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Predictors Influencing Urban and Rural Area students to Use Tablet Computers as Learning Tools: Combination of UTAUT and TTF Models

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Abstract: University students use various ICT-based media a goal to help them learn. The Chinese government is also increasing the use of ICT tools in the education sector because they relate to university students' learning outcomes. Several universities in China provide tablet computer facilities as learning tools for their university students. These learning tools are widely used in the country because they have many benefits in educational settings. For instance, they are paperless, practical, and portable and support sustainable education. Although tablets provide many benefits, their use as learning tools is not necessarily accepted by university students. Knowing the factors influencing the intention to use them as a learning tool increases their effective utilization by college university students. Therefore, this study aimed to determine the factors predicted to relate to the intention and actual usage of tablet computers by university students in urban and rural areas. It combined the TTF model and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT-2). The study sample comprised 232 university students in rural and 214 university students in urban areas. Data were analyzed using the partial least squares statistical technique to examine the structural model and test the initial hypothesis. The results showed that the intention of university students in the village to use tablet computers as learning media is influenced by hedonic motivation and task technology fit. In contrast, habit and task technology fit is the most significant factor for university students in urban areas to use tablet computers as learning tools.

Keywords: rural-urban area; learning tools; tablet; higher education

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1. Introduction

Cheaper mobile devices are developing and changing every day, with more features and positively impacting various sectors, including education [1]. More university students use laptop computers, tablets, and smartphones as learning tools [2]. Mobile devices such as tablet computers improve student learning outcomes and abilities when used properly [3,4]. Based on the promising impact, countries have programs to integrate technology into the classroom and allow university students to use tablet computers [4,5]. Some universities in China provide tablet computer facilities to their university students to increase the use of technology-based tools in education [6].

The use of tablet computers has sometimes become a necessity when students study, record, and review lessons [7]. Tablet computers are usually used by students to participate in online learning, communicate with teachers, find sources of knowledge, read e-books, take notes, and do homework [8,9]. However, the promising effects of use at the university level are not maximal. This necessitates understanding the perceptions and factors of university students using tablet computers.

The behavioral intention to use technology tools for learning purposes by university students in rural and urban areas has become an important aspect of study in education [10]. Many educators believe that geographical location, resources, habits, and culture bring differences in student acceptance of technology [11–13]. Wang (2013) found differences in experimentation and goals between university students studying in rural and urban areas in using technology for learning purposes [14]. According to Asfar and Zainuddin [15], university students in cities are more prepared and effective in using technology tools than those studying in rural areas. Other studies show that university students in cities have a good attitude toward the use of technology than those in the village [16]. However, several studies deny that geographical location affects students' intention to use technology. For example, [17,18] showed no difference in attitude towards technology between university students in rural and urban areas. Moreover, [19] found no significant difference between rural and urban settings in using technology in education.

The literature analysis shows contradictions in students' intention to use technology tools in urban and rural schools [20–22]. Therefore, it is important to investigate differences in factors influencing university students to use tablet computers for learning tools between universities in rural areas and cities. The investigation would increase the use and effect of tablet computers as learning tools. This study could offer suggestions for governments and institutions in urban and rural areas to encourage university students to use tablet computers as learning tools. Furthermore, an empirical study [4] used the UTAUT model [23] to analyze the factors influencing the integration of tablet computers in higher education. Another study focused on user intentions to use tablets instead of learning tools [24]. However, there is limited literature on the influence of the TTF model, geographical location, and differences in university students in the village and the city on the use of tablet computers for learning tools.

This paper is divided into several parts, where the theoretical background describes the functions and benefits of tablet computers in education. The next part explains the study model and initial hypotheses that explain the intentions of pre-service teachers and university students in rural and urban areas to use tablet computers for learning tools. Furthermore, the method section explains the questionnaire development, as well as data collection and processing to test the study model. The results section is divided into the measurement and structural models, as well as initial hypothesis testing. The last section presents an in-depth discussion based on the findings and conclusions.

2. Theoretical Background

2.1. Tablet Computers in Education

Tablet computers are portable mobile devices with features integrated with GPS sensors, NFC, and a built-in camera functioning for photos and scanning barcodes. They are touchscreen devices that do not require a keyboard and mouse, have a longer battery life than laptops, and are cheaper than other traditional computing devices. Tablet computers began to be widely used by people worldwide in 2022 [4]. In 2009, more than 14 million tablet computers were sold in various countries. After the launch of the android-based tablet and iPad applet in 2010, their popularity increased as mobile devices for educational purposes. With the development of digital learning materials, tablets have the potential to enhance learning activities. Furthermore, they could increase student motivation [25], help teachers improve student learning outcomes, and support learning outside the classroom. This implies that tablet computers have a great potential impact when used properly by university students for learning purposes, especially as technology is increasingly easy to master and use.

A literature study showed that the use of tablet computers by university students avails searching sources of knowledge, databases, and scientific investigations that support high-order thinking [26]. The use of tablet computers also improves student technology literacy and student-centered learning. In line with this, other studies support student-centered learning to be more effective than teacher-centered learning. The devices also

increase student attendance in class [27,28] and their attitudes toward teaching and learning activities [29,30]. Furthermore, a study showed that student learning outcomes are better when they use tablet computers [31]. This shows the many benefits that university students obtain when using tablet computers. Therefore, it is important to improve and promote their use in universities as learning tools [4].

Many previous studies examined university students' attitudes towards the use of tablet computers for learning purposes but only analyzed one element in the education system [25,32–34]. Haßler, Major, & Hennessy [3] reviewed the use of tablets for learning purposes and found that the effect size of tablet computer use in schools was not as expected. At the same time, several other studies showed differences in learning outcomes. Hablet et al. [3] only stated that the use of tablet computers had been successfully implemented in schools. However, many of the implementations were not successful due to factors such as the university students' intention to use the devices. Therefore, it is important to analyze university students' intentions to use a tablet computer as a learning tool. Most university students that have played with tablet computers since childhood consider the tablet a tool for leisure and entertainment purposes. This implies the importance of analyzing factors to increase university students' intention to use tablet computers as learning tools.

2.2. Study Model and Hypothesis

Previous studies stated that the technology acceptance model and UTAUT should be extended to predict the factors influencing the use of technology-based media. Therefore, this study aimed to develop a purpose model by combining UTAUT2 and TTF as a ground theory to investigate student perceptions of using tablet computers as learning tools. Figure 1 shows the proposed model from the combination of UTAUT2 and TTF, as well as the initial hypothesis of the relationship between variables. The original UTAUT2 model was modified by adding the TTF model. This is because many studies show that TTF predicts the intention to use and actual use of the new technology.

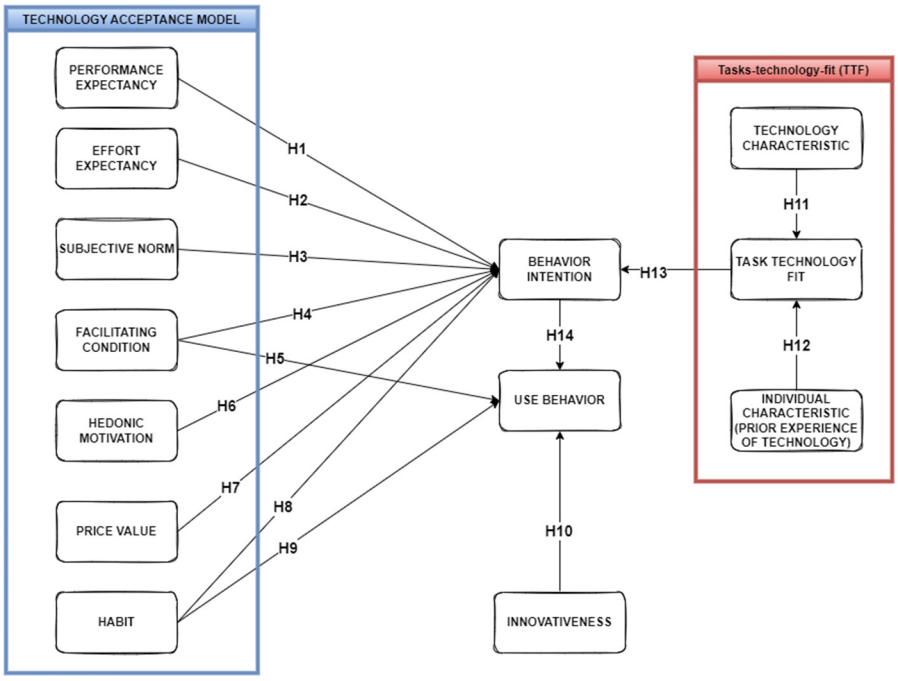

Figure 1. The study model and initial hypotheses combined UTAUT2 and TTF models with the extension of innovativeness.

2.3. Performance Expectancy (PE)

Performance expectancy is how users believe that using new technology helps them improve their performance in daily activities [23]. This study defined PE as urban and rural

area university students that belief using a tablet computer as a learning tool improves their learning outcomes. According to Venkatesh and team [23], PE is the strongest predictor that influences someone to use new technology. Other studies also showed that PE is the strongest predictor of behavioral intention and actual usage of new technology [35–37].

2.4. Effort Expectancy (EE)

Effort expectancy (EE) is how the user feels that learning and using new technology is easy to operate [23,38] showed that the ease of using new technology relates to the teacher's intention to use micro-lectures. Conversely, users are reluctant to use something new related to technology when it is difficult to use or learn. This study defined EE as university students in urban and rural areas that believe a tablet is easy to use as a learning tool and does not require much effort to operate.

2.5. Subjective Norm (SN)

Subjective Norm (SN) is how people's perceptions and the environment influence their use of new technologies [23]. These people and environments could be government and regional programs, school regulations, and opinions of friends, teachers, university students, or their parents. Therefore, this study defined Subjective Norm as university students using tablet computers as learning tools because of their perceptions and environmental influences. Several literature studies state that SN directly influences BI [39,40].

2.6. Facilitating Conditions (FC)

Facilitating conditions (FC) are people's belief that an organizational and technical infrastructure supports them using the new technology [23]. This study defined FC as university students in rural and urban areas that believe there is adequate support for them to use tablet computers as learning tools. The UTAUT model and several previous studies indicate a relationship between FCs and BI, and UB [41–43].

2.7. Hedonic Motivation (HM)

Hedonic motivation is someone that enjoys experimenting when using a technology tool (Gerhart, Peak, 2015). This study defined HM as university students feeling that using tablet computers as learning tools gives them enjoyment. HM positively and significantly affects the intention to use a new system or technology [44–46]. Previous studies also found a significant positive HM factor on BI, as in [13,47]. However, hedonic motivation does not always significantly and positively affect BI [24].

2.8. Price Value (PV)

The price value is the costs incurred by university students or academics to buy mobile devices, tools, or internet packages used for learning [45]. This study defined PV as the costs incurred by university students in urban-rural areas to buy tablet computers used for learning tools. It shows no relationship between price value and user intention to use mobile internet [47]. In contrast, Wang [48] found a positive relationship between PV and student and teacher behavior intention in using mobile internet. This study has an initial hypothesis that a tablet computer's price influences university students to use the device for learning. Low-cost tablet computers may greatly affect university students' intentions to use them.

2.9. Habit (HB)

Habit is how people tend to perform the behavior or use technology-based media in learning [49]. This study defined HB as university students in urban and rural areas that think they use tablet computers as learning tools because they use them in their daily lives. Studies such as [50–52] found that the habit positively and significantly affects BI. However, other studies found that habits do not relate to behavioral intention because they affect subconscious behavior [53].

2.10. Behavioral Intention (BI)

Behavioral intention (BI) is the most significant predictor of actual technology use in various intention models [23,54,55]. In education, Reyes [56] found that behavioral intention affects the actual use of google classroom by teachers and university students during the pandemic.

2.11. Innovativeness (INV)

Innovativeness is a person's tendency or intention to be the first to use new technology [57,58]. It is predicted as a motivator for someone to use technology [59]. A previous study showed innovative characteristics as the main factor in adopting and use new technology [51,58,60]. However, some studies have found no relationship between innovativeness and intention to use technology [61]. Zampieri et al. [62] showed that higher innovativeness reduces the intention to use technology tools. Therefore, the innovativeness variable should be tested to determine whether it relates to university students' behavior in using tablets as learning tools.

2.12. Task Technology Fit (TTF)

Task technology fit is how technology helps a person perform daily tasks [63,64]. Technology acceptance and adoption studies have developed, empirically tested, validated, and implemented many theories and models in various systems and sectors, including education [65,66]. This means that the proposed theoretical adoption model has many similarities [30]. However, the models developed and validated have their advantages and uniqueness adapted to the conceptualization and theory of technology adoption. For instance, the UTAUT-2, widely adopted and modified, provides a better understanding of user acceptance and technology adoption. However, one's perception of technology cannot sufficiently determine actual technology use [67]. Based on TTF theory, the match between task and technology characteristics significantly affects the intention to use technology [68]. Therefore, the TTF theory has been developed and validated to examine whether the congruence between technology and task characteristics influences the intention to use new technology [69,70].

Tablet computer tasks have complex problems because they have features and application programs that do not necessarily support learning. Not all the features and apps on a tablet computer are easy to use. Therefore, users and developers must be certain about the suitability of technology and task characteristics as tools to improve student learning outcomes in higher education. This necessitates entering the TTF model to investigate user intentions and the actual use of tablet computers as learning tools. Furthermore, the combination of the TTF and UTAUT2 models helps explore and understand the university students' dynamic adoption of tablet computers in education [71]. Most empirical-based studies are implemented to predict the intentions and use of various learning tools. This suggests that UTAUT2 may be the best choice for predicting factors related to the intentions of urban and rural-based university students to use tablet computers as learning tools. The UTAUT2 combined with the TTF model may be a powerful theoretical framework that could increase the variance in behavioral intention to use a tablet computer. Based on many literature studies, combining the two models to predict technology adoption provides valuable attributes for analysis [30,70]. The models are combined because of several reasons. First, technology use is based on the user's perception, and there must be compatibility between technology tools and the user's daily work. Second, users may not be interested in new technology unless the tools improve their work performance. Third, the technology tools must be easy to use. The user feels that the new technology could save time with less effort. Fourth, the combination of UTAUT2 and TTF models could increase the variance in user intentions by at least 20%. Fifth, many previous studies showed that the UTAUT2 and TTF models have a high correlation that could improve the use of new technologies [69,72]. Sixth, the combination implies that many factors besides

the determinants in the UTAUT2 model could be used to better understand the use of tablet computers by university students in rural and urban areas.

Few previous studies predict the use of tablet computers as learning tools by university students in rural and urban areas by combining the UTAUT2 and TTF models. Moran [4] used the UTAUT model to predict tablet computer use in higher education. Zheng [73] used the TAM model to analyze the intention of K-12 university students using tablet computers. Similarly, Stefano [7] used the TAM model to analyze Italian student factors using tablet pcs, and several studies on tablets use the UTAUT model instead of the educational context [24]. In this study, the use of tablet computers by university students in urban and rural areas has high technical complexity. Therefore, it is necessary to analyze the compatibility between technology and assignments in universities. This means that the use of tablet computers by university students could maximally improve learning outcomes. From the description of each construct item and how TTF should be integrated into UTAUT, the following hypotheses were formulated:

Hypothesis 1: *PE impacts university students' behavior and intention to use a tablet computer as a learning tool.*

Hypothesis 2: *EE influences university students' behavior and intention to use tablet computers as learning tools.*

Hypothesis 3: *SI influences university students' behavioral intention to use tablet computers as learning tools.*

Hypothesis 4: *FCs affect university students' behavior and intention to use tablet computers as learning tools.*

Hypothesis 5: *FCs influence university students' behavior in using tablet computers as learning tools.*

Hypothesis 6: *HM impacts university students' behavior and intention to use tablet computers as learning tools.*

Hypothesis 7: *PV impacts BI university students in using tablet computers as learning tools.*

Hypothesis 8: *HB affects BI university students in using tablet computers as learning tools.*

Hypothesis 9: *HB influences student behavior by using a tablet computer as learning tool.*

Hypothesis 10: *INV influences student behavior by using tablet computers as learning tools.*

Hypothesis 11: *TC affects student TTF in using a tablet computer as a learning tool.*

Hypothesis 12: *IC impacts student TTF in using a tablet computer as a learning tool.*

Hypothesis 13: *TTF influences BI university students to use tablet computers as learning tools.*

Hypothesis 14: *BI affects the UB of tablet computers as learning tools by university students.*

The literature review is a reference for the study framework, design, and data collection methods [45,74]. The UTAUT model has moderating variables such as gender, age, and experience predicted to affect the intention to use new technology [23]. Many studies in the literature do not include moderator variables in the objective model [75,76]. Therefore, this study excluded the moderator variables and focused on the main determinants. The model being tested is shown in Figure 1.

3. Method

This study tested the initial hypothesis using a quantitative approach with an online questionnaire-based survey. The steps in this method include questionnaire development, data collection, basic respondent information, and data analysis to conclude.

3.1. Questionnaire Development

The questionnaire was divided into two parts, the first part contained complete demographic data of participant university students that used tablets to study. The second part includes 12 constructs with 40 questionnaire items that combine the original UTAUT2 [45] and the TTF models [30]. The 12 constructs are perceived usefulness, perceived ease to use, subjective norm, facilitating conditions, hedonic motivation, habit, price value, behavioral intention, actual use of tablet computers as a learning tool, technology characteristics, task technology fit, and individual characteristics (Appendix A). The questionnaire used a 5-point Likert scale to measure all items from a rating of 5, indicating strongly agree to 1, implying strongly disagree. The original questionnaire was translated into Chinese, prepared, reviewed, and analyzed by two native English and two native Chinese academicians.

3.2. Data Collection

The respondents comprised students from China's normal universities that focus on professional teacher education as well as developing and integrating pedagogical, content, and technological knowledge. Respondents were selected from two normal universities in China. The samples from the urban and rural areas were taken from normal universities in Beijing and the Xining cities, respectively. The two normal universities were determined using the convenience method for several reasons. The students are asked to volunteer to fill in the questionnaire. The selection criteria included the best universities in each province with learning objectives and curricula and lecturers qualified by the ministry of higher education. However, there are differences in educational facilities, teaching methods, and educational technology tools between the two campuses. The background makes this study suitable for comparing urban-rural areas, enriching the sample based on student habits and social and cultural differences. Furthermore, university students from the campuses often use tablet computers as learning tools. The tablet computers used by normal university students have an internet connection to facilitate uploading learning to storage drives. Moreover, students use tablet computers to take online classes, MOOC, or SPOC.

The teachers were contacted at their campuses to explain the study's purpose and seek permission to collect data. After obtaining consent, A total of 500 questionnaires were distributed to university students by instructors, resulting in 461 respondents. As many as 448 questionnaires were filled out completely, while 13 had errors and missing responses and could not be used for data analysis. There were 232 respondents from Xining and 214 from Beijing.

All respondents, comprising male and female university students, had used tablets for learning purposes. Females were more than males because the sample was taken from a normal university, where the teaching profession is mostly occupied by women. Other respondent data is shown in Table 1.

3.3. Ethic Protocol

The study protocol was approved by the school of mathematics and statistics, Qinghai normal university, on 15 May 2022. All respondents knew the study's purpose and participated voluntarily without coercion. Participants that did not want to join were not negatively impacted, while participant respondents were given prizes to increase their seriousness in filling out the online questionnaire.

Table 1. Respondent demographic data.

Demographic Information	Item	Xining		Beijing	
		N	%	N	%
Level education	undergraduate	154	66.38	114	49.14
	Master degree	73	31.47	52	22.41
	Doctoral student	5	2.16	48	20.69
major	science	65	28.02	92	39.66
	social	167	71.98	122	52.59
gender	male	72	32.33	93	40.09
	female	160	68.97	121	52.16
age	18–24 years old	148	63.79	113	48.71
	25–30 years old	61	26.29	64	27.59
	Upper 30	23	9.91	37	15.95
Daily use of tablet computers for learning purposes	Less than 2 h	28	12.07	51	21.98
	2–5 h	97	41.81	44	18.97
	More than 5 h	107	46.12	119	51.29
How often do you use tablet computer for learning purposes?	occasionally	41	17.67	8	0.03
	often	69	29.74	51	21.98
	Primary learning tool	122	52.59	155	66.81

3.4. Data Analysis

Data were analyzed using the variance-based structural equation modeling approach or partial least squares–structural equation modeling analysis. This is a multivariate method commonly used to test the relationship between many construct variables [77]. The PLS-SEM approach was chosen because it is flexible on a small sample size and does not consider normal data distribution. The software used is SPSS version 23 and SMART PLS. Furthermore, the steps of the measurement and structural models, as well as the initial hypothesis testing, were evaluated using the suggestions from [77].

4. Results

SEM was used as the main statistical tool with two stages following the procedure recommended by Hair [77]. First, measurement models, including convergent, construct, and discriminant validity, were presented. Second, a structural modeling approach was used. PLS-SEM is most suitable for developing new theoretical complex models to achieve objectives than other analysis technologies [77]. Therefore, this study used SmartPLS 3.0 to test the model and verify the initial hypothesis.

4.1. Measurement Model

The first step was to evaluate the measurement model in the SEM approach to determine whether the data were suitable for initial hypothesis testing [30]. Construct reliability and validity are the two steps in the measurement model procedure to determine the validation criteria. Cronbach alpha and composite reliability become the assessment reference in the Construct reliability process. According to [77], Cronbach alpha and CR exceeding 0.7 indicate that the data have good internal consistency reliability. Furthermore, factor loadings must exceed 0.7 for the observed variables to explain the latent variables well.

Table 2 shows the CR and AVE values, as well as loading factors for measurement models for university students in rural and urban areas. The loading factor value for university students in rural and urban areas ranged from 0.796 to 0.967 and from 0.704 to 0.963, respectively. This shows that the loading factor value is more than 0.7. Subsequently, the CR value for rural and urban area university students ranges from 0.894 to 0.973 and 0.869 to 0.961, respectively. The AVE scores for rural and urban area university students range from 0.738 to 0.924 and from 0.692 to 0.891, respectively. Therefore, the measurement model for data from urban and rural areas have good convergent validity.

Table 2. Measurement Model Validation.

Measurement Items	Factor Loading		Cronbach Alpha		Composite Eability		AVE	
	Rural	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
Behavioral intention			0.959	0.939	0.973	0.961	0.924	0.891
BI1	0.967	0.939						
BI2	0.962	0.963						
BI3	0.955	0.929						
Facilitating conditions			0.825	0.821	0.894	0.894	0.738	0.737
FC1	0.897	0.886						
FC2	0.796	0.809						
FC3	0.880	0.879						
Habit			0.903	0.823	0.939	0.895	0.837	0.739
HAB1	0.916	0.847						
HAB2	0.903	0.848						
HAB3	0.925	0.884						
Hedonic motivation			0.929	0.924	0.955	0.952	0.876	0.868
HM1	0.935	0.896						
HM2	0.935	0.951						
HM3	0.938	0.946						
Individual characteristic			0.940	0.914	0.961	0.946	0.892	0.853
IC1	0.937	0.918						
IC2	0.949	0.939						
IC3	0.948	0.913						
innovativeness			0.934	0.895	0.958	0.935	0.883	0.827
INV1	0.939	0.900						
INV2	0.942	0.939						
INV3	0.937	0.888						
Effort expectancy			0.860	0.870	0.915	0.921	0.781	0.795

Table 2. *Cont.*

Measurement Items	Factor Loading		Cronbach Alpha		Composite Eability		AVE	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
EE1	0.860	0.859						
EE2	0.926	0.913						
EE3	0.865	0.902						
Performance expectancy			0.894	0.927	0.935	0.954	0.827	0.873
PE1	0.851	0.917						
PE2	0.946	0.952						
PE3	0.928	0.933						
Price value			0.834	0.857	0.900	0.914	0.750	0.780
PV1	0.821	0.876						
PV2	0.912	0.938						
PV3	0.863	0.832						
Subjective Norm (SN)			0.858	0.812	0.913	0.888	0.778	0.725
SN1	0.864	0.818						
SN2	0.868	0.857						
SN3	0.914	0.879						
Technology characteristics			0.921	0.861	0.950	0.915	0.864	0.783
TC1	0.933	0.890						
TC2	0.930	0.926						
TC3	0.925	0.837						
Task technology fit			0.888	0.776	0.931	0.869	0.818	0.692
TTF1	0.921	0.906						
TTF2	0.945	0.872						
TTF3	0.844	0.704						
Usage behavior			0.913	0.888	0.945	0.931	0.852	0.817
UB1	0.927	0.891						
UB2	0.921	0.907						
UB3	0.921	0.914						

Discriminant validity was checked using the Fronell larcker method [78]. The AVE value (the diagonal value in bold in Tables 3 and 4) must exceed the correlation value between variables. In this study, the AVE value for urban and rural area data exceeds the correlation value between latent variables. Therefore, the discriminant validity is sufficient and explains the proposed model.

4.2. Structural Model

The test results showed that the measurement model is empirically feasible to predict the factors influencing university students to use tablets as learning tools in cities and villages. Before testing the initial hypothesis, it is important to test whether the conceptual model has an acceptable data-model fit. The first step is assessing the multicollinearity in the study model using the variance inflation factor (VIF) in all constructs. The VIF value should not exceed five to ensure that the construct has no multicollinearity problem [79]. Smart-PLS could be equipped with VIF value analysis for each construct in the objective model.

In this study, the VIF value for urban area data does not exceed 4878, while the VIF value for rural areas is 4586. This indicates that the model has no multicollinearity problems.

Table 3. Inter-correlations between the variables (Urban area).

	AU	BI	FC	HB	HM	IC	INV	PEU	PU	PV	SN	TC	TTF
AU	**0.904**												
BI	0.849	**0.944**											
FC	0.721	0.717	**0.859**										
HB	0.780	0.674	0.673	**0.860**									
HM	0.789	0.706	0.615	0.736	**0.932**								
IC	0.844	0.781	0.687	0.762	0.753	**0.923**							
INV	0.752	0.693	0.656	0.681	0.704	0.751	**0.909**						
PEU	0.711	0.695	0.724	0.665	0.647	0.664	0.651	**0.891**					
PU	0.734	0.685	0.683	0.704	0.676	0.738	0.680	0.724	**0.934**				
PV	0.672	0.679	0.703	0.666	0.614	0.624	0.644	0.654	0.627	**0.883**			
SN	0.621	0.615	0.638	0.588	0.564	0.621	0.547	0.590	0.581	0.585	**0.852**		
TC	0.820	0.787	0.721	0.690	0.698	0.770	0.741	0.709	0.672	0.657	0.596	**0.885**	
TTF	0.800	0.771	0.658	0.707	0.690	0.780	0.695	0.693	0.606	0.661	0.637	0.837	**0.832**

Table 4. Inter-correlations between the variables (Rural area).

	AU	BI	FC	HB	HM	IC	INV	PEU	PU	PV	SN	TC	TTF
AU	**0.923**												
BI	0.882	**0.961**											
FC	0.674	0.670	**0.859**										
HB	0.718	0.660	0.687	**0.915**									
HM	0.842	0.839	0.691	0.756	**0.936**								
IC	0.817	0.776	0.671	0.711	0.793	**0.945**							
INV	0.545	0.555	0.477	0.512	0.580	0.625	**0.940**						
PEU	0.633	0.636	0.695	0.601	0.641	0.594	0.436	**0.884**					
PU	0.676	0.657	0.601	0.517	0.651	0.615	0.433	0.778	**0.909**				
PV	0.674	0.678	0.660	0.728	0.713	0.678	0.441	0.618	0.620	**0.866**			
SN	0.617	0.572	0.646	0.694	0.612	0.570	0.412	0.600	0.596	0.576	**0.882**		
TC	0.853	0.817	0.666	0.682	0.820	0.787	0.578	0.636	0.606	0.646	0.571	**0.929**	
TTF	0.840	0.828	0.719	0.697	0.842	0.867	0.616	0.638	0.638	0.702	0.581	0.873	**0.905**

The model's structural fit analysis is seen in the total variance (R2). For urban areas, the model explains 74.6% variation in task technology fit, 71.7% variance in behavioral intention, and 81.6% in actual tablet usage, as shown in Figure 2. For rural areas, this model explains 84.8% of task technology fit, 76.7% of behavioral intention, and 81.6% of actual tablet usage, as shown in Figure 3. These results indicate that the study has a fit model structure, validity, and good performance to predict university students' intention and actual usage of tablets as learning tools.

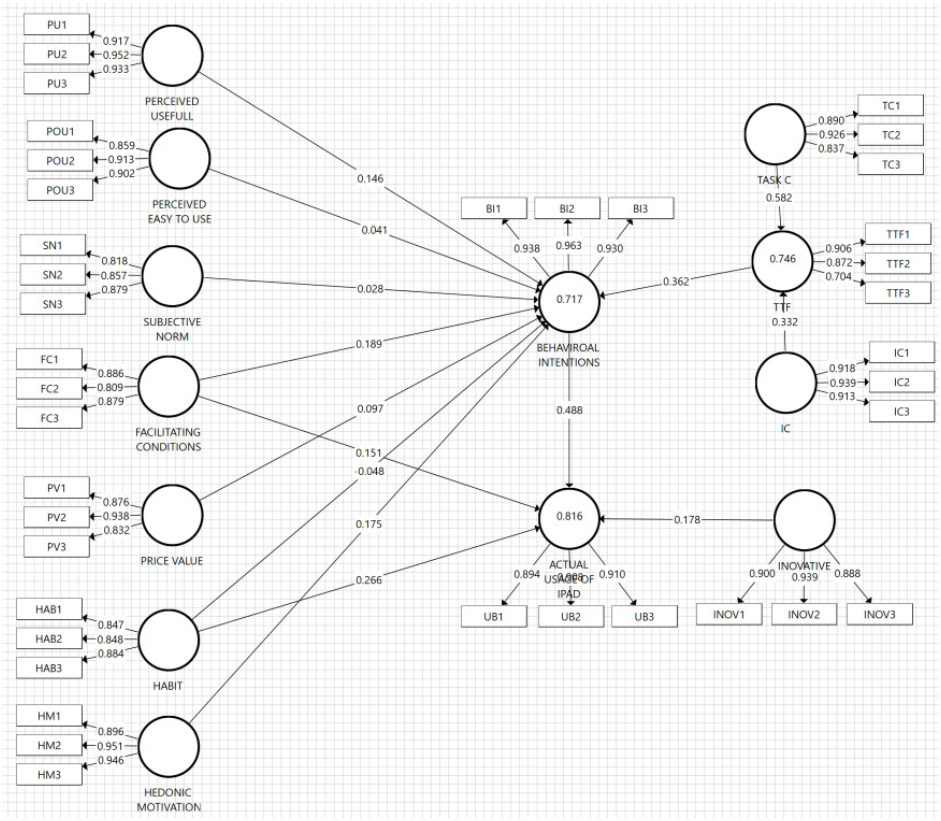

Figure 2. Structural model analysis results for an urban area with R2 value and direct effect value.

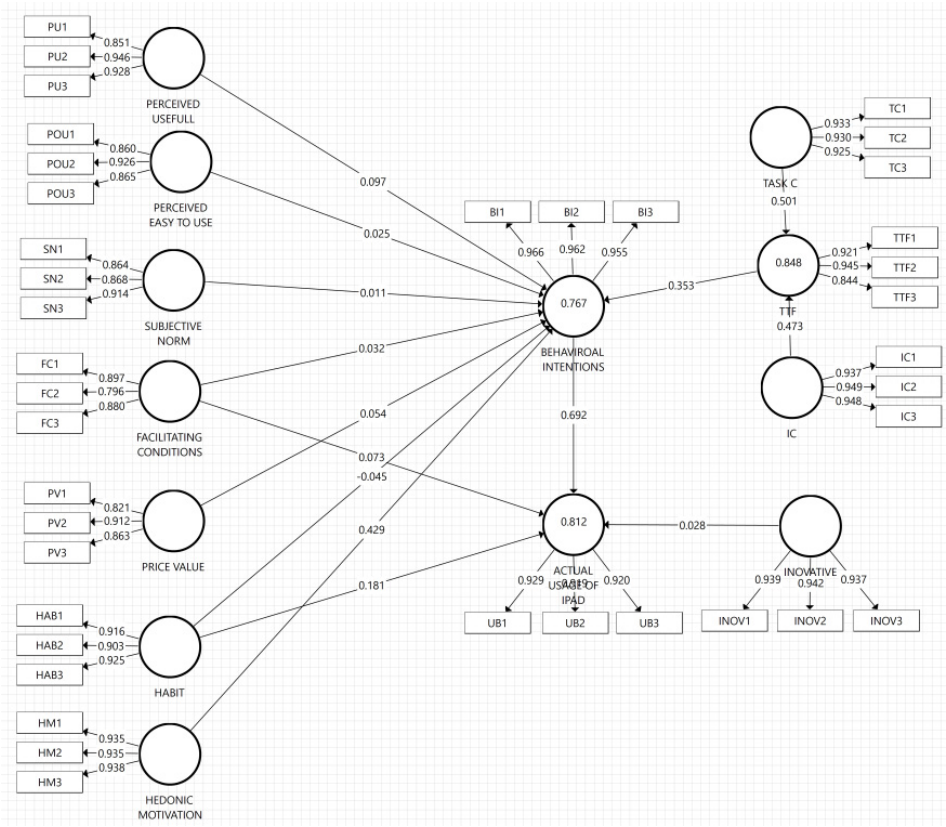

Figure 3. Structural model analysis results for a rural area with R2 value and direct effect value.

4.3. Hypothesis Testing

This study analyzed the difference between the factors influencing university students' intention in rural and urban areas to use the tablet as a learning tool. Based on hypothesis 1, perceived usefulness has a significant effect ($\beta = 0.146$, $p < 0.05$) on the intentions of university students in urban areas to use tablets as learning tools. The perceived usefulness of tablets has no significant effect on student intentions in rural areas ($p > 0.05$). This finding supports previous studies that teachers pay more attention to whether technology-based learning media increase teaching effectiveness. Wijnen [80] found that primary school teachers analyzed whether technology could stimulate elementary students' higher-order thinking skills. Moreover, Nikolopoulou [47] showed that the performance expectations of elementary and junior high school teachers significantly affect behavioral intentions to use mobile internet. Alturki [81] discovered that perceived usefulness significantly impacts behavioral intentions to use mobile learning in universities. Additionally, several studies have revealed that perceived usefulness affects the use of MOOC for sustainable learning [81–83].

Previous studies have shown that PEU significantly influences behavioral intention to use technology-based learning media [41,84–86]. In contrast, hypothesis 2 test results in this study showed that PEU does not affect BI for rural and urban students ($p > 0.05$). This finding is consistent with previous studies that PEU did not significantly affect the use of digital mathematics textbooks in Indonesia [75].

SN also did not affect the intention of rural and urban area university students to use tablet computers as learning tools, meaning that Hypothesis 3 was rejected ($p > 0.05$). Timothy [87] also found that SN did not significantly affect behavior intention to use interactive whiteboards.

Regarding hypothesis 4, facilitating conditions ($p > 0.05$) do not affect the actual usage of tablet computers for rural and urban area university students. Hypothesis 7 regarding price value on behavior intentions shows insignificant results ($p > 0.05$) for rural and urban area university students. Additionally, hypothesis 10 shows that the innovativeness of tablet computers as learning tools does not affect the intention of urban and rural university students to use the devices.

Hypotheses 11 and 12 of the task technology fit of the TC model affect the TTF determinants. Similarly, technology fit for rural and urban areas shows significant results in influencing the TTF determinants. This finding is consistent with previous studies that used the TTF theory [64,72].

This study found that task technology fits in hypothesis 13 is the main positive factor influencing urban area university students to use tablet computers. TTF is the second positive factor influencing rural area university students to use tablet computers as learning tools. Facilitating conditions had the second-largest positive effect after TTF ($\beta = 0.146$, $p < 0.05$) on the intention of urban area university students to use tablet computers as learning tools. In rural areas, the factor was not a significant predictor influencing university students to use tablets or computers as learning tools, according to hypothesis 5.

The hedonic motivation in hypothesis 6 is the predictor with the largest significant influence on rural area university students' use of tablet computers as learning tools ($\beta = 0.429$, $p < 0.001$). For university students in urban areas, hedonic motivation has a positive effect ($\beta = 0.175$, $p < 0.01$).

Habit in hypothesis 8 is the second-largest significant factor influencing urban area university students to use tablet computers. In rural areas, habit significantly influences the actual usage of tablet computers as learning tools. However, it does not affect the intention of university students in urban and rural areas to use tablet computers as learning tools, according to hypothesis 9.

In hypothesis 14, BI is the largest positive predictor in urban and rural areas influencing university students to use tablet computers as learning tools. Table 5 shows the detailed hypothesis testing in urban and rural areas.

Table 5. The results of hypothesis testing in urban and rural areas. *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

Respondent		Hypothesis	B	T-Statistics	*p*-Values	Decision
Xining Rural	H1	Perceived Useful → Behavioral Intentions	0.097	1.623	0.105	Not-Sig
	H2	Perceived Easy to Use → Behavioral Intentions	0.025	0.457	0.648	Not-Sig
	H3	Subjective Norm → Behavioral Intentions	0.011	0.234	0.815	Not-Sig
	H4	Facilitating Conditions → Actual Usage of Tablet Computer	0.051	1.012	0.312	Not-Sig
	H5	Facilitating Conditions → Behavioral Intentions	0.032	0.494	0.622	Not-Sig
	H6	Hedonic Motivation → Behavioral Intentions	0.429 ***	5.049	0.000	Sig
	H7	Price Value → Behavioral Intentions	0.054	0.805	0.421	Not-Sig
	H8	Habit → Actual Usage of Tablet Computer	0.212 ***	4.291	0.000	Sig
	H9	Habit → Behavioral Intentions	−0.045	0.575	0.566	Not-Sig
	H10	Innovativeness → Actual Usage of Tablet Computer	0.028	0.750	0.454	Not-Sig
	H11	Task Characteristics → Task Technology Fit	0.501 ***	8.568	0.000	Sig
	H12	Individual Characteristics → Task Technology Fit	0.473 ***	8.513	0.000	Sig
	H13	Task Technology Fit → Behavioral Intentions	0.353 ***	3.816	0.000	Sig
	H14	Behavioral Intentions → Actual Usage of Tablet Computer	0.692 ***	12.714	0.000	Sig
				T Statistics	*p*-Values	
Beijing Urban	H1	Perceived Useful → Behavioral Intentions	0.146 *	2.276	0.023	Sig
	H2	Perceived Easy to Use → Behavioral Intentions	0.041	0.593	0.554	Not-Sig
	H3	Subjective Norm → Behavioral Intentions	0.028	0.512	0.609	Not-Sig
	H4	Facilitating Conditions → Actual Usage of Tablet Computer	0.059	1.158	0.247	Not-Sig
	H5	Facilitating Conditions → Behavioral Intentions	0.189 **	2.567	0.011	Sig
	H6	Hedonic Motivation → Behavioral Intentions	0.175 **	2.652	0.008	Sig
	H7	Price Value → Behavioral Intentions	0.097	1.331	0.184	Not-Sig
	H8	Habit → Actual Usage of Tablet Computer	0.289 ***	5.419	0.000	Sig
	H9	Habit → Behavioral Intentions	−0.048	0.739	0.460	Not-Sig
	H10	Innovativeness → Actual Usage of Tablet Computer	0.178 **	2.921	0.004	Sig
	H11	Task Characteristics → Task Technology Fit	0.582 ***	8.580	0.000	Sig
	H12	Individual Characteristics → Task Technology Fit	0.332 ***	4.718	0.000	Sig
	H13	Task Technology Fit → Behavioral Intentions	0.362 ***	4.862	0.000	Sig
	H14	Behavioral Intentions → Actual Usage of Tablet Computer	0.488 ***	7.350	0.000	Sig

5. Discussion

This study aimed to analyze the factors predicted to relate to behavioral intention and the actual use of tablet computers as learning tools in urban and rural areas. Data analysis showed that seven and nine of 14 hypotheses are supported for rural and urban area samples, respectively. Behavioral intention and task technology fit factors have a more significant effect than other factors related to the actual use of tablet computers as learning tools in universities. A more specific explanation is as follows:

Hedonic motivation and task technology fit have the most significant positive relationship with the use of tablet computers as learning tools in rural areas. Anyway, the educational level and community's economic status is at the lower middle level, while ICT development is quite slow [21,22]. Therefore, university students in rural areas might consider it enjoyable to use a tablet computer as a learning tool. This increases their willingness to continue using the devices. Furthermore, the behavioral intention of university students in urban areas is influenced by task technology fit. They consider the suitability of tablet computer functions, its features, and assignments and tasks given by lecturers in class, such as blended and MOOC learning approaches [88,89]. This implies that urban area university students do not use tablet computers as learning tools when the teaching and learning activities on campus do not require the devices. Perceived usefulness has no significant relationship with their intention to use tablet computers as learning tools. University students are more concerned with hedonic motivation, the pleasure of learning to use a tablet computer, than performance and the effect of a tablet on their learning outcomes.

Habits and task technology fit are the biggest factors influencing urban area university students to use tablet computers as learning tools. Most students have high-level knowledge and think that tablet computers support them to study anywhere and anytime [25,90]. It also helps them study outside class hours to support sustainable learning [8,91,92]. Furthermore, the tablet computer features help them accomplish sudden tasks and meet deadlines given by the lecturer [4,93]. This is the main factor influencing university students in urban areas to use tablet computers as learning tools. The second factor is that university students think that they use tablet computers because they are used to studying. This is not surprising because the development of technology-based learning media in urban areas may be faster and more widely used than in rural areas. As a result, the use of tablets has been introduced in K-12 Education [22,94].

The price value factor does not influence university students in urban and rural areas to use tablet computers as learning tools. This finding supports Martins [95] that users cannot see the price when they feel eBooks are easier to use than printing books. Similarly, users feel that price value does not significantly affect their use of the electronic ring system [96]. This shows that habit is more important than price value. These hold provided they feel that the features on the tablet computer are suitable and support their learning activities. Furthermore, subjective norms do not affect university students in urban and rural areas to use tablet computers as learning tools. This is because the study sample comprised university students that had used tablet computers as learning tools. Therefore, the influence of the opinions of people around them about tablet computers would not affect their actual use of computers as learning tools. University students have experienced and better understand their needs and the advantages of tablet computers as learning tools. Predictors perceived as easy to use also did not affect the use of tablet computers as learning tools. This is because university students feel that learning tools help them learn, meaning the youthfulness of using the tablet is not important. Furthermore, generation Z university students are enthusiastic and never have difficulty operating a tablet computer [97,98].

6. Contribution and Implication

This study contributes theoretically, methodologically, and practically to the existing literature on using tablet computers in learning. Theoretically, the finding adds to the literature related to tablet computers and related features. Previous studies used the

original UTAUT or TAM model to analyze student acceptance of tablet computers and other mobile devices in learning. In contrast, this study combined the TTF model and the modification of the UTAUT2 model by using tablet computers as learning tools at the higher education level. The model is suitable and could be applied to investigate the factors influencing behavioral intention and the actual usage of tablet computers as learning tools for urban and rural university students. Studies have analyzed the factors that might influence someone to use a tablet computer. However, this is the first study to combine the TTF and UTAUT2 models to investigate the factors influencing behavioral intention and the actual usage of tablet computers as learning tools for urban and rural university students. The existing literature only uses a link model to investigate factors that might influence tablet computer use [4]. In contrast, other studies on the effect of tablet computer use are not in the context of education [24]. Furthermore, the findings carry significant implications and provide in-depth knowledge for increasing the use of tablet computers as learning tools in urban and rural areas. In this case, tablet computers as learning tools support sustainable education and enable university students to learn anywhere and anytime. The results could be used to design plans to increase the use of tablet computers by university students in rural and urban areas.

The practical implication is to report the factors influencing China's normal university students' intention to use tablet computers for learning. The study also investigated the factors influencing the actual use of tablet computers. The results would make policymakers, campuses, and lecturers understand the effects of using the devices and feedback from students. Furthermore, the findings would help improve tablet computers for prospective professional teachers. In the future, these results may help developers understand the needed changes and modifications and what should be created to develop high-quality and user-friendly tablet computers to support university learning activities. Teachers in China should master the ability to use technology and related knowledge, as well as to complete assignments quickly and precisely. Therefore, it is necessary to analyze the normal university students' intention to use tablet computers and other technologies for learning purposes. Increasing the intention and use of tablets would increase the ability to use technology as future teachers. Subsequently, it would contribute to integrating technology to improve education quality by 2030.

7. Limitations and Recommendations for Future Studies

All studies have limitations and should be elaborated on to make the findings more focused and objective and provide suggestions for future studies. First, this study used the proposed sampling method, meaning the generalization may be biased. Future studies could use random sampling techniques in more universities and student samples. Furthermore, this study used the UTAUT model as a theoretical background. Many models and factors could be developed to predict the use of tablets as learning tools in universities.

This study aimed to predict the differences in factors influencing rural and urban area university students to use tablet as learning tools. Respondents were and often used tablets to study, while the sample was not focused on university students that had not used tablets to study. Therefore, future studies could conduct a qualitative approach to explore and understand the factors influencing the use of tablets.

This study used the SEM approach, which is considered the best in testing models and hypotheses, though it has limitations. Gefen and Rigdon stated that the SEM technique might have an over-fit test of the non-linear effect and the influential outliers estimates. Therefore, some of the limitations are considered when interpreting these results.

This study excluded moderating effects such as age, experience, and gender in the proposed model but used these data for further elaboration in the findings section. It aimed to identify differences between university students in urban and rural areas using a confirmatory approach. Therefore, other studies could include many moderators in the proposed model.

8. Conclusions

Tablet computers have many benefits and have become learning tools that support sustainable education. This study used a sample of only 232 university students in rural areas and 214 university students in urban areas from Xining and Beijing cities. However, it may contribute to developing the UTAUT model using tablet computers as learning tools at the higher education level. There is much potential for further studies on the use of tablet computers by university students as learning tools in urban and rural areas. The measurement instrument was adopted and modified according to the objectives, while the model was empirically validated. The findings indicate a significant difference between urban and rural area university students that use tablet computers as learning tools. This could be important information to increase the intention to use tablet computers to support future learning in universities.

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Appendix A. Measurement Item and Sources

Determinants	Measurement Items
Performance expectancy	Tablet computers improve learning performance
	A tablet computer helps search for literature and complete college assignments quickly
	Tablet computers help review lessons effectively
Effort expectancy	Tablet computers are easy to use
	It is easy to learn using a tablet computer
	The interaction with the tablet computer is clear and understandable
Subjective Norm (SN)	Friends at university use a tablet computer as a learning tool
	Friends at university recommended using tablet computers as learning tools
	People recommend using tablet computers as learning tools
Facilitating conditions	I have a tablet computer for learning
	I have the knowledge to use tablet computers for learning
	People help when I do not know how to use a tablet computer to learning

Determinants	Measurement Items
Price value	Tablet computers for learning purposes are reasonably priced
	The tablet computer is a good value for money
	Using a tablet computer to learn is reasonably priced than other learning tools, such as a laptop
habits	The use of tablet computers for learning has become a habit
	I must use a tablet computer when learning
	Using a tablet computer has become natural
Hedonic motivation	Using a tablet computer in my learning activities is fun
	The use of tablet computers is amusing
	I enjoy using a tablet computer when learning
Behavioral intentions	I intend to use a tablet computer as a learning tool in the future
	I predict I will use a tablet computer for learning in the future
	I have a plan to use a tablet computer for learning in the future
Usage behavior	I use a tablet computer frequently during my academic period
	I use a tablet computer as the main tool for my studies
	I recommend tablet computers to other friends to use
Task Characteristics	I need to use a tablet computer to learn at any time.
	I need to use a tablet computer to learn anywhere
	I often get non-routine tasks
Technology Characteristics	Using a tablet computer as a learning tool helps me provide high-quality learning material
	Tablet computers support learning outside the classroom
	It is convenient for me to learn to use a tablet computer
Task-Technology Fit (TTF)	I think the features of the tablet computer are sufficient to help me complete my learning activities.
	I think the features of the co tablet computer are appropriate to help me complete my learning activities.
	I think the features of the tablet computer fully meet my learning activities needs
Innovation	I like new things and technologies.
	I am good at discovering new things.
	Compared to the people around me, I often experience new products and technologies first.

References

1. Çetin, K.; Kılıçkaya, F. A systematic review of research on reading in English on screen and on paper. *Online Submiss.* **2019**, *61*, 7–21. [CrossRef]
2. Zhang, R.; Zou, D.; Xie, H.; Au, O.T.S.; Wang, F.L. A systematic review of research on e-book-based language learning. *Knowl. Manag. E-Learn.* **2020**, *12*, 106–128. [CrossRef]
3. Haßler, B.; Major, L.; Hennessy, S. Tablet use in schools: A critical review of the evidence for learning outcomes. *J. Comput. Assist. Learn.* **2016**, *32*, 139–156. [CrossRef]
4. Moran, M.; Hawkes, M.; El Gayar, O. Tablet personal computer integration in higher education: Applying the unified theory of acceptance and use technology model to understand supporting factors. *J. Educ. Comput. Res.* **2010**, *42*, 79–101. [CrossRef]
5. Reychav, I.; Warkentin, M.; Ndicu, M. Tablet adoption with smart school website technology. *J. Comput. Inf. Syst.* **2016**, *56*, 280–287. [CrossRef]
6. Çukurbaşi, B.; Işbulan, O.; Kiyici, M. Acceptance of educational use of tablet computers: A critical view of the FATIH Project. *Egit. Bilim* **2016**, *41*, 67–82. [CrossRef]
7. Cacciamani, S.; Villani, D.; Bonanomi, A.; Carissoli, C.; Olivari, M.G.; Morganti, L.; Riva, G.; Confalonieri, E. Factors Affecting Students' Acceptance of Tablet PCs: A Study in Italian High Schools. *J. Res. Technol. Educ.* **2018**, *50*, 120–133. [CrossRef]
8. Chou, P.N.; Feng, S.T. Using a tablet computer application to advance high school students' laboratory learning experiences: A focus on electrical engineering education. *Sustainability* **2019**, *11*, 381. [CrossRef]
9. Villani, D.; Morganti, L.; Carissoli, C.; Gatti, E.; Bonanomi, A.; Cacciamani, S.; Confalonieri, E.; Riva, G. Students' acceptance of tablet PCs in Italian high schools: Profiles and differences. *Br. J. Educ. Technol.* **2018**, *49*, 533–544. [CrossRef]
10. Opoku-Asare, N.A.; Siaw, A.O. Rural–Urban Disparity in Students' Academic Performance in Visual Arts Education: Evidence From Six Senior High Schools in Kumasi, Ghana. *SAGE Open.* **2015**, *5*, 4.
11. Liebenberg, J.; Benade, T.; Ellis, S. Acceptance of ICT: Applicability of the Unified Theory of Acceptance and Use of Technology (UTAUT) to South African Students. *Afr. J. Inf. Syst.* **2018**, *10*, 1.
12. Šumak, B.; Šorgo, A. The acceptance and use of interactive whiteboards among teachers: Differences in UTAUT determinants between pre- and post-adopters. *Comput. Human Behav.* **2016**, *64*, 602–620. [CrossRef]
13. Moorthy, K.; Tíng, L.C.; Ming, K.S.; Ping, C.C.; Ping, L.Y.; Joe, L.Q.; Jie, W.J. Behavioral Intention to Adopt Digital Library by the Undergraduates. *Int. Inf. Libr. Rev.* **2019**, *51*, 128–144. [CrossRef]
14. Wang, P.-Y. Examining the Digital Divide between Rural and Urban Schools: Technology Availability, Teachers' Integration Level and Students' Perception. *J. Curric. Teach.* **2013**, *2*, 127–139. [CrossRef]
15. Asfar, N.; Zainuddin, Z. Secondary students' perceptions of information, communication and technology (ICT) use in promoting self directed learning in Malaysia. *Online J. Distance Educ. E-Learn.* **2015**, *3*, 67–82.
16. Sarfo, F.K.; Amartei, A.M.; Adentwi, K.I.; Brefo, C. Technology and gender equity: Rural and urban students' attitudes towards information and communication technology. *J. Media Commun. Stud.* **2011**, *3*, 221–230.
17. Siaw, K.P.; Muesser, N.; Robert, B.A. Over time and task-fit technology factors on urban—rural high in flipped learning approach. *Educ. Technol. Res. Dev.* **2018**, *66*, 1547–1569.
18. Sulisworo, D.; Kusumaningtyas, D.A.; Anomeisa, A.B.; Wahyuningsih; Rahmadhani, W. Perceptions of online learning experiences between students in urban and remote areas: Case study in Indonesia. *Int. J. Sci. Technol. Res.* **2020**, *9*, 4850–4854.
19. Menachemi, N.; Langley, A.; Brooks, R.G. The use of information technologies among rural and urban physicians in Florida. *J. Med. Syst.* **2007**, *31*, 483–488. [CrossRef] [PubMed]
20. Pujiastuti, H.; Haryadi, R. Interactive Math E-Book: An Alternative Learning Resources for 21st Century Learners, 2019. In Proceedings of the First International Conference on Technology and Educational Science, ICSTES 2018, Bali, Indonesia, 21–22 November 2018. [CrossRef]
21. Lim, K.; Kim, Y.; Kim, M.; Jang, Y.; Joo, M.H. The digital divide? Analyzing regional differences of tablet PC use in Korean middle schools for sustainable development. *Sustainability* **2019**, *11*, 5054. [CrossRef]
22. Pruet, P.; Ang, C.S.; Farzin, D. Understanding tablet computer usage among primary school students in underdeveloped areas: Students' technology experience, learning styles and attitudes. *Comput. Human Behav.* **2016**, *55*, 1131–1144. [CrossRef]
23. Venkatesh, M.G.; Morris, G.; Davis, B.; Davis, F.D. User acceptance of information technology: Toward a unified view. *Manag. Inf. Syst. Q.* **2003**, *27*, 425–478. [CrossRef]
24. Garg, A. Investigating the Moderating Effects of Age and Gender on Customers' Use of Tablet Menu in Casual Dining Restaurants. *J. Qual. Assur. Hosp. Tour.* **2021**. [CrossRef]
25. Roldán-Álvarez, D.; Martín, E.; Haya, P.A. Collaborative video-based learning using tablet computers to teach job skills to students with intellectual disabilities. *Educ. Sci.* **2021**, *11*, 437. [CrossRef]
26. Hooft, M.v.; Swan, K. *Ubiquitous Computing in Education: Invisible Technology, Visible Impact*; Lawrence Erlbaum Associates: London, UK, 2007.
27. Christensen, R.; Knezek, G.; Overall, T. Transition points for the gender gap in computer enjoyment. *J. Res. Tech. Educ.* **2005**, *38*, 23–38. [CrossRef]
28. Zucker, A.; McGhee, R. *A Study of One-to-One Computer Use in Mathematics and Science Instruction at the Secondary Level in Henrico County Public Schools*; SRI: Menlo Park, CA, USA, 2005.

29. Al-mekhlafi, A.A.; Othman, I.; Kineber, A.F.; Mousa, A.A.; Zamil, A.M.A. Modeling the Impact of Massive Open Online Courses (MOOC) Implementation Factors on Continuance Intention of Students: PLS-SEM Approach. *Sustainability* **2022**, *14*, 5342. [CrossRef]
30. Faqih, K.M.S.; Jaradat, M.I.R.M. Integrating TTF and UTAUT2 theories to investigate the adoption of augmented reality technology in education: Perspective from a developing country. *Technol. Soc.* **2021**, *67*, 101787. [CrossRef]
31. Penuel, W.R.; Fishman, B.J.; Cheng, B.H.; Sabelli, N. Organizing research and development at the intersection of learning, implementation, and design. *Educ. Res.* **2011**, *40*, 331–337. [CrossRef]
32. Al-Mashaqbeh, I.F. IPad in elementary school math learning setting. *Int. J. Emerg. Technol. Learn.* **2016**, *11*, 48–52. [CrossRef]
33. Hart, K.; Ahmed, R. Using demibooks composer to create remedial learning apps for the profoundly deaf. In Proceedings of the IDC '13: 12th International Conference on Interaction Design and Children, New York, NY, USA, 24–27 June 2013; pp. 573–576. [CrossRef]
34. Cho, Y.H.; Huh, S.Y.; Jo, G.T. Influence of individual differences on learning with digital textbooks. In Proceedings of the ICCE 2018—26th International Conference on Computers in Education, Main Conference Proceedings, Manila, Philippines, 26–30 November 2018; pp. 506–511. Available online: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85060047802&partnerID=40&md5=5b9afa767f7bbff1b8ad2acc1ef58c1e (accessed on 10 April 2022).
35. Mukminin, A.; Habibi, A.; Muhaimin, M.; Prasojo, L.D. Exploring the drivers predicting behavioral intention to use m-learning management system: Partial least square structural equation model. *IEEE Access* **2020**, *8*, 181356–181365. [CrossRef]
36. Al-Maroof, R.S.; Alnazzawi, N.; Akour, I.A.; Ayoubi, K.; Alhumaid, K.; AlAhabi, N.M.; Alnnaimi, M.; Thabit, S.; Alfaisal, R.; Aburayya, A.; et al. The effectiveness of online platforms after the pandemic: Will face-to-face classes affect students' perception of their behavioural intention (BIU) to use online platforms? *Informatics* **2021**, *8*, 83. [CrossRef]
37. Camadan, F.; Reisoglu, I.; Ursavas, Ö.F.; Mcilroy, D. How teachers' personality affect on their behavioral intention to use tablet PC. *Int. J. Inf. Learn. Technol.* **2018**, *35*, 12–28. [CrossRef]
38. Wijaya, T.T.; Cao, Y.; Weinhandl, R.; Yusron, E. Applying the UTAUT Model to Understand Factors Affecting Micro-Lecture Usage by Mathematics Teachers in China. *Mathematics* **2022**, *10*, 1008. [CrossRef]
39. Alenezi, A.R. Modeling the Social Factors Affecting Students' Satisfaction with Online Learning: A Structural Equation Modeling Approach. *Educ. Res. Int.* **2022**, *2022*, 2594221. [CrossRef]
40. Lavidas, K.; Komis, V.; Achriani, A. Explaining faculty members' behavioral intention to use learning management systems. *J. Comput. Educ.* **2022**, *9*, 707–725. [CrossRef]
41. Taamneh, A.; Alsaad, A.; Elrehail, H.; Al-Okaily, M.; Lutfi, A.; Sergio, R.P. University lecturers acceptance of moodle platform in the context of the COVID-19 pandemic. *Glob. Knowl. Mem. Commun.* 2022; *ahead-of-print*. [CrossRef]
42. Sarfraz, M.; Fiaz, K.; Ivascu, L. The International Journal of Management Education Factors affecting business school students' performance during the COVID-19 pandemic: A moderated and mediated model. *Int. J. Manag. Educ.* **2022**, *20*, 100630. [CrossRef]
43. Acharjya, B.; Das, S. Adoption of E-Learning during the COVID-19 Pandemic. *Int. J. Web-Based Learn. Teach. Technol.* **2022**, *17*, 1–14. [CrossRef]
44. Choi, H.; Hong, H. Influential Factors on Elementary School Teachers' Intention to Use MOOC. *Teach. Educ. Res.* **2018**, *57*, 16–29. [CrossRef]
45. Venkatesh, V.Y.L.; Thong, J.; Xu, X. Consumer acceptance and use of information Technology: Extending the unified theory of acceptance and use of technology. MIS Quarterly. *Manag. Inf. Syst. Q.* **2012**, *36*, 157–178. [CrossRef]
46. Uymaz, P.; Uymaz, A.O. Assessing acceptance of augmented reality in nursing education. *PLoS ONE* **2022**, *17*, e0263937. [CrossRef]
47. Nikolopoulou, K.; Gialamas, V.; Lavidas, K. Habit, hedonic motivation, performance expectancy and technological pedagogical knowledge affect teachers' intention to use mobile internet. *Comput. Educ. Open* **2021**, *2*, 100041. [CrossRef]
48. Wang, Y.S.; Wu, M.C.; Wang, H.Y. Investigating the determinants and age and gender differences in the acceptance of mobile learning. *Br. J. Educ. Technol.* **2009**, *40*, 92–118. [CrossRef]
49. Clements, J. Beyond habit: The role of sunk costs on developing automatic IS use behaviors. *J. South. Assoc. Inf. Syst.* **2015**, *3*, 17–37. [CrossRef]
50. Yu, C.W.; Chao, C.M.; Chang, C.F.; Chen, R.J.; Chen, P.C.; Liu, Y.X. Exploring Behavioral Intention to Use a Mobile Health Education Website: An Extension of the UTAUT 2 Model. *SAGE Open* **2021**, *11*, 4. [CrossRef]
51. Hu, S.; Laxman, K.; Lee, K. Exploring factors affecting academics' adoption of emerging mobile technologies-an extended UTAUT perspective. *Educ. Inf. Technol.* **2020**, *25*, 4615–4635. [CrossRef]
52. Herting, D.C.; Pros, R.C.; Tarrida, A.C. Habit and social influence as determinants of PowerPoint use in higher education: A study from a technology acceptance approach. *Interact. Learn. Environ.* **2020**, 1–17. [CrossRef]
53. Prasetyo, Y.T.; Roque, R.A.C.; Chuenyindee, T.; Young, M.N.; Diaz, J.F.T.; Persada, S.F.; Miraja, B.A.; Redi, A.A.N.P. Determining factors affecting the acceptance of medical education elearning platforms during the covid-19 pandemic in the philippines: Utaut2 approach. *Healthcare* **2021**, *9*, 780. [CrossRef] [PubMed]
54. Briz-Ponce, L.; Pereira, A.; Carvalho, L.; Juanes-Méndez, J.A.; García-Peñalvo, F.J. Learning with mobile technologies—Students' behavior. *Comput. Human Behav.* **2017**, *72*, 612–620. [CrossRef]
55. Al-rahmi, A.M.; Al-rahmi, W.M.; Alturki, U.; Aldraiweesh, A.; Almutairy, S.; Al-adwan, A.S. Exploring the factors affecting mobile learning for sustainability in higher education. *Sustainability* **2021**, *13*, 7893. [CrossRef]

56. Reyes, E.G.D.; Galura, J.C.; Pineda, J.L.S. C5-LMS design using Google Classroom: User acceptance based on extended Unified Theory of Acceptance and Use of Technology. *Interact. Learn. Environ.* **2022**, 1–10. [CrossRef]
57. Lazar, I.M.; Panisoara, G.; Panisoara, I.O. Digital technology adoption scale in the blended learning context in higher education: Development, validation and testing of a specific tool. *PLoS ONE* **2020**, *15*, e0235957. [CrossRef] [PubMed]
58. Huang, H.; Cheng, E.W.L. The Role of Commitment in an Extended Theory of Planned Behavior: Test of Its Mediating Effect with Partial Least Squares Structural Equation Modeling. *Mathematics* **2022**, *10*, 1049. [CrossRef]
59. Fussell, S.G.; Truong, D. Using virtual reality for dynamic learning: An extended technology acceptance model. *Virtual Real.* **2022**, *26*, 249–267. [CrossRef] [PubMed]
60. Saprikis, V.; Avlogiaris, G.; Katarachia, A. Determinants of the intention to adopt mobile augmented reality apps in shopping malls among university students. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 491–512. [CrossRef]
61. Arenas, J.E.; Bravo, C.J.; Ramírez, P.E.; Arenas, J.; Bravo, C.; Ramírez, J.P. Aceptación del Re- conocimiento Facial Como Medida de Vigilancia y Seguridad: Un Estudio Empírico en Chile. *Inf. Tecnológica* **2018**, *29*, 115–122.
62. Zampieri, M.; Lindner, D.; Flores, L.; Pellegrin, T. Compreensao da satisfacao e intencao de con- tinuidade de uso da tecnologia por meio do indice de prontidao tecnològica. *Rev. Adm. Innov.* **2014**, *11*, 101.
63. Ye, C. Antecedents and Consequences of Perceived Fit of an Interactive Digital Textbook. *J. Inf. Syst. Educ.* **2021**, *32*, 27–39.
64. Liu, D.; Luo, J. College Learning from Classrooms to the Internet: Adoption of the YouTube as Supplementary Tool in COVID-19 Pandemic Environment. *Educ. Urban Soc.* **2021**, *54*, 848–870. [CrossRef]
65. Alismaiel, O.A. Using structural equation modeling to assess online learning systems' educational sustainability for university students. *Sustainability* **2021**, *13*, 13565. [CrossRef]
66. Navarro, M.M.; Prasetyo, Y.T.; Young, M.N.; Nadlifatin, R.; Redi, A.A.N.P. The perceived satisfaction in utilizing learning management systems among engineering students during the COVID-19 pandemic: Integrating task technology fit and extended technology acceptance model. *Sustainability* **2021**, *13*, 10669. [CrossRef]
67. Goodhue, D.; Thompson, R.L. Task-technology fit and individual performance. *MIS Q.* **1995**, *19*, 213–236. [CrossRef]
68. Alyoussef, I.Y. Massive open online course (Moocs) acceptance: The role of task-technology fit (ttf) for higher education sustainability. *Sustainability* **2021**, *13*, 7374. [CrossRef]
69. Sharif, A.; Afshan, S.; Qureshi, M.A. Acceptance of learning management system in university students: An integrating framework of modified UTAUT2 and TTF theories. *Int. J. Technol. Enhanc. Learn.* **2019**, *11*, 2. [CrossRef]
70. Pal, D.; Patra, S. University Students ' Perception of Video-Based Learning in Times of COVID-19: A TAM/TTF Perspective. *Int. J. Hum. Comput. Interact.* **2021**, *37*, 903–921. [CrossRef]
71. Ain, N.U.; Kaur, K.; Waheed, M. The influence of learning value on learning management system use: An extension of UTAUT2. *Inf. Dev.* **2016**, *32*, 1306–1321. [CrossRef]
72. Paulo, M.M.; Rita, P.; Oliveira, T.; Moro, S. Understanding mobile augmented reality adoption in a consumer context. *J. Hosp. Tour. Technol.* **2018**, *9*, 142–157. [CrossRef]
73. Zheng, J.; Li, S. What drives students' intention to use tablet computers: An extended technology acceptance model. *Int. J. Educ. Res.* **2020**, *102*, 101612. [CrossRef]
74. Dahri, N.A.; Vighio, M.S.; Bather, J.D.; Arain, A.A. Factors influencing the acceptance of mobile collaborative learning for the continuous professional development of teachers. *Sustainability* **2021**, *13*, 13222. [CrossRef]
75. Wijaya, T.T.; Zhou, Y.; Houghton, T.; Weinhandl, R.; Lavicza, Z.; Yusop, F.D. Factors affecting the use of digital mathematics textbooks in Indonesia. *Mathematics* **2022**, *10*, 1808. [CrossRef]
76. Zhou, Y.; Li, X.; Wijaya, T.T. Determinants of Behavioral Intention and Use of Interactive Whiteboard by K-12 Teachers in Remote and Rural Areas. *Front. Psychol.* **2022**, *13*, 934423. [CrossRef]
77. Hair, J.F.; Hult, G.T.M.; Ringle, C.; Sarstedt, M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*; SAGE Publications: Thousand Oaks, CA, USA, 2016.
78. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]
79. Kock, N. Common method bias in PLS-SEM: A full collinearity assessment approach. *Int. J. E-Collab.* **2015**, *11*, 1–10. [CrossRef]
80. Wijnen, F.; van der Molen, J.W.; Voogt, J. Primary school teachers' attitudes toward technology use and stimulating higher-order thinking in students: A review of the literature. *J. Res. Technol. Educ.* **2021**, 1–23. [CrossRef]
81. Alturki, U.; Aldraiweesh, A. Students' Perceptions of the Actual Use of Mobile Learning during COVID-19 Pandemic in Higher Education. *Sustainability* **2022**, *14*, 1125. [CrossRef]
82. Li, Y.; Zhao, M. A Study on the Influencing Factors of Continued Intention to Use MOOCs: UTAUT Model and CCC Moderating Effect. *Front. Psychol.* **2021**, *12*, 1–13. [CrossRef]
83. Khalid, B.; Chaveesuk, S.; Chaiyasoonthorn, W. Moocs adoption in higher education: A management perspective. *Polish J. Manag. Stud.* **2021**, *23*, 239–256. [CrossRef]
84. Wijaya, T.T.; Cao, Y.; Bernard, M.; Rahmadi, I.F.; Lavicza, Z.; Surjono, H.D. Factors influencing microgame adoption among secondary school mathematics teachers supported by structural equation modelling-based research. *Front. Psychol.* **2022**, *13*, 1–16. [CrossRef]
85. Wijaya, T.T.; Weinhandl, R. Factors Influencing Students' Continuous Intentions for Using Micro-Lectures in the Post-COVID-19 Period: A Modification of the UTAUT-2 Approach. *Electronics* **2022**, *11*, 1924. [CrossRef]

86. Mujalli, A.; Khan, T.; Almgrashi, A. University Accounting Students and Faculty Members Using the Blackboard Platform during COVID-19; Proposed Modification of the UTAUT Model and an Empirical Study. *Sustainability* **2022**, *14*, 2360. [CrossRef]
87. Timothy, K.W.; Sharon, T. Interactive Whiteboard Acceptance: Applicability of the UTAUT Model to Student Teachers. *Asia-Pacific Educ. Res.* **2013**, *22*, 1–10. [CrossRef]
88. Joa, C.Y.; Magsamen-Conrad, K. Social influence and UTAUT in predicting digital immigrants' technology use. *Behav. Inf. Technol.* **2021**, *41*, 1620–1638. [CrossRef]
89. Balasundaram, M.; Porter, M.; Miller, S.; Sivakumar, D.; Fleming, A.; McCallie, K. Increasing Parent Satisfaction with Discharge Planning: An Improvement Project Using Technology in a Level 3 NICU. *Adv. Neonatal Care* **2021**, *22*, 108–118. [CrossRef]
90. Courage, M.L.; Frizzell, L.M.; Walsh, C.S.; Smith, M. Toddlers Using Tablets: They Engage, Play, and Learn. *Front. Psychol.* **2021**, *12*, 564479. [CrossRef]
91. Ramkalawon, L.; Bholoa, A. Using tablet PC in the teaching and learning of secondary mathematics: A case of a girl's class in Mauritius. In Proceedings of the 2016 SAI Computing Conference (SAI), London, UK, 13–15 July 2016; pp. 850–857. [CrossRef]
92. Courtois, C.; Montrieux, H.; de Grove, F.; Raes, A.; de Marez, L.; Schellens, T. Student acceptance of tablet devices in secondary education: A three-wave longitudinal cross-lagged case study. *Comput. Human Behav.* **2014**, *35*, 278–286. [CrossRef]
93. Haksız, M. Investigation of Tablet Computer Use in Special Education Teachers' Courses. *Procedia Soc. Behav. Sci.* **2014**, *141*, 1392–1399. [CrossRef]
94. Clarke, L.; Abbott, L. Young pupils', their teacher's and classroom assistants' experiences of iPads in a Northern Ireland school: 'Four and five years old, who would have thought they could do that?'. *Br. J. Educ. Technol.* **2016**, *47*, 1051–1064. [CrossRef]
95. Martins, M.; Farias, J.S.; Albuquerque, P.H.M.; Pereira, D.S. Adoption of technology for reading purposes: A study articles of e-books acceptance. *Braz. Bus. Rev.* **2018**, *15*, 568–588. [CrossRef]
96. El-Masri, M.; Tarhini, A. Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educ. Technol. Res. Dev.* **2017**, *65*, 743–763. [CrossRef]
97. Priporas, C.V.; Stylos, N.; Fotiadis, A.K. Generation Z consumers' expectations of interactions in smart retailing: A future agenda. *Comput. Human Behav.* **2017**, *77*, 374–381. [CrossRef]
98. Cilliers, E.J. The Challenge of Teaching Generation Z. *PEOPLE Int. J. Soc. Sci.* **2017**, *3*, 188–198. [CrossRef]