IJERE International Journal of Educational Research Review

International Journal of Educational Research Review

Examining Chinese University Students' Digital Nativity and Its Effect on Their Intentions to Use Technology in English Learning

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Article History:
Received 16.06.2022
Received in revised form 03.11.2022
Accepted
Available online 01.01.2023

Digital natives demonstrate distinct characteristics compared with digital immigrants. Considering the importance of analyzing learner traits in language education, this study explores Chinese EFL learners' digital nativity and its effects on their intentions to use technology for learning English. A questionnaire was used to collect responses from 109 university students. Results from data analyses suggested that Chinese EFL students had positive responses to digital nativity and behavioral intentions to use technology. In addition, growing up with technology and striving for instant rewards significantly influenced their technology-using intentions, while the influences from being comfortable with multitasking and reliant on graphics for communication did not achieve significant levels. Based on the findings, the study provides some suggestions to governments, policymakers, and teachers to consider students' features when promoting technology-enhanced language teaching and learning.

Keywords: Chinese students, digital nativity, technology, English learning

INTRODUCTION

People born after the 1980s grew up with technology and spent most of their time with it. Prensky (2001) called them digital natives. To be specific, digital natives show their preferences for using graphics for communication and are comfortable with multitasking, they prefer to receive instant feedback and seek gratifications. These features may influence the ways they take and the tools they adopt for learning in the digital age.

Technology breaks up the limitation of time and improves students' learning autonomy (Liu & Li, 2020; Huang et al., 2020; McKnight et al., 2016) and thus, is extensively adopted in language teaching and learning. Recently, many teachers have endeavored to use information technology in language teaching (Andre, 2005; Lai et al., 2019; McKnight et al., 2016; Oh et al., 2020) but students' learning is far beyond their expectations. Yuan (2020) suggested teachers provide rich learning materials via technology for students without taking into account students' acceptance, students were overwhelmed and did not improve learning efficiency. Some researchers surveyed the effect of online teaching and learning during COVID-19 and found that students held negative attitudes toward online teaching (e.g., Unger & Meiran, 2020). This was contradictory to previous studies that suggested digital native students were fond of using technologies for learning (Çebi & Özdemir, 2019; Teo et al., 2019).

To examine users' behavior, researchers (e.g., Ajzen, 1991; Davis, 1989) proposed that the stronger the intention to engage in a behavior, the more likely should be its performance. They have used behavioral intention (BI) to test the degree of one's willingness to perform a behavior because it is the most powerful factor that explains one's behavior (Davis, 1989). Many empirical studies have verified its significance in examining one's technology adoptions (Huang et al., 2020; Venkatesh & Bala, 2008).

The existing studies have examined external variables that influence users' behavioral intentions, such as attitudes, perceived usefulness, and ease of use, etc (Davis, 1989; Huang et al., 2020), but few studies paid attention to users' digital nativity and its impact on BI (see Zhao & Zhao, 2021 as an exception). In addition, fewer studies placed foci on students to examine whether and to what extent students' digital nativity would affect their intentions to adopt technology in English learning.

Based on the discussion above, this study aims to examine Chinese university EFL learners' digital nativity and its influence on their intention to adopt technology in English learning. Specifically, the following questions would be answered in this study:

(1) Do Chinese EFL learners demonstrate digital nativity?

(2) To what extent does EFL learners' digital nativity influence their intentions to use technology in English learning?

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LITERATURE REVIEW

Digital natives (DN)

The term of digital natives was put forward by Prensky (2001). Digital natives were people who were born after the 1980s, they have access to technology and use technology frequently, and thus, they have a certain level of digital literacy (Ng, 2012; Thompson, 2013). For them, the most remarkable characteristic was growing up with technology. Many studies (e.g., Chun et al., 2016; Grigoryan, 2022; Huang et al., 2021; Kim et al., 2012) had confirmed that technology changed ways of students' language learning. For EFL learners, technology provided successive authentic materials, which contributed to language learning gains. Also, digital native students are comfortable with multitasks. They prefer to deal with more than one task at the same time. In terms of communication, they are fond of using graphics and data to deliver information. Last but not least, they are used to receiving information fast, hoping that they could receive rewards or feedbacks as quickly as possible.

Based on the above four natures of digital natives (Prensky, 2001), Teo (2013) initially developed The Digital Nativity Assessment Scale (DNAS) to examine people's digital nativity. Four constructs measure digital nativity: Grow up with technology, Comfortable with multitasking, Reliant on graphics for communication, and thrive on instant gratifications and rewards. Grow with technology (Tech) refers to the degree to which students live and are accompanied by technologies, and frequently keep in touch with technology. Comfortable with multitasking (Multi) measures the degree to which students do more than one task at the same time. Reliance on graphics for communication (Graphics) points to the degree to which students prefer to use graphics rather than using other methods when they want to express their opinions. Thrive on instant gratification and rewards (Rewards) refers to the degree to which students are eager to get immediate satisfaction and quick access to get information (Teo, 2013).

The DNAS was suggested as a valid tool to examine digital nativity by scholars in diverse cultures, such as Australia (Teo, 2013), China (Huang et al., 2021; Teo et al., 2022), Turkey (Çebi & Özdemir,2019; Ursavaş et al., 2016) and France (Wagner & Acier, 2017).

Behavioral Intention (BI)

Behavioral intention (BI) generally refers to the degree of one's willingness to perform a behavior. According to the Theory of Reasoned Action (Hill et al., 1977), the theory of Planned Behavior (Ajzen, 1991), and the technology acceptance model (TAM), BI is the most direct antecedent to one's actual behavior (Davis, 1989; Davis et al., 1989). The stronger the intention to engage in a behavior, the more likely he or she would perform the behavior (Ajzen, 1991). Previous studies have verified its significant effect on examining people's technology adoptions (Huang et al., 2020; Teo et al., 2019; Venkatesh & Bala, 2008), including studies in teaching and learning contexts, such as pre-service teacher's intention to use technology (Teo, 2012), student's acceptance of a digital learning platform (Song & Kong, 2017), and teachers' intentions to continually study MOOC (Wu et al., 2020).

In this study, behavioral intention (BI) estimates the degree to which students intend to adopt technology in language learning (Teo, 2012). Zhao and Zhao (2021) examined Chinese university faculties' intentions to use technology for online teaching and results showed that digital nativity (DN) was one of the key factors affecting their online teaching. In addition, Huang et al. (2021) examined university English teachers' digital nativity and indicated experienced teachers also demonstrated explicit characteristics of digital natives. However, these studies focused on teachers, whether and to what extent university students' digital nativity affects their intentions to adopt technology in English learning is still under-explored.

METHOD

Participants

The current study examined 109 university EFL learners' digital nativity and their intentions to use technology for English learning. Most participants (88.1%) reported they use technology in English learning. Among them, 37 (35.8%) were males and 70 (64%) were females. Their ages ranged from 18 to 25 years old, with the mean being 20.5 years old (SD = 1.79). They also suggested their cities are mostly located in urban areas (97.7%). Few were in the countryside (4.6%) or urban-rural areas (2.8%). Table 1 showed detailed information about the participants.

Table 1. Demographic Information (N = 109)

	Category	Number	Percentage
Gender	Male	39	35.8%
	Female	70	64.2%
School Location	City	101	92.7%
	Countryside	5	4.6%
	Urban-rural areas	3	2.8%
Technology Use	Yes	96	88.1%
	No	13	11.9%

Instrument and procedure

This study adopted an online questionnaire to examine Chinese EFL learners' digital nativity and their intentions to use technology. It consists of two parts. Part one inquired into students' basic information, such as gender, age, school location, and technology using experience. Part two inquired into students' responses to items measuring digital nativity and their intentions towards technology use for English learning. All the measurements in this part were adapted from previous studies (e.g., Teo, 2013; Venkatesh & Bala, 2008), including *grow up with technology* (Tech, 5 items), *comfortable with multitasking* (Multi, 5 items), *reliant on graphics for communication* (Graphics, 7 items), *thrive on instant gratification and rewards* (Rewards, 5 items), and *intentions to use technology in English learning* (BI, 4 items). All the items were tested by using a 7-point Likert scale, considering that it has optimal reliability (Symonds, 1924). The sample item is shown as *I often learn English with technology (such as reciting words, listening to English news, practicing, etc.).* The participants were informed of the purpose and procedures of the study, and their due rights to quit the study at any time. Generally, participants spent about 10 minutes filling in the questionnaire.

Data analysis

Collected responses from participants were analyzed by using SPSS 23.0. The reliabilities of the constructs were examined. Descriptive analyses were later applied to suggest their demographic information and their responses to the constructs. Multiple regression analysis was conducted to examine the effects of students' digital nativity on their intentions of using technology in English learning.

RESULTS

Reliability

The reliability of the constructs used in this study achieved a satisfactory level, given that Cronbach's alphas were all above .70. Nunnally (1978) proposed that the value of Cronbach's alphas exceeding .70 can be considered a generally accepted standard. Table 2 illustrated detailed information about the survey, including the number of items, sources, and reliabilities.

Table 2. Questionnaire Source and Reliability

Constructs	Number of items	Source	Cronbach's Alphas
Tech	5	Teo, 2013	.725
Multi	5	Teo, 2013	.837
Graphics	7	Teo, 2013	.706
Rewards	5	Teo, 2013	.826
BI	4	Venkatesh & Bala, 2008	.926

Note*: *Tech grow up with technology, ***Multi*** comfortable with multitasking, ***Graphics*** reliant on graphics for communication, ***Rewards*** thrive on instant gratification and rewards, ***BI*** behavioral intentions.

Descriptive analysis

As for students' responses to constructs of digital nativity and behavioral intention, descriptive analyses were conducted and results suggest a normal distribution, as the skewness (from -1.28 to -.24) and kurtosis (from .11 to 3.42) were within the | 3 | and | 8 | , respectively (Kline, 2010) (see Table 3).

As Table 3 suggested, for the four constructs of digital nativity, university EFL learners achieved the highest score in thriving on instant gratification and rewards (Rewards) (M = 5.44, SD =1.09), followed by growing up with technology (Tech) (M = 5.13, SD = 1.16), reliant on graphics for communication (Graphics) (M = 5.13, SD = 1.09) and comfortable with multitasking (Multi) (M = 4.63, SD=1.32). The mean of behavior intentions (BI) was 5.27 (SD = 1.14). These indicated students' had positive responses to all the constructs in the study.

Table 3. Descriptions of constructs (N = 109)

	Mean	SD	Skewness	Kurtosis
Tech	5.13	1.16	-1.28	3.23
Multi	4.63	1.32	- .24	.11
Graphics	5.13	1.09	- .76	1.64
Rewards	5.44	1.09	-1.11	3.42
BI	5.27	1.14	- .54	.89

Note*: *Tech grow up with technology, ***Multi*** comfortable with multitasking, ***Graphics*** reliant on graphics for communication, ***Rewards*** thrive on instant gratification and rewards, ***BI*** behavioral intentions.

Multiple Regression Analysis

In this study, the multiple regression analysis was conducted to examine the effect of students' digital nativity on their intentions of using technology for English learning. As Table 4 indicates, the variables were significantly correlated, with coefficients ranging from .398 to .724, indicating the content validity of the variables.

Table 4. Correlation of constructs (N = 109)

	Tech	Multi	Graphics	Rewards	BI
Tech	1				
Multi	.653**	1			
Graphics	.543**	.519**	1		
Rewards	.575**	.449**	.724**	1	
BI	.506**	.408**	.398**	.532**	1

Note*:** **. Correlation is significant at the 0.01 level (2-tailed). ***Tech grow up with technology, ***Multi*** comfortable with multitasking, ***Graphics*** reliant on graphics for communication, ***Rewards*** thrive on instant gratification and rewards, ***BI*** behavioral intentions.

Further, the study examined the extent to which the independent variables (Tech, Multi, Graphics, Rewards) explained students' intentions toward using technology for English learning (BI as the dependent variable). To infer the explainable variables more objectively and accurately, the "Progress" method was adopted in multiple regression analysis. Four simulation models were produced (see Table 5). According to model 4, both Rewards (β= .40) and Tech (β= .252) had significant effects on BI, with the variance of BI explained being 32.5%. Multi (β= .108) and Graphic (β = -.085) influenced BI but their influences did not achieve significance levels. Although the explanation of the digital nativity to BI is less than 50% ($\Delta R^2 < .5$) (Nagelkerke,1991), the significant effect of the digital nativity on BI was verified as the significance level has achieved.

Table 5. Results of Multiple Regression Analysis for Variables Predicting BI (N=109)

Model	Variable	B	Std. error	β	t	Sig.	VIF	R	R^2	ΔR^2	F	Sig.
1	(Constant)	2.235	.477	——	4.685	.000***	——					
	Rewards	.559	.087	.532	6.491	.000***	1.000	.532	.283	.276	42.134	.000***
2	(Constant)	1.703	.490	——	3.478	.01**	——					
	Rewards	.378	.101	.359	3.734	.000***	1.494	.585	.343	.330	27.616	.000***
	Tech	.295	.095	.299	3.111	.02**	1.494					
3	(Constant)	1.657	.315	——	3.385	.000***	——					
	Rewards	.367	.102	.349	3.601	.000***	1.515	.589	.347	.329	18.612	.000***
	Tech	.243	.113	.246	2.150	.034**	2.109					
	Multi	.078	.091	.090	.861	.391	1.768					
4	(Constant)	1.737	.504	——	3.449	.01**	——					
	Rewards	.420	.127	.400	3.307	**.001****	2.339	.592	.350	**.325**	14.014	.000***
	Tech	.248	.113	.252	2.187	**.031***	2.119					
	Multi	.094	.094	.108	1.000	.320	1.873					
	Graphics	-.089	.127	-.085	-.700	.486	2.347					

Note*: ($p < .001$, $p < .05$**)**. ***Tech*** grow up with technology, ***Multi*** comfortable with multitasking, ***Graphics*** reliant on graphics for communication, ***Rewards*** thrive on instant gratification and rewards, ***BI*** behavioral intentions, ΔR^2 the adjusted R^2, ***B*** Unstandardized coefficients, β Standardized coefficients.

DISCUSSION

This study examined Chinese university EFL learners' digital nativity and its influence on their intentions to use technology (BI) in English learning. Results showed that Chinese university EFL learners showed positive responses to the four constructs of digital nativity as well as intentions to use technology, and the 32.5% variance of BI was explained by the four constructs of digital nativity. The university students demonstrated features of digital nativity, which were consistent with previous studies (e.g., Prensky, 2001). To be specific, students achieved the highest score in the "thrive on instant gratification and rewards (Rewards)" construct, indicating they were eager to receive timely feedback and gratification when using technology. They achieved equally high scores on the "grow up with technology (Tech)" and the "reliant on graphics for communication (Graphics)" constructs (M=5.13), these indicated their rich experiences of using technology and preferences in the ways of communicating. Comparatively, they achieved a lower score in the "comfortable with multitasking (Multi)" construct (M= 4.63). It may be attributed to the limitations in human abilities (Kirschner & De Bruyckere, 2017; Kirschner & van Merriënboer, 2013). Regarding intentions to use technology, most university EFL learners suggested their willingness to use technology in English learning, which, to some extent, indicated the potential benefits of technology adoption in language learning (Huang et al., 2021; Ng, 2012). This study also suggested the significant effect of the digital nativity on students' behavioral intention to use technology in English learning, which is consistent with the previous study (Zhao & Zhao, 2021). According to model 4 in Table 5, two constructs (Rewards and Tech) had significant effects on BI. This indicated that those who grow up with technology and prefer to have instant gratifications and rewards were more likely to use technology in English learning. Venkatesh and Davis (2000) claimed that if the users had more experience in using a system, it would provide more intentions toward use in the future. Students who grew up with technology had more opportunities to experience technology thus, their intentions would increase. In addition, Intention towards use was theorized to be based on positive feedback in time

(Bagozzi, 1982). If students received positive feedback from their teachers, their intentions to use would increase. Contrary to our expectations, the constructs of "comfortable with multitasking" (Multi) and "reliant on graphics for communication" (Graphics) did not significantly influence students' intention to use technology (BI) to learn English. The reason for these results may be that even though university students showed relatively high levels of Multi and Graphics, many use technologies to perform different types of tasks, and those tasks may not be related to English learning. Similarly, although university EFL learners may prefer to use pictures when communicating with others, this preference may not directly influence their intentions to use technology.

LIMITATIONS AND FURTHER STUDY

This study had some limitations. Firstly, considering the large population of Chinese university students, the sample size was comparatively small, and the results of the study cannot represent all Chinese university students. Further studies were suggested to enlarge the sample size to understand Chinese students' perceptions of using technology in English learning. Secondly, due to the impact of the COVID-19 epidemic, this study adopted an online questionnaire to collect students' responses. Students may lack the willingness to respond in the online survey (Lefever et al., 2007). Traditional paper-and-pencil forms were suggested in future studies because they may provide higher response rates. Thirdly, other factors may affect students' intentions of using technology in English learning, such as subjective norm (Teo, 2012) and innovativeness (Guo et al., 2020), but they were not examined in this study. Further studies could add these factors to explore the degree to which these antecedents influence students' technology adoption in English learning.

CONCLUSION

This study examined the effects of Chinese EFL learners' digital nativity on their intentions of using technology for English learning. Results contributed to both the technology acceptance theories and computer-assisted language learning theory. Results of the study suggested although Chinese university EFL learners didn't possess a high level on the "comfortable with multitasking" construct, they had strong intentions to use technology in English learning. In addition, two constructs of digital nativity (growing up with technology and thriving on instant gratification and rewards) significantly affected their technology-using intentions.

These results had important implications for English teaching and learning, as well as for government and educational policymakers. The government and decision-makers should carefully consider students' needs and traits when making technology-related educational policies. They were suggested to continue increasing the investment in the network infrastructure at schools. Teachers were supposed to give feedback as quickly as possible to students and pay more attention to students' technology-using experiences in English teaching. Given that students didn't possess a high level of multitasking competence, teachers should arrange teaching tasks appropriately according to students' actual features.

ACKNOWLEDGMENTS

The authors thank all the participants in this research.

DECLARATION OF CONFLICTING INTERESTS

The authors declared that they have no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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