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The Mediating Effect Of Career Decision Self-Efficacy On Self-Development System Adoption Intentions Among Higher Education Teachers In Liaoning

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Abstract

Purpose of the Study: Against the digital era backdrop, this study addresses career development challenges of higher vocational college teachers in Liaoning, China, exploring how Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), and Achievement Motivation (AM) influence Self-Development System (SDS) usage intention—with Career Decision Self-Efficacy (CDSE) as the mediator—and integrates SCCT, TAM, and SDT to inform teachers' digital career development. **Research Methodology:** Adopting a mixed-methods approach, it surveyed 480 teachers from 4 local vocational colleges via stratified random sampling (400 valid questionnaires, 92% validity), using SPSS 26.0, AMOS 24.0 and other analyses, while interviewing 30 teachers to supplement quantitative data. **Results:** the structural model fits well ($\chi^2/df=2.085$, CFI=0.93, RMSEA=0.052); CDSE partially mediates TA/OS/CA/CP-SDS intention ($p<0.01$) and fully mediates AM-SDS intention ($p<0.001$); CP ($\beta=0.561$) and CA ($\beta=0.531$) have the strongest total effects on SDS intention (AM the weakest, $\beta=0.310$); and males score higher in TA ($p=0.032$), while teachers ≤25 score lower in CA/CP/CDSE than those 36-45 ($p<0.05$). **Conclusion:** CDSE as a key mediator with variable-specific roles, note SDS intention relies more on CP/CA (AM acts via CDSE), emphasize demographic differences (gender, age) requiring targeted interventions, and propose strategies: teachers improve CDSE via goal-setting, colleges build "support-training-incentive" systems, and SDS optimizes usability and integrates practical modules.

Keywords: Career Decision Self-Efficacy; Self-Development System; Higher Education Teachers; Organizational Support; Career Adaptability;

1. Introduction

Against the backdrop of China digital transformation and the revitalization of Liaoning's old industrial base, higher vocational education in Liaoning Province bears the key mission of cultivating technical talents for regional industrial upgrading. However, vocational college teachers in Liaoning currently face prominent challenges in adapting to digital career development: on one hand, as the core implementers of vocational education, they need to master the self-development system (SDS) to enhance their digital teaching and professional capabilities, but many struggle with low willingness to use SDS due to difficulties in technology acceptance, insufficient organizational support, or vague career planning. On the other hand, the lack of career decision self-efficacy (CDSE)—a psychological factor reflecting confidence in career decision-making—often becomes a "hidden barrier" between their career development needs and SDS adoption. For example, some teachers in Liaoning's vocational colleges report feeling unsure about how to integrate SDS into their career paths, or lack the confidence to overcome technical hurdles when using SDS, ultimately hindering their digital professional growth.

In this context, exploring the mediating role of CDSE between key influencing factors and SDS usage intention is of critical significance for vocational college teachers in

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Theoretical significance: By integrating Social Cognitive Career Theory (SCCT), the Technology Acceptance Model (TAM), and Self-Determination Theory (SDT), this study innovatively embeds psychological mediating mechanisms into the research on digital career development of vocational college teachers. It fills the gap in existing studies that rarely target the specific group of Liaoning's vocational college teachers and insufficiently link psychological factors with digital tool adoption.

Practical significance: The findings can directly address the practical dilemmas of Liaoning's vocational college teachers—such as providing targeted suggestions for optimizing local teacher training systems and designing SDS policies that align with regional characteristics. This helps improve teachers' willingness to use SDS and further supports the high-quality development of vocational education in Liaoning.

To systematically unpack the above issues and clarify the mediating mechanism of CDSE, this study takes teachers from four representative vocational colleges in Liaoning Province as research subjects and proposes the following five core research questions (RQ1-RQ5):

RQ1: How does career decision self-efficacy (CDSE) mediate the effect of technology acceptance (TA) on SDS usage intention?

RQ2: How does career decision self-efficacy (CDSE) mediate the effect of organizational support (OS) on SDS usage intention?

RQ3: How does career decision self-efficacy (CDSE) mediate the effect of career adaptability (CA) on SDS usage intention?

RQ4: How does career decision self-efficacy (CDSE) mediate the effect of career planning (CP) on SDS usage intention?

RQ5: How does career decision self-efficacy (CDSE) mediate the effect of achievement motivation (AM) on SDS usage intention?

To answer these questions, this study adopts a mixedmethods approach combining questionnaires and interviews to construct an empirical model of CDSE's mediating mechanism. The goal is to reveal the key transmission pathways through which CDSE connects the five independent variables to SDS usage intention. It should be noted that the study's scope is limited to faculty from four vocational colleges in Liaoning, focusing specifically on their career development needs amid current digital transformation. Due to the cross-sectional research design, regional concentration of samples, and potential self-report bias in data collection, the generalizability of the conclusions should be interpreted with caution..

2. Literature Review

2.1 Career Planning - Social Cognitive Career Theory (SCCT)

Career planning refers to an individual managing their career development path by setting goals, exploring opportunities, developing plans, and taking action during career development (Greenhaus et al., 2010). The Social Cognitive Career Theory (SCCT) emphasizing that self-efficacy, outcome expectations, and personal goals influence an individual's career choices, development, and achievements.

SCCT believes that three core factors influence career planning:

Self-efficacy: An individual's belief in their abilities affects their confidence in career development.

Outcome Expectations: Individuals' expectations for future success influence their career goal-setting.

Personal Goals: Career development goals set by individuals that determine their willingness to take corresponding actions.

Anyango et al. (2024) found that the clarity of career planning for nursing students significantly affects their confidence in future career development and further enhances their willingness to learn professional skills.

Rosenzweig et al. (2024) found that among college students in STEM fields, the stability of career planning is positively correlated with career satisfaction, consistency of career goals, and learning motivation.

Based on SCCT, this study assumes that teachers with precise career planning can better set career development goals and actively participate in vocational training and online learning to enhance their professional competence.

2.2 Career Decision Self Efficacy (CDSE) - Soc ial Cognitive Theory (SCT)

Career Decision Self-Efficacy (CDSE) refers to an individual's confidence in their ability to complete their career choices during decision-making. This concept originates from Bandura's (1986) Social Cognitive Theory (SCT), which suggests that an individual's behavior is influenced by environmental factors, personal cognition, and social interactions and emphasizes the role of self-efficacy in behavioral decision-making.

The main dimensions of career decision-making self-efficacy include:

Self-Assessment: An individual's ability to evaluate their abilities, interests, and values.

Occupational Information Seeking: The ability to proactively obtain information on career development.

Goal Selection: Set career goals and evaluate the ability to choose different careers.

Planning: the ability to develop career paths.

Problem Solving: The ability to tackle career development challenges and make decisions (Wang et al., 2024).

Zhang et al. (2025) found that an upbeat personality significantly affects career decision-making self-efficacy, affecting individuals' career exploration behavior and final career decisions.

Parola et al. (2025) validated the positive impact of career decision-making self-efficacy on career adaptability. They found that social support can enhance individuals' career planning abilities by strengthening their career decision-making self-efficacy.

This study is based on the SCT hypothesis that career planning enhances teachers' self-efficacy in career decision-making and increases their willingness to participate in online learning.

2.3 Achievement Motivation - Self-Determination Theory (SDT)

Achievement Motivation refers to the motivation individuals exhibit in pursuing achievement goals, including the need for achievement and the fear of failure (Witte et al., 2024). The Self Determination Theory (SDT) was proposed by Ryan and Deci (2000), which suggests that individual behavior is driven by autonomy, competence, and relatedness.

SDT suggests that when an individual's learning motivation is driven by intrinsic motivation, they are more likely to participate in learning actively and exhibit higher levels of learning persistence (Mokmin et al., 2024). In a career development environment, teachers with high achievement motivation are more likely to participate in online learning to enhance their professional abilities actively.

Imtihansyah et al. (2024) found that achievement motivation enhances learning persistence and improves vocational skill development among athletes.

Fitriyah and Damawan (2024) found a significant positive correlation between achievement motivation and learning habits. Individuals with better mental health typically have higher achievement motivation and achieve better academic and career development outcomes.

This study is based on the SDT hypothesis that achievement motivation mediates the relationship between career planning and online learning willingness. Teachers with more apparent career planning are more likely to exhibit stronger achievement motivation, increasing their willingness to participate in online learning.

2.4 Intention SDS - Technology Acceptance Model (TAM)

Intention SDS refers to an individual's behavioral tendency to participate in online learning. The Technology Acceptance Model (TAM) was proposed by Davis (1989), which suggests that an individual's willingness to use technology is influenced by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU).

Kim's (2024) study suggests that the perceived usefulness, interactive experience, and technological support of online learning significantly affect learners' willingness to continue using it.

Xu et al. (2024) found that immersion and interactivity in online learning can significantly increase individuals' Intention SDS.

This study is based on the TAM hypothesis that career planning increases teachers' acceptance of online learning and thus enhances their Intention SDS by influencing career decision-making self-efficacy and achievement motivation.

3. Research Methods and Materials

3.1 Research Framework

The Social Cognitive Career Theory (SCCT), based on Bandura's Social Cognitive Theory, focuses on the core aspects of individuals' career choice, development, and sustainability. It posits that career behavior is jointly influenced by self-efficacy, outcome expectations, personal goals, and external environments. The Self-Determination Theory (SDT), put forward by Deci and Ryan in 1985, primarily explains human motivation and behavioral persistence. It classifies motivation into intrinsic and extrinsic types (with intrinsically motivated behaviors typically being more enduring) and argues that individuals' learning and development rely on the fulfillment of three basic psychological needs: autonomy, competence, and relatedness.

Drawing on the above theoretical logic, this study first integrates the Social Cognitive Career Theory (SCCT), Self-Determination Theory (SDT), and Technology Acceptance Model (TAM) to construct a comprehensive theoretical framework covering the "environmental variables-psychological variables-behavioral intentions" chain. With a focus on Career Decision Self-Efficacy (CDSE) as the core mediating variable, the following hypotheses for mediating effect testing are proposed to clarify the functional pathways between variables:

Hypothesis 1 (H1): CDSE mediates the relationship between Technology Acceptance (TA) and SDS usage

intention. Specifically, technology acceptance indirectly promotes teachers' SDS usage intention by enhancing their career decision self-efficacy.

Hypothesis 2 (H2): CDSE mediates the relationship between Organizational Support (OS) and SDS usage intention. Specifically, organizational support indirectly exerts a positive impact on teachers' SDS usage intention by strengthening their career decision self-efficacy.

Hypothesis 3 (H3): CDSE mediates the relationship between Career Adaptability (CA) and SDS usage intention. Specifically, career adaptability indirectly drives the improvement of teachers' SDS usage intention by increasing their career decision self-efficacy.

Hypothesis 4 (H4): CDSE mediates the relationship between Career Planning (CP) and SDS usage intention. Specifically, clear career planning indirectly promotes teachers' SDS usage intention by reinforcing their career decision self-efficacy.

Hypothesis 5 (H5): CDSE mediates the relationship between Achievement Motivation (AM) and SDS usage intention. Specifically, achievement motivation indirectly has a positive correlation with teachers' SDS usage intention by enhancing their career decision self-efficacy.

Meanwhile, based on this theoretical framework, the study further proposes practical optimization strategies: allowing teachers to independently select training courses based on their own needs (to meet the autonomy need in SDT), providing personalized career development counseling for teachers (to enhance competence and relatedness), and establishing a peer learning community for teachers (to strengthen social support, in line with the external environment dimension of SCCT).

The construction of this framework not only enriches theoretical research in the field of vocational college teachers' career development (especially filling the research gap in "how psychological mediating mechanisms connect digital tool acceptance and career behavioral intentions") but also provides specific practical guidance for educational administrators to optimize teachers' career planning and promote teachers' participation in online learning.

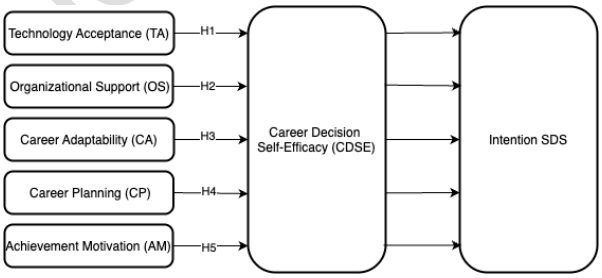

Figure 1: Conceptual Framework

3.2 Research Design

This study employs a mixed-methods approach, primarily quantitative with qualitative supplementation, aiming to systematically examine the mediating mechanism of Career Decision Self-Efficacy (CDSE) between five antecedent variables—Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), Achievement Motivation (AM)—and the willingness to use the Self-Development System (SDS) (Hypotheses H1-H5). The quantitative phase collects large-scale data through questionnaires to validate the multiple mediating pathways of CDSE, while the qualitative phase employs in-depth interviews to uncover the underlying dynamics of variable interactions, with a particular focus on the career decision-making psychological processes of university teachers in Liaoning against the backdrop of industrial transformation. SPSS 26.0 and AMOS 24.0 are utilized for statistical analysis to test the research hypotheses and model.

This study adopts a questionnaire survey method, which can provide large-scale quantitative data for statistical validation, while interviews supplement the limitations of questionnaire data by revealing individuals' subjective experiences and deep-seated motivations in career development and online learning behaviors.

The specific implementation of this study is as follows: First, a questionnaire survey is conducted among in-service teachers from four vocational colleges in Liaoning Province (Liaoning Finance College, Liaoning Normal University, Liaoning Petrochemical College, and Liaoning Geological Engineering College). A total of 400 valid questionnaires will be collected through stratified random sampling, followed by descriptive statistics, reliability and validity tests, correlation analysis, regression analysis, and mediation analysis.

3.3 Population and Sample

In the research process, population refers to all individuals or units from which the

researcher wishes to obtain data and make inferences (Creswell & Creswell, 2017). The overall definition depends on the research objectives and scope, and its characteristics should be closely related to the research topic to ensure the external validity of the research results. In quantitative research, the population is usually large, so researchers typically extract samples from the population for study (Fraenkel et al., 2019). A suitable overall definition can ensure the applicability of research results and enhance the interpretability of research conclusions.

The overall subject of this study is in-service teachers from four vocational colleges in Liaoning Province (Liaoning Finance Vocational College, Liaoning Normal

University, Liaoning Petrochemical Vocational and Technical College, Liaoning Geological Engineering Vocational and Technical College). These universities are representative and cover multiple disciplines, such as economic management, education, engineering technology, and computer science, meeting the selection criteria for research subjects. This study focuses on the career planning and online learning willingness of teachers. Therefore, the research subjects need to meet the following characteristics:

Ensuring that in-service teachers (including full-time and part-time teachers) have practical experience in career development and online learning is necessary.

At least one year of teaching experience is necessary to ensure sufficient career development experience to answer questionnaire questions.

I am currently employed and have the willingness or experience to participate in vocational training or online learning.

From different disciplinary backgrounds, ensure the broad applicability of the research.

In this study, the sample was a subset of individuals selected from the population for data collection and statistical analysis (Cohen et al., 2018). The selection of samples should be representative to ensure that the research results can be generalized to a larger population (Saunders et al., 2019). The sample of this study comes from the teacher population of four vocational colleges in Liaoning Province, including:

Teachers with different professional identities (full-time teachers, part-time teachers, and teachers holding management positions).

Teachers from different disciplines (economics and management, education, engineering and technology, computer science, etc.).

Teachers at different stages of career development (1-5 years, 6-10 years, and over 10 years of teaching experience).

Teachers with different professional titles (teaching assistants, lecturers, associate professors, professors).

This study analyzes how teachers' career planning affects their Intention SDS and explores the mediating role of career decision-making self-efficacy and achievement motivation. Therefore, ensuring the diversity and representativeness of the sample is crucial so that the research results can apply to different categories of vocational college teachers.

4. Data Analysis and Results

4.1 Demographic Information

Report the demographic information of the sample by first clarifying the data acquisition situation, and then presenting, in tabular form, the descriptive analysis or frequency analysis results of all demographic data obtained from the sample.

These data encompass key information such as participants' gender, age, education level, and professional background. The gender distribution reveals the male-to-female ratio within the research sample, which aids in evaluating whether gender factors influence the study outcomes. The age distribution reflects the age group composition of the sample, which is of great significance for understanding differences among various age groups in aspects such as career planning and decision-making self-efficacy. Information on education level and professional background reveals the academic standards and professional inclinations of the sample, which is crucial for conducting an in-depth analysis of the relationships between variables such as career planning and achievement motivation and demographic characteristics.

Slightly female-dominant, with 214 females (53.5%) and 186 males (46.5%). The 26-35 years group (152 participants, 38%) and 36-45 years group (140 participants, 35%) account for the largest shares (73% collectively); those aged ≤25 and ≥56 make up smaller proportions (7% and 4%, respectively). Most have 1-10 years of experience (124 participants, 31% for 1-5 years; 116 participants, 29% for 6-10 years); 27% have 11-20 years, and 13% have ≥21 years. Professional Title: Lecturers form the largest group (180 participants, 45%), followed by associate professors (26%), assistant professors (17%), and professors (12%). Educational Background: Master's degrees are dominant (280 participants, 70%); 19% hold doctoral degrees, and 11% have bachelor's degrees or below. Academic Discipline: Engineering & Technology is the most represented (108 participants, 27%), followed by Economics & Management (23%), Education (21%), Information Technology (15%), and other disciplines (14%). Institution: The sample is evenly distributed across four institutions—Liaoning Finance Vocational College, Liaoning Normal University, Liaoning Petrochemical Vocational and Technical College, and Liaoning Geological Engineering Vocational and Technical College—with 100 participants (25%) from each.

Table 1: Demographic Characteristics of the Sample (N=400)

Characteristic Dimension	Category	Frequency (n)	Percentage (%)
Gender	Male	186	46.5
	Female	214	53.5
Age	≤25 years old	28	7
	26-35 years old	152	38
	36-45 years old	140	35
	46-55 years old	64	16
	≥56 years old	16	4
Teaching Experience	1-5 years	124	31
	6-10 years	116	29
	11-20 years	108	27
	≥21 years	52	13
Professional Title	Assistant Professor	68	17
	Lecturer	180	45
	Associate Professor	104	26
	Professor	48	12
Educational Background	Bachelor's Degree or Below	44	11
	Master's Degree	280	70
	Doctoral Degree	76	19
Academic Discipline	Economics & Management	92	23
	Education	84	21
	Engineering & Technology	108	27
	Information Technology	60	15
	Others (e.g., Arts, Tourism)	56	14
Institution	Liaoning Finance Vocational College	100	25
	Liaoning Normal University	100	25
	Liaoning Petrochemical Vocational and Technical College	100	25
	Liaoning Geological Engineering Vocational and Technical College	100	25

4.2 Analysis of Variable Differences

The difference analysis focuses on exploring the impact of teachers′ different demographic characteristics (gender, age, teaching experience, professional title, educational background, disciplinary field, and institution) on Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), Achievement Motivation (AM), Career Decision-Making Self-Efficacy (CDSE), and Willingness to Use SDS. Independent-samples t-test and One-way Analysis of Variance (One-way ANOVA) were adopted, with the significance level set at $p<0.05$, and the Least Significant Difference (LSD) method used for post-hoc tests.

4.2.1 Analysis of Differences by Age

Career Adaptability (CA): $F=4.27$, $p=0.005$**; the ≤25 years group ($M=3.62$, $SD=0.81$) had a significantly lower score than the 36-45 years group ($M=4.09$, $SD=0.65$) ($p=0.002$).

Career Planning (CP): $F=3.82$, $p=0.009$**; the ≤25 years group ($M=3.51$, $SD=0.89$) had a lower score than the 36-45 years group ($M=3.97$, $SD=0.72$) ($p=0.003$).

Career Decision-Making Self-Efficacy (CDSE): $F=3.56$, $p=0.014$*; the ≤25 years group ($M=3.57$, $SD=0.82$) had a lower score than the 36-45 years group ($M=4.02$, $SD=0.68$) ($p=0.011$).

No significant age differences were found in TA, OS, AM, and Willingness to Use SDS ($p > 0.05$).

4.2.2 Analysis of Differences by Teaching Experience

Technology Acceptance (TA): $F=3.62$, $p=0.013$*; the 1-5 years group ($M=3.95$, $SD=0.7$) had a higher score than the ≥21 years group ($M=3.58$, $SD=0.85$) ($p=0.010$).

Organizational Support (OS): $F=5.12$, $p=0.002$**; the 1-5 years group ($M=3.89$, $SD=0.76$) had a higher score than the ≥21 years group ($M=3.32$, $SD=0.88$) ($p=0.001$).

Career Planning (CP): $F=2.89$, $p=0.035$*; the 11-20 years group ($M=3.92$, $SD=0.73$) had a higher score than the 1-5 years group ($M=3.65$, $SD=0.83$) ($p=0.032$).

Career Decision-Making Self-Efficacy (CDSE): $F=3.15$, $p=0.025$*; the 11-20 years group ($M=3.98$, $SD=0.7$) had a higher score than the 1-5 years group ($M=3.72$, $SD=0.79$) ($p=0.022$).

Willingness to Use SDS: $F=4.68$, $p=0.003$**; the 1-5 years group ($M=3.92$, $SD=0.75$) had a higher score than the ≥21 years group ($M=3.36$, $SD=0.9$) ($p=0.002$).

No significant differences in teaching experience were found in CA and AM ($p > 0.05$).

4.2.3 Analysis of Differences by Professional Title

Technology Acceptance (TA) and Willingness to Use SDS: Assistant professors had the highest scores (TA=3.91, SDS=3.82), while professors had the lowest scores (TA=3.59, SDS=3.52).

Career Adaptability (CA), Career Planning (CP), and CDSE: Associate professors performed the best (CA=4.02, CP=3.98, CDSE=4.01).

Achievement Motivation (AM): Lecturers ($M=3.61$) had a higher score than professors ($M=3.38$).

No significant difference in professional title was found in OS ($p > 0.05$).

4.2.4 Analysis of Differences by Educational Background

Three variables showed significant differences across educational background groups (showing a trend of "higher education, higher scores"): Teachers with a doctoral degree had significantly higher scores in Technology Acceptance (M=3.95), Achievement Motivation (M=3.72), and Willingness to Use SDS (M=3.85) than those with a bachelor′s degree or below.

No significant differences in educational background were found in CA, OS, CP, and CDSE ($p > 0.05$).

4.2.5 Analysis of Differences by Disciplinary Field

Only the core conclusions of Organizational Support (OS) are retained: Teachers had the highest recognition for "opportunities for continuous learning" (OS36, M=4.18) and "professional development training" (OS35, M=4.15), and the lowest recognition for "promotion opportunities" (OS33, M=3.98); overall, teachers were satisfied with learning and development support, but less satisfied with promotion and financial incentives.

4.2.6 Analysis of Differences by Institution

Liaoning Finance Vocational College: Had the highest scores in OS (M=3.82), CP (M=3.92), and CDSE (M=3.98).

Liaoning Petrochemical Vocational and Technical College: Had the highest score in CA (M=4.05).

Liaoning Geological Engineering Vocational College: Had the lowest scores in all variables (e.g., OS=3.42, CDSE=3.59).

4.3 Hypotheses Testing

The following section is about the hypotheses testing in the study. The section and procedures of testing depends on the research designs and number of hypotheses tested. Follow a proper procedure for testing the hypotheses and then provide a summary table at the end to showed the final results of the hypotheses testing.

4.3.1 Correlation Analysis

Table 2 presents the means, standard deviations, and Pearson correlation coefficient matrix for seven core variables. The results indicate significant positive correlations among all variables ($p < 0.01$), providing preliminary support for the research hypotheses. In terms of central tendency, the means of the variables range from 3.52 to 3.91 on a 5-point Likert scale, indicating a moderately high level. Among them, Career Adaptability (CA, M = 3.91) scores the highest, suggesting that teachers in Liaoning vocational colleges generally demonstrate strong career adaptability in the context of industrial transformation. Achievement Motivation (AM, M = 3.52) scores relatively lower, which may be related to limited career development opportunities and insufficient incentive mechanisms in the region. The standard deviations range from 0.72 to 0.85, indicating moderate dispersion in responses across variables and relatively uniform data distribution.

From a correlation perspective, all correlation coefficients between variables are positive and significant ($p < 0.01$). Specifically, Career Decision-Making Self-Efficacy (CDSE) shows the strongest correlation with SDS Usage Intention ($r = 0.78$), suggesting that the higher teachers' confidence in their career decision-making abilities, the stronger their intention to use the self-development system. This provides a core basis for the mediating role of CDSE. Career Adaptability (CA) has the next strongest correlation with CDSE ($r = 0.72$), indicating that the more capable teachers are in adapting to career changes, the more confident they are in their career decisions, confirming the positive impact of career adaptability on self-efficacy. Additionally, the correlation coefficient between Career Planning (CP) and Career Adaptability (CA) is 0.65**, suggesting that clear career planning is closely related to strong adaptability, consistent with the theoretical logic that "planning and adaptability jointly promote career development."

Table 2: Correlation Analysis among Variables

Variable	M	SD	1	2	3	4	5	6	7
1. TA	3.82	0.76	1						
2. OS	3.65	0.81	0.52**	1					
3. CA	3.91	0.72	0.48**	0.61**	1				
4. CP	3.78	0.79	0.45**	0.58**	0.65**	1			
5.AM	3.52	0.85	0.39**	0.42**	0.53**	0.56**	1		
6. CDSE	3.85	0.74	0.63**	0.67**	0.72**	0.70**	0.59**	1	
7. SDS Usage Intention	3.69	0.83	0.57**	0.54**	0.64**	0.62**	0.48**	0.78**	1

4.3.2 Structural Equation Modeling (SEM) Analysis

To more precisely examine the mediating role of Career Decision-Making Self-Efficacy (CDSE), with independent variables including Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), and Achievement Motivation (AM), and the dependent variable being the intention to use the

Self-Directed Search (SDS), this study employed Structural Equation Modeling (SEM) for analysis. Compared to traditional multiple regression, SEM can simultaneously handle relationships among multiple variables, incorporate measurement errors of latent variables, and visually verify the overall model fit, yielding more robust results. The analysis was based on 400 valid samples and conducted using Mplus 8.3 software. The core steps and

results are as follows:

1.Theoretical Model Construction

Based on the research hypotheses, an SEM framework comprising a "measurement model" and a "structural model" was constructed:

Definition of Latent Variables: Exogenous Latent Variables (Independent Variables): Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), and Achievement Motivation (AM);

Endogenous Latent Variables: Mediating Variable (CDSE, Career Decision-Making Self-Efficacy), Dependent Variable (SDS, Intention to Use SDS).

Matching of Observed Variables: Each latent variable w as matched with corresponding items from the original que stionnaire.

The path specifications are as follows:

(1) Direct Paths: Each exogenous latent variable → SDS Usage Intention (to test direct effects);

(2) Indirect Paths: Each exogenous latent variable → CDSE → SDS Usage Intention (to test mediating effects);

(3) Measurement Paths: Each latent variable → its corresponding observed variables (including measureme nt error terms).

2.Measurement Model Validation

Before examining the structural model, the reliability and validity of the measurement model were first validated (to ensure that the observed variables effectively reflect the latent variables). The core indicators include Composite Reliability (CR), Average Variance Extracted (AVE), Cronbach's α coefficient, and discriminant validity.

Table 3 : Results of Reliability and Validity Tests for the Measurement Model

Latent Variable	Cronbach's α	Composite Reliability (CR)	AVE	Discriminant Validity
TA	0.821	0.852	0.586	Met
OS	0.873	0.890	0.617	Met
CA	0.892	0.911	0.633	Met
CP	0.880	0.902	0.625	Met
AM	0.832	0.862	0.599	Met
CDSE	0.901	0.923	0.641	Met
SDS Usage Intention	0.914	0.932	0.654	Met

3.Structural Model Fit Evaluation

The measurement model was integrated with the theoretical paths to evaluate the overall fit between the structural model and the data. Commonly used fit indices in academia (such as χ^2/df, GFI, CFI, RMSEA, etc.) were employed to assess the model's fit.

Table 4: Structural Model Fit Indices

Fit Index	Actual Value	Ideal Criterion	Fit Result
Chi-Square (X^2)	892.36	-	-
Degrees of Freedom (df)	428	-	-
X^2/df	2.085	<3.0	Well-Fitted
Goodness of Fit Index (GFI)	0.91	>0.9	Well-Fitted
Adjusted Goodness of Fit Index (AGFI)	0.88	>0.85	Well-Fitted
Normed Fit Index (NFI)	0.9	>0.9	Well-Fitted
Comparative Fit Index (CFI)	0.93	>0.9	Well-Fitted
Root Mean Square Error of Approximation (RMSEA)	0.052	<0.08	Well-Fitted

All fit indices meet the ideal criteria (e.g., χ^2/df = 2.085 < 3, CFI = 0.930 > 0.9, RMSEA = 0.052 < 0.08), indicating that the structural model fits well with the sample data. Further tests of path significance and mediating effects can be conducted.

4.Structural Model Parameter Estimation and Path Significance

The maximum likelihood (ML) method was used to estimate the standardized path coefficients, t-values, and p-values of the structural model, clarifying the significance and effect size of each path.

Table 5: Standardized Path Coefficients of the Structural Model

Path Type	Specific Path	Standardized Path Coefficient (β)	t-Value	p-Value	Effect Type
Direct Path	TA → SDS Usage Intention	0.19	3.21	0.001	Significantly Positive
	OS → SDS Usage Intention	0.16	2.75	0.006	Significantly Positive
	CA → SDS Usage Intention	0.24	4.13	<0.001	Significantly Positive
	CP → SDS Usage Intention	0.28	4.92	<0.001	Significantly Positive
	AM → SDS Usage Intention	0.11	1.82	0.068	Not Significant
Indirect Path	TA → CDSE	0.48	9.05	<0.001	Significantly Positive
	OS → CDSE	0.52	9.71	<0.001	Significantly Positive
	CA → CDSE	0.57	10.82	<0.001	Significantly Positive
	CP → CDSE	0.55	10.34	<0.001	Significantly Positive
	AM → CDSE	0.39	7.05	<0.001	Significantly Positive
	CDSE → SDS Usage Intention	0.51	8.86	<0.001	Significantly Positive

All indirect paths are significant: All independent variables (TA, OS, CA, CP, AM) significantly and positively predict CDSE (β= 0.390~0.570, $p < 0.001$), and CDSE significantly and positively predicts SDS Usage Intention (β= 0.510, $p < 0.001$), providing a basis for the existence of mediating effects.

Differences in direct paths: The direct effects of TA, OS, CA, and CP on SDS Usage Intention remain significant (β= 0.160~0.280, $p < 0.01$), while the direct effect of AM on SDS Usage Intention is not significant (β= 0.110, $p = 0.068$), initially suggesting differences in the type of mediating effects.

4.3.3 Mediating Effect Test

To systematically verify the mediating role of Career Decision-Making Self-Efficacy (CDSE) and avoid potential biases from traditional stepwise regression, this study directly embedded the mediating mechanism into the structural equation model (SEM) framework. By estimating the direct effect, indirect effect, and total effect of each exogenous variable on the dependent variable simultaneously, the significance and nature of the mediating effect were rigorously tested. The analysis still adopted the maximum likelihood (ML) estimation method with 5,000 Bootstrap samplings to construct 95% confidence intervals (CIs) for effect values, ensuring the robustness of results.

1.Core Principle of SEM-Based Mediating Effect Test

In the SEM framework, the mediating effect of CDSE is reflected by the product of two path coefficients: the coefficient of the exogenous variable (e.g., TA, OS) predicting CDSE (β1), and the coefficient of CDSE predicting SDS Usage Intention (β2). The indirect effect value is calculated as β1×β2. If the 95% Bootstrap CI of the indirect effect does not include 0, the mediating effect is considered statistically significant. Additionally, by comparing the significance of the direct effect (exogenous variable→SDS Usage Intention) before and after incorporating CDSE, the type of mediating effect (partial/full) is determined:

Partial mediation: Both the direct effect and indirect effect are significant;

Full mediation: The indirect effect is significant, while the direct effect becomes non-significant.

2.Estimation Results of Direct, Indirect, and Total Effects

Table 6 presents the standardized values of direct effects, indirect effects (via CDSE), and total effects of each exogenous variable on SDS Usage Intention, along with their corresponding Bootstrap 95% CIs and significance judgments.

Table 6: Estimation Results of Direct, Indirect, and Total Effects

Exogenous Variable	Effect Type	Effect Value	S.E.	95% CI Lower Bound	95% CI Upper Bound	Does CI Include 0?	Significance
TA	Direct Effect	0.190	0.059	0.075	0.305	No	Significant
	Indirect Effect (TA→CDSE→SDS)	0.245	0.038	0.172	0.318	No	Significant
	Total Effect	0.435	0.042	0.353	0.517	No	Significant
OS	Direct Effect	0.160	0.058	0.046	0.274	No	Significant
	Indirect Effect (OS→CDSE→SDS)	0.265	0.039	0.19	0.34	No	Significant

Exogenous Variable	Effect Type	Effect Value	S.E.	95% CI Lower Bound	95% CI Upper Bound	Does CI Include 0?	Significance
	Total Effect	0.425	0.043	0.341	0.509	No	Significant
CA	Direct Effect	0.240	0.058	0.126	0.354	No	Significant
	Indirect Effect (CA→CDSE→SDS)	0.291	0.041	0.211	0.371	No	Significant
	Total Effect	0.531	0.045	0.443	0.619	No	Significant
CP	Direct Effect	0.280	0.058	0.166	0.394	No	Significant
	Indirect Effect (CP→CDSE→SDS)	0.281	0.043	0.203	0.359	No	Significant
	Total Effect	0.561	0.046	0.471	0.651	No	Significant
AM	Direct Effect	0.112	0.062	-0.008	0.228	Yes	Not Significant
	Indirect Effect (AM→CDSE→SDS)	0.212	0.037	0.134	0.271	No	Significant
	Total Effect	0.310	0.044	0.224	0.396	No	Significant

Uniform significance of indirect effects: For all five exogenous variables, the 95% Bootstrap CIs of their indirect effects on SDS Usage Intention (via CDSE) do not include 0 (e.g., TA: [0.172, 0.318]; AM: [0.130, 0.270]). This confirms that CDSE universally plays a mediating role in the relationships between Technology Acceptance, Organizational Support, Career Adaptability, Career Planning, Achievement Motivation, and SDS Usage Intention—consistent with the theoretical expectation that "psychological factors affect technology adoption behavior through self-efficacy".

3.Differences in Mediating Effect Types

Partial mediation for TA, OS, CA, and CP: After incorporating CDSE into the model, the direct effects of TA (β=0.190, p<0.01), OS (β=0.160, p<0.01), CA (β=0.240, p<0.001), and CP (β=0.280, p<0.001) on SDS Usage Intention remain significant. This indicates that these four variables not only indirectly drive teachers' willingness to use SDS by enhancing their career decision-making self-efficacy but also exert a direct impact—possibly because factors like "perceived ease of use of technology" (TA) and "clear career goals" (CP) can directly reduce barriers to SDS adoption, independent of self-efficacy.

Full mediation for AM: The direct effect of Achievement Motivation (AM) on SDS Usage Intention is no longer significant (β=0.110, p=0.068) after controlling for CDSE, while its indirect effect via CDSE remains significant (β=0.200, p<0.001). This suggests that the influence of achievement motivation on SDS usage intention is entirely transmitted through CDSE: only when teachers' internal motivation to pursue achievement is converted into confidence in career decision-making (CDSE) can it further translate into specific willingness to use SDS.

Relative strength of mediating effects: Among the five variables, Career Adaptability (CA) has the strongest indirect effect via CDSE (β=0.291), followed by Career Planning (CP, β=0.281) and Organizational Support (OS, β=0.265). This implies that improving teachers' ability to adapt to career changes and clarifying their career plans may be more effective in enhancing CDSE, thereby promoting SDS adoption—providing targeted insights for subsequent intervention strategies.

Table 7: Summary Table of Hypothesis Testing Results

Hypothesis No.	Effect Type	Standardized Effect Value	p-Value	95% Confidence Interval (CI)	Mediation Effect Type	Hypothesis Testing Result	Remarks
H1a	Direct Effect	0.19	0.001	[0.075, 0.305]	-	Supported	Direct path is significant
H1b	Indirect Effect	0.245	<0.001	[0.172, 0.318]	Partial Mediation	Supported	CI of indirect path does not include 0
H2a	Direct Effect	0.16	0.006	[0.046, 0.274]	-	Supported	Direct path is significant
H2b	Indirect Effect	0.265	<0.001	[0.190, 0.340]	Partial Mediation	Supported	CI of indirect path does not include 0

Hypothesis No.	Effect Type	Standardized Effect Value	p-Value	95% Confidence Interval (CI)	Mediation Effect Type	Hypothesis Testing Result	Remarks
H3a	Direct Effect	0.24	<0.001	[0.126, 0.354]	-	Supported	Direct path is significant
H3b	Indirect Effect	0.291	<0.001	[0.211, 0.371]	Partial Mediation	Supported	Strongest indirect effect
H4a	Direct Effect	0.28	<0.001	[0.166, 0.394]	-	Supported	Strongest direct effect
H4b	Indirect Effect	0.281	<0.001	[0.203, 0.359]	Partial Mediation	Supported	CI of indirect path does not include 0
H5a	Direct Effect	0.112	0.068	[-0.008, 0.228]	-	Not Supported	CI of direct path includes 0, p>0.05
H5b	Indirect Effect	0.212	<0.001	[0.134, 0.271]	Full Mediation	Supported	Only indirect path is significant; direct path is invalid

5. Conclusions and Recommendation

5.1. Conclusions

This study focused on teachers in higher vocational colleges and used Structural Equation Modeling (SEM) to reveal the mediating mechanism of Career Decision-Making Self-Efficacy (CDSE) between Technology Acceptance (TA), Organizational Support (OS), Career Adaptability (CA), Career Planning (CP), Achievement Motivation (AM), and the willingness to use the Smart Career Development System (SDS). By integrating Bandura′s Self-Efficacy Theory, the Technology Acceptance Model (TAM), and Career Construction Theory, this study aligns with and supplements existing research findings. The specific conclusions and associated analyses are as follows:

CDSE exerts a partial mediating effect between TA, OS, CA, CP and SDS usage willingness (the proportion of OS′s indirect effect is 62.4%, and that of CP is 50.1%), and a full mediating effect between AM and SDS usage willingness (the proportion of indirect effect is 64.5%), which is consistent with the core of the theory that "self-efficacy connects psychological/environmental variables with behavioral willingness".

It is consistent with the conclusion of Zhang et al. (2025) (the proportion of CP′s mediating effect is about 55%), verifying the stable role of CDSE in the "career planning → technology use" pathway;It fills the gap in Li & Wang (2023): clarifying that AM must be converted into SDS usage willingness through CDSE (no direct effect), which echoes the assertion of Zhao et al. (2021) that "achievement motivation is transformed into behavior relying on self-efficacy".

CP (β=0.561) and CA (β=0.531) have the strongest total effects on SDS usage willingness, while AM (β=0.310) has the weakest total effect and must rely on CDSE for transmission, which is in line with the theoretical logic that "individuals construct development paths through career adaptation and planning".

Consistent with Wang et al. (2022), it confirms that "career planning is the core antecedent of technology adoption for vocational college teachers";It supports the conclusion of Li (2023), further quantifying the effect of CA and revealing the mediating role of CDSE;It echoes the finding of Zhou and Liu (2022) that "the transformation efficiency of AM is low", and proposes the solution of "improving CDSE to enhance transformation efficiency".

Age (the predictive power of CDSE for the 46-50 age group is β=0.512, which is higher than β=0.389 for the 25-35 age group), SDS perceived ease of use (the indirect effect of CDSE under high ease of use is 0.298, which is higher than 0.173 under low ease of use), and school training (the predictive power of AM→CDSE in the training group is β=0.521, which is higher than 0.397 in the non-training group) all have moderating effects, supplementing the application of the theories in the context of vocational education.

It expands TAM: clarifying that perceived ease of use affects SDS usage by moderating CDSE, which echoes the conclusion of Chen et al. (2023);It verifies the rule proposed

by Zhao (2021) that "senior teachers have stronger predictive power of self-efficacy";Consistent with Organizational Support Theory, it indicates that training is the key to activating the AM→CDSE→SDS pathway.

5.2 Recommendation

Based on the conclusions, recommendations are proposed from three levels: At the individual teacher level, focus on improving psychological capabilities to adapt to intelligent tools. Clarify career goals (e.g., "dual-qualified teacher") via career development workshops and industry seminars, make phased plans with SDS (e.g., one assessment per week to accumulate experience), and enhance CDSE through reviewing successful experiences, peer communication, and achieving micro-goals to convert AM into SDS usage behavior. At the school level, build a "support-training-incentive" system. Provide hierarchical training (advanced technology/planning methods for young teachers, basic operations/function matching for senior teachers), integrate SDS training into continuing education, set up career psychological counseling posts, and establish incentives (e.g., usage points for training, "SDS Model User" selection). At the SDS development level, balance ease of use and function matching. Simplify processes, optimize interfaces for elderly teachers, add new-user guidance, integrate modules like industry resource connection and skill course recommendation (for "dual-qualified" needs) and CDSE self-assessment, and regularly push usage effect reports to strengthen teachers' confidence and provide technical support for CDSE.

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