



Determinants of Career Goals among Chinese Vocational College Students: Insights from Social Cognitive Career Theory in a Digital Learning Context

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Abstract

The formation of clear career goals is critical for vocational college students to successfully navigate the transition from education to employment. In the post-pandemic era, digital learning platforms and blended learning environments have become integral to vocational education in China, offering new opportunities to support students' professional development. Drawing on Social Cognitive Career Theory (SCCT), this study investigates the determinants of career goals among Chinese vocational college students in a digital learning context. Data were collected from 400 students in a vocational college in Zhejiang Province using a structured questionnaire measuring vocational interests, outcome expectations, career barriers, career self-efficacy, career values, and career goals. Students' participation in digital learning activities, including mobile learning platform usage and blended course engagement, was also recorded. Structural equation modeling (SEM) was employed to examine the hypothesized relationships. The results indicate that vocational interests, outcome expectations, career self-efficacy, and career values positively influence career goals, while career barriers exert a significant negative effect. Students with higher engagement in digital learning platforms demonstrated clearer career goals than those with lower engagement. The SCCT model exhibited good fit indices, confirming its applicability in a technology-supported vocational education setting. This study contributes to the integration of educational technology and career development theory by revealing how digital learning environments can facilitate career goal formation. Practical implications include leveraging mobile learning platforms and blended courses to enhance students' career planning and goal-setting processes.

Keywords: Social Cognitive Career Theory, Career Goals, Vocational Education, Digital Learning, Mobile Learning, China

1. Introduction

In recent years, vocational education has played an increasingly crucial role in supporting China's economic transformation and workforce development. According to the Ministry of Education, over 10 million students are currently enrolled in higher vocational institutions, yet many face challenges in career decision-making and goal formation due to the rapid evolution of labor market demands and the increasing complexity of technical

occupations (Wang et al., 2023). Career goal clarity—the degree to which students can define, commit to, and plan for specific career objectives—is widely recognized as a critical predictor of career exploration, employability, and long-term professional success (Cheung et al., 2024). However, despite extensive policy initiatives aimed at improving career guidance in vocational colleges, a considerable proportion of students struggle to identify clear career paths, leading to uncertainty and delayed career decision-making.

The formation of career goals is inherently a multifactorial process involving both internal motivation and external support. Social Cognitive Career Theory (SCCT) provides a robust framework for explaining how self-efficacy, outcome expectations, vocational interests, personal values, and perceived barriers interact to shape career decision-making (Lent et al., 1994). SCCT has been successfully applied to predict career goal clarity, persistence, and decision-making quality in higher education settings, including teacher preparation and STEM programs (Shang et al., 2022; Domínguez, et al., 2022). Yet, most SCCT studies in China have focused on general universities, while vocational education contexts remain underexplored, despite their distinct student profiles and career challenges.

Concurrently, the digital transformation of education has accelerated in China, particularly in the aftermath of the COVID-19 pandemic. Vocational colleges have increasingly adopted mobile learning platforms, blended courses, and smart education technologies to deliver flexible, self-paced, and skill-oriented learning experiences (Zhang et al., 2024; Uzorka & Odebiyi, 2025). These digital environments not only support academic learning but also offer new affordances for career development, such as career planning modules, progress dashboards, and online consultation services. Recent studies suggest that active digital engagement can enhance self-efficacy, interest exploration, and decision-making confidence, making technology a potential environmental support in SCCT (Cao & Han, 2024; Ma et al., 2025). Nevertheless, few empirical studies have systematically examined how digital learning engagement interacts with SCCT variables to influence career goal clarity among vocational students.

This study addresses these gaps by integrating SCCT with digital learning engagement to examine the determinants of career goal clarity in Chinese vocational colleges. Specifically, it investigates:

1. How SCCT variables (self-efficacy, vocational interests, outcome expectations, career values, and perceived barriers) predict career goal clarity;
2. Whether digital learning engagement functions as an independent predictor of goal clarity; and
3. Whether digital engagement moderates the pathways from internal motivation to career goal clarity.

By addressing these questions, the study makes three key contributions. First, it extends SCCT to a technology-enhanced vocational context, providing empirical evidence of how environmental supports interact with psychological determinants. Second, it highlights the role of digital learning engagement as a catalyst for career goal formation, bridging career development theory and educational technology practice. Third, the findings provide actionable insights for vocational educators and platform designers, suggesting that well-designed digital interventions can strengthen students' self-efficacy and career planning, ultimately improving employability and career readiness.

2. Literature Review

2.1 Social Cognitive Career Theory (SCCT) and Its Core Constructs

Social Cognitive Career Theory (SCCT; Lent et al., 1994) is a widely recognized framework for explaining how individuals develop career interests, form career goals, and take

corresponding actions. It emphasizes the dynamic interaction of self-efficacy, outcome expectations, vocational interests, personal values, and perceived barriers in shaping career behavior. Self-efficacy and outcome expectations are regarded as proximal determinants, while vocational interests and personal values provide motivational direction. Perceived barriers and supports function as environmental moderators that may either facilitate or hinder career goal formation.

Recent empirical evidence has demonstrated SCCT's applicability across diverse educational contexts. In Chinese vocational and teacher education settings, for instance, SCCT has been applied to predict career decision-making, goal clarity, and engagement outcomes. Cao and Han (2024) found that academic self-efficacy mediated the effect of feedback perception on online learning engagement among vocational students, indirectly supporting SCCT pathways in digital education. Similarly, Shang et al. (2022) showed that occupational self-efficacy and outcome expectations significantly mediated the relationship between career calling and learning engagement in preservice teachers, underscoring the central role of SCCT constructs in shaping career-related behaviors.

While these findings affirm SCCT as a robust theoretical foundation, research remains uneven. The majority of prior studies have been conducted in general universities or teacher education programs, whereas vocational education—characterized by different student demographics, labor-market pressures, and skill-oriented curricula—has received comparatively less attention. Moreover, although SCCT explicitly acknowledges environmental supports and barriers, existing research often conceptualizes these supports narrowly, focusing on family, peers, or institutional guidance. The potential of digital learning engagement as an environmental factor has rarely been systematically examined. This gap suggests the need to extend SCCT into technology-enhanced vocational contexts, where digital platforms may not only provide resources but also reshape the mechanisms through which self-efficacy, interests, and outcome expectations influence career goal clarity.

2.2 Self-Efficacy and Vocational Interests

Self-efficacy - the belief in one's capability to perform career-related tasks - is a central predictor in SCCT. Students with higher career self-efficacy are more likely to engage in career exploration, seek relevant experiences, and set specific and actionable career goals. High self-efficacy also buffers against the demotivating effects of perceived barriers. Vocational interests, as another core construct, represent intrinsic preferences for certain professional domains and drive persistent engagement with career-related tasks.

Multiple studies in Chinese vocational education support these mechanisms. Jiang and Zhang (2012) reported that vocational students with strong academic self-efficacy and interests were significantly more likely to form clear and specific career goals. More recently, Wang et al. (2023) developed an SCCT-based model among higher vocational students and confirmed that both self-efficacy and interest had significant positive effects on career goal clarity. These findings are consistent with global SCCT research, which identifies self-efficacy and interest as foundational motivational drivers in career development (Lent et al., 2013; Wang et al., 2023).

However, existing studies often take these constructs as universally applicable, paying limited attention to contextual differences between vocational and academic higher education. Vocational students, for example, may experience unique challenges such as limited access to internships, stronger parental expectations, or more volatile labor market conditions, which could influence the way self-efficacy and interests translate into career goals. Furthermore, most prior studies focus on traditional learning environments, overlooking the possibility that digital engagement may strengthen or weaken the role of self-efficacy and interests in shaping career clarity. Addressing these contextual gaps is essential for extending SCCT to technology-

supported vocational education.

2.3 Outcome Expectations, Career Values, and Perceived Barriers

Outcome expectations reflect students' anticipation of the consequences of pursuing specific career paths, such as income potential, job security, or social prestige. Positive outcome expectations reinforce commitment to career goals, while negative expectations can suppress goal formation. Career values provide the internal framework for evaluating long-term occupational choices. Students who prioritize values such as social contribution, autonomy, or work–life balance are more likely to pursue congruent career goals and maintain persistence in goal-directed actions.

Conversely, perceived barriers—including labor market uncertainty, limited internship opportunities, or lack of parental support—can hinder students' ability to translate interests and values into concrete goals. In SCCT, perceived barriers operate as contextual constraints that can weaken the effect of self-efficacy and outcome expectations. Wang et al. (2023) confirmed that outcome expectations and career values positively predicted career goal clarity, while perceived barriers had a significant negative effect. Similar patterns were observed in Esparza et al. (2025), where environmental challenges reduced the strength of self-efficacy pathways toward career decision-making. These studies highlight the dual nature of SCCT: career goal formation depends on both individual motivation and the perception of environmental feasibility (Domínguez, et al., 2022; Wang et al., 2023).

However, existing literature often conceptualizes outcome expectations and values in relatively narrow economic or psychological terms, without sufficiently considering cultural or institutional contexts. For vocational college students, career values may be strongly shaped by local labor demands, family expectations, or regional development policies, which traditional SCCT models rarely address. Similarly, perceived barriers are frequently treated as static constraints, yet in digital learning environments, technology itself may serve as both a barrier (e.g., unequal access, digital fatigue) and a support (e.g., online mentoring, virtual internships). Thus, while current studies validate the significance of these constructs, they also reveal the need for a more nuanced framework that captures how values and barriers evolve in technology-mediated vocational education settings.

2.4 Digital Learning Environments in Vocational Education

The COVID-19 pandemic catalyzed the rapid expansion of digital learning and blended teaching models in Chinese vocational colleges. Mobile learning platforms, such as Chaoxing Learning and Rain Classroom, have been widely adopted to deliver flexible, self-paced, and interactive learning experiences. These platforms integrate online courses, discussion forums, resource libraries, and even career planning modules, supporting both academic learning and professional development.

Zhang et al. (2024) found that digital technology usage significantly influenced student satisfaction in vocational colleges, both directly and indirectly through learning experience and engagement. Ma et al. (2025) emphasized the importance of infrastructure readiness, high-quality digital resources, and enhanced digital competencies for effective vocational digital transformation. These findings indicate that digital learning has moved beyond mere content delivery to serve as a comprehensive environment for student engagement and career preparation.

Nevertheless, existing research often emphasizes the technical dimension of digital adoption (e.g., infrastructure and resource provision) while paying less attention to its psychological and career-related outcomes. In particular, there is limited discussion on how digital engagement shapes motivational constructs such as self-efficacy, interests, and values—core elements of SCCT. For vocational students, whose career pathways are strongly tied to

applied skills and labor market realities, understanding this psychological dimension of digital learning environments is essential but still underexplored.

2.5 Educational Technology and Career Development

Educational technology can play a crucial role in career development by enhancing self-efficacy, supporting interest exploration, and providing structured career planning resources. Mobile learning platforms frequently incorporate career guidance modules, resume-building tools, and online consultation services. These features allow students to monitor progress, receive timely feedback, and visualize their career pathways, thereby reinforcing goal clarity.

Empirical studies support this linkage between technology and career development outcomes. Cao and Han (2024) found that online engagement mediated the relationship between feedback and motivational outcomes, suggesting that technology-enabled feedback loops strengthen SCCT's motivational pathways. Uzorka and Odebiyi (2025) further observed that smart education technologies—such as AI-assisted instruction and VR-based training—enhanced students' engagement and perceived competence in vocational contexts. Collectively, these findings suggest that digital learning engagement functions as an environmental support within SCCT, reinforcing psychological predictors of career goal formation.

Despite these promising findings, most studies focus on isolated tools or short-term interventions, often overlooking the sustained impact of digital technologies on long-term career goal clarity. Moreover, while international scholarship increasingly explores digital career guidance and online mentoring, such perspectives are rarely integrated into Chinese vocational research. A more holistic view is needed, positioning educational technology not merely as a delivery tool but as an environmental support that interacts with SCCT variables over time.

2.6 Integrating SCCT with Digital Learning

Although SCCT has been extensively validated in conventional educational settings, its integration with digital learning environments is still emerging. SCCT explicitly acknowledges environmental supports and barriers as key determinants of career development. Digital learning engagement can thus be conceptualized as a positive environmental input that amplifies the effects of self-efficacy, interest, and outcome expectations on career goal clarity. Embedding digital variables into the SCCT model addresses a significant research gap by linking psychological motivation with technology-rich learning contexts.

However, the literature has yet to fully theorize potential boundary conditions. For instance, while digital engagement may enhance motivational pathways, it could also introduce risks such as unequal access, digital fatigue, or over-reliance on online platforms. These factors complicate the assumption that digital learning is uniformly beneficial. Recognizing both supportive and constraining aspects is crucial for refining SCCT in contemporary vocational education.

This integration also has practical implications for vocational education. By understanding how digital engagement interacts with SCCT constructs, educators and platform designers can develop technology-enhanced career interventions, such as goal-tracking dashboards, personalized feedback loops, and online peer mentoring modules, to strengthen students' career goal clarity and commitment.

2.7 Research Hypotheses

Based on SCCT and the reviewed literature on digital learning and career development, the following hypotheses are proposed:

- H1: Vocational interests positively predict career goal clarity.
- H2: Outcome expectations positively predict career goal clarity.
- H3: Perceived barriers negatively predict career goal clarity.
- H4: Career self-efficacy positively predicts career goal clarity.
- H5: Career values positively predict career goal clarity.
- H6: Higher levels of digital learning engagement are associated with clearer career goals.

3. Research Methodology

3.1 Research Design

This study employed a cross-sectional quantitative survey design to examine the determinants of career goal clarity among Chinese vocational college students in a digital learning context. The survey method was chosen because it enables the systematic collection of self-reported data across multiple Social Cognitive Career Theory (SCCT) constructs, including self-efficacy, vocational interests, outcome expectations, career values, and perceived barriers. Additionally, it captures students' engagement with mobile learning platforms and blended courses, which was conceptualized as a form of environmental support in SCCT.

To test the hypothesized structural relationships, Structural Equation Modeling (SEM) was employed. SEM was selected because it allows simultaneous testing of the measurement model and the structural paths between latent variables, while accounting for measurement error. This approach is widely applied in SCCT-based career research and educational technology studies due to its robustness in handling complex constructs and environmental moderators (Kline, 2023; Wang et al., 2023). Although this cross-sectional design provides efficiency in testing structural relationships, it does not permit strong causal inferences. Future research should adopt longitudinal or experimental designs to examine the dynamic effects of digital engagement on SCCT pathways.

3.2 Participants and Sampling

Participants were 400 students recruited from two vocational colleges in Zhejiang Province, China. The two colleges were chosen because they represent diverse majors, have relatively large student enrollments, and have actively implemented mobile learning platforms, which enhances their relevance for studying digital engagement in vocational education. To ensure representation across disciplines, stratified cluster sampling was applied based on major categories (engineering, business, healthcare, and arts) and year level (first through third year).

The final sample included 211 females (52.8%) and 189 males (47.2%), with an age range of 17 to 22 years ($M = 19.8$, $SD = 1.2$). Regarding digital learning engagement, 45% of participants were high-frequency users of mobile learning platforms (logging in at least 4 days per week), and 55% were low-to-moderate users (logging in ≤ 3 days per week). These engagement levels were later used in a multi-group SEM to explore the potential moderating role of digital learning.

The target sample size exceeded the recommended threshold for SEM analysis, which requires at least 200 participants and ideally 10 cases per estimated parameter, ensuring sufficient statistical power and model stability (Kline, 2023). Nevertheless, as the sample was geographically concentrated in Zhejiang Province, caution should be exercised in generalizing the findings to all Chinese vocational students.

3.3 Measures

All measures were adapted from validated SCCT instruments and adjusted for Chinese

vocational education contexts. The scales were translated into Chinese and back-translated into English to ensure linguistic and conceptual equivalence. Adaptations were made to fit vocational education contexts (e.g., replacing general career tasks with examples relevant to vocational majors). Items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). A pilot study with 50 students confirmed the clarity and reliability of the items.

1. Career Self-Efficacy: Measured with 5 items adapted from the Career Decision-Making Self-Efficacy Scale – Short Form (CDMSE-SF) (Betz & Taylor, 2012). Sample item: “I am confident that I can identify a career that suits my abilities.” Cronbach’s $\alpha = .85$.

2. Vocational Interests: Measured using 5 items reflecting intrinsic interest in career-related activities (Jiang & Zhang, 2012). Sample: “I enjoy exploring tasks related to my desired occupation.” $\alpha = .82$.

3. Outcome Expectations: Measured with 4 items adapted from SCCT literature, reflecting perceived benefits of goal attainment (Lent et al., 2013). Example: “If I pursue my career goal, I will gain stable employment and recognition.” $\alpha = .80$.

4. Career Values: Measured with 4 items assessing the alignment between personal values and career pursuits (Wang et al., 2023). Sample: “My career choice should reflect my core personal values.” $\alpha = .81$.

5. Perceived Career Barriers: 4 items assessing internal and external obstacles, such as market uncertainty and lack of guidance (Domínguez, et al., 2022). Sample: “Even if I have a career goal, I face many barriers to achieving it.” $\alpha = .79$.

6. Career Goal Clarity: 5 items measuring specificity and commitment to career goals (Wang et al., 2023). Sample: “I have a clear career goal and know what I need to do to achieve it.” $\alpha = .87$.

7. Digital Learning Engagement: A composite measure including mobile learning usage frequency, blended course participation, and self-reported active engagement (Zhang et al., 2024). Sample: “I actively use mobile learning platforms to explore career-related content.” $\alpha = .83$.

Reliability and validity were further confirmed through Confirmatory Factor Analysis (CFA), with thresholds of Cronbach’s $\alpha > 0.70$, Composite Reliability (CR) > 0.70 , and Average Variance Extracted (AVE) > 0.50 .

3.4 Procedure

Data collection took place from March to May 2024 via an online survey embedded in the colleges’ mobile learning platform (Chaoxing Learning). Students were invited during career guidance classes and informed that participation was voluntary and anonymous.

Ethical approval was obtained from the Institutional Review Board of Zhejiang Vocational University (IRB #2024-VET-015). The study complied with the ethical principles of the Declaration of Helsinki. Participants provided electronic informed consent, were assured of confidentiality, and were informed of their right to withdraw from the study at any time without penalty. Data cleaning procedures included removing responses with $>20\%$ missing data or straight-line response patterns, yielding the final sample of 400 valid cases.

3.5 Data Analysis

Data analysis followed three stages:

1. Preliminary Analysis: Descriptive statistics and Pearson correlations were computed using SPSS 27.0 to examine data distribution and initial relationships.

2. Measurement Model Evaluation: CFA using Mplus 8.3 was conducted to verify construct validity. Model fit was assessed with standard indices (χ^2/df , CFI, TLI, RMSEA, SRMR), all of which met recommended thresholds (Hu & Bentler, 1999).

3. Structural Model Testing: SEM was applied to test the hypothesized SCCT model and examine direct effects of psychological and environmental predictors on career goal clarity. Multi-group SEM compared high vs. low digital engagement groups, and bootstrapping with 5,000 resamples was used to estimate the significance of path coefficients and indirect effects. This allowed us to explore whether the effects of SCCT constructs differed across engagement levels, ensuring both psychometric rigor and substantive insights into vocational education contexts.

4. Results

4.1 Preliminary Analysis

Prior to hypothesis testing, descriptive statistics, skewness, and kurtosis were examined to ensure normality. All variables exhibited acceptable skewness and kurtosis (within ± 2), supporting their suitability for SEM. Means (M), standard deviations (SD), skewness, and kurtosis are reported in Table 1.

Table 1 Descriptive Statistics of Study Variables (N = 400)

Variable	M	SD	Skewness	Kurtosis
Career Self-Efficacy	3.71	0.68	-0.41	-0.18
Vocational Interests	3.84	0.65	-0.33	-0.12
Outcome Expectations	3.69	0.72	-0.29	-0.27
Career Values	3.92	0.63	-0.36	-0.08
Perceived Career Barriers	2.81	0.77	0.41	-0.35
Digital Learning Engagement	3.55	0.71	-0.21	-0.22
Career Goal Clarity	3.78	0.70	-0.39	-0.17

Note. Skewness and kurtosis within ± 2 indicate acceptable normality.

4.2 Reliability and Validity

Reliability and convergent validity were assessed using Cronbach's α , Composite Reliability (CR), and Average Variance Extracted (AVE). All scales demonstrated strong reliability ($\alpha = 0.79$ – 0.87) and adequate convergent validity (AVE = 0.51 – 0.66). See Table 2.

Table 2 Reliability and Convergent Validity of Constructs

Construct	Cronbach's α	CR	AVE
Career Self-Efficacy	0.85	0.86	0.55
Vocational Interests	0.82	0.83	0.53
Outcome Expectations	0.80	0.81	0.52
Career Values	0.81	0.82	0.54
Perceived Career Barriers	0.79	0.80	0.51
Digital Learning Engagement	0.83	0.84	0.56
Career Goal Clarity	0.87	0.88	0.66

Note. AVE > 0.50 and CR > 0.70 indicate acceptable convergent validity.

4.3 Correlation Analysis

Pearson correlation analysis indicated that career goal clarity was positively correlated with self-efficacy ($r = 0.45$, $p < .01$), vocational interests ($r = 0.41$, $p < .01$), outcome expectations ($r = 0.36$, $p < .01$), and career values ($r = 0.33$, $p < .01$), and negatively correlated with perceived barriers ($r = -0.29$, $p < .01$). Digital learning engagement was moderately correlated with self-efficacy ($r = 0.32$, $p < .01$) and career goal clarity ($r = 0.29$, $p < .01$), supporting the hypothesized relationships.

4.4 Structural Equation Modeling

The measurement model showed excellent fit: $\chi^2/df = 1.92$, CFI = 0.956 , TLI = 0.948 , RMSEA = 0.048 , SRMR = 0.041 .

The structural model also demonstrated good fit: $\chi^2/df = 1.96$, CFI = 0.952 , TLI = 0.944 , RMSEA =

0.049, SRMR = 0.046.

Standardized path coefficients are reported in Table 3, and the structural model is visualized in Figure 1.

Table 3 SEM Path Coefficients for Hypothesized Model

Path	β	p	Supported?
H1: Vocational Interests → Career Goals	0.23	<.001	Yes
H2: Outcome Expectations → Career	0.18	<.01	Yes
Goals			
H3: Perceived Barriers → Career Goals	– 0.19	<.01	Yes
H4: Self-Efficacy → Career Goals	0.27	<.001	Yes
H5: Career Values → Career Goals	0.21	<.01	Yes
H6: Digital Engagement → Career Goals	0.17	<.05	Yes

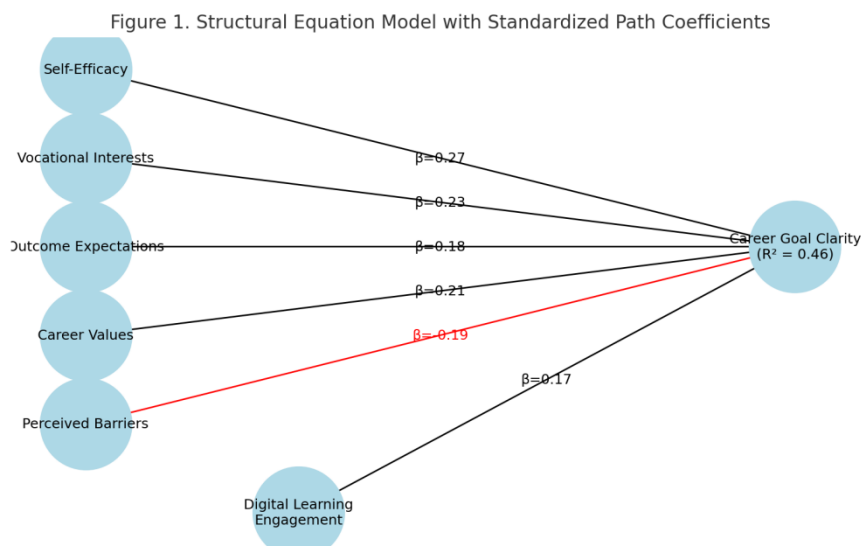


Figure 1. Structural equation model with standardized path coefficients (N = 400).

Note. Solid lines represent significant paths ($p < .05$). $R^2 = 0.46$ indicates explained variance in career goal clarity.

4.5 Multi-Group Analysis

Participants were divided into high digital engagement ($n = 180$) and low engagement ($n = 220$) groups.

Multi-group SEM confirmed configural and metric invariance ($\Delta CFI < 0.01$).

Key differences emerged in the self-efficacy → career goal clarity pathway:

High engagement: $\beta = 0.31$, $p < .001$

Low engagement: $\beta = 0.19$, $p < .05$

$\Delta\chi^2 = 4.86$, $p < .05$

This suggests that digital engagement strengthens the effect of self-efficacy on goal clarity. Vocational interests showed a non-significant trend ($\beta = 0.25$ vs. 0.18), while outcome expectations and career values were stable across groups. The results indicate that students actively engaged in digital learning platforms translate confidence into clearer goals more effectively, likely due to access to career resources and feedback mechanisms.

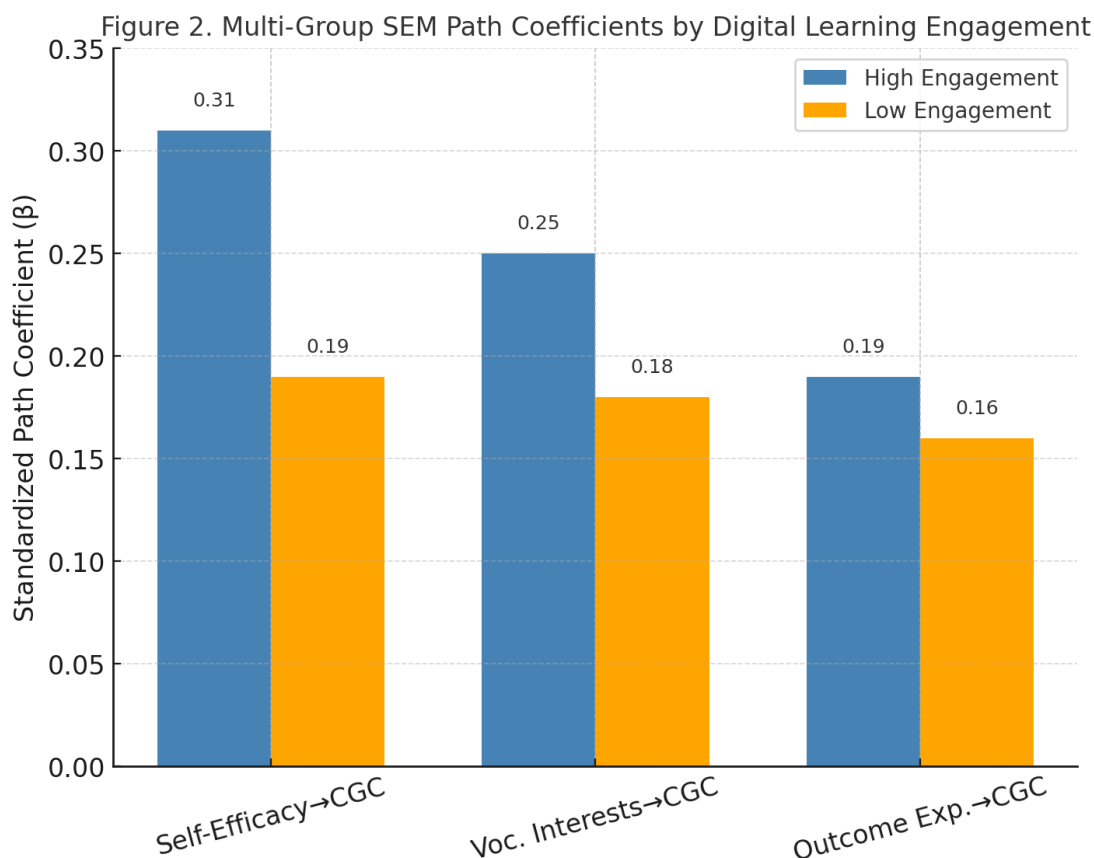


Figure 2. Standardized path coefficients by digital learning engagement level.

Note. High engagement ($n = 180$) vs. low engagement ($n = 220$). The self-efficacy $\rightarrow$ career goal clarity path difference is significant ($\Delta\chi^2 = 4.86$, $p < .05$).

5. Conclusion

This study examined the determinants of career goal clarity among Chinese vocational college students by integrating Social Cognitive Career Theory (SCCT) with digital learning engagement. The results demonstrate that career self-efficacy, vocational interests, outcome expectations, and career values positively contribute to goal clarity, whereas perceived barriers exert a negative effect. Importantly, digital learning engagement emerged as both a direct positive predictor and a moderator, strengthening the pathways from self-efficacy to career goal clarity. These findings highlight the joint influence of motivational and environmental factors on vocational students' career development.

The study offers several theoretical contributions. First, it extends SCCT into a technology-enhanced vocational context, where few studies have systematically explored its mechanisms. Second, it clarifies the moderating role of digital engagement, showing that environmental supports amplify the influence of internal motivation. Third, it bridges motivational and environmental perspectives, offering a holistic framework that links self-efficacy, interests, and values with technology-rich learning environments. Together, these contributions not only advance SCCT but also respond to calls for more critical engagement with the integration of digital contexts into career development theories.

Beyond theoretical significance, the findings carry practical implications for vocational education administrators, instructors, and platform designers. Vocational colleges should leverage mobile and blended platforms to deliver career planning modules, goal-tracking dashboards, and online counseling services that help students clarify their goals. Because self-

efficacy is a particularly strong predictor of goal clarity—especially among highly engaged students—platforms can incorporate interactive tasks, gamified achievements, and peer collaboration tools to reinforce confidence. Moreover, digital affordances such as virtual internships and labor market dashboards can mitigate perceived barriers. These practices are especially important in vocational contexts, where students often face more limited access to career guidance than their peers in academic universities.

Despite these contributions, several limitations remain. The cross-sectional design restricts causal inference, suggesting that longitudinal or experimental studies are needed to capture dynamic relationships over time. Digital engagement was measured through self-report, which may be influenced by recall or social desirability bias; future research could employ platform log data for greater objectivity. The geographic focus on two Zhejiang colleges limits generalizability, and expanding to multi-region, multi-discipline samples would strengthen external validity. Finally, this study treated digital engagement as a composite construct, whereas future work should disentangle the effects of specific technological features such as AI recommendations, peer mentoring modules, or e-portfolio tools. Addressing these limitations will enhance methodological rigor and deepen our understanding of how digital environments reshape SCCT processes in vocational education.

In conclusion, this study demonstrates that career goal clarity among vocational students is shaped by the synergy of internal motivational resources and external technological supports. By embedding digital learning engagement into SCCT, it advances both career development theory and educational technology research, while offering actionable strategies for strengthening vocational students' confidence, interests, and career planning skills to support their transition into the workforce. These statistical findings not only validate the hypothesized SCCT model but also raise important questions about their theoretical and practical implications, which are elaborated in the following discussion.

6. Discussion

This study investigated the determinants of career goal clarity among Chinese vocational college students by integrating Social Cognitive Career Theory (SCCT) with digital learning engagement. Consistent with prior SCCT research (Lent et al., 2013; Wang et al., 2023), self-efficacy, vocational interests, outcome expectations, and career values positively predicted goal clarity, while perceived barriers exerted a negative influence. These findings reaffirm SCCT's premise that motivational resources facilitate, whereas contextual constraints hinder, career goal formation. At the same time, digital learning engagement emerged as both a direct predictor and a moderator, highlighting its role as an environmental support in contemporary vocational education.

6.1 Alignment and Divergence with Prior Studies

The strong influence of self-efficacy aligns with extensive evidence confirming its central role in career development (Lent et al., 1994; Jiang & Zhang, 2012). Vocational interests and outcome expectations also contributed significantly, consistent with findings in higher education and teacher training contexts (Shang et al., 2022). Nevertheless, the relatively weaker role of career values requires further reflection. While SCCT assumes values to guide long-term career pursuit, vocational students may be more immediately influenced by short-term employment stability or parental expectations, particularly in the Chinese context. This suggests that SCCT may understate the weight of sociocultural and structural pressures when applied outside Western higher education systems (Tang, 2020).

The negative effect of perceived barriers confirms their status as contextual constraints but also points to the specific vulnerabilities of vocational students. Limited internship opportunities, uncertain labor markets, and resource gaps may not only weaken motivational drivers but, in some cases, overshadow them entirely. This observation raises the possibility

that barriers in vocational settings function less as moderators and more as dominant determinants, an aspect that warrants greater theoretical consideration within SCCT applications.

Digital engagement emerged as a novel extension of SCCT. The stronger self-efficacy → goal clarity pathway among high-engagement students illustrates how technology amplifies psychological mechanisms, echoing findings that online platforms provide feedback and opportunities to translate confidence into concrete action (Cao & Han, 2024). However, this effect should be interpreted cautiously. Overreliance on digital tools may create inequities, as students with weaker digital literacy or limited access are less likely to benefit. Thus, while engagement strengthens SCCT pathways, it may simultaneously reinforce educational disparities—an issue that existing research has yet to address sufficiently.

6.2 Theoretical and Practical Implications

Theoretically, this study advances SCCT by demonstrating that environmental supports can be digital as well as social or institutional. Digital learning engagement should not be viewed as a passive background factor but as an active, dynamic input that both predicts and moderates career goal formation. This reconceptualization positions SCCT as adaptable to technology-rich educational environments.

Practically, the results provide clear implications for vocational education. Mobile and blended platforms can be leveraged to deliver career planning modules, dashboards, and virtual internships, reinforcing self-efficacy and goal clarity. Such interventions are especially important in vocational colleges, where individualized career counseling is often limited compared to universities. At the same time, educators and policymakers must remain attentive to risks such as unequal access and digital fatigue, ensuring that technological supports are inclusive and sustainable.

6.3 Critical Reflections and Future Directions

Despite its contributions, this study also highlights several areas for further research. The weaker role of career values suggests that SCCT constructs may operate differently across educational tracks, pointing to the need for culturally and institutionally sensitive adaptations. Furthermore, digital engagement was operationalized as a composite construct; future studies should disentangle the effects of specific features—such as peer communities, AI career recommendations, or e-portfolio tools—using log-data analytics or experimental designs. Finally, the cross-sectional nature of this study precludes causal inference, and longitudinal or mixed-methods approaches are needed to capture the dynamic interplay between motivation, barriers, and digital engagement.

7. Suggestions

Building on the theoretical and practical implications discussed above, several actionable strategies are recommended for vocational education stakeholders—including administrators, instructors, and policymakers—to enhance students' career goal clarity in digitally supported contexts.

First, integrate digital career guidance into institutional strategies. Since digital engagement was found to directly and indirectly promote career goal clarity, vocational colleges are encouraged to systematically embed career planning modules, progress-tracking dashboards, and online counseling services into mobile and blended platforms. Such integration can create a structured environment that provides real-time feedback and fosters self-regulation, thereby translating engagement into concrete goal formation.

Second, strengthen students' self-efficacy and intrinsic motivation. The strong predictive role of self-efficacy suggests that instructors should design interactive, task-oriented, and gamified learning activities that explicitly connect coursework to career pathways. Peer collaboration, reflective tasks, and project-based learning may further reinforce students'

confidence and help sustain intrinsic motivation in pursuing career goals.

Third, reduce perceived career barriers through targeted interventions. Given that perceived barriers negatively affected goal clarity, administrators and career service offices should consider offering virtual internships, labor market information dashboards, and structured mentorship programs. Clear communication of employment pathways and opportunities can alleviate uncertainty, enhance perceived feasibility, and strengthen students' commitment to career objectives.

Finally, promote evidence-based digital innovation. As engagement varied across students, policymakers and platform developers are advised to analyze digital trace data to identify which platform features most effectively support career development. Tailoring interventions to actual usage patterns can optimize digital investments and build a sustainable ecosystem for technology-enhanced career guidance.

By linking these recommendations directly to empirical findings, this study underscores how vocational colleges can leverage the synergy between psychological motivation and digital supports to strengthen students' career readiness and facilitate smoother transitions into the workforce.

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