

## **A STUDY ON THE IMPACT OF TEACHERS' INFORMATION LITERACY ON TEACHER EFFICACY IN SHANDONG YINGCAI UNIVERSITY, CHINA**

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**Abstract:** This study aimed to study the current levels of information literacy and Teacher efficacy among teachers at Shandong Yingcai University, and to explore the impact of teachers' information literacy on Teacher efficacy. The quantitative study was conducted through questionnaire surveys. Descriptive statistics, independent samples t-test, one-way analysis of variance, correlation analysis, and regression analysis were applied for analyzing the data from 291 valid questionnaires. The results showed that: 1) teachers' information literacy and Teacher efficacy were both at a high level 2) there were significant differences in information literacy among teachers with different educational qualifications and professional titles, but there are no significant differences among teachers of different genders, ages, years of teaching experience and departments 3) there were significant differences in Teacher efficacy among teachers of different genders and educational backgrounds, but there are no significant differences in Teacher efficacy among teachers of different ages, years of teaching experience, titles, and departments. 4) The information literacy of teachers at Shandong Yingcai University was significantly positively correlated with Teacher efficacy, and the information literacy of teachers had a significant positive impact on Teacher efficacy. Finally, based on the above results, it suggested that it should systematically carry out the teacher information literacy improvement project, build a precise Teacher efficacy improvement support system, and improve the sustainable development guarantee mechanism.

**Keywords:** Information literacy, Teacher efficacy, Shandong Yingcai University

### **Introduction**

In the context of the digital economy wave sweeping the world and the digital transformation of education becoming a national strategy, information literacy has become a key indicator for measuring an individual's comprehensive ability and adaptability to social development. Education, as a frontier of

social development, is also deeply influenced by the information technology revolution. Emerging technologies such as artificial intelligence, big data, and the metaverse are deeply integrated into the education scenario, and teachers' information literacy has become a core issue in the process of educational modernization (Wei Haiying, 2024).

As a major educational province, Shandong has been promoting the development of educational informatization in recent years and incorporating teachers' information literacy into the key points of regional educational modernization. Jinan, the provincial capital, has a significant aggregation effect of colleges and universities, but there is still a gap between the digital teaching ability of teachers and the demand for educational innovation. There is also a significant imbalance in the development of information literacy among teachers at present.

In this context, conducting in-depth research on the impact of information literacy of teachers at Shandong Yingcai University on Teacher efficacy will not only help enrich and improve theoretical research in the field of Teacher efficacy and teaching quality improvement of university teachers, but also provide empirical evidence for optimizing the teacher training system and improving the digital education support mechanism.

## **Research Objectives**

(1) To understand the current levels of information literacy among teachers at Shandong Yingcai University in Jinan City, Shandong Province.

(2) To understand the current levels of Teacher efficacy of teachers at Shandong Yingcai University, Jinan City, Shandong Province.

(3) To analyze the differences in teachers' information literacy under different background variables.

(4) To analyze the differences in Teacher efficacy of teachers under different background variables.

(5) To determine the relationship of the impact of teachers' information literacy on Teacher efficacy at Shandong Yingcai University in Jinan City, Shandong Province.

## **Literature Review**

### ***Theory of Information Literacy***

Information literacy theory focuses on an individual's ability to acquire, evaluate, utilize and create information. From the perspective of teachers, this theory is of great significance. The "Information Search Process Model" proposed by Kuhlthau (2004) reveals the emotional, cognitive and behavioral changes of users during the information search process. Based on this model, teachers can guide students to overcome the confusion and obstacles in the information search process and improve the efficiency of information acquisition. In educational practice, teachers' information literacy directly

affects the quality of teaching and the effectiveness of student development. The TPACK framework, proposed by Mishra and Koehler (2006), emphasizes the ability of teachers to integrate technology, pedagogy, and subject knowledge, which requires teachers not only to master information tools but also to be able to effectively integrate them into teaching and design innovative teaching activities.

### ***The Connotation of Teacher Information Literacy***

Teacher self-efficacy was the teacher's subjective judgment and belief about whether they could effectively complete teaching tasks and promote students' learning and development. Lazarides and Warner(2020) defined teacher self-efficacy from a macro perspective in the field of education, emphasizing that its core was the belief system of teachers in their own teaching ability, specifically covering three dimensions: classroom management, subject teaching, and student motivation.

Information retrieval literacy refers to the comprehensive ability to efficiently obtain, screen, evaluate and utilize information from a complex information environment, including identifying retrieval needs, choosing appropriate tools, using retrieval strategies to precisely locate information, and being able to judge the authenticity, relevance and value of information. Ultimately, the ability to apply effective information to problem-solving, learning and research, or decision-making practice (Wang Anqi and Tang Jinshu, 2022).

Information evaluation literacy refers to the ability to judge the authenticity, accuracy, relevance, timeliness, etc. of information. Gunduzalp (2021) believed that information evaluation literacy is also an important predictor of digital literacy skills in the 21st century. At the basic level, the information literacy of college teachers includes the ability to use some common office software and various technical application means on teaching platforms (Huang, 2024).

### ***Measurement of Information Literacy among College Teachers***

The information literacy of college teachers is influenced by multiple factors, which is one of the contents that must be considered in the measurement research. Wu et al. (2022) found a connection between external factors such as teachers themselves and schools and the cultivation of students' information literacy ability. Scientific measurement methods are an important way to conduct research on the information literacy of college teachers. Chen (2023) starts with the TPACK framework to study the improvement of EAP teachers' information literacy and provides a theoretical framework for related measurements.

### ***The Connotation of Teacher efficacy***

Teacher classroom management refers to the act of planning, guiding, and controlling people, events, things, and time in the classroom in order to create a good learning atmosphere and ensure students' participation and academic development, as well as their overall practice. Oliver et al. (2011) argued that classroom management by teachers encompasses both behaviors or interventions used for prevention and interventions used for intervention.

Teacher teaching strategy refers to a combination of specific, planned, and purposeful teaching

methods, skills, and procedures selected and adopted by the teacher for the purpose of achieving teaching objectives and optimizing teaching effects in a particular teaching situation (Hast, 2007; Van et al., 2018).

Student engagement refers to the extent to which students engage physically and mentally in the educational process and interact with the learning environment. Its three aspects mainly include cognitive engagement, emotional engagement, and behavioral engagement (Trowler, 2010; Groccia, 2018).

### ***Measurement of Teacher efficacy of College Teachers***

Teacher efficacy of university teachers, as a key indicator of how teachers achieve educational goals and promote student development in teaching practice, has always been an important topic in educational research. Singerin (2021) argues that the teaching level and teaching performance of teachers are facilitated by academic supervision, and that teacher effectiveness plays a moderating role in promoting such interaction among teachers, and therefore it is necessary to measure Teacher efficacy. In domestic, the measurement of teaching efficacy in colleges and universities is one of the major topics in the field of educational research at present. Teaching efficacy, as an important factor affecting Teacher efficacy, is a core point related to students' academic performance and teachers' career development (Li Hong et al., 2000).

### ***The Relationship between Information Literacy and Teacher efficacy***

Teachers' digital literacy affects Teacher efficacy. The improvement of digital literacy can increase the possibility of Teacher efficacy. Feng and Jih-Lian (2016) pointed out from the perspective of information literacy that school effectiveness is greatly influenced by teachers' information literacy, and at the same time, school effectiveness directly affects Teacher efficacy, indicating that teachers' information literacy can enhance Teacher efficacy in many ways. The willingness to use information technology teaching methods is driven by information literacy to affect Teacher efficacy, and teachers' willingness to use information technology teaching methods is an important factor in this process. Zhang and Li (2019) found based on a questionnaire survey of accounting teachers in colleges and universities that teachers' information literacy status has a significant impact on their willingness to use information technology teaching methods.

With the continuous integration of digitalization and education, Shandong Province has gradually begun to pay attention to the issue of teachers' information literacy. A large number of academic studies have shown that the higher the information literacy of teachers, the more they can activate the interactivity in the classroom and to some extent enhance Teacher efficacy (Zhang Zhi, 2017). Wang et al. (2024) pointed out that information literacy is an auxiliary condition for Teacher efficacy, information search and evaluation literacy constitutes the cornerstone of Teacher efficacy, and the primary prerequisite for enhancing the ability to teach and educate is the information search and evaluation ability of teachers, which is a fundamental factor for Teacher efficacy in the information age.

Focusing on the existing research in Shandong Province, most studies only consider descriptive statistical analysis of teachers' information literacy, less in-depth analysis of the relationship between information literacy and Teacher efficacy, and the existing research lacks dynamic analysis based on teaching practice, making it difficult to systematically expound the causal relationship between information literacy and Teacher efficacy.

## **Methodology**

This study takes teachers from Shandong Yingcai University as the research subjects and mainly investigates the impact of teachers' information literacy on Teacher efficacy. Shandong Y College, 6 colleges, a total of 1,200 full-time teachers in service. According to the sample size requirements of Krejcie and Morgan (1970), a stratified sampling method was used to invite 291 teachers to participate in this questionnaire survey.

This study is based on the Teacher Information Literacy Scale revised by Peciuliauskiene et al. (2022) and the Teacher efficacy Questionnaire developed by Tschannen-Moran & Hoy (2001). The questionnaire was divided into three parts. The first part was information on demographic background variables of teachers, the second part is the teacher information literacy questionnaire, the third part is the Teacher efficacy Questionnaire.

Questionnaires for this study were distributed and collected through online channels. With the assistance of the leaders of Shandong Yingcai University, the researchers distributed the Questionnaire on teachers' information Literacy and Teacher efficacy to the target group. Participants were required to answer the questionnaire online based on their own circumstances. The questionnaire was automatically collected and stored in the background by the online system after submission. The researchers used Excel software to initially organize the collected questionnaire data and further used SPSS statistical analysis software for reliability tests, validity tests, and analysis of differences and correlations to ensure the scientific and reliable nature of the research results.

## **Results**

### ***Basic Information of the Respondents***

The questionnaire used in this study was named Teacher Information Literacy and Teacher efficacy Questionnaire. The questionnaire was divided into three parts: personal basic information of teachers, teacher information literacy questionnaire, and teacher efficacy questionnaire. A total of 291 valid sample data were collected for data analysis.

There are a total of 55 male teachers, accounting for 18.9%, while there are 236 female teachers, accounting for 81.1%. The number of male teachers is far less than that of female teachers. In terms of age composition, there were 183 young teachers aged 25 and under, accounting for 62.9%; There are 61 teachers aged 26 to 35, accounting for 21.0; There are 37 middle-aged teachers aged 36 to

45, accounting for 12.7 percent; The group of senior teachers aged 46 and above consists of 10, or 3.4%. In terms of the distribution of teaching experience, 195 new teachers have three years or less of teaching experience, accounting for 67.0; There are 42 teachers with 4 to 10 years of teaching experience, accounting for 14.4%; There are 33 teachers with 11-15 years of teaching experience, accounting for 11.3%; There are 12 teachers with 16-20 years of teaching experience, or 4.1%; Nine teachers, or 3.1%, have 21 years or more of rich teaching experience. As for educational attainment, there are 2 teachers with an associate degree, or 0.7%; There are 193 teachers with a bachelor's degree, or 66.3%; There are 79 teachers with master's degrees, or 27.1%, and 17 teachers with doctoral degrees, or 5.8%. In terms of title, there were 196 teachers with the title of teaching assistant, accounting for 67.4%; There are 59 teachers with intermediate titles, accounting for 20.3%; There are 14 teachers with the title of associate professor, accounting for 4.8%; There are 22 professors, or 7.6 percent. Regarding the college where the teachers are located, the college of Engineering has the largest number of teachers, with 85, accounting for 29.2%; There are 49 teachers in the business school, or 16.8 percent; There are 44 teachers in the School of Early Childhood Education, or 15.1 percent; There are 41 teachers in the medical school, accounting for 14.1%; The number of teachers in the School of Music and Dance and the School of Design is 36 each, accounting for 12.4%.

### ***Current Levels of Teachers' Information Literacy***

According to research Question 1: What is the current levels of information literacy among teachers at Shandong Yingcai University in Jinan, Shandong Province? The study used descriptive statistics such as mean and standard deviation to analyze the current levels of information literacy among teachers at Shandong Yingcai University in Jinan, Shandong Province. According to the analysis results in Table 1, the overall average of teachers' information literacy is 4.49, indicating that teachers' information literacy is at a high level. The average of each dimension is within the range of 4.1 to 4.5, all of which are at a high level. Among them, the average score of teachers' information retrieval literacy was 4.48, which was the highest, indicating the highest level of teachers' information retrieval literacy. The average score of teachers' information evaluation literacy was 4.13, the lowest score, indicating a relatively low level of teachers' information evaluation literacy.

**Table 1:** Status of teachers' Information Literacy

Variables	N	M	SD	Analysis
Self-efficacy	291	4.47	0.739	high
Information retrieval literacy	291	4.48	0.736	high
Information evaluation literacy	291	4.13	1.029	high
Teachers' information literacy	291	4.49	0.713	high

### ***Current Levels of Teacher efficacy of Teachers***

According to research Question 2: What is the current levels of Teacher efficacy of teachers at Shandong Yingcai University in Jinan, Shandong Province? The study used descriptive statistics such as mean and standard deviation to analyze the current levels of Teacher efficacy of teachers at Shandong Yingcai University in Jinan, Shandong Province. According to the analysis results in Table 2, the overall average of teachers' Teacher efficacy is 4.11, indicating that teachers' Teacher efficacy is at a high level. The average of each dimension is within the range of 4.0 to 4.7, all of which are at a high level. Among them, the teacher's student engagement effectiveness score is 4.70, which is the highest, indicating that the teacher has the highest level of student engagement effectiveness. The teacher's teaching strategy effectiveness score was the lowest at 4.09, indicating a lower level of teaching strategy effectiveness.

**Table 2:** Status of Teacher efficacy of Teachers

Variables	N	M	SD	Analysis
Teaching strategy effectiveness	291	4.09	1.081	high
Classroom management effectiveness	291	4.10	1.055	high
Student engagement effectiveness	291	4.70	0.741	high
Teacher efficacy	291	4.11	1.037	high

### ***Statistical analysis of quantitative Questionnaire Data***

There was no significant gender, age, teaching years and departments differences in teachers' information literacy and each dimension. There were significant differences in information literacy among teachers with different educational qualifications, titles. In terms of differences in Teacher efficacy of teachers, there were significant gender, educational qualifications differences. There were no significant differences in Teacher efficacy among teachers with different ages, teaching ages, titles and departments.

### ***Correlation Statistical Analysis***

Pearson correlation analysis was used to examine the correlation between teachers' information literacy and Teacher efficacy in order to verify that H2.1 of this study: there is a significant correlation between teachers' information literacy and Teacher efficacy at Shandong Yingcai University. According to the results of the correlation analysis in Table 4, the correlation coefficient  $r$  between teacher information literacy and Teacher efficacy at Shandong Yingcai University is 0.480, reaching a significant level at 0.01, indicating a significant positive correlation between teacher information literacy and Teacher efficacy at Shandong Yingcai University. There was a positive correlation between teachers' information literacy and each dimension of Teacher efficacy. The overall relevant situation was shown in Table 3.



**Table 3:** Correlation Analysis 1 of Teachers' Information Literacy with Teacher efficacy at Shandong Yingcai University

	DV1	DV2	DV3	DV
IV	451 **	438 **	450 **	454 **
IV1	472 **	457 **	472 **	475 **
IV2	466 **	436 **	470 **	465 **
IV3	477 **	459 **	478 **	480 **

Note: \* $p < 0.05$ , \*\* $p < 0.01$

IV1: Information retrieval literacy, IV2: Information evaluation literacy, IV3: Teacher information literacy; IV Teacher information literacy

DV1: Teaching Strategy effectiveness, DV2: Classroom Management effectiveness, DV3: Student Engagement effectiveness, DV: Teacher efficacy

### *Regression analysis*

Regression analysis was conducted with teachers' information literacy as the independent variable, Teacher efficacy as the dependent variable, and gender, age, years of teaching experience, educational attainment, professional title, and department as control variables.

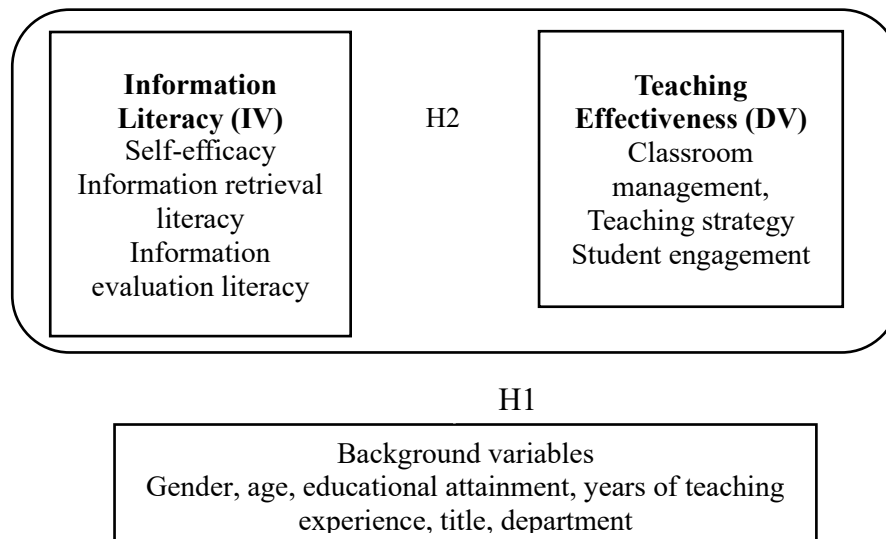
As can be seen from Table 4, the VIF values of each independent variable at the time of model construction are all within a reasonable range, indicating that there is no problem of multicollinearity in the research model. The standardized coefficients of teachers' information literacy were 0.494, with  $p$  values  $< 0.001$ , indicating that teachers' information literacy at Shandong Yingcai University has a significant positive impact on Teacher efficacy.

**Table 4:** 2Regression Analysis of Teachers' Information Literacy on Teacher efficacy

Model	Unstandardized coefficients		Standardized coefficient	t	Sig.	Collinearity statistics
	B	Standard error	Beta			VIF
1 (Constant)	1.086	.518		2.095	.037	
Teacher information literacy	.691	.073	.494	9.466	.000	1.024
Gender	-.022	.150	-.008	-.145	.885	1.213
Age	.162	.113	.131	1.433	.153	3.154
Teaching experience	-.014	.081	-.014	-.171	.864	2.500
Academic qualifications	-.169	.127	-.099	-1.332	.184	2.060
Title	-.058	.081	-.050	-.724	.469	1.822
Departments	.027	.044	.037	.618	.537	1.322



This study analyzes and summarizes the research literature on teachers' information literacy and Teacher efficacy; Categorize and elaborate on the relevant theoretical achievements. The conceptual framework of this study was presented after sorting out the research variables, as shown in Figure 1.1:



**Figure 1.1** Research Conceptual Framework

## Discussion

### *Analysis of Current Situation of Information Literacy and Teacher efficacy of Teachers at Shandong Yingcai University*

The findings show that the information literacy of teachers at Shandong Yingcai University is generally at a high level, reflecting that teachers at the university generally have the awareness of actively learning new technologies and are proficient in integrating digital resources to assist in instructional design and implementation. The overall Teacher efficacy of teachers also showed high-level characteristics, with excellent performance in dimensions such as classroom management, application of teaching strategies, and student engagement.

### *Analysis of Differences in Teacher information Literacy and Teacher efficacy with Different Demographic Background Variables*

In terms of gender differences, no significant differences were shown in each dimension of teachers' information literacy, indicating that schools have achieved gender equality in the allocation of information technology training resources.

No significant differences were observed in the age and seniority dimensions, confirming the effectiveness of the whole-cycle teacher development strategy in schools. Educational attainment has a significant impact on teachers' information literacy. There is a significant gradient of title differences in

the field of information literacy, with the professor group having a prominent advantage in critical evaluation of academic information and technological integration and innovation. The lack of significant differences among departments indicates that the school has achieved university-wide sharing of teaching resources through the construction of "smart campus".

Educational attainment has a significant impact on teachers' information literacy. Doctoral students excel in information literacy, but their Teacher efficacy is actually lower than that of master's students. It may be because highly educated teachers are more inclined to research-oriented teaching, and there is room for improvement in practical dimensions such as classroom interaction design and student engagement incentives. Teachers with a junior college degree are at the bottom in all dimensions of information literacy and need to focus on strengthening their basic skills in digital teaching.

#### ***Analysis of Relationship between Information Literacy and Teacher efficacy of Teachers at Shandong Yingcai University***

Correlation analysis confirmed a significant positive correlation between teachers' information literacy and Teacher efficacy, indicating that when teachers have the ability to critically evaluate digital resources, they can more accurately select technical tools that fit the teaching content, thereby enhancing the scientificity and effectiveness of instructional design. Regression analysis showed that after controlling for demographic variables, the improvement of information literacy could lead to an increase in Teacher efficacy. Consistent with the findings of Feng and Jih-Lian(2016), teachers' information literacy can enhance Teacher efficacy in various ways. When teachers are proficient in using digital tools to conduct teaching activities, students' learning interest and participation will increase, and the possibility of achieving teaching goals will increase, ultimately promoting the improvement of Teacher efficacy.

#### **Conclusions**

This study reached the following conclusions:

(1) In terms of the current situation of teachers' information literacy and Teacher efficacy at Shandong Yingcai University: Teachers' information literacy and Teacher efficacy are both at a high level.

(2) In view of the differences in information literacy and Teacher efficacy among teachers of Shandong Yingcai University under different demographic background information.

There are significant differences in information literacy among teachers with different educational qualifications. Teachers with a doctoral degree have the highest level of information literacy, while those with an associate degree have the poorest performance. There are significant differences in information literacy among teachers with different titles. Professors have the highest level of self-information literacy, while teaching assistants have the poorest information literacy. But

there were no significant differences in information literacy among teachers of different genders, ages, years of teaching experience, or departments.

There are significant differences in Teacher efficacy among teachers of different genders. Male teachers have higher Teacher efficacy, while female teachers have poorer overall Teacher efficacy. There are significant differences in Teacher efficacy. among teachers with different educational qualifications. Teachers with a master's degree have the highest average Teacher efficacy, while those with an associate degree have the lowest overall average Teacher efficacy. But there were no significant differences in Teacher efficacy among teachers of different ages, years of teaching experience, titles, or departments.

(3) In terms of the impact of information literacy of teachers at Shandong Yingcai University on Teacher efficacy, information literacy of teachers at Shandong Yingcai University is significantly positively correlated with Teacher efficacy, and information literacy of teachers has a significant positive impact on Teacher efficacy.

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