

THE IMPACT OF PROFESSIONAL IDENTITY AND INNOVATIVE SELF-EFFICACY ON COLLEGE STUDENTS' INNOVATIVE BEHAVIOR

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Abstract: This study explores the impact of professional identity and innovative self-efficacy on the innovative behavior of college students from different majors. It examines the relationship between the independent variables of professional identity and innovative self-efficacy and the dependent variable of innovative behavior among college students. A quantitative study was conducted with 450 samples, and 399 valid questionnaires were collected. Descriptive analysis, correlation analysis, and regression analysis of the independent and dependent variables were performed using SPSS 27.0 software. The study found that professional identity and innovative self-efficacy have significant positive effects on college students' innovative behavior. Additionally, it explored the cross-disciplinary effects. The findings of this study have important implications for educational practices and interventions to promote innovative behavior among college students, providing valuable insights for advancing academic research and practical innovation projects.

Keywords: Professional Identity, Innovative Self-Efficacy, College Students' Innovative Behavior

Introduction

Research Background

In recent decades, the field of higher education has experienced a significant transformation from traditional teaching methods to more innovative approaches. This shift has been driven by a recognition of the limitations inherent in traditional teaching models, which often do not address the diverse needs of learners or adequately prepare them for success in a complex and rapidly changing world (Zhao, 2019). Consequently, there has been a growing emphasis on fostering environments that promote active learning and innovation among students. Within this context, the concepts of professional identity and innovative self-efficacy have gained considerable attention as crucial factors influencing students' engagement in innovative activities (Smith & Turner, 2020).

Professional identity refers to an individual's sense of belonging and commitment to their chosen academic field, which is believed to foster a supportive environment conducive to innovation (Beijaard, Meijer, & Verloop, 2004). Meanwhile, innovative self-efficacy pertains to students'

confidence in their ability to propose and implement innovative solutions, playing a vital role in their participation in creative problem-solving and innovative activities (Bandura, 1997). Although the importance of these constructs is evident, their impact on innovative behavior, particularly across different academic disciplines, remains underexplored (Johnson, 2021).

Statement of the Problem

The relationship between professional identity, innovative self-efficacy, and innovative behavior among college students is a relatively unexplored area. Specifically, the extent to which these constructs influence innovation and their differential effects across various academic fields remain open questions. This study aims to fill this gap by elucidating the impact of professional identity and innovative self-efficacy on the innovative behavior of college students from different disciplines. Adopting a multidisciplinary approach, this research seeks to:

Assess the impact of professional identity on college students' innovative behavior by examining how professional identity serves as a motivating force for student innovation.

Investigate the role of innovative self-efficacy in shaping college students' innovative behavior, focusing on the influence of innovative self-efficacy on students' innovative practices and abilities.

Analyze the differences in professional identity across different disciplines to understand the variations in professional identity among students from diverse fields and the reasons behind these differences.

Explore the impact of academic disciplines on innovative self-efficacy, examining how different academic disciplines influence students' innovative self-efficacy and its subsequent impact on innovation participation.

Identify the differences in innovative behavior among college students from different disciplines, determining whether significant behavioral differences exist and explaining the possible mechanisms behind these differences.

Through this structured investigation, the study aims not only to contribute to the theoretical understanding of professional identity and innovative self-efficacy but also to provide empirical insights that can guide educational strategies aimed at fostering innovative abilities among college students.

Research Objective (s)

This study, through a series of well-defined objectives, aims to analyze the complex relationships between professional identity, innovative self-efficacy, and the innovative behavior of college students in different academic backgrounds. These objectives are intended to provide a detailed understanding of these constructs and their interactions, offering actionable insights for the development of educational strategies and policies.

1. Evaluate the impact of professional identity on innovative behavior: This objective aims to

explore how the sense of belonging and commitment to one's chosen academic field creates an environment conducive to innovation. By delving into professional identity as a psychological motivator, the study seeks to elucidate how it inspires students to engage in innovative activities and offer new insights in their academic pursuits and future professional fields.

2. Examine the role of innovative self-efficacy in promoting innovative behavior: This objective focuses on how students' beliefs in their innovative capabilities influence their actual engagement in innovative processes. The study will explore the relationship between enhanced innovative self-efficacy and increased propensity for innovative behavior, thus testing the theoretical assertion that self-efficacy is a key catalyst for innovation.

3. Identify the differential effects across disciplines: Considering the diversity of academic fields, this objective aims to distinguish the differences in the impact of professional identity and innovative self-efficacy on innovative behavior across different majors. This comparative analysis seeks to reveal how disciplinary cultures and educational emphases shape the development of target psychological constructs and their impact on students' contributions to innovation.

4. Propose educational interventions: Utilizing insights gained from the study, the goal is to develop specific educational strategies and interventions that higher education institutions can implement to promote and enhance students' innovative behavior. The recommendations will assist educators and policymakers in creating an academic environment that not only values but actively fosters innovation through enhancing students' professional identity and innovative efficacy beliefs.

By adopting this structured approach, the study endeavors to deepen the academic discourse on innovation within the context of higher education while providing practical guidelines for nurturing a new generation of innovators and thereby fostering the development of an innovative ecosystem.

Literature Review

In recent years, the exploration of factors influencing innovative behavior in educational settings has become a focal point of contemporary research, with particular emphasis on the role of psychological constructs in shaping students' inclination towards innovation. This literature review integrates the latest theoretical and empirical findings on professional identity, innovative self-efficacy, and their impact on innovative behavior, laying the foundation for this study.

Professional Identity in Higher Education

The role of professional identity in higher education is crucial for cultivating students' engagement, commitment, and overall satisfaction with their chosen fields. A study by Clark et al. (2024) explored how the Doctor of Nursing Practice (DNP) program utilized its mission, vision, and values statements to formulate curricula and foster the professional identity of nursing students. This study highlighted that professional identity extends beyond academic competence, encompassing the

adoption of professional roles and values that resonate with students' personal beliefs and the educational values advocated by the institution.

The findings of Clark et al. emphasized the critical role of professional identity in higher education, particularly in fostering a sense of mission and alignment with the values of the professional community. Moreover, the study suggested that explicitly articulated mission, vision, and values statements within educational programs can serve as effective tools in guiding the development of students' professional identities, better preparing them for future roles.

Yang and Ma (n.d.) also explored the importance of enhancing college students' professional identity to cultivate vocational capabilities and psychological well-being, thereby improving their employment prospects. They advocated for the formation of professional identity as a core focus in higher education and promoted educational approaches that combine knowledge acquisition with the development of professional identity.

These insights are vital for educational policy and program design, indicating that higher education institutions should integrate clear professional identity development goals into their curricula and student engagement strategies. Such integration not only enriches the educational experience but also more effectively prepares students for their professional roles.

Innovative Self-Efficacy as a Catalyst for Innovation

Innovative self-efficacy, derived from Bandura's theory of self-efficacy, is a central concept in our study. Bandura (1977) proposed that self-efficacy influences individuals' choices, effort levels, and persistence in the face of challenges. This concept is particularly important in the realm of innovation, as it pertains to individuals' willingness to engage in innovative activities and persist through potential difficulties and challenges.

In recent years, increasing research has focused on the relationship between innovative self-efficacy and innovative behavior. For example, Wilson and Liu (2020) demonstrated that innovative self-efficacy is a significant predictor of individuals' engagement in the innovation process. Similarly, Zhang Zhou and Liu (2018) found that high levels of innovative self-efficacy are associated with a greater likelihood of initiating and successfully implementing novel ideas.

Moreover, some studies have shown the application of innovative self-efficacy in specific educational contexts. For instance, in nursing undergraduates, the innovation climate and innovative self-efficacy positively influenced innovative behavior, with innovative self-efficacy acting as a mediator (Shen Yijing et al. 2021). This suggests that in specific disciplines and professional fields, how to enhance students' innovative self-efficacy through education and environmental settings is a question worth exploring.

Therefore, this study will further explore how students' innovative self-efficacy can be enhanced through various educational interventions and analyze how this enhancement promotes their

innovative behavior, especially in the context of higher education. By gaining a deeper understanding of these relationships, we can better design educational strategies to cultivate the key abilities of future innovators.

The Relationship Between Professional Identity, Innovative Self-Efficacy, and Innovative Behavior

The interplay between professional identity and innovative self-efficacy has garnered increasing attention due to its potential to significantly impact innovative behavior in higher education. This study aligns with Bandura's (1986) social cognitive theory, which posits that professional identity and innovative self-efficacy are critical determinants of innovative behavior. Forming professional identity in academic settings is particularly important as it shapes students' engagement and commitment, thereby fostering an environment conducive to innovation (Beijaard, Meijer, & Verloop, 2004; Trede, Macklin, & Bridges, 2012).

Recent research has enhanced this understanding by revealing how professional identity interacts with other psychological constructs, such as motivation, to enhance students' innovative outcomes. For instance, Zhu et al. (2024) found that professional identity and motivation significantly improved nursing students' innovative capabilities, illustrating the dynamic interplay of these constructs in professional education environments. This highlights the necessity for further exploration of how these relationships manifest across different disciplines and educational contexts to effectively cultivate innovative capacities (Zhu et al., 2024).

Additionally, the innovative self-efficacy construct, rooted in Bandura's work, has been expanded in recent empirical studies, confirming its crucial role in promoting innovative actions. For example, research by Chen, Zhang, and Farh (2013) demonstrated that higher self-efficacy is associated with increased innovation in professional settings. The findings from more recent studies, such as those by Wilson & Liu (2020) and Zhang Zhou & Liu (2018), supplement this by asserting that innovative self-efficacy significantly influences the initiation and successful implementation of novel ideas, emphasizing its role as a catalyst for innovation.

The empirical insights from these studies provide a robust framework for examining the combined impact of professional identity and innovative self-efficacy on students' innovative behavior. By integrating these perspectives, this study aims to offer a nuanced understanding of how educational strategies can be tailored to enhance these psychological constructs, fostering a more innovative student body across disciplines.

Research Gaps and Current Study

While the importance of fostering student innovation has been widely recognized, the specific mechanisms by which educational and psychological constructs such as professional identity and innovative self-efficacy influence innovative behavior remain underexplored. This gap in the literature

indicates an urgent need for a detailed investigation of how these factors interact to cultivate innovative thinking and behavior among students.

The current literature review underscores the pressing need for interdisciplinary research to bridge the gap between psychological theories and educational practices. Such research is crucial for uncovering the complex dynamics between students' professional identity, beliefs in their innovative capabilities, and actual innovative practices. By delving deeply into these relationships, this study aims to enrich the theoretical framework surrounding educational innovation and provide actionable insights that can be implemented across various academic fields to enhance students' innovative outcomes.

This study aims to address these gaps by empirically examining the combined impact of professional identity and innovative self-efficacy on students' innovative behavior. The research findings are expected to provide detailed insights that inform curriculum development, teaching strategies, and policy-making in higher education, fostering a stronger culture of innovation.

Methodology

This study adopts a quantitative research design to investigate the relationships between professional identity, innovative self-efficacy, and college students' innovative behavior. The methodology section includes the following parts: participants, measurement tools, data collection, and data analysis.

Participants

The research sample consists of 399 college students from a large public university. Participants come from various faculties, including science, arts, and humanities, to ensure academic discipline diversity. Selection criteria include students enrolled full-time in their respective majors during the 2023-2024 academic year.

The sample size and calculation formula are listed below:

$$n = \frac{N}{1 + Ne^2}$$
$$n = \frac{31100}{1 + 31100 \times 0.05^2}$$
$$n \approx 394.92$$

Measurement Tools

Data were collected through a structured questionnaire comprising three main sections: professional identity, innovative self-efficacy, and innovative behavior. Each section uses a Likert scale from 1 (strongly disagree) to 5 (strongly agree) to measure the respective constructs.

Professional Identity Scale:

The measurement of professional identity uses the "College Students' Professional Identity Survey" compiled by Qin Panbo in 2009. The questionnaire is designed with four psychological

dimensions: cognitive, emotional, behavioral, and adaptive, containing a total of 23 items. These items provide an in-depth understanding of students' recognition, interest, and adaptability to their chosen majors. A five-point rating system is used, with higher scores indicating stronger professional identity.

Innovative Self-Efficacy Scale:

The concept of innovative self-efficacy is based on Bandura's (1986) theory of self-efficacy. In this study, we adapted a revised version of the Innovative Self-Efficacy Scale for middle and primary school students, originally revised by Li Jinde, to suit the characteristics of college students. After student discussions and expert interviews, a final single-dimension innovative self-efficacy scale with 12 items was adopted to measure students' confidence in conducting innovative activities.

Innovative Behavior Scale:

We referenced the modified version of Kirton's Innovative Behavior Scale by Danis and Dollinger, which was introduced into the Chinese context. The revised scale contains seven items, such as "I tend to create new methods rather than merely improve existing ones" and "I often have new perspectives when looking at old problems." This scale uses a five-point Likert scale, with 1 representing "strongly disagree" and 5 representing "strongly agree." Through these items, we can quantify students' tendencies toward innovative behavior.

During the data collection process, these scales underwent a series of pre-tests to verify their reliability and validity. With these validated tools, the study aims to comprehensively understand and analyze how professional identity and innovative self-efficacy influence college students' innovative behavior. Data collection was conducted over four months during the spring semester of 2024. The questionnaire was distributed online to ensure wide dissemination and participant convenience.

Data Analysis

Quantitative data were analyzed using SPSS 27. Descriptive statistics were computed to outline the demographic characteristics of the sample and provide an overview of the variables. Pearson correlation and multiple regression analyses were used for inferential statistics to examine the relationships between professional identity, innovative self-efficacy, and innovative behavior. Additionally, analysis of variance (ANOVA) tests were conducted to explore variations across different academic disciplines.

Results

This study utilized quantitative analysis to thoroughly analyze data from 399 questionnaires to explore the impact of professional identity and innovative self-efficacy on college students' innovative behavior. The following are the analysis process and main findings:

Data Processing

Initially, invalid questionnaires were removed through descriptive analysis and Z-value

calculation, including those with insufficient response time (less than 100 seconds) and high repetition in answers. A total of 399 valid questionnaires were used for the final analysis.

Reliability and Validity Analysis

The overall questionnaire's Cronbach's alpha coefficient reached .967, indicating extremely high internal consistency. Reliability tests for the professional identity, innovative self-efficacy, and college students' innovative behavior scales showed Cronbach's alpha coefficients of .942, .888, and .839, respectively, all above 0.7, indicating good reliability. Validity analysis showed KMO and Bartlett's test of sphericity results of .979 and .000 (significant), indicating that the data were suitable for factor analysis.

Table 1: Reliability Statistics

Variable	Cronbach's Alpha	Number of Items
Overall	.967	43

Descriptive Analysis and ANOVA

Descriptive analysis showed a relatively balanced gender distribution and diverse academic backgrounds, including humanities, sciences, engineering, and arts, with humanities and sciences students accounting for the largest proportion. ANOVA results showed significant differences in professional identity across different majors ($F=1.572$, $P<.05$), but no significant differences in innovative self-efficacy and innovative behavior.

Table 2: Distribution of Examinees

Variable	Category	Frequency	Percentage
Gender	Male	195	48.9%
	Female	204	51.1%
Background	Urban	255	63.9%
	Rural	144	36.1%
Year	Freshman	121	30.3%
	Sophomore	114	28.6%
	Junior	115	28.8%
	Senior	49	12.3%
Major	Humanities	201	50.4%
	Sciences	83	20.8%
	Engineering	92	23.1%
	Arts	23	5.8%
Major Choice	Self-selected	276	69.2%
	Others' suggestion	83	20.8%
	Adjusted major	40	10.0%

Correlation Analysis

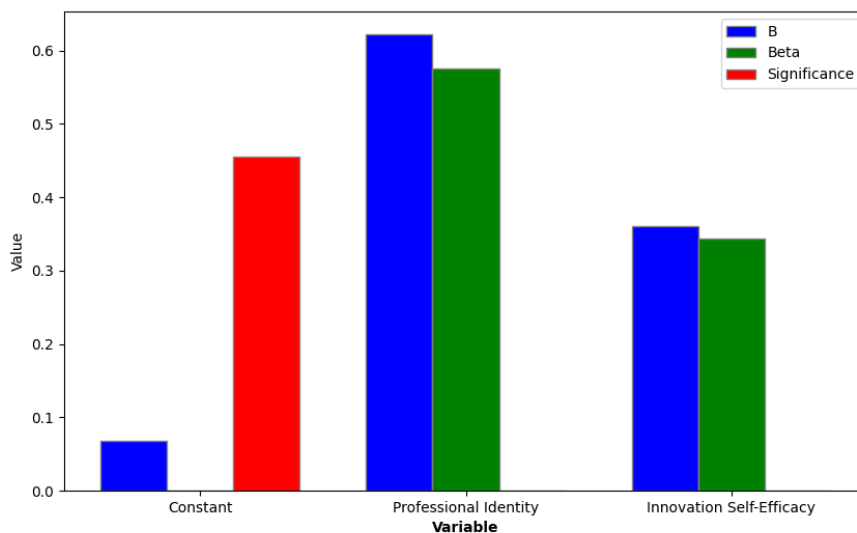
Pearson correlation analysis results indicated significant positive correlations between professional identity and innovative behavior ($r=.885, P<.01$), and between innovative self-efficacy and innovative behavior ($r=.862, P<.01$).

Regression Analysis

Regression analysis results showed that professional identity and innovative self-efficacy have significant positive effects on college students' innovative behavior, with standardized coefficients of .576 and .343, respectively, both significant at the $P<.01$ level. This further confirms the research hypothesis that professional identity and innovative self-efficacy play important roles in promoting college students' innovative behavior.

Table 3: Regression Analysis

Variable Category	Cronbach's Alpha	KMO and Bartlett's Test	Mean	Standard Deviation	ANOVA F-Value	Pearson's Correlation (r)
Overall Questionnaire	.967	.979	-	-	-	-
Professional Identity	.942	-	3.7327	.54422	1.572	.885
Innovation Self-Efficacy	.888	-	3.7063	.55957	1.184	.862
College Students' Innovative Behavior	.839	-	3.7304	.58858	1.467	-



Picture 1: Regression Analysis

Discussion

This study aims to explore the impact of professional identity and innovative self-efficacy on college students' innovative behavior and to clarify the variability of these effects across different academic backgrounds. The results show significant positive correlations between professional identity

and innovative behavior, as well as between innovative self-efficacy and innovative behavior, consistent with Bandura's social cognitive theory and the findings of Tierney and Farmer (2011). Notably, the correlation coefficient for professional identity (Pearson $r = .885$) is stronger than that for innovative self-efficacy (Pearson $r = .862$), which may reflect the core role of professional identity in motivating students to engage in the innovation process.

However, the ANOVA reveals an important finding: there are significant differences in professional identity among students from different academic backgrounds ($F=1.572$, $P<.05$), while differences in innovative self-efficacy and innovative behavior are not significant. This indicates that although professional identity plays a key role in promoting innovative behavior, its influence is affected by disciplinary cultures and educational environments. In contrast, students' beliefs in their innovative capabilities remain relatively stable across different disciplines.

Moreover, this study emphasizes the importance of considering individual differences in educational strategies and practices. Specifically, higher education institutions may need to design more targeted interventions to cultivate students' professional identity, thereby motivating them to engage in innovative activities. For example, providing interdisciplinary innovation projects, implementing student-centered teaching methods, and establishing professional communities could positively impact students' professional identity and innovative behavior.

1. In-Depth Discussion of ANOVA and Educational Practice Suggestions

While discussing the ANOVA results and pointing out the influence of disciplinary cultures, further exploration of how these findings impact educational theory and practice would enhance the depth of the discussion. It is recommended to investigate how the disciplinary differences in professional identity reflect in the broader structure of higher education teaching or curriculum. Discussing how interdisciplinary educational approaches can mitigate these differences and promote more uniform development of innovative behavior will provide valuable insights.

2. Specific Educational Practice Suggestions

For interventions aimed at fostering professional identity and innovative self-efficacy, providing specific examples of implementation would be highly beneficial. For instance, concrete interventions designed based on the study findings could address specific aspects of professional identity and innovative self-efficacy. Referencing successful related strategies would enhance the practicality and credibility of the suggestions.

3. Limitations and Future Research Directions

The limitations of this study include the single-source sample and cultural context, which may affect the generalizability and external validity of the results. Future research could expand these findings by including more diverse samples from multiple institutions and different cultural backgrounds. Employing mixed-method research designs could also provide deeper insights into the

subtle mechanisms behind these relationships.

4. Combining with Broader Research

To deepen the theoretical richness of our discussion, it is suggested to closely connect these findings with the current literature on innovation and educational psychology. This may involve comparing our results with other studies and exploring alternative theoretical explanations that may challenge or extend our understanding. Further analysis of how these dynamics play out in different educational contexts can also provide valuable perspectives for both academic research and practical applications.

In conclusion, this study not only clarifies the crucial role of professional identity and innovative self-efficacy in shaping college students' innovative behavior but also provides empirical support for targeted educational strategies to cultivate these attributes. The insights gained from this study can inform educational policies and curriculum design aimed at nurturing a generation of innovators capable of navigating and contributing to the complexities of the modern world. By considering the detailed suggestions for future research and educational practice mentioned above, this study can serve as a foundational reference for ongoing and future investigations promoting innovation in academic fields.

Conclusions

Professional Identity and Innovative Behavior

There is a strong positive correlation between professional identity and students' innovative activities. This relationship indicates that students who are committed to and identify with their discipline are more likely to engage in innovative activities. This finding enriches existing educational theories by illustrating how professional identity profoundly influences students' practical innovative efforts.

Innovative Self-Efficacy

The positive impact of innovative self-efficacy on innovative behavior highlights the importance of fostering students' confidence in their innovative capabilities. This is crucial for innovation education and suggests enhancing curricula and extracurricular activities to boost self-efficacy across disciplines.

Cross-Disciplinary Differences

While there are significant differences in professional identity among different majors, cross-disciplinary innovative self-efficacy and innovative behavior appear to be consistent. This observation emphasizes the potential of applying universal strategies to effectively enhance innovative self-efficacy across various academic fields.

Combined Impact on Innovation

The combined effects of professional identity and innovative self-efficacy significantly promote innovative behavior. This complex interaction provides new dimensions to existing models and offers precise understanding that may influence future research in educational psychology.

Implications for Educational Practice

Based on these findings, it is suggested that educators consider implementing targeted interventions to enhance professional identity and innovative self-efficacy. For example, interdisciplinary projects and collaborative initiatives can help bridge the gaps between different academic cultures and promote a unified approach to innovation.

Future Research and Addressing Limitations

Recognizing the limitations posed by the study's scope and cultural specificity, future research should expand to include diverse educational environments and broader populations. Employing mixed-methods research can provide deeper insights into the different impacts of psychological constructs on innovation across various cultural and educational contexts.

Enhancing Research Impact

This study emphasizes the long-term benefits of promoting innovation through educational interventions, suggesting that enhancing students' professional identity and innovative self-efficacy can play a crucial role in addressing global challenges and driving social progress. Incorporating these findings into detailed recommendations for educational policy and practice can greatly benefit educators and policymakers focused on fostering innovative mindsets.

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