Factors Affecting to the Adoption of a 2-Way Interactive Video in Guangxi Zhuang Autonomous Region China

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Abstract

This study aimed to analyze the factors influencing teachers to adopt the 2-way interactive video in Guangxi Zhuang Autonomous Region China. To make suggestions to encourage teachers to adopt the 2-way interactive video teaching level. This study applies the diffusion of innovations paradigm theory (Rogers, 1983) and the attitudes paradigm theory (Eargly & Chaiken, 1993). The sample size was 188 teachers from the Junhua Primary School and Shuangding Town Central Primary School of Xixiangtang District of Nanning. The research found that the factors affecting the adoption of a /-way interactive video in Guangxi Zhuang Autonomous Region China were as follows; 1) attitude goal, 2) habit, 3) self-identity outcome, 4) attitude toward the behavior, 5) normative outcome, 6) Utilitarian outcome, and 7) intention. The teacher agrees that the most factors that affect adopting a 2-way interactive video are the normative outcome, attitude toward behavior, and attitude toward the target. The minor factor was the intention. The research suggests that education departments and schools should create an educational informatization atmosphere conducive to 2-way interactive video application and provide policy support. Train teachers to use 2-way interactive video to improve the pertinence and effectiveness of training. Improve the frequency of teachers' use of 2-way interactive video, and encourage teachers to improve their teaching level in the application.

Keywords: 2-way interactive video, Teachers' adoption, Affecting factors

Introduction

Today's society has stepped into the information society, and the reform and development of education are faced with many major challenges. The revolutionary influence of information technology on education is becoming increasingly prominent. Educational informatization is not only an important symbol of education modernization but also plays a leading and supporting role in comprehensive education reform (Education Department of Guangxi Zhuang Autonomous Region, 2017). It is a strategic policy of China's education development to accelerate educational informationization and drive educational modernization by educational informationization. Educational informatization is not only a problem of information environment construction but also a problem of application, and the key of application is teachers. School education informatization is a dynamic and complex stage of the innovation diffusion process, the teacher in the process plays an important role innovation agent, is an important impetus the spread of information technology in schools, teachers use level for various tasks in the information technology is a basic standard judging the success or failure of the school information construction (Liu, 2017).

According to the Action Plan for Educational Informatization 2.0: By 2022, the development goal of "3 comprehensive education, 2 advanced education and 1 advanced education" will be basically achieved, that is, all teachers will be covered by teaching applications, learning applications will cover all school-age students, and all schools will be covered by digital campus construction. The application level of information technology and the information literacy of teachers and students will be generally improved,

and an "Internet + Education" platform will be built. Push from education dedicated to education resources, promote information technology application ability between teachers and students to improve their information literacy, the shift from fusion applied to the innovation and development, efforts to build "Internet +" under the condition of the new mode of cultivating talented person, development of web-based education service new mode, explore new models of information age education management goal requirements (Ministry of Education, People's Republic of China, 2018).

In view of the current situation that the level of education informatization construction and development in Guangxi Zhuang Autonomous Region is still significantly behind the national requirements and developed provinces, the Department of Education of Guangxi Zhuang Autonomous Region has issued the Guangxi Education Informatization Development Plan (2017 - 2020) in recent years, which makes it clear that the process of education informatization in Guangxi will be accelerated in 2017 - 2020. We will meet the tasks and requirements for strengthening weak links in development. At the request of education informatization, the Guangxi Zhuang Autonomous Region in recent years the education informationization as the main fulcrum of school development, actively developed modern education technology application and research of 2-way interactive video teaching, promote the wisdom of garden construction strive to build information-based teaching mode, to develop the project learning activities based on information technology, promote the sustainable development of school education quality (Guangxi Education Department, 2015)

In December 2015, the Audio-Visual Education Center of Guangxi Zhuang Autonomous Region identified 53 schools in Guangxi as pilot schools to apply the "Video Teaching Resource System," promoting education informatization using 2-way interactive video technology. In the information environment of Guangxi Zhuang Autonomous Region, Shuangding Town Central Primary School of Xixiangtang District of Nanning City and Nanning Jinhua Primary School have the honor to be one of the 53 pilot schools of "video teaching resource system" application in Guangxi, and the 2 schools are urban-rural matching schools for mutual aid. Since then, Shuangding Town Central Primary School of Xixiangtang District of Nanning City and Nanning Jinhua Primary School, a city school, have started using 2-way interactive video technology to carry out network teaching. Application in the 2 schools, 2-way interactive video experiment greatly mobilized the enthusiasm of communicating with teachers in both schools cooperation, initiative, make 2 schools teachers' teaching ability, the application level of informatization has made great progress, the 2 schools to form the atmosphere of cooperation and exchange, promote each other, effectively promote the balanced development of the 2 school education level.

Teaching using 2-way interactive technologies is very empowering if it is used to facilitate the learners' construction of their meaning and to create new knowledge, not just to make the learning process faster or easier. It may significantly influence the quality of student learning. However, the various media of instruction are only tools. Their successful and productive use depends upon the quality of teaching the content, not the newest communications miracles. All educational technology software and hardware represent nothing more than a tool to enhance teaching and learning. Without ready and willing teachers, technology can accomplish nothing.

Problem statement

The problem of this study is to prepare and help teaches to use the 2-way video interaction technology, which is the partnership of rural and urban schools. It has organized several in-services to prepare and support the teachers to use 2-way interactive technologies. The teachers who complete the in-services in 2-way interactive technologies may know and learn the 2-way interactive video but may not regard it as relevant to their situation and consequently may not adopt it. Different factors may influence teachers' decisions to adopt an innovation. Some factors are external, such as the availability and the accessibility of the innovation, administrative support, and the existence of environments that encourage innovation (Niu, 2018). Other factors are personal, such as feeling incompetent, uncertain, and having anxiety (Bu，2014). Teachers' judgments (either good or bad) about using the 2-way interactive video

for classroom instructional activities may intervene between their knowledge of the 2-way interactive video and their future adoption decisions.

Objective of the study

The objectives of the study are as follows; 1) to analyze the factors that influence teachers to use the 2-way interactive video in Guangxi Zhuang Autonomous Region China and 2) to make suggestions to promote teachers to adopt the 2-way interactive video teaching level, which can be used as a reference for teacher training and school to promote the education informatization.

Literature review

The paper is based on 2 different, yet theoretically liked, bodies of paper. These are the diffusion of innovations paradigm (Rogers, 1983) and the attitudes paradigm (Eagly & Chaiken, 1993). Rogers' diffusion model posits that a new technology diffuses through a social system, where individuals learn about the technology through formal and informal communication channels. Access to these information channels provides potential adopters with data about the new technology and the various options. The mass media, commercial entities, formal organizations, educational institutions, and personal interaction are among the information sources that influence adoption behaviors. Individuals evaluate information about innovation; if a favorable attitude toward the technologies emerges, Rogers's model assumes adoption will follow (Rogers, 1983). People will not adopt innovations if they lack the skills or the accessory resources that are maybe needed (Rogers, 1983)

The individual's decision about innovation is not an instantaneous act. It is a process that occurs over time and consists of a series of actions (Rogers, 1983). The innovation-decision process can lead to various decisions ranging from making full use of innovation to deciding not to adopt an innovation. Because the persuasion stage of the innovation-decision model involves the formation of attitudes towards the innovation, the attitude-behavior literature is relevant. For instance, Eagly and Chaiken (1993) have developed the composite model of the attitude-behavior relation that delineates the conditions under which relatively good behavior prediction can be achieved.

Eagly and Chaiken's (1993) model takes habit, attitude toward targets, utilitarian outcome, normative outcomes, self-identity outcomes, attitudes toward engaging in the behavior, and intention into account when predicting behavior. Eagly and Chaiken (1993) defined habit as the sequences of behavior that have become relatively automatic in the sense that they occur without self-instruction. Attitudes toward targets are the evaluations of targets of behavior formulated at any level of abstraction. Utilitarian outcomes are those rewards and punishments that are anticipated to follow from engaging in the behavior. Normative outcomes refer to the approval and disapproval that significant others are expected to express about behavior, as well as self-administered rewards and punishments that follow from internalized moral rules. Self-identity outcomes refer to affirmations of self-concept that are anticipated to follow from engaging in the behavior. Attitude toward engaging in the behavior is the evaluation of the respondent toward engaging in the behavior. The intention is the decision to act in a particular way.

Examining the innovation-decision model and the composite model of the attitude-behavior relation can be seen to make links between the 2 models. Behavior in the combined model could be thought of as the actual adoption or rejection of innovation, and the behavioral intention corresponds to the actual decision to either adopt or reject the invention. This study will contribute to the body of knowledge by analyzing the factors influencing teachers to adopt the innovation. The conceptual framework of this study is as follow;
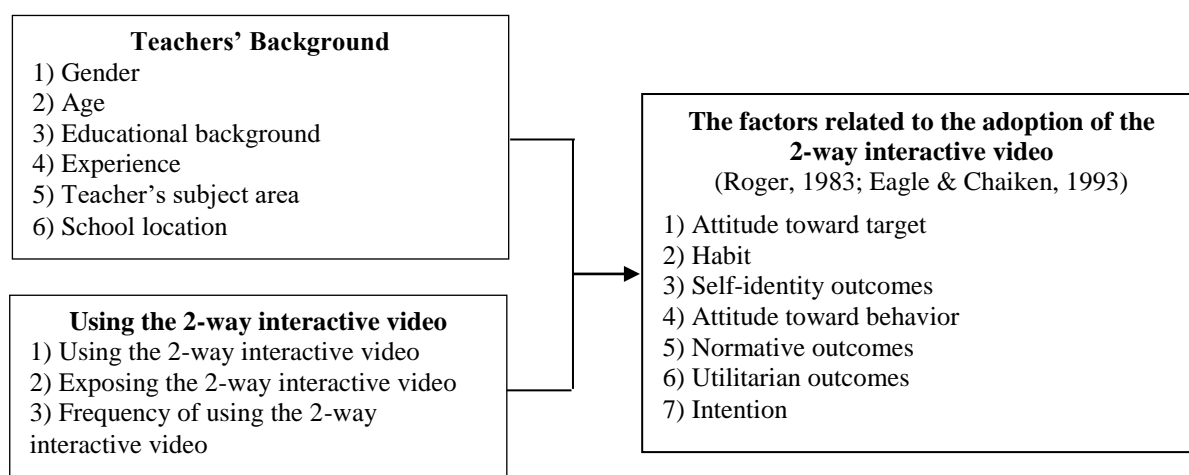
Figure 1 Conceptual framework.

Methodology

Descriptive research which involves conducting survey research is used in this study. This research adopts the questionnaire survey method. The 53 pilot schools that applied the video teaching resource system in Guangxi Zhuang Autonomous Region, Nanning Jinhua Primary School, and Shuangding Town Central Primary School of Xixiangtang District Nanning were investigated. Aiming to understand the status quo of teachers' use of 2-way interactive video in Guangxi under the background of education informatization, and puts forward feasible measures by analyzing the problems affecting teachers' use of 2-way interactive video, practical measures are put forward.

Population

The subjects consisted of all 2-way interactive video unit schools in Guangxi Zhuang Autonomous Region China. Teachers are from Jinhua Primary School and Shuangding Town Central Primary School of Xixiangtang District of Nanning. They attended in-service training in 2-way interactive video technology in 2015. A total of 250 teachers were surveyed in the 2 selected schools.

Sampling method and sample

Krejcie & Morgan Table (1970) was used to sample the population in this study. The sample size was 188 teachers. Samples are from Jinhua Primary School and Shuangding Town Central Primary School of Xixiangtang District of Nanning. The basic information of the sample teachers includes gender, age, years of being a teacher, education degree, teachers' teaching levels, and teachers' subject areas.

Instrument

The researcher employs the questionnaire research instruments in collecting data from the respondents. Items designed for this study reflected seven of the constructs of the composition model of the attitude-behavior relation (Eagly & Chaiken, 1993). The model constructs are attitude toward the 2-way interactive video, habit, self-identity outcomes, attitude toward the behavior, normative outcomes, utilitarian outcomes and intention.

The items for each construct are reviewed critically by three experts such as Dr. Lei Lan, Associate Professor of Guangxi College of Finance and Economics; Dr. Yaqiu Liu, Associate Professor of Guangxi Institute of Technology; Dr. Geng Lan, Associate Professor of Guangxi College of Finance and Economics whose area of expertise in attitude theories. The definition and the set of items are showed in the **Table 1**.

Table 1 The definition and the set of items of the factors affecting to the adoption of a 2-way interactive video.

Factors name	Definition	Set of items
Attitude goal	Attitude towards the 2-way interactive video refers to the teachers' general views on the 2-way interactive video teaching.	- The 2-way video will increase education learning opportunity for teachers in Nanning city of Guangxi. - The 2-way video will allow schools to share resources - The 2-way video will provide more educational opportunities for students from all regions of Guangxi. - There are many issues with the operation of 2-way video (for example, scheduling, access, support, etc.) - In general, I have a positive attitude towards 2-way video as a teaching system
Habit	Habits in this study were defined as teachers' propensity to use innovative technologies in classroom teaching activities.	- Using innovative technology for classroom instructional activities is something I rarely do. - Trying new teaching methods is something I often do. - I'm used to using interactive technology in class.
Self-identity outcomes	Self-identification outcomes were defined as teachers' perceptions of self-identification and expectations to follow their use of instant information technology, such as 2-way interactive video, in classroom teaching activities.	- The idea of using interactive instructional technology such as 2-way interactive video for classroom instruction technology is consistent with my view as a teacher. - To me, being an effective teacher means being open to the use of innovative technologies such as 2-way interactive video for classroom activities. - I don't think I would use innovative technology like 2-way interactive video in my classroom activities. - I would be a better teacher if I used 2-way interactive video as a classroom activity. - In the future, I believe that my teaching will be inseparable from the use of innovative technologies in classroom teaching activities
Attitude toward the behavior	Attitude toward behavior refers to the teacher's judgment that the use of 2-way interactive video for classroom teaching technology is good or bad, that she or he approves of or frequently uses it.	- For me, the use of 2-way interactive video for classroom teaching activities is beneficial. - As a teacher, I think it would be troublesome to use 2-way interactive video teaching in classroom teaching activities. - In general, I have a good attitude towards the 2-way interactive video of classroom teaching activities.

Factors name	Definition	Set of items
Normative outcomes	Normative outcomes refer to the teachers' perception of the expectations of significant others when using 2-way interactive video in the classroom, taking into account their motivation to conform to the ideas of others.	- The teachers at my school think I should use 2-way interactive video in my classroom activities. - My students' parents will support me to use 2-way interactive video for classroom teaching activities. - The school administration thought I should use 2-way interactive video in my classroom activities. - Students expect me to use 2-way interactive video for classroom teaching activities.
Utilitarian outcomes	Utilitarian results refer to the teachers' cognition of the consequences of using 2-way interactive video in classroom teaching, taking into account their own evaluation consequences.	- Applying 2-way interactive video to classroom teaching activities can improve students' learning quality. - The use of 2-way interactive video in classroom teaching activities will make the interaction between students and teachers objective. - Using 2-way interactive video for classroom activities will increase the time required for planning and preparation. - The use of 2-way interactive video in classroom teaching activities will lead to technical problems in teaching. - The use of 2-way interactive video in classroom teaching activities can cause many disciplinary problems for students. - The 2-way interactive video can solve the problem of interactive communication between teachers and students in different places.
Intention	Utilitarian results refer to the teachers' cognition of the consequences of using 2-way interactive video in classroom teaching, taking into account their own evaluation consequences.	- If the 2-way interactive video were available to me, I would use it for classroom instructional activities

Reliability and validity of the instrument

Before sending questionnaires to the 188 teachers at both schools, the researchers tested the reasonableness and friendliness of the questions by placing them in a small sample of people. At the same time, the accuracy and applicability of the research question are investigated. The researchers will use the research tools used in the final data collection to determine its reliability. Tool reliability refers to the degree to which the selected research tool provides consistent data and results to the researcher when used repeatedly in different samples. The reliability of the research tools compared to other sources is also measured by the level of accuracy provided by the research results. The pilot test will help the researcher

measure the research tools presented in this study and be familiar with the management of the study questionnaire. The Cronbach's alpha value is 0.95, with excellence.

Data analysis

The second part is the formal questionnaire. This part mainly investigates the psychological factors of teachers' use of 2-way interactive video teaching. The psychological factors of teachers such as the attitude towards the goal, habit, the consequences of self-identity, behavior attitude, normative results, utilitarian consequences, and intention factors. The scale adopted a 5-point Likert type scale, with 5 different options set for each item: Very consistent, consistent, uncertain, inconsistent, and very inconsistent. Different 1 - 5 score values were given to the investigated teachers to select the corresponding options according to their actual situation. Most of the questions in the questionnaire are forward questions, and a few are reverse questions. In order to facilitate the statistical data, each question is designed as a single choice. I use descriptive statistics such as frequency, percentage, mean, and standard deviation to describe a group of interest. And we use inferential statistics such as t-test and ANOVA to make inferences about the larger population from which the sample was drawn.

Results

The purpose of this study was to discuss the research finding based on the responses to the administered questionnaire. The data analysis began with teachers' background section 1 of the questionnaire. And continued with the analysis of responses to open-form and closed-form questions in sections 2 and 3 of the questionnaire. Statistical data for each research question is discussed individually.

Teachers' background

Descriptive analysis sets describe the basic characteristics of variable change. In this study, the number and percentage of variables are described in teacher background factors. Firstly, descriptive statistical analysis of personal background factors was conducted. Nine factors of the personal background of 188 teachers were analyzed, including gender, age, education background, teaching age, teaching discipline, school location, and exposure to the 2-way interactive video, exposure time, and frequency of using 2-way interactive video.

As can be seen from **Table 2**, among the 188 investigated, in terms of gender, there are 60 male teachers, accounting for 31.9 % of the total number, and 128 female teachers, accounting for 68.1 % of the total number. The proportion of male and female teachers is not balanced, with more female and less male, but in line with the situation that there are more male and fewer female teachers in primary and secondary schools in Nanning.

In terms of the age of teachers, 48 teachers are between 20 to 30 years old, accounting for 25.5 % of the total number of teachers, 84 teachers between 31 to 40 years old, accounting for 44.7 % of the total number of teachers, 38 teachers between 41 to 50 years old, accounting for 20.2 % of the total number of teachers. There are 18 teachers aged 51 to 60, accounting for 9.6 % of the total number. The samples investigated are mainly young and middle-aged teachers.

Regarding teachers' educational background, 137 of them have a bachelor's degree, accounting for 72.9 % of the total number of teachers, and 51 of them have a junior college degree, accounting for 27.1 % of the total number of teachers. It shows that the school teachers' academic background is gradually improving, teachers' knowledge, ability, and quality are also gradually improving. The lack of master's and doctor's degrees suggests that there is room for improvement.

From the perspective of teaching experience, 43 teachers have less than 5 years of teaching experience, accounting for 22.9 % of the total number of teachers; There are 91 teachers with 5 to 10 years of teaching experience, accounting for 48.4 % of the total number of teachers. There are 54 teachers with more than 20 years of teaching experience, accounting for 28.7 of hers. This indicates that the teachers surveyed have certain teaching experience. According to Rogers, people with a certain level of education are more receptive to innovation. Therefore, the teachers surveyed have a certain role in

promoting the promotion of the 2-way interactive video. The subjects taught by the teachers were mainly Chinese, Mathematics, English, and other subjects.

　　The subjects investigated were relatively comprehensive. Sixty-four teachers taught Chinese, accounting for 34.0 % of the total number. There are 50 Mathematics teachers, accounting for 26.6 % of the total number; There are 19 English teachers, accounting for 10.1 % of the total. There are 55 teachers in other disciplines, accounting for 29.3 % of the total. At present, Chinese and Mathematics are still the main subjects in primary and secondary schools. In terms of school location, there are 74 teachers in urban areas, accounting for 39.4 % of the total number of teachers, and 114 teachers in rural areas, accounting for 60.6 % of the total number of teachers. The main object of this survey is township teachers. One hundred and one teachers have used 2-way interactive video in teaching, accounting for 59.0 % of the total number; 77, or 41.0 %, did not use it. It can be seen that there are still many teachers who have not used 2-way interactive video for teaching.

　　Most of the teachers surveyed have been exposed to 2-way interactive videos for more than 5 years, which is not short. It shows that teachers are no strangers to the innovation of 2-way interactive video in the field of education. However, as an innovative thing, 2-way interactive video is adopted and used by teachers. It takes a long time to go through 5 stages: Cognition, persuasion, decision, implementation and confirmation. According to the survey results of the frequency of teachers' use of 2-way interactive video, neither teachers who use 2-way interactive video every class nor teachers who use them frequently. The number of occasional users was 126 or 67.0 % of the total. Sixty-two, or 33.0 %, never used it.

　　The application rate of 2-way interactive video is very low. This is also in line with Rogers' view that innovation has few adopters in the early stage of promotion, and the promotion speed of innovation is very slow. As time goes on, the use of 2-way interactive video will gradually increase. Therefore, the promotion of the application of 2-way interactive video in the teacher group still needs a certain amount of time and certain communication channels. It also reflects that there must be some factors influencing teachers' use of 2-way interactive video.

Table 2 Frequency and percent of teachers' background.

Teachers' background	Frequency	Percent
Gender		
Male	60	31.9
Female	128	68.1
Current age		
20 - 30 years	49	26.1
31 - 40 years	84	44.7
41 - 50 years	38	20.2
51 - 60 years	17	9.0
Education		
Junior college	51	27.1
Undergraduate	137	72.9
Years of experience teaching		
Less than 5 years	43	22.9
5 - 10 years	91	48.4
more than 20 years	54	28.7
Teaching discipline		
Chinese	64	34.0
Math	50	26.6

Teachers' background	Frequency	Percent
English	19	10.1
Other	55	29.3
School location		
city	74	39.4
country	114	60.6
Using the 2-way interactive video		
Yes	111	59.0
No	77	41.0
Exposure to the 2-way interactive video		
Less than 1 year	32	17.0
1 - 2 Years	27	14.4
3 - 4 years	48	25.5
More than 5 years	81	43.1
Frequency of using the 2-way interactive video		
Occasionally	126	67.0
Never	62	33.0

The factors affecting to the adoption of a 2-way interactive video

Then the 7 factors affecting teachers' adoption of 2-way interactive video are analyzed: Attitude toward the target, Habit, self-identity outcome, attitude toward behavior, normative outcomes, utilitarian outcomes, and intention carry out a descriptive analysis. The teachers surveyed gave answers according to their situation and the specific situation of the school. **Table 3** describes the mean and standard deviation of each item data in the influencing factors. The teachers totally agree with the most factors that affect to adopt a 2-way interactive video were normative outcome (M = 4.808, SD = 0.106), attitude toward behavior (M = 4.744, SD = 0.141), and attitude toward target (M = 4.597, SD = 0.282). On the other hand, the least important factors were intention (M = 2.638, SD = 0.481), habit (M = 3.244, SD = 0.389), and utilitarian outcomes (M = 3.994, SD = 0.080).

Table 3 Mean and Standard Deviation of the factors related to the adoption of a 2-way interactive video.

Teachers' background	N	Mean	Std. Deviation
Attitude toward target	188	4.597	0.282
Habit	188	3.244	0.389
Self-identity outcomes	188	4.151	0.956
Attitude toward behavior	188	4.744	0.141
Normative outcomes	188	4.808	0.106
Utilitarian outcomes	188	3.994	0.080
Intention	188	2.638	0.481

Paired sample of the factors related to the adoption of a 2-way interactive video

Table 4 Paired sample t-test of the factors related to the adoption of a 2-way interactive video between teachers' gender and education background.

The factors related to the adoption of a 2-way interactive video	Gender				Education			
	Male	Female	t	*p*	Junior College	Undergraduate	t	*p*
Attitude toward target	4.78	4.51	6.721	0.000**	4.88	4.49	10.646	0.000**
Habit	3.23	3.25	−0.139	0.889	3.18	3.26	−1.329	0.185
Self-identity outcome	4.08	4.18	−8.090	0.000**	4.05	4.18	−9.970	0.000**
Attitude toward behavior	4.85	4.69	8.701	0.000**	4.88	4.69	10.874	0.000**
Normative outcomes	4.89	4.76	8.701	0.000**	4.91	4.76	10.874	0.000**
Utilitarian outcomes	4.03	3.98	3.642	0.000**	4.03	3.97	4.949	0.000**
Intention	2.25	2.82	−9.059	0.000**	2.33	2.75	−5.728	0.000**

**$p < 0.01$, *$p < 0.05$

The independent sample t-test in **Table 4** showed the factors related to adopting a 2-way interactive video that significantly differed between teachers' gender and educational background. However, the habit factor was no significant difference between teachers' gender [t = −0.139, $p = 0.889$] and educational background [t = −1.329, $p = 0.185$].

Table 5 One-way ANOVA Test for comparison of the factors related to the adoption of a 2-way interactive video and age groups.

The factors related to the adoption of a 2-way interactive video	Age groups	SS	df	MS	F	*p*
Attitude toward target	Between Groups	8.595	3	2.865	82.833	0.000**
	Within Group	6.364	184	0.135		
	Total	14.959	187			
Habit	Between Groups	0.915	3	0.305	2.052	0.108
	Within Group	27.384	184	0.149		
	Total	28.300	187			
Self-identity outcome	Between Groups	0.828	3	0.276	57.591	0.000**
	Within Group	0.882	184	0.005		
	Total	1.710	187			
Attitude toward behavior	Between Groups	2.193	3	0.731	86.678	0.000**
	Within Group	1.552	184	0.008		
	Total	3.745	187			
Normative outcomes	Between Groups	1.234	3	0.411	86.678	0.000**
	Within Group	0.873	184	0.005		
	Total	2.106	187			
Utilitarian outcomes	Between Groups	0.164	3	0.055	9.520	0.000**
	Within Group	1.053	184	0.006		
	Total	1.217	187			
Intention	Between Groups	9.228	3	3.076	16.561	0.000**
	Within Group	34.176	184	0.186		
	Total	43.404	187			

**$p < 0.01$, *$p < 0.05$

Table 5 shows the result of a 1-way ANOVA analysis of variance to evaluate the relationship between the factors related to the adoption of a 2-way interactive video and age group. The teachers' age group was an independent variable that included 4 levels, between 20 - 30, 31 - 40, 41 - 50 and 51 - 60 years. The dependent variable was the factors that affect the adoption of a 2-way interactive video. The ANOVA was almost significant at the 0.01 level. However, the habit factor was no significant (F = 2.052, $p = 0.108$).

Table 6 One-way ANOVA Test for comparison of the factors related to the adoption of a 2-way interactive video and teachers' experience.

The factors related to the adoption of a 2-way interactive video	Teachers' experience	SS	df	MS	F	p
Attitude toward target	Between Groups	7.555	2	3.777	94.377	0.000**
	Within Group	7.404	185	0.040		
	Total	14.959	187			
Habit	Between Groups	0.001	2	0.001	0.004	0.996
	Within Group	28.299	185	0.153		
	Total	28.300	187			
Self-identity outcome	Between Groups	0.751	2	0.375	72.419	0.000**
	Within Group	0.959	185	0.005		
	Total	1.710	187			
Attitude toward behavior	Between Groups	1.585	2	0.792	67.877	0.000**
	Within Group	2.160	185	0.012		
	Total	3.745	187			
Normative outcomes	Between Groups	0.891	2	0.446	67.877	0.000**
	Within Group	1.215	185	0.007		
	Total	2.106	187			
Utilitarian outcomes	Between Groups	0.105	2	0.053	8.738	0.000**
	Within Group	1.112	185	0.006		
	Total	1.217	187			
Intention	Between Groups	6.284	2	3.142	15.660	0.000**
	Within Group	37.120	185	0.201		
	Total	43.404	187			

**p < 0.01, **p* < 0.05

Table 6 shows the result of a 1-way ANOVA analysis of variance to evaluate the relationship between the factors related to the adoption of a 2-way interactive video and teachers' experience. The years' teaching experience was an independent variable that included three levels, Less than 1 year, 5 - 10 years, and more than 20 years. The dependent variable was the factors that affect the adoption of a 2-way interactive video. The ANOVA was almost significant at the 0.01 level. However, the habit factor was no significant (F = 2.052, $p = 0.108$).

Table 7 One-way ANOVA test for comparison of the factors related to the adoption of a 2-way interactive video and teaching subject areas.

The factors related to the adoption of a 2-way interactive video	Teaching subject areas	SS	df	MS	F	*p*
Attitude toward target	Between Groups	0.913	3	0.304	3.987	0.009**
	Within Group	14.046	184	0.076		
	Total	14.959	187			
Habit	Between Groups	1.739	3	0.580	4.015	0.008**
	Within Group	26.561	184	0.144		
	Total	28.300	187			
Self-identity outcome	Between Groups	0.189	3	0.063	7.635	0.000**
	Within Group	1.521	184	0.008		
	Total	1.710	187			
Attitude toward behavior	Between Groups	0.222	3	0.074	3.861	0.010**
	Within Group	3.523	184	0.019		
	Total	3.745	187			
Normative outcomes	Between Groups	0.125	3	0.042	3.861	0.010**
	Within Group	1.982	184	0.011		
	Total	2.106	187			
Utilitarian outcomes	Between Groups	0.056	3	0.019	2.969	0.033*
	Within Group	1.161	184	0.006		
	Total	1.217	187			
Intention	Between Groups	3.858	3	1.286	5.983	0.001**
	Within Group	39.546	184	0.215		
	Total	43.404	187			

**$p < 0.01$, *$p < 0.05$

Table 7 shows the result of a 1-way ANOVA analysis of variance to evaluate the relationship between the factors related to the adoption of a 2-way interactive video and teaching subject area. The teaching subject area was an independent variable that included four groups, Chinese, Math, English, and other. The dependent variable was the factors that affect the adoption of a 2-way interactive video. The ANOVA was almost significant at the 0.01 and 0.5 level.

Table 8 Paired sample t-test of the factors related to the adoption of a 2-way interactive video between school locations and using the 2-way interactive video in teaching.

The factors related to the adoption of a 2-way interactive video	School location		t	*p*	Using the 2-way		t	*p*
	City	Country			Yes	No		
Attitude toward target	4.40	4.72	−8.796	0.000**	4.45	4.80	−10.558	0.000**
Habit	3.26	3.23	0.598	0.551	3.18	3.32	−2.377	0.018*
Self-identity outcome	4.19	4.12	5.394	0.000**	4.19	4.08	10.055	0.000**
Attitude toward behavior	4.66	4.79	−6.784	0.000**	4.68	4.83	−8.095	0.000**
Normative outcomes	4.75	4.84	−6.784	0.000**	4.76	4.87	−8.095	0.000**
Utilitarian outcomes	3.97	4.01	−3.371	0.001**	3.97	4.02	−3.965	0.000**
Intention	2.66	2.62	0.546	0.586	2.82	2.36	7.384	0.000**

**$p < 0.01$, *$p < 0.05$

The independent sample t-test in **Table 8** showed the factors related to adopting a 2-way interactive video that significantly differed between school locations and using the 2-way interactive video in teaching. However, the habit and intention factors were no significant difference between school locations [t = 0.598, p = 0.551 and t = 0.546, p = 0.586].

Table 9 One-way ANOVA test for comparison of the factors related to the adoption of a 2-way interactive video and exposing the 2-way interactive video.

The factors related to the adoption of a 2-way interactive video	Exposing the 2-way interactive video	SS	df	MS	F	*p*
Attitude toward target	Between Groups	0.463	3	0.154	1.958	0.122
	Within Group	14.496	184	0.079		
	Total	14.959	187			
Habit	Between Groups	0.264	3	0.088	0.578	0.630
	Within Group	28.036	184	0.152		
	Total	28.300	187			
Self-identity outcome	Between Groups	0.017	3	0.006	0.633	0.595
	Within Group	1.692	184	0.009		
	Total	1.710	187			
Attitude toward behavior	Between Groups	0.042	3	0.014	0.702	0.552
	Within Group	3.702	184	0.020		
	Total	3.745	187			
Normative outcomes	Between Groups	0.024	3	0.008	0.702	0.552
	Within Group	2.083	184	0.011		
	Total	2.106	187			
Utilitarian outcomes	Between Groups	0.002	3	0.001	0.125	0.945
	Within Group	1.214	184	0.007		
	Total	1.217	187			
Intention	Between Groups	0.188	3	0.063	0.267	0.849
	Within Group	43.216	184	0.235		
	Total	43.404	187			

**p < 0.01, *p < 0.05

Table 9 shows the result of a 1-way ANOVA analysis of variance to evaluate the relationship between the factors related to adopting a 2-way interactive video and exposing the 2-way interactive video. Exposing the 2-way interactive video was an independent variable that included 4 levels, less than 1 year, 1 - 2, 3 - 4 years, and more than 5 years. The dependent variable was the factors that affect the adoption of a 2-way interactive video. The ANOVA was no significant.

Table 10 Paired sample t-test of the factors related to the adoption of a 2-way interactive video between frequencies of using the 2-way interactive video.

The factors related to the adoption of a 2-way interactive video	Mean Frequencies of using TW		Mean diff.	t	Sig
	Occasionally	Never			
Attitude toward target	4.47	4.84	−0.368	−10.636	0.000**
Habit	3.25	3.23	0.020	0.333	0.740
Self-identity outcome	4.19	4.06	0.129	11.258	0.000*
Attitude toward behavior	4.68	4.86	−0.180	−10.254	0.000**
Normative outcomes	4.76	4.89	−0.135	−10.254	0.000**
Utilitarian outcomes	3.97	4.03	−0.056	−4.729	0.000**
Intention	2.84	2.22	0.615	10.287	0.000**

**$p < 0.01$, *$p < 0.05$

　　The independent sample t-test in **Table 10** showed the factors related to adopting a 2-way interactive video that significantly differed between frequencies of using the 2-way interactive video. However, the habit factor was no significant difference between frequencies of using the 2-way interactive video [t = 0.333, $p = 0.740$].

Suggestions to promote teachers to adopt 2-way interactive video teaching level.
　　1) Strengthen the training on the use of 2-way interactive videos to further improve the effectiveness and pertinence of training. The training content should be appropriately adjusted according to the age and subject background of different teachers, and real cases in teaching should be selected pertinently; The training focuses on teachers' information knowledge and skills in using 2-way interactive video teaching. After the training, corresponding follow-up support should be provided to truly apply the content of teacher training into teaching practice. Organizers and schools should establish a platform for continuing learning and provide help, support and guidance to teachers when they encounter problems in teaching.
　　2) Improve the frequency of teachers' use of 2-way interactive video, improve their skills. In classroom teaching, teachers are required to use 2-way interactive video as much as possible to prepare and lecture, learn to use the teaching resource library of 2-way interactive video, and gradually improve the ability of teachers to apply 2-way interactive video in teaching practice. Effectively reduce teachers' anxiety in the teaching process, improve their interest, enhance their internal learning motivation, improve their sense of self-efficacy, and really play the role of 2-way interactive video in teaching.
　　3) Create a good environmental atmosphere. School organizers and administrators should further improve the policies related to the integration of 2-way interactive video board into teaching, strengthen the publicity of supporting policies, and enable teachers to have a clear understanding of the relevant procedures and support system of 2-way interactive video teaching application in our school. The school creates an information atmosphere of using 2-way interactive video classes to promote teachers' innovation in teaching concepts and teaching methods. Organize and carry out research meetings on the use of 2-way interactive video teaching, collect and exchange teachers' experiences in 2-way interactive video teaching, strengthen the exchange and cooperation between colleagues in the use of 2-way interactive video teaching, and learn from each other. Schools should provide special technical support to promote the improvement of teachers' teaching ability. The school should not only provide teachers with enough 2-way interactive videos, but also provide software resources of corresponding subjects, and constantly update the teaching resource library for the convenience of teachers at any time.

Conclusions and discussion

Investigation results of background information of the teachers

This study takes the teachers of Jinhua Primary School in Nanning city and Shuangding Town Central Primary School in Xixiangtang District as examples to explore the factors affecting the adoption of 2-way interactive video by teachers in Guangxi. The questionnaire survey is mainly used in the study, and the results of the background factors of teachers are as follow;

Item	
Gender	The number of female teachers (68.1 %) was more than double that of male teachers (31.9 %).
Age	The sample of the survey is mainly young and middle-aged teachers (70.7 %).
Educational backgrounds	The majority of teachers have bachelor's degree (72.9 %), followed by junior college degree (27.15 %).
Teachers' experience	The teaching experience of teachers is varied, with the most being 5 to 10 years (48.4 %).
Teaching subject areas	The subjects the teachers taught at school were mainly Chinese, mathematics and other subjects, and English subjects were relatively few.
Teaching grade level	Teachers are in primary school.
School locations	More than half are country teachers (60.6 %).
Using the 2-way interactive video in teaching	59.0 % of teachers had used 2-way interactive video.
Exposing the 2-way interactive video	43.1 % of teachers have been exposed to 2-way interactive video for more than 5 years, and only 17.0 % of teachers have been exposed to 2-way interactive video for less than 1 year.
Frequencies of using the 2-way interactive video	67.0 % of teachers would be willing to use 2-way interactive video occasionally while 33.0 % would not be willing to use 2-way interactive video occasionally.

Influence of teachers' background factors on teachers' adoption of 2-way interactive video teaching

We put the nine teachers' background factors into the 7 factors (attitude toward target, habit and self-identity outcome, attitude toward behavior, normative outcomes, utilitarian outcomes and intention) affecting teachers' adoption of 2-way interactive video. Almost all of us agree that the 2-way video will increase education learning opportunity for teachers in city of Guangxi; the 2-way video will allow schools to share resources; the 2-way video will provide more educational opportunities for students from all regions of Guangxi. They have a positive attitude towards 2-way video as a teaching system. But nearly 33 % of the teachers think there are many issues with the operation of 2-way video (for example, scheduling, Access, support, etc.), in which teachers are mostly older. The results showed that the habit factor was no significant difference between teachers' gender, teachers' age group, teachers' experience，school locations and the frequencies of using the 2-way interactive video. However, the factors related to adopting a 2-way interactive video that significantly differed between teachers' gender and educational background. The ANOVA was almost significant at the 0.01 level in the teachers' age group. So it can be seen that the age of teachers is related to teachers adopting 2-way interactive video. The ANOVA was almost significant at the 0.01 level between the factors related to the adoption of a 2-way interactive video and teachers' experience. The ANOVA was almost significant at the 0.01 and 0.5 level between the factors related to the adoption of a 2-way interactive video and teaching subject area.

The factors related to adopting a 2-way interactive video that significantly differed between school locations and using the 2-way interactive video in teaching. The factors related to adopting a 2-way interactive video that significantly differed between frequencies of using the 2-way interactive video.

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