

Students' Self-efficacy on Career Decision-making of Engineering Undergraduates at Nanning University

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Abstract: The objectives of this research were 1) To study the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University. 2) To provide a guideline for enhancing students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University. The sample group of this study was 375 engineering undergraduates from Nanning University. The research instruments were questionnaire and structured interviews. The statistics to analyze the data were percentage, average value, and standard deviation. The results were found that:1) The state of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University was at a high level. Considering the results of this research aspects ranged from the highest to lowest level were as follows: the highest level was intrinsic motivation, followed by external support, and the lowest level was communication and feedback.2) Guidelines for improving the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University: 2.1) Students first need to strengthen their own awareness. 2.2) Enhance the analysis of the characteristics of engineering majors to provide students with personalized career decision-making support. 2.3) Integrate digital technology to improve the effectiveness of career decision-making course quality assessment. 2.4) Increase investment in both software and hardware to strengthen support and guarantees. 2.5) Improve the digital literacy of teachers responsible for career support and management. 2.6) Strengthen the unified coordination among the university, society, and government.

Keywords: Engineering undergraduate, Self-efficacy of Career Decision-making, Nanning University

1. Introduction

The transition from university to employment is a critical phase in the lives of undergraduates, particularly in vocational fields such as engineering, where practical skills and industry readiness are essential. In engineering education, the importance of practical training has been underscored due to the rapidly changing technological environment and the advanced problem-solving skills required by the industry (Betz & Hackett, 2006). Many training programs provide students with opportunities to apply theoretical knowledge in real-life scenarios, helping them acquire valuable skills, enhance their professional competence, and increase employment opportunities. These programs aim to combine academic learning with practical experience, fostering a comprehensive education that prepares students for the job market (Ferrari, Nota, & Soresi, 2012).

Self-efficacy in career decision-making among university students refers to their self-assessment of the abilities required to accomplish various tasks during the career decision-making process. Career decision-making self-efficacy not only influences what careers students consider and choose but also affects their determination of career development goals and their willingness to exert the necessary effort for career advancement. Since American scholars Taylor and Betz introduced the concept of career decision-making self-efficacy in 1981, research on this topic has gradually become a significant aspect of career studies. Engineering students face notable barriers when transitioning from academic to professional environments. To effectively tackle challenges in engineering, it is crucial to master practical problem-solving skills and to gain a comprehensive understanding of how training programs can assist students in making informed career decisions (Ferrari, Nota, & Soresi, 2012). Therefore, a thorough analysis of how training facilitates career readiness and the decision-making process is necessary.

The impact of self-efficacy on career decision-making is significant, as it influences how students' approach and manage their career choices. Compared to students with low self-efficacy, those with high self-efficacy tend to be more confident, proactive, and resilient in the career decision-making process (Betz & Hackett, 2006). Students with low self-efficacy can also enhance their self-efficacy through accumulating a sense of achievement and receiving external support (Bandura, 1994). By strengthening self-efficacy, students can improve their ability to set clear career goals, make informed decisions, and overcome

obstacles. This enhancement of self-efficacy can lead to more effective career planning and higher job satisfaction (Chen & Soldner, 2013a). For governments, businesses, educational institutions, and educators, improving students' career decision-making capabilities can translate into a more skilled and adaptable workforce, aligning educational outcomes with industry needs and enhancing students' success rates. By fostering a more competent and prepared future workforce, strengthening career decision-making can benefit all stakeholders (Ferrari, Nota, & Soresi, 2012; Hansen, Jackson, & Pedersen, 2017).

Therefore, investigating the self-efficacy of career decision-making of engineering undergraduates at Nanning University holds both theoretical and practical significance. What is the current status of career decision-making self-efficacy among engineering undergraduates at Nanning University? What problems exist? What are the primary causes of these issues? This study aims to analyze the current state of career decision-making self-efficacy among engineering undergraduates at Nanning University through a survey and interview, thereby providing a guideline for its further enhancement.

2. Research Objective

1. To study the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.
2. To provide guidelines for enhancing students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

3. Research Methodology

This study adopts a mix of quantitative and qualitative methods. The questionnaire is to assess the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University. Following the questionnaire, the study employs a structured interviews to gain deeper insights into guidelines for enhancing students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University. The interviews are conducted with a selected group of 10 faculty members responsible for student employment training and management at Nanning University.

3.1 Population and Sample Group

The population for this study includes all engineering undergraduates at Nanning University, totaling 12,170 students, as well as the faculty responsible for student employment training and management, comprising staff from the Student Affairs Office and 10 secondary colleges, totaling 189 individuals. A sample of 375 engineering undergraduates was selected through simple random sampling, utilizing Krejcie and Morgan's method (1970) for determining sample sizes. Additionally, qualitative insights will be gathered through interviews with 10 faculty members responsible for student employment training and management at Nanning University. They were selected by using a purposive sampling method.

3.2 Research instruments and Construction

The questionnaire was distributed to 375 engineering undergraduates students at Nanning University. The survey was conducted online via www.wenjuanwang.com and disseminated through WeChat, email, and paper copies, with 375 valid responses received. Simple random sampling ensured the representativeness of the sample. Additionally, reliability tests were performed during the questionnaire design phase with sample of 30 pilot test to ensure data robustness, resulting a Cronbach's α was 0.896. All questions display consistency with the measurement target as evidenced by an average score of 0.67 to 1.00 on the acceptable consistency index (IOC).

The interview design for this study features structured yet open-ended questions, allowing respondents to elaborate on their experiences, views, and recommendations. The interviews are scheduled to follow the questionnaire survey, with interviewees informed about the survey results beforehand to provide context to their responses. A diverse group of five interviewees, including administrators and specialized teachers, was selected based on strict criteria: student employment situation and at least a Master's degree in their field. Efforts were also made to maintain gender balance among the participants. For convenience and efficiency, the interviews were conducted online using Tencent Meeting, with the sessions recorded and transcribed directly within the software.

3.3 Data Collection

The data was collected through a questionnaire survey designed based on the research questions, literature review, conceptual framework, and relevant concepts pertaining to school-enterprise collaboration. The survey was distributed to 375 students enrolled in engineering undergraduates at Nanning University. The questionnaire was edit online (www.wenjuanwang.com) and distributed through various channels including

WeChat, email, and paper copies. A total of 400 questionnaires were distributed, with 375 valid responses were sorted. Simple random sampling was used to ensure a representative sample. During questionnaire design, reliability and validity tests were conducted to ensure robustness.

The data from these interviews were meticulously transcribed and analyzed by keywords, serving as a crucial component of the study's overall data collection process.

3.4 Data Analysis

The data analysis for this study was conducted in three distinct parts to ensure a comprehensive evaluation of both quantitative and qualitative data. In Part I, the demographic details of the respondents such as gender, and grade were statistically analyzed and presented as percentages using statistical software to outline the general characteristics of the sample group.

Part II involved a more detailed analysis of responses to Likert scale statements covering 5 key dimensions: Individual Factors, External Support, Intrinsic Motivation, Emotions and Cognition, and Communication and Feedback. The analysis was performed using statistical software, and results were expressed in terms of means, standard deviations, and interpretations. The 5-point Likert scale was utilized, with the ranges defined as: 4.50 – 5.00 indicating "the highest level," 3.50 – 4.49 as "high level," 2.50 – 3.49 as "moderate level" 1.50 – 2.49 as "low level," and 1.00 – 1.49 as "the least level," following the original interpretation by Likert (1930).

Part III complemented the quantitative analysis with a Keyword Analysis of the qualitative data obtained from the structured interviews. This involved an examination of the interview transcripts to identify and quantify the most frequently used words and phrases, providing insights into prevalent themes and sentiments among the participants.

3.5 Research Framework

Research variables are derived from previous literature review: 1) Individual Factors, 2) External Support, 3) Intrinsic Motivation, 4) Emotions and Cognition, and 5) Communication and Feedback. Research Variable is students' self-efficacy, which is defined as the students' self-efficacy on career decision-making.

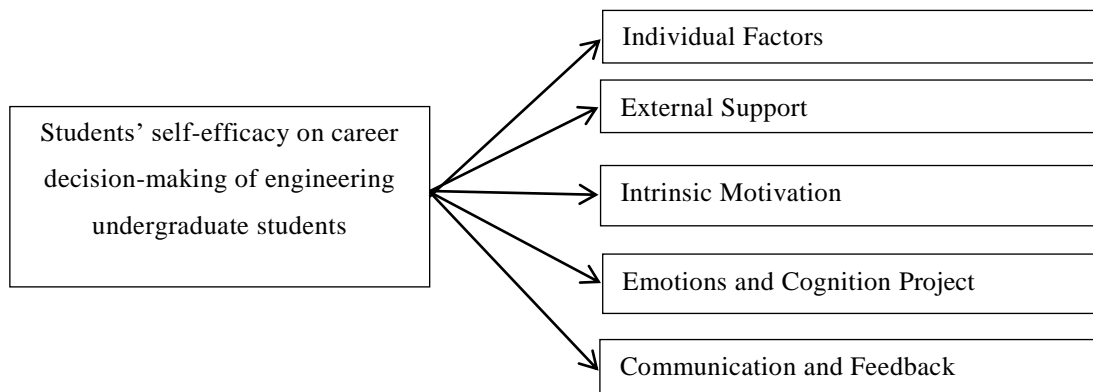


Figure 1.1 Research Framework

4. Research Findings

Part 1: The analysis results of the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

The data on the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University were analyzed in statistical method by using frequency, percentage, mean and standard deviation. Then the data was interpreted into level as the criteria in chapter 3 and ordered into ranking.

The analysis results in general information of respondents, classified by gender and grade. among the respondents, there were 134 females, accounting for 37.33 percent. Male students were 225, accounting for 62.67 percent. Among the respondents, there were 65 in first grade, accounting for 18.11percent, 88 in second grade, accounting for 24.51percent, 107 in third grade, accounting for 29.81percent, and 99 in fourth grade, accounting for 27.57percent.

The analysis results of the current situation of students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University, presented in the form of average value and standard deviation. All aspects is shown as Table 4.2.

Table 4.1 The average value and standard deviation of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University

No.	Dimension	\bar{X}	S.D.	Level	Ranking
1	Personal Factors	3.86	0.82	high	3
2	External Support	3.90	0.84	high	2
3	Intrinsic Motivation	4.01	0.84	high	1
4	Emotions and Cognition	3.68	0.83	high	4
5	Communication and Feedback	3.66	0.83	high	5
Total		3.82	0.83	high	

Table 4.1 showed that the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University overall average aspects was at a high level ($\bar{X}=3.82, S.D.=0.83$). Considering the results of these 5 research aspects as follows: the highest ranking was intrinsic Motivation ($\bar{X}=4.01, S.D.=0.84$), followed by External Support ($\bar{X}=3.90, S.D.=0.84$), whereas, Communication and Feedback ($\bar{X}=3.66, S.D.=0.83$) was the lowest ranking.

Table 4.2 The average value and standard deviation of current situation of Personal Factors of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

Personal Factors	\bar{X}	SD	Level	Ranking
1. Students have a clear understanding of career planning.	3.78	0.86	High	7
2. Students believe that they possess the fundamental skills required in the field of engineering.	3.52	0.78	High	10
3. Students are confident in academic abilities.	3.68	0.72	High	8
4. Students think personal interests have a significant impact on career decisions.	3.88	0.84	High	5
5. Students often set career goals and strive to achieve them.	3.65	0.81	High	9
6. Students believe gender influences career choices.	3.85	0.76	High	6
7. Students think race or cultural background influences career choices	3.97	0.86	High	4
8. Students believe family's financial situation influences career choices.	4.23	0.88	High	1
9. Students think personal health affects career decisions.	4.05	0.82	High	2
10. Students believe values have a significant impact on career choices.	4.04	0.85	High	3
Total	3.86	0.82	High	

Table 4.2 showed the current situation of Personal Factors of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University as at a high level ($\bar{X}=3.86, S.D.=0.82$).

Considering the results of this research aspects were as follows: the highest ranking was "Students believe family's financial situation influences career choices." ($\bar{X}=4.23, S.D.=0.88$), followed by "Students think personal health affects career decisions" ($\bar{X}=4.05, S.D.=0.82$), whereas, "Students believe that they possess the fundamental skills required in the field of engineering." ($\bar{X}=3.52, S.D.=0.78$) was the lowest ranking.

Table 4.3 The average value and standard deviation of current situation of External Support of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

External Support	\bar{X}	SD	Level	Ranking
1. Students feel that family provides enough support for their career choices.	4.08	0.89	High	3
2. Students think friends have a positive influence on their career decisions.	3.65	0.82	High	9
3. Students believe the career guidance services provided by the school are helpful for their career decisions.	4.13	0.86	High	2
4. Students think mentors or professors provide valuable advice for their	3.97	0.81	High	5

career planning.				
5. Students believe internship experiences have a significant impact on their career choices.	4.01	0.80	High	4
6. Students think career counseling services are helpful for their career decisions.	3.70	0.81	High	8
7. Students believe alumni networks play a positive role in their career choices.	3.53	0.88	High	10
8. Students think social networks (like LinkedIn) influence their career decisions.	4.24	0.81	High	1
9. Students believe industry certifications have a significant impact on their career choices.	3.85	0.82	High	7
10. Students think scholarships or financial aid influence their career choices.	3.89	0.86	High	6
Total	3.90	0.84	High	

Table 4.3 showed the current situation of external support of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University as at a high level ($\bar{X}=3.90$, S.D.=0.84).

Considering the results of this research aspects were as follows: the highest ranking was “Students think social networks (like LinkedIn) influence their career decisions” ($\bar{X}=4.24$, S.D.=0.81), followed by “Students believe the career guidance services provided by the school are helpful for their career decisions.” ($\bar{X}=4.13$, S.D.=0.86), whereas, “Students believe alumni networks play a positive role in their career choices.” ($\bar{X}=3.53$, S.D.=0.88) was the lowest ranking.

Table 4.4 The average value and standard deviation of current situation of Intrinsic Motivation of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

Intrinsic Motivation	\bar{X}	SD	Level	Ranking
1. Students are excited about work in the field of engineering.	4.18	0.86	High	2
2. Students choose engineering because of intrinsic interest.	4.26	0.84	High	1
3. Students believe self-actualization is an important factor in career choices.	4.05	0.86	High	5
4. Students choose engineering because of an interest in solving complex problems.	4.01	0.84	High	6
5. Students think a sense of personal achievement significantly influences their career decisions.	3.92	0.81	High	7
6. Students chose engineering because of an interest in innovation and invention.	3.76	0.82	High	10
7. Students believe their passion for technology influences their career choices.	4.10	0.82	High	3
8. Students think their curiosity about the field of engineering influences their career decisions.	4.08	0.83	High	4
9. Students believe a desire for challenges influences their career choices.	3.83	0.82	High	9
10. Students are passionate about engineering, and it significantly influences their career decisions.	3.87	0.85	High	8
Total	4.01	0.84	High	

Table 4.4 showed the current situation of intrinsic motivation of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University as at a high level ($\bar{X}=4.01$, S.D.=0.84).

Considering the results of this research aspects were as follows: the highest ranking was “Students chose engineering because of intrinsic interest.” ($\bar{X}=4.26$, S.D.=0.84), followed by “Students excited about work in the field of engineering.” ($\bar{X}=4.18$, S.D.=0.86), whereas “Students chose engineering because of an interest in innovation and invention.” ($\bar{X}=3.76$, S.D.=0.82) was the lowest ranking.

Table 4.5 The average value and standard deviation of current situation of emotions and cognition of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

Emotions and Cognition	\bar{X}	SD	Level	Ranking
1. Students feel anxious or stressed when making career decisions.	4.03	0.86	High	1
2. Students believe self-confidence significantly influences their career choices.	3.68	0.83	High	6
3. Students consider the possibility of failure when making career decisions.	3.80	0.83	High	3
4. Students think an optimistic attitude positively influences their career decisions.	3.53	0.84	High	8
5. Students feel fear or concern when making career decisions.	3.87	0.83	High	2
6. Students believe expectations of career success influence their decisions.	3.72	0.80	High	5
7. Students consider their personal emotional reactions when making career decisions.	3.52	0.82	High	9
8. Students think perceptions of career risks influence their decisions.	3.75	0.85	High	4
9. Students feel excited or thrilled when making career decisions.	3.51	0.82	High	10
10. Students believe perceptions of career challenges influence their decisions.	3.59	0.82	High	7
Total	3.68	0.83	High	

Table 4.5 showed the current situation of emotions and cognition of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University as at a high level (\bar{X} =3.68, S.D.=0.83).

Considering the results of this research aspects were as follows: the highest ranking was “Students feel anxious or stressed when making career decisions.” (\bar{X} =4.03, S.D.=0.86), followed by “Students feel fear or concern when making career decision.” (\bar{X} =3.87, S.D.=0.83), whereas, “Students feel excited or thrilled when making career decisions..” (\bar{X} =3.51, S.D.=0.82) was the lowest ranking.

Table 4.6 The average value and standard deviation of current situation of communication and feedback of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

Communication and Feedback	\bar{X}	SD	Level	Ranking
1. Students believe discussions with classmates are helpful for career decisions.	3.61	0.86	High	6
2. Students think communication with teachers positively influences career planning.	3.64	0.88	High	5
3. Students believe feedback from employers influences career choices.	3.58	0.82	High	7
4. Students think advice from professionals in industry is valuable for career decisions.	3.81	0.84	High	3
5. Students believe the school's career information services are helpful for career choices.	3.72	0.81	High	4
6. Students think industry discussions on social media influence career decisions.	3.85	0.76	High	1
7. Students believe family discussions significantly influence career choices.	3.56	0.86	High	8
8. Students think feedback from career counselors is helpful for career planning.	3.52	0.88	High	9
9. Students believe feedback during internships influences career choices.	3.83	0.82	High	2
10. Students think alumni sharing plays a positive role in career decisions	3.51	0.85	High	10
Total	3.66	0.83	High	

Table 4.6 showed the current situation of communication and feedback of the students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University as at a high level (\bar{X} =3.66, S.D.=0.83).

Considering the results of this research aspects were as follows: the highest ranking was “Students think

industry discussions on social media influence career decisions.” ($\bar{X}=3.85$, S.D.=0.76), followed by “Students believe feedback during internships influences career choices.” ($\bar{X}=3.83$, S.D.=0.82), whereas, “ Students think alumni sharing plays a positive role in career decisions.” ($\bar{X}=3.51$, S.D.=0.85) was the lowest ranking.

Part 2: The interview analysis on the development guidelines for enhancing students’ self-efficacy on career decision-making of engineering undergraduate students at Nanning University.

The following section presented interview analysis conducted with a diverse group of expert teachers responsible for student employment training and management at Nanning University. These interviews aimed to explore various aspects specifically focusing on 1) the perspective of individual factors, 2) the perspective of external support; 3) the perspective of intrinsic motivation; 4) the perspective of emotions and cognition and 5) the perspective of communication and feedback. Showing the question on the interview, the data were interpreted and supporting the detail.

1. The development guideline for “individual factors”.

Experts suggest that students first need to have a clear understanding of career planning in terms of awareness and enhance their basic skills in the engineering field. Students should also take the initiative to learn about the composition and characteristics of career decision-making self-efficacy. The university should provide more support for students' basic skill development and strengthen their understanding of career planning.

2. The development guideline for “External Support”

Experts suggest strengthening the analysis of students' psychological factors and personal personality traits, increasing research on students' career decision-making psychology, and providing targeted management and support. Establishing a comprehensive training, assessment, and evaluation platform for career decision-making is conducive to long-term and sustained support.

3. The development guideline for “Intrinsic Motivation”

Experts suggest increasing students' professional identification, enhancing the promotion of the importance of the engineering field to society, guiding students to form good study habits and self-discipline, and improving their professional and comprehensive abilities in engineering disciplines. Enhancing students' ability to collect and analyze employment information and guiding and strengthening their positive initiative in career planning are also recommended.

4. The development guideline for “Emotions and Cognition”

Experts suggest developing career decision-making psychological counseling courses to cultivate students' critical thinking abilities and positive career cognition. The university needs to create a positive atmosphere to enhance students' emotional management abilities, introduce career psychological assessment tools, and help students establish good self-emotional regulation mechanisms. Conducting career cognition expansion to guide students in establishing correct career risk and cognition concepts is also recommended.

5. The development guideline for” Communication and Feedback”

Experts suggest creating a smooth communication channel, paying attention to students' individual characteristics by the university and teachers, strengthening teachers' communication skills and methods with students, establishing career development files for engineering students to enhance personalized support, and creating an effective career communication decision-making feedback platform to timely collect and organize feedback information.

5. Conclusion

1. The state of the students’ self-efficacy on career decision-making of engineering undergraduate students at Nanning University was at a high level. Considering the results of this research aspects ranged from the highest to lowest level were as follows: the highest level was intrinsic motivation, followed by external support, and the lowest level was communication and feedback.
2. Guidelines for improving enhancing students’ self-efficacy on career decision-making of engineering undergraduate students at Nanning University include:
 - 1) Students in engineering at Nanning University first need to actively establish the awareness of enhancing career decision-making self-efficacy and cultivate the internal motivation for self-improvement. At the same time, they should actively clarify their personal career planning and actively carry out practical tests.

- 2) Teachers at Nanning University need to strengthen the analysis of the characteristics of engineering majors and provide students with personalized career decision-making support based on digital analysis.
- 3) Teachers at Nanning University need to strengthen career counseling closely related to the characteristics of engineering majors according to the characteristics of engineering majors, further optimize the curriculum settings related to career decision-making, and integrate digital technology to improve the quality of counseling.
- 4) Nanning University needs to further improve the related training and support platforms and systems, increase investment in software and hardware, and strengthen support and support.
- 5) Improve the digital literacy of teachers responsible for career support and management and regularly train them to use digital analysis technology in teaching and management to improve service quality.
- 6) Strengthen the unified coordination of schools, society, and government, strengthen cooperation with enterprises, provide students with more internship and practice opportunities, enhance students' practical operation ability and career adaptability, and provide a good environment and support for improving the career decision-making self-efficacy of engineering students in both theory and practice.

6. Discussion

1. The level of Students' Self-efficacy on Career Decision-making of Engineering Undergraduates at Nanning University in 5 aspects was at a high level. Considering the results of this research aspects ranged from the highest to lowest level were as follows: Intrinsic Motivation, External Support, Personal Factors, Emotions and Cognition, Communication and Feedback. This study is consistent with the research results of Lin Chongde et al. (2003). The scholar found through research that individuals with higher achievement motivation will more actively set clear career goals, are more willing to try different paths, and thus improve the quality of career decision-making. Also, Richard Ryan and Edward Deci (2024) pointed out in their research that the interaction between intrinsic and extrinsic motivation has an important impact on individual behavior and decision-making. Individuals with high intrinsic motivation can better balance intrinsic interest and extrinsic rewards when facing career decisions, thereby enhancing career decision-making self-efficacy. Li Nan et al. (2024) found through research that engineering college students with higher hope traits are more optimistic and can better cope with the uncertainties and challenges in career choices. Ye Jinghua et al. (2008) pointed out through research that achievement motivation has a significant impact on career decision-making self-efficacy. Studying the impact of intrinsic motivation factors of engineering college students to enhance their self-confidence, positive attitude, and coping ability.
2. The guidelines for improving enhancing students' self-efficacy on career decision-making of engineering undergraduate students at Nanning University include: 1) Students in engineering at Nanning University first need to actively establish the awareness of enhancing career decision-making self-efficacy and cultivate the internal motivation for self-improvement. At the same time, they should actively clarify their personal career planning and actively carry out practical tests. 2) Teachers at Nanning University need to strengthen the analysis of the characteristics of engineering majors and provide students with personalized career decision-making support based on digital analysis. 3) Teachers at Nanning University need to strengthen career counseling closely related to the characteristics of engineering majors according to the characteristics of engineering majors, further optimize the curriculum settings related to career decision-making, and integrate digital technology to improve the quality of counseling. 4) Nanning University needs to further improve the related training and support platforms and systems, increase investment in software and hardware, and strengthen support and support. 5) Improve the digital literacy of teachers responsible for career support and management and regularly train them to use digital analysis technology in teaching and management to improve service quality. 6) Strengthen the unified coordination of schools, society, and government, strengthen cooperation with enterprises, provide students with more internship and practice opportunities, enhance students' practical operation ability and career adaptability, and provide a good environment and support for improving the career decision-making self-efficacy of engineering students in both theory and practice.

7. Recommendations

7.1 Recommend for Implications

- 1) The university should strengthen the publicity and implementation of the Ministry of Education's policy documents on improving the career decision-making self-efficacy of undergraduate students in engineering at Nanning University.
- 2) The university should further improve the relevant systems in curriculum settings, teacher teaching and management systems, student internships and practices, student employment services, and provide further support and guarantees in policy, funding, equipment, supervision, assessment, and rewards.
- 3) Further strengthen training related to student employment management and training, establish online and offline learning platforms, and diversify learning channels and methods.
- 4) Cooperate with the government and all aspects of society to create a good environment for the enhancement of career decision-making self-efficacy among undergraduate students in engineering at Nanning University.

7.2 Future Research

- 1) In future research, the scope of the study can be expanded to different universities or regions. For instance, in-depth research can be conducted at various professional levels and in different fields to identify patterns and propose targeted solutions.
- 2) Future research can explore different perspectives to further improve the career decision-making self-efficacy of undergraduate students in engineering.

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