Construction of Psychological Driving Model of University Teachers "Technology Acceptance and Teaching Innovation Behavior under the Background of Digital Transformation

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Abstract: In the context of digital transformation, university teachers 'technology acceptance and teaching innovation behavior have become important factors to improve the quality of education.Based on the theory of self-efficacy, planned behavior and innovation diffusion, this paper constructs a psychological driving model with self-efficacy, organizational support, technology acceptance, innovation consciousness and teaching innovation behavior as the core, and collects 429 samples through questionnaire survey, and uses structural equation model to conduct empirical test.The results show that self-efficacy and perceived organizational support have a significant positive impact on technology acceptance, and technology acceptance not only directly promotes teaching innovation behavior, but also plays a mediating role through innovation consciousness.The research verifies the mechanism of teachers "psychological factors in technology application and teaching innovation, enriches relevant theories, and provides empirical basis and practical enlightenment for universities to optimize teacher training and support system and enhance teaching innovation ability in digital environment.

Keywords: Digital transformation; University teachers; Technology acceptance; Teaching innovation; Psychology-driven model

Introduction

With the rapid development of information technology and the acceleration of globalization, digital transformation has become an important issue in higher education.Emerging technologies such as artificial intelligence, big data and virtual reality are reshaping the teaching model and the role of teachers in colleges and universities, and teachers are changing from knowledge teachers to learning guides and innovation promoters.Teachers 'acceptance of new technology and innovative teaching behavior have become the key to measure the effectiveness of education reform.However, there are differences among teachers in the process of applying new technologies, which affects the promotion effect of digital transformation.It is of great theoretical and practical significance to explore the technology acceptance behavior and psychological driving

mechanism o/f college teachers for promoting teachers 'professional development, promoting teaching innovation and realizing high-quality education development.

1 Literature review

1.1 Research status of college teachers technology acceptance

As a core issue in the process of educational informatization transformation, the technology acceptance of university teachers has received extensive attention.Early research on individual technology acceptance behavior is based on the technology acceptance model (TAM), emphasizing the perceived usefulness and perceived ease of use of the direct impact of behavioral intention [1].The TAM model provides a basic framework for understanding the psychological process of teachers in the application of new educational technology, and has been verified by a large number of empirical studies.lat, scholars expand that TAM model many times, such as introducing variables such as self-efficacy, social influence, technology anxiety, etc., to improve the explanatory pow of the model to teachers 'behavior in complex educational environment.Further development of the integrated technology acceptance and use model (UTAUT) is a combination of TAM, the theory of planned behavior and other theories of the core elements, put forward the performance expectations, expectations, social influence and promote the four decisive variables, significantly enhance the predictive power of the model [2].In recent years, with the continuous enrichment of educational scenes and diversification of technology types, researchers have begun to pay attention to the moderating and mediating effects of situational factors, individual differences and organizational culture on teachers 'technology acceptance behavior.Research shows that teachers 'cognitive attitude, emotional experience, organizational support environment and external policy orientation shape their willingness to accept and apply digital technology.Therefore, the system of university teachers to sort out the theory of technology acceptance behavior and research evolution, for the study of the follow-up model provides a solid theoretical support [3].

1.2 Research on teaching innovation behavior

The teaching innovation behavior of university teachers is an important index to measure the effect of education reform, and it is also a key factor to improve the teaching quality and students 'comprehensive accomplishment.As for the definition of teaching innovation, the academic circles generally believe that it refers to the behavior of teachers in teaching ideas, methods, contents and means to actively adopt novel and effective ways to improve teaching results.In the early studies, foreign scholars paid more attention to the influence of teachers 'personal characteristics, such as openness, learning motivation and innovation tendency, on teaching innovation behavior.With the deepening of the research, the teacher's organizational identity, leadership support, resource availability and institutional incentives are gradually included in the scope of investigation, the formation of a multi-dimensional, multi-level research system [4].In the aspect of measurement tools, scholars usually use behavior frequency scale, innovation tendency assessment, case observation and other methods to analyze teachers 'innovative behavior

quantitatively and qualitatively.Domestic research started a little late, in recent years, with the "double first-class" construction and the promotion of education modernization strategy, the empirical research on the teaching innovation behavior of university teachers has grown rapidly.Domestic scholars pay more attention to the promotion mechanism of institutional environment, professional development support and professional identity on teachers 'innovative behavior, and gradually attach importance to the influence of teachers' psychological factors, such as self-efficacy, innovative self-confidence and job burnout. Generally speaking, the formation of teaching innovation behavior is a complex process influenced by multiple factors of individual, organization and environment, and it is difficult to reveal its internal dynamic mechanism from a single perspective.Therefore, constructing the model from the perspective of psychological drive is helpful to grasp the deep-seated causes of teachers 'teaching innovation behavior more accurately.

1.3 Theoretical base of psychological driving factor

Under the background of digital transformation, college teachers "technology acceptance and teaching innovation behavior cannot be separated from the deep intervention of psychological factors.Self-efficacy theory points out that the individual's belief in their ability to complete a particular task directly affects their behavioral intentions, efforts and persistence.In the field of educational technology application, self-efficacy has been proved to have a significant positive predictive effect on teachers 'acceptance of new technology.The theory of planned behavior suggests that behavior intention is determined by attitude, subjective norms and perceived behavior control, emphasizing the important role of social environment and individual control in the formation of behavior. This theory provides a powerful explanation for understanding teachers 'decision logic in technology acceptance and teaching innovation.Innovation diffusion theory points out that the innovation characteristics (such as comparative advantage, compatibility, complexity, trial and observability) affect the speed and degree of individual adoption of new technology, the theory for the analysis of different groups of teachers of educational technology innovation acceptance difference has important enlightenment significance [5].Based on the above theory, teachers 'self-efficacy, behavior intention, innovation perception and their social environment together constitute the psychological driving system of their technology acceptance and teaching innovation behavior. Therefore, building a comprehensive model based on these psychological theories will provide a solid theoretical basis for revealing the behavior evolution law of university teachers in the context of digital transformation.

2 Study design and model building

2.1 Research hypothesis

Based on the previous literature review and theoretical basis, this paper puts forward some core research hypotheses in the exploration of the psychological driving mechanism of technology acceptance and teaching innovation behavior under the background of university teachers 'digital transformation.First, it can be inferred that teachers 'self-efficacy has a

significant positive impact on their technology acceptance, that is, the higher the teachers' confidence in their ability to master and apply digital technology, the stronger their willingness to adopt technology and the depth of application.Secondly, technology acceptance is regarded as an important antecedent variable that affects teaching innovation behavior. Teachers with higher technology acceptance are more likely to actively introduce innovative means and strategies into instructional design, classroom organization and learning evaluation, and show a higher level of teaching innovation behavior.in addition, that sense of innovation, as the psychological characteristic of individual's positive perception and willingness to adopt new thing, may play an intermediary role between technology acceptance and teaching innovation, that is, technology acceptance can further promote the occurrence of teach innovation behavior by enhancing teachers 'sense of innovation.Based on this, this paper constructs a preliminary research hypothesis system, in order to verify it through empirical analysis, and provide a basis for the subsequent model revision and theoretical improvement.

2.2 Theoretical model construction

On the basis of the research hypothesis, this paper constructs a psychological driving theoretical model of university teachers 'technology acceptance and teaching innovation behavior.The model takes self-efficacy and organizational support as exogenous variables, technology acceptance and innovation consciousness as intermediary variables, and teaching innovation behavior as endogenous outcome variables, and focuses on depicting the direct and indirect action paths among variables.Specifically, self-efficacy and organizational support have a positive impact on technology acceptance. Technology acceptance can not only directly promote teachers 'teaching innovation behavior, but also indirectly play a role by enhancing innovation consciousness.The theoretical model of this study provides a clear path framework for the subsequent empirical test.

2.3 Variable definition and measurement

In order to ensure the scientificity and preciseness of the model test, this paper systematically defines each core variable, designs the measurement index with reference to the existing mature scale and relevant research results, and makes appropriate revision and situational adjustment in combination with the background of digital transformation.The specific definition and measurement dimensions of each variable are shown in Table 1.Self-efficacy refers to teachers 'confidence in their ability to master and apply digital teaching technology, and the measurement design refers to the self-efficacy evaluation system commonly used in the field of education. Technology acceptance includes three dimensions: perceived usefulness, perceived ease of use and intention of use, which is measured according to the standardized model widely used in educational technology research. Teaching innovation behavior refers to the prevailing standards in the field of innovation behavior measurement, focusing on teachers 'actual innovation behavior in teaching methods, curriculum content and teaching mode.Specific variables and measurement dimensions are shown in the table below.

Table 1 Definition and measurement dimensions of core variables

variable	definition	measuring dimension	Scale Rationale
self-efficacy	Teachers 'Confidence in Their Ability to Master and Apply Educational Technology	Confidence in technology mastery, confidence in problem solving	Maturity Scale Reference
perceived organizational support	Teachers perceive the support provided by the school	Technical training support, resource support and policy incentive	Maturity Scale Reference
technical acceptance	Teacher's Cognition and Intention on the Application of Digital Technology in Teaching	Perceived usefulness, perceived ease of use, intent to use	Maturity Scale Reference
innovative consciousness	Teachers "Sensitivity to Emerging Educational Technologies and Their Willingness to Use Them Actively	Technology sensitivity, willingness to apply	Self-developed scale
teaching innovation behavior	Teachers 'practical behavior of actively innovating methods, contents and modes in teaching activities	Method innovation, content update and mode change	Maturity Scale Reference

Table 1 clearly lists the core variables, definitions, measurement dimensions and measurement basis involved in this study, which ensures the scientificity and adaptability of scale design.Through systematic and standardized measurement system, it can provide solid data support for subsequent empirical tests.

3 Empirical study design

3.1 Respondents and samples

In order to fully understand the psychological driving mechanism of technology acceptance and teaching innovation behavior of university teachers in the context of digital transformation, this paper collects empirical data by questionnaire survey.In-service teachers from many universities and colleges of science and engineering in the eastern coastal areas and the central and western regions were selected to ensure the diversity and representativeness of the samples in terms of region, school type and educational background.In terms of professional categories, different disciplines such as science and engineering, arts, medicine, art and education are covered to reflect the possible differences in teachers 'acceptance of technology and innovative teaching behaviors in different disciplines.In terms of age level, the sample covers teachers under 30 years old, 30-39 years old, 40-49 years old and over 50 years old, with emphasis on the main group of 30-49 years old, because this group is usually in the main stage of teaching reform.In the determination of sample size, considering the requirements of structural equation model (SEM) on sample size, referring to academic experience and model complexity, the effective sample size is 450, 429 valid questionnaires are recovered, and the effective rate reaches 95.3%, which meets the basic requirements of empirical research and provides a reliable data basis for subsequent data analysis and model testing.

3.2 Questionnaire design and data collection

The questionnaire design of this study is strictly based on the previous literature review

and variable definition, using the existing mature scale as the main reference, and combining with the digital teaching background of colleges and universities to carry out appropriate revision and situational treatment, so as to ensure the content validity of the measurement tool.The questionnaire is divided into two parts, the first part is the basic information survey, including gender, age, education, title, subject, from teaching years, using digital teaching tools frequency, etc., to control the demographic variables of the potential interference on the results; the second part is that measurement of the core variable, which covers five module: self-efficacy, organizational support, technology acceptance, innovation awareness and teaching innovation behavior. each module is scored with 5-point Likert scale (1= totally disagree, 5= totally agree).The number of items measured were 6 items of self-efficacy, 5 items of organizational support, 7 items of technology acceptance, 5 items of innovation consciousness and 6 items of teaching innovation behavior. During the data collection process, the questionnaires are distributed through online platforms such as questionnaire star and internal OA system of the school, supplemented by some offline paper questionnaires for recycling, so as to improve the response rate and sample universality.In order to ensure the quality of answer, reverse questions and logical test items are set up, and the answers are clearly informed to be anonymous and only used for academic research, so as to reduce the social expectation bias and self-presentation bias.After preliminary screening of the final data, only the questionnaires with high completion degree and reasonable logic were retained for statistical analysis.

3.3 Data analysis method

The data analysis work is divided into three levels to ensure the scientificity and rigor of the research results.Firstly, in the data preprocessing stage, SPSS 26.0 software was used to sort out and make descriptive statistics on the data, analyze the basic characteristics of the samples (gender, age, discipline distribution, technology use frequency, etc.), and check the missing values, abnormal values and normal distribution, so as to ensure that the data meet the preconditions for subsequent analysis.Secondly, measurement model tests, including exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), were performed.Exploratory factor analysis is mainly used to investigate the rationality and convergent validity of the scale structure. Principal component analysis is selected to extract factors, and KMO test and Bartlett spherical test are used to evaluate the data suitability. Confirmatory factor analysis is performed in AMOS 24.0 software to evaluate the factor load, average variance extraction (AVE), combined reliability (CR) and other indicators of each latent variable, and test the construct validity and reliability of the scale.Finally, after the measurement model meets the standard, the structural equation model (SEM) is used to carry out the overall path analysis on the theoretical model and research hypothesis, evaluate the model fitting effect through goodness of fit indicators (such as χ^2/df, CFI, TLI, RMSEA, etc.), and test whether the direct effect, intermediary effect and regulatory effect among variables are established.Bootstrap method will be used to further verify the significance and robustness of the mediating

effect if necessary, so as to ensure the accuracy and credibility of the study conclusion.

4 Result analysis and discussion

4.1 Descriptive statistics

In order to understand the basic characteristics of the survey samples and the distribution of the main variables, descriptive statistical analysis was carried out at first.The analysis results include the mean, standard deviation, skewness and kurtosis of each core variable, which are intended to test the basic distribution characteristics of the data and whether they meet the assumption of normality.

Table 2 Descriptive statistical results of each variable of the sample

variable	mean value	standard deviation	skewness	kurtosis
self-efficacy	3.87	0.68	-0.42	0.36
perceived organizational support	3.74	0.71	-0.38	0.28
technical acceptance	3.92	0.65	-0.46	0.45
innovative consciousness	3.89	0.62	-0.33	0.21
teaching innovation behavior	3.81	0.70	-0.40	0.39

From Table 2, we can see that the mean value of each variable is in the upper middle level, the standard deviation is moderate, and the absolute values of skewness and kurtosis are less than 1, indicating that the data basically meet the requirements of normal distribution, which provides a good foundation for subsequent factor analysis and structural equation modeling.

4.2 Measurement model chec

On the basis of descriptive statistics, the reliability and validity of each variable were further tested, including Cronbach's alpha coefficient, combination reliability (CR) and average variance extraction (AVE), to evaluate the internal consistency and convergent validity of the scale.

Table 3 Reliability and validity test results of each variable

variable	Cronbach's α	CR	AVE
self-efficacy	0.891	0.910	0.718
perceived organizational support	0.876	0.892	0.677
technical acceptance	0.904	0.919	0.691
innovative consciousness	0.881	0.894	0.679
teaching innovation behavior	0.897	0.913	0.714

From Table 3, we can see that the variables Cronbach's alpha were higher than 0.8, CR values were higher than 0.7, AVE values were higher than 0.5, indicating that the measurement tools have high internal consistency and good convergence validity, can continue to carry out structural model analysis.

4.3 Structural model checking

Based on the verification of the measurement model, the structural equation model (SEM) was used to test the validity of the hypotheses, and the path relationship among self-efficacy, organizational support, technology acceptance, innovation consciousness and teaching innovation behavior was analyzed.The results of model fitting indicators and path coefficients are shown in Table 4 and Table 5.

Table 4 Structural model fitting indicators

index	χ^2/df	CFI	TLI	RMSEA	SRMR

measuring result	2.03	0.957	0.948	0.050	0.041

Table 5 Structure Path Inspection Results

path	normalization coefficient	p-value	whether there has been a significant
Self-efficacy → Technology Acceptance	0.432	<0.001	are
Perceived Organizational Support → Technical Acceptance	0.371	<0.001	are
Technology Acceptance → Innovation Awareness	0.489	<0.001	are
Technology acceptance and teaching innovation behavior	0.256	<0.001	are
Innovative consciousness and teaching innovation behavior	0.517	<0.001	are

It can be seen from Table 4 that the goodness-of-fit indicators of the model all reached a good standard (e.g. χ^2/df was less than 3, CFI and TLI were both greater than 0.9, RMSEA and SRMR were less than 0.08), indicating that the overall model fitting effect was good.The path test results in Table 5 show that the standardized coefficient of each path are positive and significant, supporting all the assumptions put forward in this paper, in which the sense of innovation on the teaching of innovative behavior of the most significant, indicating that innovation in the promotion of teaching innovation plays an important role.

4.4 Discussion of results

Through the empirical analysis, we can see that the sense of self-efficacy and organizational support are important psychological and environmental factors of university teachers 'technology acceptance. Teachers' trust in their own abilities and the technical support provided by the university can significantly enhance their acceptance of digital technology.Technology acceptance not only directly promotes teachers 'teaching innovation behavior, but also indirectly plays a role by enhancing innovation consciousness, which verifies the intermediary effect of innovation consciousness.Consistent with the previous research results, this study emphasizes the interaction between individual psychological factors and organizational environment in the process of educational technology application, and further expands the applicability of technology acceptance model and innovation behavior research in the context of higher education.Different from the limitation that some studies only focus on a single path, this paper reveals the complex mechanism behind the change of teachers 'behavior by constructing a comprehensive psychology -driven model, which provides a theoretical basis for colleges and universities to formulate precise technical training, innovation incentive and support policies.In the future, more psychological variables or longitudinal tracking data can be introduced to enrich the understanding of the dynamic process of

technology adoption and teaching innovation behavior development of university teachers.

Conclusion

Based on the realistic demand of university teachers "teaching behavior change under the background of digital transformation, this paper systematically studies the psychological driving mechanism of university teachers" technology acceptance and teaching innovation behavior, and constructs and verifies the psychological driving model including self-efficacy, organizational support, technology acceptance, innovation consciousness and teaching innovation behavior.The results show that self-efficacy and perceived organizational support, as exogenous variables, can significantly and positively predict teachers "technology acceptance, and technology acceptance not only directly promotes the occurrence of teaching innovation behavior, but also plays an intermediary role by enhancing innovation consciousness, revealing teachers" internal psychological path from technology cognition to innovation practice in digital teaching environment.Especially, the key mediating role of innovation consciousness in the model further emphasizes the importance of stimulating teachers 'innovative thinking.

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