

THE INFLUENCE OF UNIVERSITY STUDENTS' DIGITAL NATIVE TRAITS ON EFL TEACHING STRATEGIES

Hua Liu

School of Foreign Studies, South China Agricultural University, Guangzhou 510642, Guangdong, China.

Abstract: This research aims to explore the degree and traits which university students perceive themselves as digital natives, and how these technological proficiency influence the learning and teaching of English as a foreign language. We employed the Digital Native Assessment Scale (DNAS) developed by Teo (2013) to do the research among 305 participants. It measures four variants relating to accepted characteristics of a digital native. The findings indicate that these university students actively used the Internet, computers and smartphones. They are strongly characterized by the features of “growing up with technology” and “thriving on instant gratifications and rewards”, whereas they have a medium-level of digital nativity in the dimension of “being comfortable with multi-tasking” in learning, or “reliant much on graphics for communication”. Based on the statistical results, we believe it's significant for language teachers to optimize teaching methods and strategies at the levels of language input and output, and meanwhile guide the students to promote their English learning via wise use of their technological advantages.

Keywords: Digital native; Bialystok's language model; Traits; Teaching strategies

1 INTRODUCTION

The rapid development of information technology and the proliferation of multi-media have significantly transformed people's ideologies, living habits and behavioral patterns. These advancement also altered the work content and working methods in all walks of life, including higher education. Contemporary college students are typical representatives of digital natives. They were born and grew up in a social environment where digital technologies and products are evolving rapidly. Their thinking patterns, cognitive processes and learning methods exhibit unique features of the digital era, which exert a significant influence on their learning experiences. For college English teachers, It is essential to recognize these digital native attributes and strategically employ information technology to update curricula, modify teaching strategies, and enhance teaching effectiveness. Addressing these challenges is critical for constructing high-quality foreign language classrooms and remains a central focus in foreign language education research.

This paper takes Bialystok's second language learning model as its framework. By reviewing relevant literature and questionnaire results, it aims to explore what digital native attributes are reflected by contemporary Chinese university students and how their digital ability influences the English learning process at different levels such as language input, knowledge construction, and language output. Furthermore, the paper also explores how teaching strategies and methods can be adjusted based on these characteristics and students' needs. It aims to improve teaching quality, and promote the deep integration of information technology with foreign language education.

2 LITERATURE REVIEW

2.1 Digital Nativity and Its Influence on Learning

The concept of “Digital Natives” was first proposed by Marc Prensky, an expert in educational games in the United States. It refers to members of the generation born after the 1980s, who have grown up with technologies such as computers, mobile phones, video games and the Internet. They possess the characteristics such as proficiency in using various technological products, adaptability to multitasking, reliance on visual communication, and a preference for instant gratification and rewards. Correspondingly, members of the previous generations, who were born without information technology but gradually learn to use the technology in their adult lives are named “Digital Immigrants”, mainly referring to older educators. Prensky believes that the student group of digital natives are different from the previous generations of students in the traditional education system. Therefore teachers should adjust their teaching methods according to these characteristics, for example, introducing new technologies (games or videos, etc.) into the classroom[1].

The concept of “Digital Native” has had major influence on educational field and mass media. Age is not the only variable in defining “digital natives”. Gender, educational attainment, and especially the experience of technology use are important factors in predicting the behavioral characteristics of digital natives[2]. Currently there is still controversy in the academic circle over the definition of digital natives, compared with the exploration of the concept, it may be more meaningful to investigate what digital characteristics contemporary university students have demonstrated as well as the impact on their English learning and classroom teaching. After all, it is an undeniable fact that information technology has widely penetrated into every field of economic and social life, changing people's ways of learning and

living.

Teo, based on Prensky's research, was the first to develop the Digital Natives Assessment Scale (DNAS for short), a self-assessment instrument to measure attributes of digital natives[3]. It mainly includes four factors, namely "growing up with technology", "comfortable with multitasking", "reliant on graphics for communication", and "thriving on instant gratification and rewards". There are 21 Likert-scale items in this model, which are used to assess the degree and attributes of how students perceive themselves as digital natives. The results of the scale can help teachers know the ways in which students interact with technology and their learning styles, and therefore update teaching resources, modify teaching approaches in their preparation for lessons to satisfy students' needs. Since its introduction, this research scale has been applied by researchers in various countries to measure the digital native traits of pre-service teachers or primary, secondary and tertiary school students. The reliability and validity of the scale have been verified in China, Turkey, Vietnam, and Serbia and other areas[4-7].

2.2 Bialystok' Second Language Learning Model

Linguist E.Bialystok holds that the second language learning model consists of three levels: input, knowledge and output[8]. Language input refers to the environment in which learners are exposed to the target language, which can be in the classroom, extracurricular reading or life experiences in the target language country. The knowledge part consists of three types of knowledge - explicit linguistic knowledge, implicit linguistic knowledge and other related knowledge. Explicit knowledge refers to the knowledge about the target language that learners are aware of and can clearly express, such as pronunciation, vocabulary and grammar, etc. Implicit knowledge is the knowledge that learners have internalized subconsciously. It is often not easily detectable but still governs the language behavior of learners. Other knowledge refers to all knowledge other than that of the target language, that is, the background information of learners. The third level is language output, that is, the understanding and expression of the target language. Generally speaking, understanding includes listening and reading, and expression includes speaking and writing. This model describes the fundamental factors, functions and interrelationships involved in second language learning. Figure 1 shows more specific details (solid lines represent the process and dashed lines represent the strategy) :

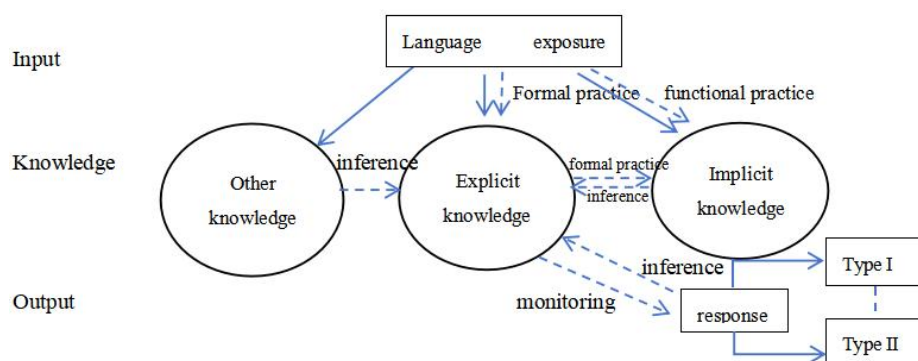


Figure 1 Bialystok' Language Learning Model

As shown in Figure 1, language input comes first, referring to any language contact. It is crucial in the learning process, as it determines the quality of the internalized knowledge and language output, and directly affects the improvement of language proficiency. At the knowledge level, comprehensible input is internalized by learners into explicit/implicit knowledge through formal and functional practicing. Explicit knowledge and implicit knowledge can also be mutually transformed through inference or formal practicing. To achieve success in language learning, the role of effective language output cannot be ignored. Two types of responses occur in output, namely, spontaneous and instantaneous (Type I) responses, and cautious, delayed responses (Type II). The three levels are interrelated, forming a dynamic and circular process of second language learning, which has provided guiding principles for language course design.

3 RESEARCH DESIGN

Although there are many studies on the validity of Teo's DNAS model with different age groups, relatively little research has been devoted to exploring how the four digital native traits respectively influence students' language input and learning outcomes. The current study aims to investigate the degree and attributes of how university students perceive themselves as digital natives, as well as the impact of digital traits on language learning and teaching in EFL contexts. The three specific research questions are:

1. What degree and attributes of digital natives have been demonstrated on EFL students in Chinese university?
2. What are the effects of digital traits on these students' language input and output?
3. What teaching strategies will be appropriate for teachers to apply at different levels of language learning?

3.1 Participants

Participants included 305 non-English sophomore students in Canton province, in southern part of China. All the

students learned English as a foreign language, aged from 18 to 20, coming from different majors such as vehicle engineering, software engineering, agriculture, and animal science in 8 secondary colleges. There were 181 male students, accounting for 59.34%, and 124 female students, accounting for 40.66%. They were reportedly familiar with the use of computers and smartphones. And a total of 259 students have passed the College English Test Band 4 in China, indicating a medium and high level of language proficiency.

3.2 Instrument

A survey was sent to the participants online to collect data. It consisted of three parts. The first part is personal information, covering participants' gender, age, major, language proficiency (mainly referring to CET scores), etc. The second part modified Teo's Digital Native Characteristics Scale (2013) to measure the degree and attributes of Chinese students' digital nativity. To help the participants accurately understand the survey questions, Chinese version of questions were also provided. The word "computer" in the original items of the DNAS scale has been modified to "computer/smartphone", considering the wide use of smartphone among young students. All 21 items of questions are rated on five-point Likert scale, ranging from 1 (not at all true of me) to 5 (very true of me). The third part of the questionnaire mainly focused on the information about the use of digital technology by students in the process of English learning.

3.3 Procedure

To ensure the authenticity and validity of the questionnaire, the instructor distributed it online to the students after class, who completed it on the spot and submitted it immediately. A total of 305 questionnaires were distributed. After excluding 11 invalid questionnaires (with a significantly shorter answering time than the average and multiple consecutive questions with the same option selected), 294 questionnaires were finally retrieved, with an effective rate of 96%.

4 RESULTS AND ANALYSIS

After collecting information from the questionnaires, we conducted data analysis of the research questions.

4.1 The Digital Native Traits of Students

We first examined the four factors of digital native traits. As shown in Table 1, the characteristic of "growing up with technology" among the college students is quite obvious, with an average score of 4.5. More than half of them scored 4.8, and the individual differences are relatively small. With the rapid development of the Internet and digital technology, the external environment for students' learning has undergone tremendous changes. University students spend a considerable amount of time on computers or smartphones for study, socializing or leisure. The other distinct feature is the preference for "instant gratification and rewards", with an average value of 4.1. This may result partly from technological development and the fast-paced lifestyle. We become impatient and stress efficiency in doing everything. Additionally, the convenient use of instant messaging apps and social platforms makes it easy for people to get quick response and rewards, which influences their psychological needs and ways of thinking. However, the other two features of being "comfortable with multitasking" and "reliant on graphics for communication" are not so prominent, with average values of both below 4. The details of the survey showed that in the dimension of "multitasking", the two sub-questions with relatively low scores are "I can check emails and chat online at the same time" and "I am able to communicate with my friends and do my work at the same time". About 25% of the participants think that it is "not at all true of me" (with a lower quartile of 3), while the average results of other sub-items are close to 4. The reason for this is very likely that high concentration is required while studying and working. For most people, "multitasking" may only be suitable for leisure or entertainment activities. As to "reliant on graphics for communication", although most of the participants use images or emoticons in their daily communications, apparently they rely more on words and text. Therefore, the average scores of several sub-items in this dimension are generally low.

Overall, Table 1 suggested participants demonstrated two relatively prominent traits of digital natives, namely "growing up with technology" and "thriving on instant gratification and rewards", while the other two characteristics were less significant.

Table 1 DNAS Self-assessment Descriptive Results

Factors	Median (Q2)	Mean	S.D
Growing up with technology	4.8	4.5	0.62
Comfortable with multitasking	4.0	3.95	0.79
Reliant on graphics for communication	3.6	3.6	0.72
Thriving on instant gratification and rewards	4.0	4.1	0.63

4.2 Digital Use in English Learning

Next we continued to discover students' use of digital technologies/products in the process of learning English. Survey results show that the digital literacy of most students is sufficient to support their English learning. For instance, 64.6% of the respondents have accesses to online resources they need for learning, and 87.5% can solve the problems they encounter in English learning by searching for information online. It's quite common for students to use various websites or English apps during their studies to practice their vocabulary, translation, listening or reading. Among different devices for English learning, the top three popular apps are "Bubaidanci", "Baicizhan" and "Youdao". More than 76% of the participants believed that their advantage of information technology had facilitated their English learning, which verified the positive effect of digital use on language learning. It is worth noting that a considerable number of students have reported that they use computers/mobile phones every day, but the proportion of those used for English learning is significantly lower than that for entertainment, leisure or socializing, see Table 2.

Table 2 Students' Use of Computers/Smartphones

Factors	Median(Q1)	Median (Q2)	Median(Q3)	Mean
I use computers/smartphones every day.	4	5	5	4.6
I use computers/smartphones for leisure every day.	4	5	5	4.5
I use computers/smartphones to contact my friends every day.	4	5	5	4.5
I use computers/smartphones for English learning every day.	3	3	4	3.2

4.3 Influences of Digital Native Traits on EFL Learning and Teaching Strategies

From the above survey results, it can be seen that contemporary university students live in a digital environment, with a lot of accesses to digital technologies and products anytime and anywhere. The four traits of digital natives exert both favorable and adverse effects on university students. For example, "growing up with technology" provide more convenient access to language learning resources, yet it can also result in increased time wasted on screen just for entertainment. "Thriving on instant gratification and rewards" may encourage more learning engagement online, but it can also diminish the inclination for deep thinking and sustained effort. In the context of foreign language teaching, it's important for teachers to guide students to apply their technical advantages to English learning while minimizing the potential negative effects. In this respect, some teaching practice at the levels of language input and output are suggested as follows.

4.3.1 Enhance language input with technological support

As we discussed before, comprehensible language input is a necessary condition for second language learning. Different ways of language input bring about different learning outcomes. In the traditional foreign language teaching environment, language input is mainly carried out in text form, including textbooks or extracurricular reading materials, etc. Whereas in the new digital era, since many students are technology savvy, in that they can make good use of electronic terminals and are accustomed to screen reading, language input can be enhanced in forms of audio and video materials, picture images, classroom activities or any other interactive activities to stimulate learning interest.

Furthermore, in the traditional context, language contact mainly occurs in the classroom, and teachers are the dominant factor in language input. In the digital environment, the channels for language input have also been broadened. By designing various kinds of assignments and tasks, instructors can help learners gain more communicative experiences of using the target language. For example, assign students regular news listening, or audio books listening every week; learn more about foreign culture by watching original English films and TV series; utilize learning strategies like setting clear goals of learning or check-in rewards in English apps to monitor self-learning, etc. All these practice can help instructors expand the ways and channels of language input, create a rich and relaxing language environment, thus achieving teaching objectives and improving learners' language proficiency.

4.3.2 Promote knowledge construction by optimize teaching strategies

Second language learning not only requires sufficient high-quality input, but also adequate consolidation and practice to enable learners to actively think about and process the input materials before constructing new knowledge and produce output. In this process, teaching approaches and strategies should also be used in light of course content and students' technological level.

In the part of "lead-in", the direct teaching method can be adopted for introducing new knowledge. Teachers' moderate lecturing and formal practice can enhance students' understanding and memory of new knowledge. After repeated or intensive training, new language forms become part of explicit language knowledge, which may be transformed into implicit language knowledge with further formal and functional practice. To facilitate the process of changing explicit knowledge into implicit knowledge, situational teaching method is a better choice. Since functional practice focuses on meaning and communication in real or simulated environments. Many functional exercises such as project-based assignments, role-playing, group dialogues or discussions, cooperative reading or writing play a major role in helping learners acquire language in an immersive environment.

In view of the current students' preference for immediate feedback and satisfaction, teachers can flexibly utilize functions such as voting and bullet comments in the Rain Classroom(a popular teaching device in China) to enhance classroom interaction and promptly address knowledge difficulties. After class, with the help of the online learning platform, instructors can not only get feedback from learners but also can track the learning situation.

All the above measures are conducive to stimulating students' interest and motivation, and creating a multi-dimensional learning space.

4.3.3 Increase effective output while diminishing negative digital interference

Input is the foundation and prerequisite for language learning, while output is the means and standard to detect language proficiency. Desired output influence students' learning initiative and outcomes. Learners can improve the accuracy and fluency of language application by paying attention to the differences between their language output and the target language. To increase effective output, it is imperative for teachers to recognize learners' digital native traits and their favorite channels of output, while decreasing possible negative interference from digital use.

Firstly, with the ubiquitous use of computers and smartphones, university students tend to spend more time on screen for socializing and entertainment. Instructors should work hard to guide the students to transfer their tech-savvy to English learning, boosting their confidence and academic achievement. Secondly, multi-modal information in forms of pictures and image may be helpful in activating interest, stimulating emotional responses, and promoting understanding of complex content. However, they can also cause negative interference to learning. Research shows that image-dependent individuals tend to passively receive information rather than actively think. Excessive reliance on pictures or images may hinder the development of deep learning and abstract thinking, making it difficult to focus on complex tasks. It implies that pictures or videos can only be used as auxiliary tools in classroom teaching to promote students' multi-sensory participation, but not be abused.

Furthermore, "multitasking" may lead to attention loss or excessive cognitive load[9]. When designing teaching activities and tasks, instructors should pay attention to mobilizing students' "productive" multitask and curbing their "distracted" multitasking behavior[10]. "Productive" multitask emphasizes the collaboration and interconnection among tasks, which can enhance work efficiency. For instance, the simultaneous training of listening, speaking, reading and writing, or the alternating practice of literature reading and thesis writing. Distracted multitasking, such as replying to messages or checking social media while studying, can disrupt concentration, lead to fragmented memory and reduce learning/work efficiency. Teachers should guide learners to keep irrelevant multitasking within a certain range during the learning process.

Finally an effective way of increasing language output is encouraging students to interact with foreign friends on social media like Xiaohongshu, or join virtual language communities to enhance their communication experience. In short, instructors should strive to diminish the negative interference of information technology, guide students to make reasonable use of digital products, therefore creating as many output opportunities as possible for them and improve their language proficiency.

5 CONCLUSION

This study finds that Chinese university students have relatively distinctive digital native traits of "growing up with technology" and "thriving on instant gratification and rewards". while the other two characteristics of DNAS model, "reliant on graphics for communication" and "comfortable with multitasking", although not obvious, also have a profound impact on foreign language learning and teaching. In the digital learning environment with booming technology and complex information, if digital technologies/products are properly utilized, they will surely become powerful tools to facilitate learning; otherwise, they may have even greater negative impacts. For teachers, the urgent problem of teaching reform and research lies in timely recognizing learners' digital traits and learning styles, optimizing teaching strategies at the three levels of language input, knowledge construction and language output. This approach can significantly stimulate students' learning interest and improve the overall quality of foreign language education.

COMPETING INTERESTS

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REFERENCES

- [1] Prensky M. Digital natives, digital immigrants. *On the Horizon*, 2001, 9(5): 1-6.
- [2] Helsper E J, Eynon R. Digital natives: where is the evidence? *British Educational Research Journal*, 2010, 36(3): 503-520.
- [3] Teo T. An initial development and validation of a Digital Natives Assessment Scale (DNAS). *Computers & Education*, 2013, 67: 51-57.
- [4] Huang F, Teo T, He J. Digital nativity of university teachers in China: factor structure and measurement invariance of the Digital Native Assessment Scale (DNAS). *Interactive Learning Environments*, 2019, 29(3): 385-399.
- [5] Isil K Y. Modeling the relationship between pre-service teachers' TPACK and digital nativity. *Education Tech Research Dev*, 2018, 66: 267-281.
- [6] Hoang DTN, Phung H, Tran N. Profiling digital nativeness of pre-service teachers: validity evidence for the Vietnamese Digital Natives Assessment Scale (V-DNAS). *Interactive Learning Environment* 2023, 31(10):

6890-6904.

- [7] Milutinovic V. Examining the influence of pre-service teachers' digital native traits on their technology acceptance: A Serbian perspective. *Education and Information Technologies*, 2022, 27(5): 6483-6511.
- [8] Bialystok E. A theoretical model of second language learning. *Language Learning*, 1978, 28(1): 68-83.
- [9] Rubinstein J S, Meyer D E, Evans J E. Executive control of cognitive processes in task switching. *Journal of Experimental Psychology: Human Perception and Performance*, 2001, 27, 763-797.
- [10] Hui Lianghong, Wang Boran. The Influence of college students' digital nativeness on online English learning engagement. *Foreign Language World*, 2022(01): 88.