while little has been paid on the improvement of their grammatical competence, which directly leads to an obvious gap between students' English grammatical knowledge and their grammatical competence. According to Anderson's cognitive theory of ACT, learners will go through three stages (cognitive, associative and automatic stage) from declarative knowledge to procedural knowledge in acquiring the automatic skills. This paper studies the implication of cognitive theory of ACT in English Grammar acquisition, internalization and automatic output. Basing on the integration between explicit grammatical knowledge and implicit grammatical competence in grammar acquisition, we put forward an English grammar automatic output model, aiming at helping foreign language learners narrow down the gap between their grammatical knowledge and grammatical competence under non-native environment.

Index Terms—cognitive theory of ACT, declarative and procedural knowledge, automatic output model

I. INTRODUCTION

Grammar, according to Rutherford (1987), is "a necessary component of any language teaching program", and thus plays an essential role in language teaching. However, since the middle twentieth century, the view whether English grammar should be taught or not has been remained controversial in English teaching field (Krashen, 1982; Long, 1983; Ellis, 1999). According to Krashen and Terrel (1983), grammar explanations should be avoided in the classroom simply because they take time away from acquisition activities. Krashen's (1992) challenged the limitations of grammar-based approach, but in fact, he doesn't deny the idea that students need to acquire a great deal of grammar. However, he holds that students will acquire more grammar if the course focuses on communications and provides pupils with sufficient comprehensible and meaningful input. Almost at the same period, a series of problems, like whether English grammar is learned or acquired, whether grammar teaching is necessary and how to teach grammar systematically, have become big headaches to English teachers in and abroad. Exploring new ways of grammar teaching is still a hot topic in English teaching, especially foreign language teaching field.

English grammar teaching in China has gone through the "grammar- centered" teaching to the period that grammar teaching had been ignored during 1970s when Audio-lingual method was popular. Since 1990s, the importance of grammar teaching has been reemphasized among Chinese scholars and grammarians. Shu Dingfang (1996) has made it clear that the status and function of grammar in foreign language teaching, is not whether grammar should be taught or not, but the question of what to teach and how to teach. In the article "Reflections on China's English education", Hu Zhuanglin (2002) says "Grammar teaching is necessary, and the problem is to compile an interesting grammar book which is easy to be mastered" (P.2). Another Chinese scholar Dai Weidong (2005) proposed that grammar teaching can be compatible with students' communicative ability improvement. These viewpoints about grammar teaching and researches, to a certain degree, helped Chinese English teachers realize the importance of grammar teaching under non-native environment. And these views are, in a sense, consistent with Higgs's (1985) point of view that teaching communication and teaching grammar are inseparable aspects of teaching language, and a successful foreign language user is one who possesses and combines all of the communicative elements of a linguistic system, i.e., a "grammar", in ways that are at least analogous to the ways that native speakers possess and combine them.

In recent years, the research about whether English grammatical knowledge can promote learners' grammatical competence mainly focuses on the "non-interface hypothesis", "weak interface hypothesis" and "strong interface hypothesis". Gu Qiyi (2005) holds that "interface hypothesis" further explains the explicit and implicit links; through the empirical research, Zeng Yonghong (2009) confirms that the implicit grammatical knowledge can better predict the students' English level; to the relationship between explicit grammatical knowledge and implicit grammatical competence, we (2009, 2010, 2011) hold that English grammar acquisition is a complex higher mental process, which possesses both implicit and explicit features. Explicit grammatical knowledge acquired consciously is the precondition of foreign language learners' implicit grammatical competence, and under certain conditions, the explicit grammatical knowledge students acquired can be transformed into their grammatical competence.

As is known to all, English grammar acquisition under non-native environment is a complex mental process which remains to be further explored. The existing researches have broadened the scope of English grammar study,

emphasized the importance of grammar teaching, but the research on how to help foreign language learners internalize their explicit grammatical knowledge into their grammatical competence under non-native environment is still in its infancy. Anderson's *Adaptive Control of Thought (ACT) Model* (Anderson 1976; 1983) rests on the distinction between declarative and procedural knowledge and discussed the three stages of transition from declarative to procedural knowledge. According to ACT, learners will go through three stages (cognitive, associative and automatic stage) from declarative knowledge to procedural knowledge in acquiring the automatic skills. This paper aims to put the ACT model into Chinese college students' grammar acquisition and automatic output process practice, combining with explicit grammatical knowledge and implicit grammatical competence, to construct a practical grammar automatic output model and help college students narrow the gap between their grammatical knowledge and their grammatical competence.

II. THE NECESSITY OF CONSTRUCTING A GRAMMAR AUTOMATIC OUTPUT MODEL

According to Chinese College English Teaching Syllabus (2000), the objective of grammar teaching is to help college students improve their ability of using English grammar in the certain contexts, to have a relatively systematic understanding of grammar and use English grammar knowledge to solve the problems in the process of English learning. This teaching syllabus clearly demonstrates that the target of grammar teaching is to cultivate students' communicative competence by using grammatical knowledge and the ability of using English grammatical knowledge to solve actual problems in English study. Though explicit grammatical knowledge is indispensable to learners' English grammatical competence improvement, how to help foreign language learners internalize their grammatical knowledge and achieve the language output automation is the key factor to college English grammar teaching.

In the book *The Teacher's Guide to Grammar*, Deborah Cameron (2007) mentions that grammatical knowledge is a tool: like any tool, it is for some people and unnecessary or unsuitable for others. When it is useful, and how it can be best used, are matters for teachers' professional judgment. Under native environment, though learners know little about grammatical rules, such as they even don't know what infinitive (including bare infinitive/ naked infinitive and split infinitive) is, but they can express themselves clearly by using infinitives. Therefore, it's no need for native English teachers to explain grammatical rules in detail. However, under non-native environment, because learners have no environment of acquiring grammatical competence, declarative grammatical knowledge acquisition is not only useful but also necessary. In such situations, foreign language teachers have to deliver the systematic rules of grammar to foreign language learners, so as to help them acquire the related declarative knowledge and prepare for the improvement of their language competence.

Learning a foreign language, like any other type of skill such as driving a car or playing table tennis, involves the procedures of transforming declarative knowledge into procedural knowledge, and achieving the goal of internalization and acquisition. However in China, for a long period, there is a common phenomenon that much has been focused on students' English grammatical knowledge while little was laid on their grammatical competence, which, to a certain degree, leads to the gap between college students' English grammatical knowledge and their grammatical competence. For example, many teachers find that tenses are far more difficult to teach than, say, vocabulary. Though teaching a lesson around a tense is obviously easier, it may be a different matter help students internalize and output English tenses freely. Despite their best efforts, most students still consistently misuse, misunderstand and misapply tenses, which is really a big headache to both students and teachers. Besides, foreign language learners are, generally, not sensitive to foreign grammar systems, partly because they often compare the grammar structures to their native ones, which usually confuse them in grammar acquisition and production.

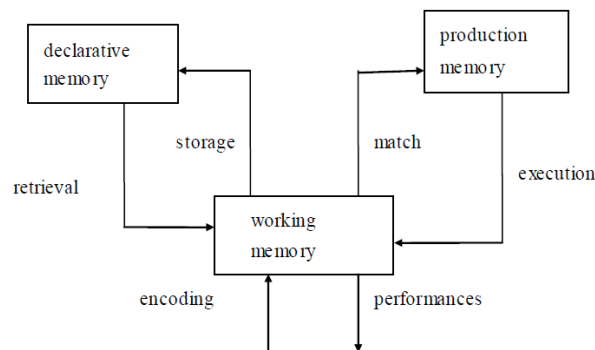
In addition, the researches about foreign language learners' internalization from their grammatical knowledge into their grammatical competence are still far from enough. It is still a sticking point about how to help foreign learners internalize their grammatical knowledge and improve their implicit grammatical competence.

III. THEORETICAL FRAMEWORK ACCORDING TO ANDERSON'S ACT MODEL

In order to understand Anderson's ACT model, it's necessary for us to make sure the interrelationship between declarative knowledge and procedural knowledge. The former is equivalent to the knowledge concept we traditionally have, while the latter mainly refers to the knowledge used to answer question like "how to do". Accordingly, English grammar rules belong to declarative knowledge, while how to use grammatical rules during language output is a kind of skill which belongs to procedural knowledge. "The first stage of procedural knowledge is declarative knowledge acquisition, that is to say, the declarative knowledge is the basis of procedural knowledge; the second stage of procedural knowledge is achieved through the application of rules and exercises of the declarative knowledge; the third stage is the highest stage of knowledge development, skills to achieve the degree of automation in language output" (Pi Liansheng, 2004, P92, P93). For example, after learning the usage of "gerund" systematically, students only obtained the declarative knowledge of gerund, namely, the grammatical rules and concepts of gerund, if they don't internalize the related knowledge, that is, don't put it into their procedural knowledge by applying it in daily communication or writing, they still cannot have the competence of outputting gerund in their speaking and writing.

As a general theory of cognition developed by John Anderson that focuses on memory processes, ACT distinguishes the three types of memory structures: declarative, procedural and working memory. Anderson's ACT Model (Anderson

1976, 1983) rests on the distinction between declarative and procedural knowledge. According to Anderson, a learner may acquire declarative knowledge suddenly, by being told, whereas he can only acquire procedural knowledge gradually, by performing the skills. A person can communicate his declarative knowledge verbally, but cannot communicate his procedural knowledge. On the basis of ACT, knowledge general begins as declarative information, while procedural knowledge is learned by making inferences from already existing factual knowledge.

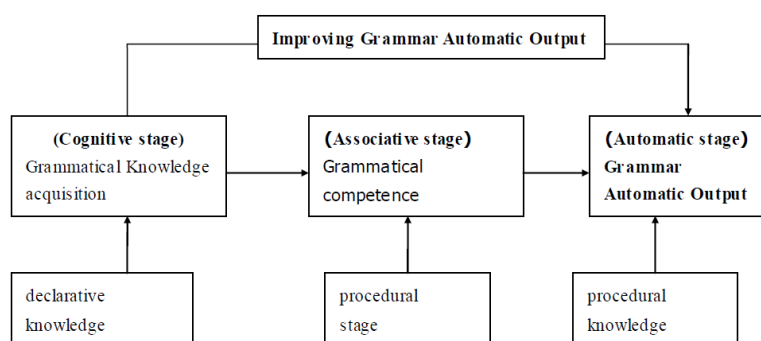


Source: Shichun Gui (2011, P38).

According to ACT, the transition from declarative to procedural knowledge and working memory takes place in three stages. At the declarative stage, knowledge is just stored as facts, and it is quite difficult for learners to use declarative knowledge on the first stage. The second is the associative stage. A learner tries to apply the general rules acquired at the first stage into particular instance. For example, the learner may have learnt 'booked', 'hooked' and 'helped' as distinct items, but may come to realize that they can be represented more economically in a production set: 'If we generate the past tense of a verb, just add -ed to the verb'. In the autonomous stage, in which procedures become increasingly automated, the mind continues to generalize productions. At this stage, the consciousness of using grammatical rules can disappear entirely, and learners will output language naturally. That is, learners can not only recognize the past tense in reading and listening, but also can use them freely in their speaking and writing.

IV. CONSTRUCTION OF ENGLISH GRAMMAR AUTOMATIC OUTPUT MODEL BASING ON ACT

Though declarative knowledge and procedural knowledge are different, both of them are aimed at helping foreign language learners internalize their knowledge into their competence. Basing on ACT model, English grammar acquisition and automatic output process under non-native environment can be expressed as:



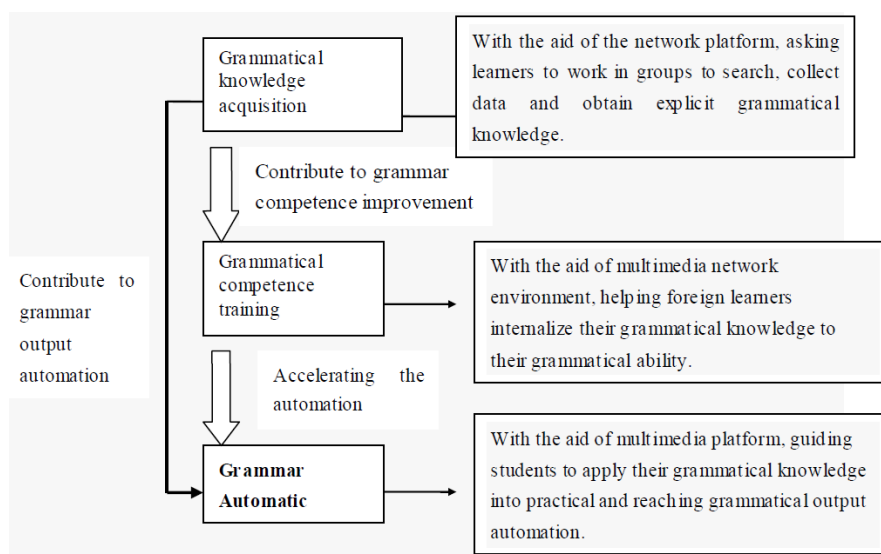
English grammar acquisition and automatic output process under non-native environment

According to this diagram, in order to achieve the state of grammar automatic output, foreign language learners should first of all experience two stages: "grammatical knowledge acquisition" and "grammatical competence training". "Grammar automatic output" belongs to the third stage of automation; while "grammatical knowledge acquisition" and "grammatical competence" are equivalent to the processes of "cognitive" and "associative" stage of ACT model, which equated to the explicit grammatical knowledge accumulation, practice and transformation. These two stages are the preconditions to the formation of foreign language learners' grammar automatically output model. Practice, application, feedback and transformation are the basis and conditions in the internalization from declarative knowledge into procedural knowledge. That is to say, to foreign language learners under non-native environment, grammatical competence training contributes to their grammar automatically output process. In the process of realizing the state of one's grammar output automation, both declarative and procedural knowledge are indispensable.

If grammar teaching only stays at the stage of grammatical knowledge presentation, foreign language learners can only get declarative knowledge. Creating native-like grammar acquisition environment and providing learners with

enough chances to use grammatical rules will, to a certain degree, accelerate the internalization from their explicit grammatical knowledge to their grammatical competence. Implicit grammatical knowledge, or we can call it grammatical competence, is tacit knowledge which is not easily visible and expressible, and is often acquired unconsciously or subconsciously. So, what the foreign language teachers should not neglect is to bring the “real” or native-like environment to foreign learners.

With the advent of the Internet, there are more and more new teaching tools and equipments can be used to improve our grammar teaching effect. For example, the introduction and application of multimedia technology to foreign language teaching, it can not only provide students with real language environments and vivid contexts, but also can help to explain the abstract grammatical knowledge by using pictures and other animation or cartoons (Du Xiaohong, 2009), which gives non-native English learners favorable external conditions of grammar acquisition. Basing on multimedia and network environment, the grammar automatic output model under non-native environment can be expressed as:



Celce-Murcia (1992) hold that any formal grammar instruction is more effective if it is discourse-based and context-based than if it is sentence-based and context-free. In order to promote foreign language learners' grammatical knowledge internalization, foreign language teachers should create different native-like contexts to stimulate students' grammar autonomous learning ability and guide them to combine their grammar learning with the provided audio-visual resource. According to Oxford and Crookall (1990), foreign language learning techniques includes three categories, namely decontextualized, semi-contextualized, and fully contextualized. Though Oxford and Crookall's classification is mainly used for vocabulary learning, it can also be applied to grammar learning. Multimedia-aided grammar learning belongs to semi-contextualized or fully contextualized learning. Under such environment, students are fully activated and encouraged, and teachers' role will transfer from simple imparting knowledge into the role of giving directions, inspirations and answering questions etc.. The students are given more opportunities to think, discuss, reflect, engage in task-based activities about grammar, even do some inquiry learning or learn automatically in their spare time. At the grammar automatic stage, with the aid of multimedia platform, students will apply their grammatical knowledge into their practice subconsciously or consciously and reach the stage of their grammatical output automation.

V. CLASS PRACTICE OF THE GRAMMAR AUTOMATIC OUTPUT MODEL UNDER NON-NATIVE ENVIRONMENT

In order to imply the Grammar Automatic Output Model into practice, on the first grammar class of a new semester, I ask the sophomore to write an article within 100 words, using as more subject clauses and conjunctions as possible. More than one third of the students only selected “that, which, who and what” for connecting clauses, none of them using “when, where, how, why” to connect subject clauses, let alone “however, how often, how soon, how far” and other conjunctions.

In China, most college students are familiar with the three categories of subject clause connections: ① subordinate conjunctions “that” and “whether”; ② the connecting pronouns “who, what, which” (including whom, whose, whoever, whomever, whatever, whichever); ③ “where, when, how, why (including whenever, wherever, however, how many, how much, how long ...). Though they've acquired the related explicit grammatical knowledge, just because of lacking the process of internalization, they cannot make use of them freely in their speaking and writing.

In order to check the applicability of Grammar Automatic Output Model under non-native environment, basing on students' present grammatical knowledge and the aid of multimedia, we carefully select some films, TV programs, live broadcast, newspapers, long and difficult sentences in the novels, etc. to our grammar class. Create native-like

environment for foreign language learners and let them feel and experience these grammatical rules and their vivid usages subconsciously, even unconsciously. For example, in helping students internalize and output the present tense and past tense, we use some clips taken from the movie "Home Alone II"

(K: abbreviation for Kevin; M: abbreviation for Mary)

...

M: I wasn't always like this.

K: What were you like before?

M: I had a job. I had a home. I had a family.

K: Any kids?

M: No, I wanted them. But the man I loved fell out of love with me ...

The above example clearly shows the comparison between "past tense" and "present tense". From the conversation, we can easily conclude that Mary has no job and no home now. "No, I wanted them" means that she wanted to have a child in the past, but now she doesn't want to. This simple past tense conveys that Mary has been hopeless, no longer want children. From the vivid dialog of the movie, it is easy for students to internalize the comparison between the two tenses.

Then I asked my students to infer the implication of "You studied very hard last year" (In certain context, it means "You don't study hard this year."), then encouraged them to distinguish the differences between "You studied very hard last year" and "You study very hard this year". In order to help students internalize and output past tense automatically, I asked them to freely output some vivid examples such as "I loved you", "I was a top student when I was in senior school." This kind of teaching can not only arouse students' enthusiasm, shorten the time of their grammar automatic input and output, but also can help them lay a solid foundation for improving their automatic grammar output competence.

...

M: I was afraid of getting my heart broken again. Sometimes you can trust a person..., and then, when things are down, they forget about you.

This sentence is a typical example of flexible usage and transition from present tense to past tense. We can ask students to analyze the reason of the tenses change, then ask them to distinguish the differences between the two tenses (The former part of the sentence is past tense because it describes Mary's state in the past; the latter part adopts present tense because it indicates the objective facts of common people.).

...

K: Maybe they're just too busy. Maybe they don't forget about you, but they forget to remember you. People don't mean to forget. My grandfather says if my head wasn't screwed on, I'd leave it on the school bus.

The above sentence states the objective fact, so it adopts the present tense. Kate also uses subjective mood to achieve his conversational purpose. Obviously, this discourse-based grammar teaching is effective in helping students acquire grammatical points.

Comparing with the traditional grammar teaching method that grammatical rules are directly delivered to students, we can clearly find that the English grammar automatic output model basing on multimedia gives students more opportunities to observe, analyze, discover and use grammatical knowledge under non-native environment, which to a certain degree, helps foreign language learners narrow down the gap between their grammatical knowledge and grammatical competence.

VI. CONCLUSION AND FURTHER RESEARCH

It is obvious that applying ACT model into foreign language learners English grammar automatic output can, to a certain degree, benefit students' grammatical competence improvement, but there are still some problems to be solved. On one hand, it's not easy for teachers to collect appropriate teaching materials from films, TV programs, live broadcast, or newspapers. On the other hand, at present we still have no relatively ideal textbooks for improving foreign language learners' grammatical competence, which requires grammar teachers to spend a lot of time and energy selecting suitable teaching materials, finding grammar points, and guiding students to internalize the related grammatical rules. Therefore, cultivating students' grammatical automatic output competence under non-native environment only limits to college students who have strong sense of self-study and already have a basic command of explicit grammatical knowledge which, to some extent, hinders the application of this grammar automatic output mode.

In addition, just because of the differences between L1 and FL learning, it's easy for L1 learners to reach the grammar autonomous output stage. But to foreign language learners, internalizing the explicit grammatical knowledge into implicit grammatical competence is not an easy process, in fact, they do not really reach full automatic output in language output.

What's also cannot be neglected is the difference between spoken and written grammar. Traditionally, the spoken language has been regarded as relatively inferior to written language in grammar teaching, and for many centuries grammarians have taken the written language as a benchmark for standard grammar. In fact, language is in use, and spoken grammar, especially grammar in communication, will also be emphasized in our grammar teaching, for the aim of grammar teaching is to improve students' grammatical competence, not just their grammatical knowledge.

How to narrow the gap between foreign language learners' explicit grammatical knowledge and their grammatical competence under non-native environment and improve their grammar automatic output competence still needs further studies.

Note:

This research is part of the Project 'the Construction of English Grammar Acquisition Model Basing on Inquiry Learning (122400450461), supported by Henan Science and Technology Agency

REFERENCES

- [1] Anderson, J. R. (1976). *Language Memory and Thought*. Hillsdale NJ: Erlbaum Associates.
- [2] Anderson, J. R (1983). *The Architecture of Cognition*. Cambridge, MA: Harvard University Press.
- [3] Celce-Murica, M. (1992). Formal grammar instruction: An educator comments. In S. McKay (Ed.), *Teaching Issues. TESOL Quarterly*, 26(2), 406-409.
- [4] China's Foreign Language Teaching Committee. (2000). *The College English teaching syllabus*. Shanghai: Shanghai Foreign Language Education Press.
- [5] Dai Weidong & Chen Liping. (2005). *The Summary of SL Grammar Teaching*. Beijing: *Foreign Language Teaching and Research* (2), 92-99.
- [6] Deborah Cameron (2007). *The Teacher's Guide to Grammar*. Oxford: Oxford University Press.
- [7] Du Xiaohong. (2009). A Study on English Grammar Teaching Model to College Students Majoring in English Education, Jinan: *Shandong Foreign Language Teaching* (5), 42-45.
- [8] Du Xiaohong. (2010). A Study on the Construction of Implicit Grammatical Ability on the Basis of Inquiry Learning. Tianjin: *Journal of Tianjin Foreign Language University* (6), 62-66.
- [9] Du Xiaohong. (2011). On Dynamic Equilibrium between Implicit Grammatical Knowledge and Explicit Grammatical Competence. Shanghai: *Contemporary Foreign Language Studies* (7), 26-29.
- [10] Ellis, R. (1999). *The Study of Second Language Acquisition*. Shanghai: Shanghai Foreign Language Education Press.
- [11] Gu Qiyi (2005). Implicit, Explicit and the Interface Hypothesis. Xi'an: *Foreign Language Teaching* (6), 45-49.
- [12] Gui Shichun. (2011). *What's Psycholinguistics?* Shanghai: Shanghai Foreign Language Education Press, 38.
- [13] Higgs, T. V. (1985). Teaching Grammar for Proficiency. *Foreign Language Annals*, 18(4), 289-296.
- [14] Hu Zhuanglin. (2002). Reconsideration on English Education in China. Nanjing: *Foreign Language Research* (3), 2-9.
- [15] Krashen, S. D. (1982) *Principles and Practice in Second Language Acquisition*. Oxford: Pergamon.
- [16] Krashen, S. D. & Terrel, T. D. (1983). *The Natural Approach*. London: Prentice Hall Intl.
- [17] Krashen, S. D. (1992). Formal grammar instruction: Another educator comments. In S. McKay (Ed.), *Teaching Issues. TESOL Quarterly*, 26(2), 409-411.
- [18] Long, M. (1983). Does Second Language Instruction Make a Difference? A Review of the Research. *TESOL Quarterly* (17), 359-382.
- [19] Pi Liansheng. (2004). *Educational Psychology*. Shanghai Education Press, 92-93.
- [20] Rutherford, W. E. (1987). *Second Language Grammar: Learning and Teaching*. Harlow, England: Longman.
- [21] Shu Dingfang, Zhixiang Zhuang. (1996). *Modern Foreign Language Teaching---Theory, Practice and Strategies*. Shanghai: Shanghai Education Press.
- [22] Zeng Yonghong. (2009). Empirical Studies of the Implicit Knowledge of Grammar Application of English Majors. Beijing: *Foreign Language Teaching and Research* (4), 298-302.



Xiaohong Du was born in Xuchang, China, in 1973. She received her MA in Applied Linguistics from Hubei University in 2004, Wuhan, China, and a BA in English Education from Henan Normal University in 1997, Xinxiang, China. Her main research interests are linguistics, English grammar acquisition and intercultural communication.

From 1997 to 2001, she was a full time English teacher in Xuchang Teacher's College; from 2001 to 2004, she taught in Hubei University as a part time teacher and since 2004, she has been teaching English in Zhengzhou University, Zhengzhou, China. From Sep 1, 2012 to Sep1, 2013, she is an academic visitor in the Centre of Intercultural Research in Communication and Learning (CIRCL) at De Montfort University, UK. She has published nearly 30 academic papers, translated one book, compiled 5 English textbooks and finished 9 research projects on linguistics and English grammar acquisition. Recently, she has taken a keen interest in English grammar teaching and research, and published more than 15 related papers.

Associate professor Du is an IELTS Invigilator and a Cambridge ESOL Oral Examiner (BEC Preliminary / Vantage /Higher Level) in Zhengzhou, China. She is also an honorary associate professor of De Montfort University, UK from Sep 1, 2012 to Sep1, 2013.