A Survey and Empirical Study on the Current Status of Middle School Students' Information Society Responsibility Literacy

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Abstract: Information social responsibility is one of the four core literacies proposed in the Compulsory Education Information Technology Curriculum Standards. Middle school is the key period for adolescents to develop information social responsibility literacy. This study firstly tests and analyzes the current status of junior high school students' information social responsibility literacy, and secondly, based on the self-determination theory, it proposes six influencing factors from both personal and external environment aspects, and adopts the structural equation modeling to derive the relationship between the influencing factors, and puts forward the suggestions for improving junior high school students' information social responsibility literacy.

Keywords: information technology; information social responsibility; structural equation modeling; influencing factors

1.Introduction

In 2022,the Compulsory Education IT Curriculum Standards(2022 Edition) pointed out the need to cultivate students' four core literacies:information awareness, computational thinking, digital learning and innovation, and information social responsibility[1].The four core literacies promote each other and work together to promote the development of students' core literacy in IT subjects.And information social responsibility is an important guarantee for the development of the other three elements[2].The development of information social responsibility literacy is not only a requirement of the curriculum,but also an enhancement of one's own literacy.Nowadays,we are in the era of rapid development of information technology,the amount of information on the network is large and complex, junior high school students are facing problems such as network fraud,online game addiction,personal information leakage,etc. junior high school students are in the formation of the world outlook of the important period of time, there is no correct guidance,which will lead to a lack of understanding of junior high school students on information social responsibility literacy.So it is of great significance to correctly cultivate junior high school students' good information social responsibility literacy.In terms of academics,there are relatively few studies that specifically focus on the influencing factors of junior high school students' information social responsibility literacy.As a result, this study firstly produced a questionnaire for testing information social responsibility literacy,which was used to test the current status of junior

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high school students' information social responsibility literacy.Secondly,combined with the self-determination theory,six influencing factors were proposed from both personal and external environment aspects,and a questionnaire on the influencing factors of information social responsibility literacy was produced, which was empirically analyzed using structural equation modeling, discussing the relationship between the influencing factors, and proposing suggestions to enhance the information social responsibility literacy of junior high school students.

2.Materials and Methods

2.1 Theoretical foundations

2.1.1 Information Society Responsibility

Ribble believes that in order to be responsible for the information society, one must first become a digital citizen [3].Mike Ribble & Gerald Bailey have proposed nine basic requirements for digital citizenship education, in which aspects such as digital law, digital rights and responsibilities, digital health, and digital security are all constituent elements of responsible education for the information society[4].The new standard defines the specific performance of information social responsibility as: having a certain degree of information security awareness and ability; being able to comply with information laws and regulations; and having good information morals and ethics.[1] The new standard defines the specific performance of information social responsibility as: having certain information security awareness and ability; being able to comply with information laws and regulations; and having good information morality and ethics. Scholar Zhang Shilan studied the teaching strategies and methods for the cultivation of information social responsibility in high school students from the aspects of information security awareness and ability, information laws and regulations, and information morality and ethics.[2] The study is based on the curriculum standard of the information society. Therefore, according to the definition of information social responsibility in the curriculum standard and the literature related to information social responsibility, this study divides it into three dimensions, namely, information security awareness and ability (ISA), information laws and regulations (ILR), and information ethics and morality (IE), and creates a questionnaire for testing the literacy of information social responsibility based on these three dimensions.

2.1.2 Self-determination theory

Self-Determination Theory(SDT) is a theory of motivation developed by American psychologists Edward L. Deci and Ryan[5]et al. in the 1980s as a theory of motivation. The theory explains the nature of human autonomous behavior from the perspective of motivation and uses empirical methods to examine the influence of the external environment on individual autonomous behavior .

In students' learning, learning motivation as an important internal factor, how to stimulate students' learning motivation is more necessary from the students themselves. In this study, according to the self-determination theory, removing no motivation, the personal motivation of

junior high school students towards responsible literacy in the information society is categorized into external motivation and internal motivation.

2.2 Research questionnaire and hypothesis

The questionnaire of this study adopts a five-level Likert scale, which is divided into a total of three parts, the first part is the basic situation of students, with two questions, investigating the students' grade and gender; the second part is the survey of the current status of the information society responsibility literacy, according to the three dimensions mentioned earlier, the questionnaire of the test part is prepared by referring to the relevant scale, and there are a total of 16 questions in this part; the third part is the survey of the influences on the information society responsibility literacy The third part is the survey of influencing factors of Information Society Responsibility Literacy, which summarizes six influencing factors, namely, Teacher Teaching (TT), School Support(SS), Family Atmosphere(FA), Teacher-Student Quality (TSQ), Internal Motivation (IM), and External Motivation (EM), based on the Self-Determination Theory, from the aspects of individual and external environment, and there are a total of 30 questions in this part.

Based on the above to construct the model of factors influencing the information society responsibility literacy of junior high school students, as shown in Figure 1.The hypotheses for this are formulated as follows:

H1: Teacher teaching contributes to students' internal motivation to develop responsible literacy in the information society;H2: Teachers' teaching has a direct impact on developing students' information society responsibility literacy;H3: School support contributes to students' internal motivation to develop responsible information society literacy;H4: School support has a direct impact on developing students' information society responsibility literacy;H5: Family climate contributes to students' external motivation to develop responsible information society literacy;H6: Family atmosphere has a direct impact on developing students' information society responsibility literacy;H7: Teacher and student literacy has a positive effect on students' external motivation to develop responsible information society literacy;H8: Teacher and student literacy has a direct impact on developing students' information society responsibility literacy;H9: Internal motivation has a direct impact on students' development of responsible information society literacy;H10: External motivation has a direct impact on students' development of responsible information society literacy;H11: External motivation has a direct impact on students' internal motivation to develop responsible literacy in the information society.

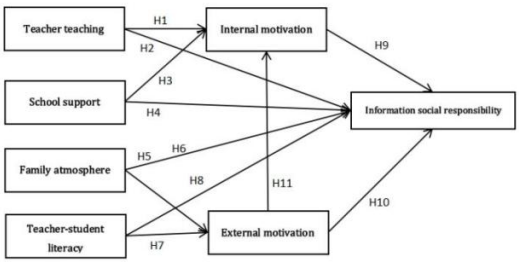

Figure. 1 Model diagram of factors influencing information social responsibility literacy of junior high school students

3. Results & Discussion

3.1 Data analysis

In this study, the formal questionnaire was sent to middle school students from three middle schools in Chongqing, and the online questionnaire was adopted to conduct the survey, with a total of 452 questionnaires distributed. After removing invalid data, 431 valid questionnaires were obtained, with an effective rate of 95%.

3.1.1 Reliability analysis

Cronbach's coefficient criterion was used in this study and when Cronbach's coefficient is greater than 0.7, it indicates that the reliability of the questionnaire is good.

The Cronbach's coefficient for the status test questionnaire was 0.928; and the Cronbach's coefficient for the influencing factors questionnaire was 0.956. This indicates that the two parts of the questionnaire have good reliability, and both of them satisfy the questionnaire reliability test.

3.1.2 Validity analysis

This study used factor analysis to test the construct validity of the questionnaire. In this study, exploratory factor analysis was first used to test the structural validity of the questionnaire, and then validated factor analysis was used to test the convergent and discriminant validity of the questionnaire. Before doing factor analysis, KMO and Bartlete tests need to be performed on the data first as a way of examining whether the research sample is suitable for factor analysis. It requires a KMO value of 0.6, preferably above 0.8, and a p-value below 0.05 in the Bartlete test.

The KMO value of the test questionnaire is 0.944, which is greater than 0.7, and the approximate chi-square value is 3904.123, which corresponds to the significance of the p-value of 0. The KMO value of the influencing factors questionnaire is 0.963, which is greater than 0.7, and the approximate chi-square value is 7390.195, which corresponds to the significance of the p-value of 0, which indicates that both parts of the questionnaire are suitable for factor analysis. Secondly, using the principal component method, exploratory factor analysis was conducted on all the items in the two-part questionnaire, and the items could converge well on each variable, indicating that the structural validity test of the questionnaire was qualified.In addition, statistically, it is believed that a sample with good convergent validity should satisfy standardized factor loadings of 0.5 and above, combined reliability greater than 0.7 and square root of AVE and AVE greater than 0.5. In this study, the standardized factor loading coefficients of each question item are above 0.6, the AVE values of the mean variance extract of each variable are above 0.5, and the CR values of the combined reliability are above 0.7, which indicates that the convergent validity of both questionnaires is qualified. And the square root of the AVE value of each variable is greater than the correlation coefficient between other variables, so the discriminant validity tests are also qualified.

According to the results of the above data analysis, the overall validity of the questionnaire in this study is good.

3.2 Structural Equation Modeling Analysis

3.2.1 Model construction

In order to investigate the relationship between the factors affecting junior high school students' information society responsibility literacy, the structural equation model was constructed as shown in Fig.2 by using AMOS 26 software and the great likelihood estimation method.

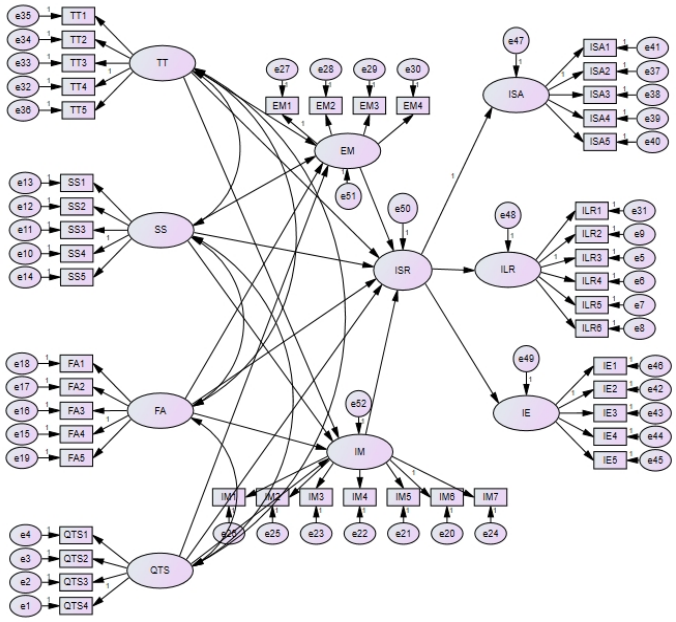

Figure. 2 Structural Equation Modeling of Factors Influencing Responsible Literacy in the Information Society

3.2.2 Model fit test

After the structural equation model is established, it is necessary to test whether the model and data are suitable, and the overall model fitness test is needed for the structural model. The judgment criteria of overall model fit test are mainly based on the model fitting indexes, which are: cardinality degree of freedom ratio (CMIN/DF), comparative fit index (CFI), norm fit index (NFI), and root mean square of approximation error (RMSEA).

As can be seen from Table 1, the chi-square degrees of freedom ratio of the model in this study is less than 3, the RMSEA value is less than 0.08, the RMR is less than 0.05, and the values of the rest of the indicators are all greater than 0.9, and all of these fitting indicators have met the requirements of the model fit, which indicates that the data can be fitted to the model better.

Table1 Results of the model fit test

	fitness index	standard of judgment	measured value
Absolute Fit Indicator	RMR	Closer to 0 indicates a better model fit, usually using RMR < 0.05	0.037
	RMSEA	Closer to 0 indicates a better model fit, the RMSEA < 0.1 is usually used	0.019
Value-added fitting indicators	NFI	Between 0 and 1, closer to 1 means better model fit	0.912
	IFI		0.988
	TLI		0.987
	RFI		0.905
Composite fit indicator	CMIN/DF	Between 1 and 3 indicates a good model fit	1.147

4.Conclusions

4.1. Status of the Information Society Responsibility Literacy Survey

The basic information in the survey and test data of this study are grade level and gender, as shown in Table 2. According to the statistics, it can be seen that in terms of gender, more than fifty percent of the male students participated in the survey, which is more than the female students, and in terms of grade level, the ninth grade is the majority.

Table2 basic information of the tested middle school students

Title	Options	Frequency	Percentage (%)
Grade	Seventh grade	117	27.15
	Eighth grade	151	35.03
	Ninth grade	163	37.82
Sex	Male	237	54.99
	Female	194	45.01

According to the results of the survey on the current status of junior high school students' information social responsibility literacy, 78.2% of junior high school students clicked on unknown links and photos in the "Information Security Awareness and Competence" question. In the question of "Information Laws and Regulations", 79.1% of junior high school students still choose to download and use pirated software even though they know it is pirated. In the question of "information morality and ethics", 72.6% of students still choose to post uncivilized language. The above data show that most junior high school students have a certain degree of information social responsibility literacy, but many of them do not know how to deal with the situation when they feel it is wrong, or they knowingly violate the law, which is a sign of the lack of information social responsibility literacy.

4.2 Analysis of model results

As can be seen from Table 3, the p-values corresponding to the standardized path coefficients in the structural equation model are all less than 0.05, and the absolute values of the critical ratios (C.R.) are all greater than 1.96, which indicates that the effects between the paths of the variables are all significant, i.e., all the path hypotheses are valid.

Structural equation modeling analysis showed that the standardized path coefficients between the variables and information society responsibility literacy were, from largest to smallest, teacher and student literacy(0.256), internal motivation(0.187), external motivation(0.168), teacher teaching(0.151), family atmosphere (0.15), and school support (0.149). Teacher and student literacy is the factor that most directly affects information social responsibility literacy, i.e., the higher the information social responsibility literacy of teachers and students around them is the more useful it is for students' own literacy improvement. Secondly, internal and external motivation are more influential, indicating that students' information society responsibility literacy is influenced by personal motivation, which can be cultivated by stimulating students' motivation. The standardized path coefficients of teacher teaching, family atmosphere and school support do not differ much, indicating that these three factors have basically the same influence on information society responsibility literacy.

The standardized path coefficients from largest to smallest from the paths of the variables to external motivation were teacher teaching(0.288), school suppor(0.267), family climate(0.235), and teacher and student literacy(0.173).It can be seen that teacher teaching has the greatest impact on external motivation, i.e., teachers can effectively mobilize students' external motivation through teaching, thus promoting students' information society responsibility literacy. In the path with internal motivation, the standardized path coefficients from largest to smallest are family atmosphere(0.266), teacher teaching(0.248), school support(0.243), and teacher-student literacy(0.166), which indicates that family atmosphere has the greatest influence on internal motivation, i.e., the moral literacy of the parents as well as the family environment and so on have the most significant influence on students' internal motivation.

Table 3 Table of results of research hypothesis testing

trails	Standardized path factor	C.R.	P	conclude
External Motivation <-- Teachers Teaching	0.288	4.55	***	set up
External motivation <- school support	0.267	4.114	***	set up
External motivation <-- family atmosphere	0.235	3.576	***	set up
External Motivation <-- Teacher and Student Literacy	0.173	2.207	0.027	set up
Internal Motivation <-- Teachers Teaching	0.248	3.955	***	set up
Internal motivation <- school support	0.243	3.758	***	set up
Internal motivation <-- family atmosphere	0.266	4.016	***	set up
Internal Motivation <-- Teacher and Student Literacy	0.166	2.133	0.033	set up
Responsible Literacy for the Information Society <-- Internal Motivation	0.187	2.978	0.003	set up
Responsible Literacy in the Information Society <--External Motivation	0.168	2.263	0.024	set up
Responsible Literacy in the Information Society<--Teaching for Teachers	0.151	2.344	0.019	set up
Responsible Literacy in the Information Society <--School Support	0.149	2.312	0.021	set up
Responsible Literacy in the Information Society <--Family Climate	0.15	2.272	0.023	set up
Responsible Literacy in the Information Society <-- Teacher and Student Literacy	0.256	3.351	***	set up

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