

Analysis of the Effect of Information Technology Leadership of Colleges and Universities on Teaching Effectiveness based on Structural Equation Model

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Abstract. From the perspective of teacher evaluation, a question structural equation model, colleges and universities, teacher leadership, information technology capabilities, teaching effectiveness naira survey was conducted on the informatization leadership of colleges and universities, and the structural equation model analysis of the data was performed through Mplus7 software. The results showed that the information technology capabilities of colleges and universities have direct influence on their informatization planning capabilities the positive effect of information, the ability of informatization planning has a direct positive effect on its information evaluation ability and information management ability has a direct positive effect on school information efficiency. Based on the data analysis results, it is recommended to focus on improving the information management capabilities of college teachers, focusing on improving their information planning capabilities, and scientifically improving their information technology capabilities.

Keywords: Smart electric energy meter, RFID, data acquisition.

1. Introduction

As the enrolment scale of colleges and universities in China expands year by year, higher and higher requirements are placed on the teaching quality of higher education. How to improve the teaching quality of colleges and universities, improve the quality of personnel training, and promote the healthy development of higher education is a problem that is generally concerned by the education community and society. Although research on teaching satisfaction is now a hot topic, there are very few articles on quantitative analysis using structural equation modelling.

Research on teaching satisfaction in colleges and universities is helpful to arouse students' enthusiasm and adjust their mental health; help teachers effectively grasp the psychological and ideological dynamics of modern college students; help teachers improve teaching methods and change teaching concepts. Although the current development of education informatization in China has achieved more results in "hardware informatization", there is still a long way to go in terms of how to promote "human informatization". As the core participants in the development of school informatization, teachers continue to face new challenges and requirements in the process of informatization teaching reform. Their informatization teaching leadership has an important value orientation for teachers 'informatization teaching ability and the improvement of school informatization teaching effectiveness effect. Focusing on "information of teachers" is conducive to promoting the deep integration of information technology and school education. In the promotion of educational fairness, the development of information technology in colleges and universities needs to be paid close attention to urgently. How to improve and train the leadership of informatization teaching in colleges and universities needs to be explored and considered urgently. At present, the influencing factors and improvement paths of college teachers' informationized teaching leadership are not clear. Therefore, this study attempts to analyse the interaction between information technology and teaching leadership from the perspective of technology acceptance model, explore the influencing factors and improvement paths of college teachers 'information-based teaching leadership, with a view to the development of China 's college teachers' information-based teaching leadership And to provide value reference for the promotion of university education informatization [1].

2. Establishment of the Theoretical Model

Structural equation modelling is a multivariate statistical technique, which is the most rapidly developing branch of applied statistics, integrating factor analysis in multivariate statistics, path analysis in biology, and multiple simultaneous equations in econometrics. The complete structural equation model consists of two parts: the measurement equation and the structural equation. The measurement equation reflects the relationship between the observed variables and the latent variables [2]. The expression of the measurement equation is:

$$\begin{aligned} X &= \Lambda_x \xi + \delta \\ Y &= \Lambda_y \eta + \varepsilon \end{aligned} \quad (1)$$

Among them, X is an exogenous observation variable, which is composed of questions related to the factors affecting teaching satisfaction in the appendix questionnaire; Y is an endogenous observation variable, which is composed of specific questions of satisfaction and participation in the appendix questionnaire; ξ is an exogenous latent variable, which is composed of Factor composition obtained by factor analysis of exogenous observed variables; η is endogenous latent variable, which is obtained by factor analysis of endogenous observed variables; E and F are coefficient matrix of equations, δ and ε are error terms. The interaction relationship between exogenous latent variables and endogenous latent variables, and between endogenous latent variables, is expressed by structural equations:

$$\eta = B \eta + \Gamma \xi + \zeta \quad (2)$$

Where B is the matrix representing the relationship between endogenous variables, Γ is the matrix of the influence of exogenous latent variables on endogenous latent variables, and ζ is the residual term of the model. Use X to represent the questionnaire of influencing factors of teaching satisfaction, indicating external observation variables; ξ_1 indicates teaching attitude, ξ_2 indicates teaching skills, ξ_3 indicates teaching content, ξ_4 indicates teaching methods, indicating external factors latent variables; λ_{ik}^x is the I-observation variable Factor load on the k external causal latent variable; F represents the measurement error and constructs the measurement equation:

$$X_i = \lambda_{ik}^x \xi_k + e_i \quad (3)$$

Structural equation

$$\eta = B \eta + \Gamma \xi + \zeta \quad (4)$$

3. Brief Description of the Concept

3.1 Informatization Leadership and Service Innovation

Informatization leadership is one of the new leadership theories that have emerged in recent years. It refers to the ability of an enterprise's senior management team (TMT) to lead enterprises to correctly deploy and integrate modern information technology to lead enterprises to better meet the challenges of informatization. Enterprises gain a competitive advantage. The leadership team of the Chinese Academy of Sciences has constructed an informational leadership paradigm, pointing out that it has five characteristics: knowledge leadership, network leadership, virtual leadership, global leadership, and diversified leadership.

This study condenses the four dimensions of informatization leadership. (1) Information literacy and informatization awareness: the corporate senior management team's cognition and attitude towards information technology; (2) informatization strategic decision-making power: the

enterprise's senior management team generally grasps the enterprise informatization direction and makes key decisions Ability; (3) Information organization coordination ability: The enterprise's senior management team organizes and coordinates relevant personnel and departments to promote the informationization process to realize internal and external collaboration; (4) Informationization resource guarantee: the enterprise's senior management team is the information The ability to provide resources such as funds, personnel, and time is smoothly carried out in the chemical work [3].

3.2 Technical Acceptance

Technology acceptance involves multiple dimensions such as whether technology can be accepted, in what way, and in what link. Literature review found that the academic community generally regards the technology acceptance model (referred to as TAM, as shown in Figure 1) as a theoretical model for rationally explaining the technology acceptance process, which explains the individual determined by the behavioural purpose of the individual when performing a specific task Special behaviours can be used to explain the reasons why users accept or reject information technology, and also propose how to develop this kind of acceptability, as well as predict and explain such acceptance. The model has two basic variables: perceived usefulness and perceived ease of use [4].

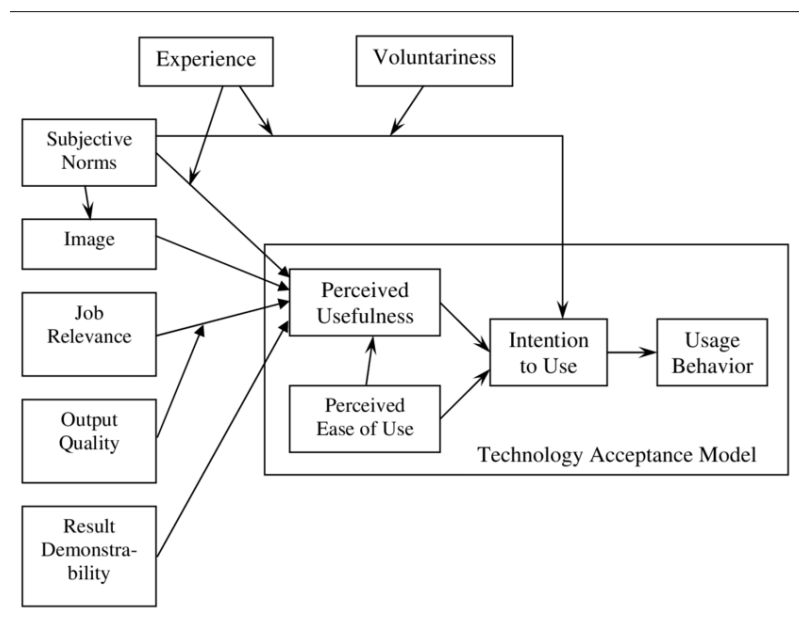


Figure 1. Technology acceptance model

3.3 Teachers' Information Teaching Leadership

According to statistics, although many primary and secondary schools have achieved certain results in the construction of education informatization infrastructure, the benefits of school informatization have been questioned. The reason is that the school is still lacking in personnel informatization. Many education scholars and experts pointed out that teacher informatization leadership has become the key to effectively solve the problems of school informatization development. On the one hand, teacher informatization leadership can be seen as an ability to promote the effective use of technology in all aspects of the school. Teacher teaching leadership can be regarded as a kind of leadership ability that can influence the teaching of the curriculum, including defining the school mission, managing the curriculum and teaching, and creating an active school atmosphere. This kind of influence involves not only direct influence, but also indirect influence (it is generally related to many elements such as school teaching goals and vision, organizational collaboration, etc. that guarantee the implementation of curriculum teaching). Based on the literature review of teaching leadership, we can find that teaching leadership is mainly

reflected in clear vision and goals, teaching collaboration and communication, teaching monitoring and supervision, promoting professional learning of teachers, caring for the needs of teachers and students, encouraging the development of teachers and students, and creating a teaching environment. And other specific functions [5].

4. Analysis of Influencing Factors

4.1 Model Assumptions

What is the relationship between the informatization leadership of college teachers and the effectiveness of informatization? In order to investigate this issue in depth, we first list the basic assumptions of this research from the perspective of practical possibility analysis: (1) Teacher's information technology ability (itc) has a direct positive effect on its information planning ability (ipc) (H1); (2) Teacher's information technology planning ability (ipc) its information management ability (imc) Has a direct positive effect (H2); (3) Teacher's information planning ability (ipc) has a direct positive effect on its information evaluation ability (iac) (H3); (4) Teacher's information Evaluation ability (iac) has a direct positive effect on its information management ability (imc) (H4); (5) Teachers' information management ability (imc) has a direct positive effect on school informationization effectiveness (ise) Effect (H5); (6) School informatization effectiveness (ise) has a direct positive effect on teachers' information planning ability (ipc) (H6).

4.2 Research Hypothesis Verification

Before conducting structural equation model analysis, the reliability and validity of the formal questionnaire need to be checked. This study used SPSS19.0 to analyse the reliability and validity of the formal questionnaire. In general, the Cranbach 's a coefficient in general exploratory studies is above 0.6, which is considered to be highly reliable. The closer the KMO value is to 1, the more suitable for factor analysis. The significance probability of the χ^2 statistical value of the Bartlett sphere test) P value <0.05 , the questionnaire has structural validity. Based on SPSS19.0, the reliability and validity of the questionnaire were tested, and the reliability and validity of the questionnaire were higher. The theoretical research model represented by the logical relationship between the research hypotheses belongs to the hypothesis model of this research and needs to be further verified and revised [6].

This study attempts to analyse and verify the research hypothesis using structural equation model analysis. Generally speaking, $CFI > 0.90$, $TLI > 0.90$, RMSEA (approximate root means square error) < 0.08 , the model reaches the fitting standard. After a preliminary test, it is assumed that the fit of the model is poor, and hypothesis H4 (perceived usefulness has a direct positive effect on leadership behaviour intention) is not true. According to the basic fitting standard of factor load (that is, the factor load must be between 0.5 -0.95), combined with the teacher's leadership practice, this study made relevant corrections: First, due to PU2, PEU2, PEU3, BI3, ITL2, ITL5, The factor load of ITL6 is less than 0.5. In this study, PU2, PEU2, PEU3, BI3, ITL2, ITL5, and ITL6 are removed from the measurement model. The second is to use the MI correction index to adjust the model to increase the usefulness of perception. The path of force. After model correction, the structural equation model test results of the model (as shown in Tables 1 and 2) meet the fitting criteria of SEM. After that, this study lists the structural equation model diagrams marked with path coefficients, that is, the structural equation model diagrams of college teachers' information-based teaching leadership and its influencing factors (as shown in Figure 2).

Table 1. Reliability and aggregation validity test

Second-order latent variable	First-order latent variable	Number of measurements	Cronbach α	CR	AVE
Information Leadership (EL)	Information Literacy and Information Awareness (Awa)	3	0.850	0.838	0.638
	Information strategic decision-making power (Str)	3	0.922	0.880	0.710
	Information organization coordination (Coo)	3	0.865	0.829	0.618
	Information Resource Guarantee (Res)	3	0.906	0.871	0.692
Information Technology Support Service Strategy (ITS)	Information technology supports customer-oriented service strategy (Cuss)	3	0.903	0.833	0.625
	Information Technology Support Technology Oriented Service Strategy (Tec)	3	0.902	0.838	0.633
	Information technology supports competition-oriented service strategy (Com)	3	0.885	0.783	0.547
	Information technology supports future-oriented service strategy (Ent)	3	0.906	0.822	0.606
Information Technology Support Service Process (ITP)		3	0.906	0.917	0.648
Service Innovation (SI)		3	0.943	0.909	0.628

Table 2. Discriminant validity test

variable	Awa	Str	Str	Res	Cuss	Tec	Com	Ent	ITP	SI
Awa	0.799									
Str	0.552	0.843								
Str	0.357	0.486	0.786							
Res	0.185	0.292	0.405	0.832						
Cuss	0.259	0.304	0.270	0.238	0.791					
Tec	0.276	0.123	0.120	0.257	0.558	0.796				
Com	0.188	0.429	0.340	0.370	0.361	0.514	0.740			
Ent	0.327	0.332	0.349	0.162	0.443	0.314	0.583	0.778		
ITP	0.289	0.245	0.296	0.309	0.572	0.482	0.494	0.501	0.805	
SI	0.372	0.418	0.266	0.362	0.524	0.520	0.523	0.453	0.585	0.792

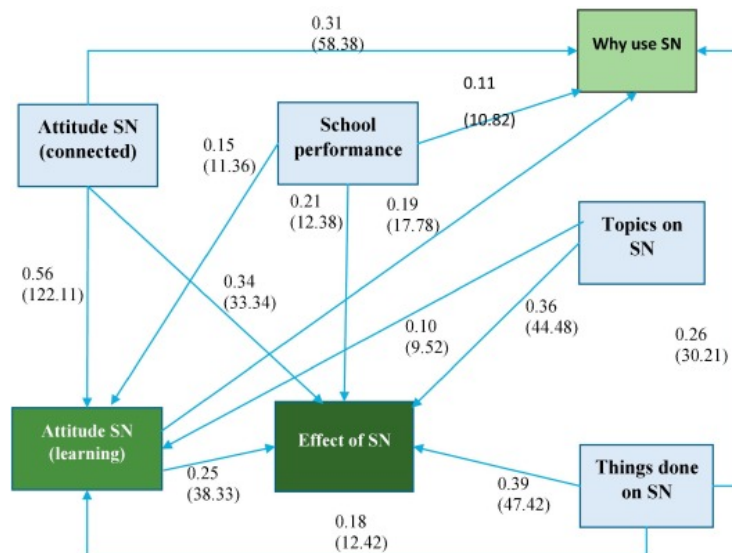


Figure 2. Structural equation model diagram of teachers' information teaching leadership and its influencing factors

5. Conclusion

According to the analysis results of the structural equation model in this study, the information technology ability of college teachers can directly promote the development of its informatization planning ability, thus its informatization planning ability, informatization evaluation ability, informatization management ability and school Informatization efficiency has an indirect promotion effect, which to a certain extent shows that: scientifically improving the information technology capabilities of college teachers will have an impact on the development of college teachers informatization planning ability, informatization evaluation ability, informatization management ability and school informatization effectiveness Have a basic impact effect. Therefore, scientifically improving the information technology capabilities of college teachers has a basic guiding role for the development of college teachers' informationization leadership and the improvement of school informationization efficiency.

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