

Key career planning competences for Chinese college students in Shanxi province: An exploratory factor analysis

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Abstract: This study aimed to identify key career planning competencies to enable Chinese college students to navigate the complexities of the modern labor market. It conducted a survey in Shanxi Province, China, to determine the essential career planning competencies for Chinese college students. A random sample of 372 teaching and administrative staff from six universities in Shanxi Province participated in the study. Fourteen career planning skills were reviewed, and data were analyzed using exploratory factor analysis. The results identified four competency dimensions, with their respective contributions as follows: Information Seeking and Decision-Making (23.186%), Goal Setting and Planning (15.399%), Interpersonal and Communication Skills (14.996%), and Self-Awareness (14.682%). Five skills were classified under Information Seeking and Decision-Making, while three skills were categorized into each of the remaining three dimensions. The findings offer a comprehensive framework of career planning competencies, which can effectively support the development of students' skills for their future careers.

Keywords: Career planning competences, Chinese college students, Exploratory factor analysis, Shanxi Province.

1. Introduction

In an era of rapid technological advancement and economic transformation, equipping students with strong career planning competence is essential for their future success [1]. The competences of career planning enable students to make informed decisions about their educational and professional paths, moreover, it equips them with the adaptability and resilience necessary to navigate a dynamic job market [2]. Furthermore, strong career planning skills enhance employability by improving job search strategies, interview performance, and networking abilities [3]. Ultimately, effective career planning promotes work-life balance and overall well-being. As Shanxi Province transitions towards a knowledge-based economy, cultivating a skilled and adaptable workforce is crucial. However, the specific career planning competencies required for success in this context are not yet fully understood. To address this gap, this study aimed to define the key career planning competencies of college students through exploratory factor analysis.

2. Literature Review

2.1. Career Planning Competences

Career planning is a critical process in helping students transition from education to employment, equipping them with the skills to navigate an increasingly competitive and complex labor market [4]. Central to this process are four core components: self-awareness, goal setting and planning, interpersonal and communication skills and information seeking and decision-making [5]. These interconnected competencies form the foundation for students' career readiness and long-term professional success.

2.2. Self-Awareness

Self-awareness is widely recognized as the cornerstone of effective career planning, enabling individuals to make informed decisions by understanding their strengths, weaknesses, interests, values, and personality traits Soeprijanto, et al. [6]. Pretorius and Plaatjies [7] works on emotional intelligence emphasizes that self-awareness is critical for recognizing one's emotional drivers and aligning them with career goals. In the context of career development, researchers such as Carden, et al. [8] suggested that self-awareness fosters clarity, allowing individuals to assess their compatibility with various roles and industries. individuals who link personal attributes with career options, enhancing decision-making accuracy [9]. Moreover, reflective practices, including journaling and self-assessment exercises, have been shown to deepen self-understanding, which is essential for effectively navigating career transitions and challenges.

2.3. Goal Setting and Planning

Goal setting and planning are fundamental components of a successful career plan. They provide a roadmap, guiding individuals toward their desired career goals. In the context of career planning, goal setting refers to the process of identifying specific, measurable, achievable, relevant, and time-bound (SMART) goals related to one's career [10]. These goals can range from short-term objectives, such as completing a specific course or obtaining a certification, to long-term goals, such as attaining a particular job title or starting one's own business. Jackson and Tomlinson [11] indicates that individuals with structured career goals are more likely to demonstrate persistence and focus, leading to higher achievement rates. Planning, which involves strategizing the steps to reach these goals, is equally critical. Studies within the framework of career adaptability. show that planning helps individuals anticipate challenges and develop contingency strategies, enhancing their ability to navigate complex career paths [12]. Furthermore, incorporating feedback mechanisms into the planning process ensures flexibility and alignment with evolving circumstances and opportunities.

2.4. Interpersonal and Communication Skills

Interpersonal and communication skills are essential competencies that enable individuals to build professional relationships, foster collaboration, and convey their ideas effectively [5]. Social Cognitive Career Theory (SCCT) underscore the role of social interactions in shaping career decisions and opportunities [13]. Effective communication, encompassing verbal, non-verbal, and written skills, facilitates the exchange of information and the negotiation of expectations in both job-seeking and workplace contexts, interpersonal skills such as active listening, empathy, and conflict resolution further enhance one's ability to navigate complex social dynamics Tripathy [14]. Detgen, et al. [15] highlights those strong interpersonal competencies are positively correlated with job satisfaction, leadership potential, and career progression.

2.5. Information Seeking and Decision-Making

The ability to seek relevant information and make informed decisions is a critical competency for navigating the ever-evolving career landscape. Gati and Kulcsár [16] emphasizes the importance of curiosity and proactive exploration in uncovering career opportunities. Information-seeking involves leveraging diverse resources, such as labor market data, industry trends, informational interviews, and online platforms, to gather insights about potential career paths. Studies show that individuals with robust information-seeking skills are better equipped to identify and capitalize on emerging opportunities [17]. Decision-making, on the other hand, requires synthesizing this information to weigh options, assess risks, and select paths that align with one's goals and values [5].

2.6. Overview of Needed Skills for Career Planning Competences

Skill of understanding self's strengths, weaknesses, values, interests and personality traits is a foundational skill in career planning. This skill enables individuals to align their career paths with their intrinsic

capabilities and preferences, fostering both job satisfaction and professional success [18]. For instance, identifying strengths such as analytical thinking or creativity helps individuals target roles where they can excel, while recognizing weaknesses enables them to focus on self-improvement. Values, such as autonomy or stability, guide long-term career alignment, while interests and personality traits influence engagement and workplace behavior. However, limited exposure to such practices or cultural norms discouraging personal introspection can hinder the development of this skill, particularly in collectivist societies.

Skill of recognizing personal goals and aspirations is essential for giving direction to one's career planning efforts. This skill involves identifying short-term and long-term objectives that align with an individual's interests and values, providing motivation and a sense of purpose [19]. By setting clear and specific goals, individuals can focus their efforts on achieving meaningful milestones, such as acquiring specific skills, gaining work experience, or pursuing higher education. The SMART framework is often used to ensure goals are actionable and realistic, while mentorship and vision boards help refine aspirations and maintain motivation [19]. Despite its importance, many students struggle with articulating their aspirations due to uncertainty about their interests or external pressures, such as family expectations [20].

Skill of assessing self's skills and knowledge: Assessing one's skills and knowledge is equally important in the career planning process, as it allows individuals to identify their competencies and address gaps in their readiness for the labor market. Skill assessment involves evaluating technical skills, such as proficiency in industry-specific tools, as well as transferable skills like communication and teamwork [1]. Regular self-assessment, combined with tools such as skills inventories, mock interviews, and internships, helps students align their abilities with their career goals and build confidence in their professional capabilities. Additionally, frameworks like skill gap analysis enable students to compare their current skills with industry demands, guiding targeted learning and upskilling efforts [21]. However, overestimation or underestimation of one's abilities can lead to unrealistic career expectations or self-doubt, emphasizing the need for structured feedback mechanisms and mentorship.

Skill of setting clear, achievable, and measurable career goals is a fundamental component of career planning, providing individuals with a sense of purpose and direction. A well-defined goal—specific, measurable, achievable, relevant, and time-bound (SMART)—enhance motivation and performance [10]. For instance, students aiming to secure a job in engineering might set a measurable goal, such as earning a professional certification within a specific timeframe, to mark progress toward their career aspirations. Such clarity not only improves focus but also fosters accountability [22]. However, students often face challenges, such as balancing ambitious goals with practical realities or articulating their aspirations due to limited exposure to self-assessment tools.

Skill of developing strategic plan to achieve career goals is another critical skill in career planning. A strategic plan bridges the gap between aspirations and outcomes by identifying long-term objectives, intermediate milestones, and actionable steps. This process often involves mapping career trajectories, such as pursuing internships, networking with professionals, or enrolling in advanced education programs. Research shows that students with a clearly outlined plan are more likely to stay motivated and resilient in the face of obstacles [23]. Moreover, strategic planning incorporates flexibility, allowing individuals to adapt to changing circumstances, such as shifts in labor market demands or personal priorities.

Skill of identifying the necessary steps and recourses for career goals complements goal-setting and strategic planning by focusing on the practicalities of implementation. This includes recognizing the qualifications, experiences, and resources required to progress along a chosen career path. For example, students aspiring to enter the field of data science must identify prerequisites, such as proficiency in programming languages, participation in relevant projects, or access to professional certifications. Resource identification also extends to networking opportunities, mentorship, and financial support systems. Research emphasizes that individuals who effectively pinpoint the steps and resources needed for their goals demonstrate higher levels of career readiness and confidence [24].

Skill of effective communication is pivotal in career planning as it underpins a wide array of professional interactions, from job interviews to workplace collaboration. Effective communication involves the ability to articulate thoughts clearly, listen actively, and adapt messaging to suit various audiences [25]. In the context of career planning, strong communication skills are essential for creating compelling résumés and cover letters, engaging meaningfully in networking events, and excelling in interviews. Moreover, these skills foster better interpersonal relationships and teamwork, which are critical in most work environments. Research shows that students with well-developed communication skills are more likely to build lasting professional relationships and successfully advocate for themselves in competitive job markets [26].

Skill of building network and building relationships with professionals plays a crucial role in career planning by expanding access to opportunities and industry insights. Networking enables individuals to connect with mentors, peers, and industry leaders who can provide guidance, recommend resources, or facilitate introductions to potential employers, furthermore, job opportunities are secured through networking, emphasizing its importance in career advancement [4]. Effective network-building requires a proactive approach, including attending professional events, utilizing online platforms like LinkedIn, and maintaining consistent and respectful communication with contacts. Educational programs that incorporate networking events, industry panels, and alumni mentoring initiatives equip students with the tools to strengthen their professional relationships [27]. However, students often face barriers, such as a lack of confidence or cultural norms that discourage assertiveness, which can impede networking efforts.

Skill of presenting oneself and one's ideas with confidence is essential for effectively showcasing personal strengths and standing out in competitive environments. Confidence in self-presentation encompasses verbal and non-verbal communication, including body language, tone, and professional etiquette [28]. In career planning, this skill is particularly critical during interviews, networking events, and workplace interactions, where individuals must convey their capabilities and value to potential employers or collaborators. Research indicates that individuals who demonstrate confidence in self-presentation are perceived as more competent and are more likely to achieve career success [29]. Developing this skill often involves training in public speaking, role-playing scenarios, and constructive feedback from mentors or peers. However, it is important to address underlying factors, such as low self-esteem or fear of rejection, that can hinder students' confidence in presenting themselves effectively.

Skill of seeking information with technologies for different career paths, industries and job market is a critical skill in career planning. In the digital era, technologies like online job boards, career portals, and professional networks such as LinkedIn offer extensive access to labor market trends and opportunities [30]. This skill involves efficiently utilizing search engines, databases, and company websites to gather accurate and up-to-date information about various industries and roles. Additionally, online tools such as Glassdoor or Payscale provide insights into salaries, job descriptions, and employer reviews, empowering students to make informed choices about their career directions. However, navigating the vast array of online resources can be overwhelming, and students must develop discernment to identify credible and relevant sources.

Skill of logical analysis plays an essential role in interpreting the information gathered during the career planning process. Logical analysis involves breaking down complex information, identifying patterns, and making connections to understand trends and implications [5]. For example, students analyzing industry reports and employment statistics need to assess how economic trends or technological advancements may impact their desired fields. This skill also aids in comparing job roles and evaluating how they align with one's skills and interests. Logical analysis helps students to make sense of their research and prioritize opportunities that best suit their long-term aspirations.

Skill of evaluating information is crucial for ensuring the reliability and relevance of data used in career planning. Information evaluation entails assessing the credibility of sources, understanding the biases present in various materials, and validating data against multiple references [31]. For instance, while reviewing job market trends, students need to discern whether the data is based on reputable

research or speculative content. Evaluating information also involves aligning insights with personal goals and circumstances, ensuring that decisions are grounded in practical and well-researched foundations. This competency is particularly important in an era of misinformation, where students must navigate a mix of credible and unreliable sources online.

Skill of identifying potential obstacles is indispensable in career planning, as it helps students anticipate and prepare for challenges they may encounter along their career paths. Obstacles can include skill gaps, financial constraints, geographic limitations, or competitive job markets. By proactively recognizing these barriers, students can develop contingency plans and seek solutions, such as acquiring additional qualifications, applying for scholarships, or exploring alternative pathways [2]. This skill fosters resilience and adaptability, enabling individuals to remain focused on their goals despite setbacks. Career counseling sessions, self-reflection exercises, and mentoring can help students identify personal and systemic challenges and devise strategies to address them effectively.

Skill of decision-making ties together the entire career planning process, as it involves synthesizing information, weighing options, and choosing the best course of action. Decision-making requires individuals to balance logical reasoning with emotional considerations, such as personal values and long-term satisfaction [32]. Effective decision-making also involves accepting uncertainty and being prepared to adapt as new information or opportunities emerge. However, many students struggle with decision paralysis, particularly when faced with multiple appealing options. Support from career advisors, peer discussions, and experiential learning opportunities like internships can help students build confidence in their decision-making abilities.

3. Research Method

Population and sample: Six universities have been randomly selected from Shanxi Provinces; the population of this study is the teaching and administrative personnels from selected six universities. Furthermore, based on the official websites of those six universities, total population of the teaching and administrative personnels has been found to be 10863. According to the table of Krejcie and Morgan [33] the sample size of this study shall be at least 375. Hence, the researcher has collected data from 375 respondents to ensure the reliability of the finding results, and such sample size is rationale for this study.

Research tool: A five-points likert scale questionnaire has been designed for this survey, to find the agreement level of 14 items related with the needed skills under career planning competences of college students.

Data analysis: The instruments were subsequently subjected to Exploratory Factor Analysis (EFA) to examine the underlying factor structure. Furthermore, EFA was employed to categorize questionnaire items into distinct factors based on their shared variance. The statistic software was utilized to conduct the EFA analysis.

4. Result

In this study, the instrument developed college students' career planning competences questionnaire with 14 indicators. Table 1 showed a general description of contents of this instrument.

Table 1.
Grid of career planning competences instruments.

Item Code	Statement Indicator
A1	Skill of understanding self's strengths, weaknesses, valued, interests and personality traits.
A2	Skill of recognizing personal goals and aspirations
A3	Skill of assessing self's skills and knowledge
B1	Skill of setting clear, achievable, and measurable career goals
B2	Skill of developing strategic plan to achieve career goals
B3	Skill of identifying the necessary steps and recourses for career goals
C1	Skill of effective communication
C2	Skill of building network and building relationships with professionals
C3	Skill of presenting oneself and one's ideas with confidence
D1	Skill of seeking information with technologies for different career paths, industries and job market
D2	Skill of logical analysis
D3	Skill of evaluating information
D4	Skill of identifying potential obstacles
D5	Skill of decision making

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was found to be 0.816, indicating a very good sample adequacy for factor analysis. Bartlett's test of sphericity was significant at the 0.05 level ($p = 0.001$), suggesting that the correlation matrix is not an identity matrix, which is a necessary condition for conducting factor analysis. These results support the suitability of the data for factor analysis.

Table 2.
KMO and Bartlett's Test Results.

Test	Value
KMO	0.816
Approx. Chi Square	4731.776
Df	91
Sig	0.000

A factor analysis was conducted to identify underlying dimensions of career planning competence. Varimax rotation was employed to simplify the factor structure. The Variance Extraction Ratio (VER) was used to assess the proportion of variance explained by each factor. The following Table 3 presents the results of total variance explained. The results indicate that four factors were extracted, each dimensions provides certain percent of information, respectively were: Information Seeking and Decision-Making (23.186%); Goal Setting and Planning (15.399%); Interpersonal and Communication Skills (14.996%); Self-Awareness (14.682%). The remaining variance is attributed to other factors not captured by the items in this study.

Table 3.
Total variance explained.

Dimensions	Initial eigenvalues	Percent of variance %	Cumulative percent %	Extraction sums of squared loadings	Percent of variance %	Cumulative percent %
Information seeking and decision-making	4.072	29.085	29.085	3.246	23.186	23.186
Goal setting and Planning	2.201	15.719	44.804	2.156	15.399	38.585
Interpersonal and communication skills	1.720	12.285	57.089	2.095	14.966	53.551
Self-awareness	1.560	11.145	68.234	2.056	14.682	68.234

The item validation results are shown in Table 4 below. The first factor, Self-Awareness, is comprised of items A1, A2, and A3. The second factor, Goal Setting and Planning, includes items B1, B2, and B3. Additionally, a third factor, Interpersonal and Communication Skills, is represented by items C1, C2, and C3. Finally, the fourth factor, Information Seeking and Decision-Making, is composed of items D1, D2, D3, and D4. Furthermore, based on the EFA analysis results, it is known that there are 14 items in the valid category because they have a loading factor value greater than 0.5. Besides that the communalities of all of items were greater than 0.4, indicating the factors extracted from the data provide a good representation of the underlying constructs.

Table 4.
Loading factors.

	Information seeking and decision-making	Self-awareness	Interpersonal and communication skills	Goal setting and Planning	Communality
A1		0.842			0.739
A2		0.820			0.706
A3		0.819			0.703
B1				0.800	0.664
B2				0.816	0.685
B3				0.825	0.700
C1			0.830		0.703
C2			0.818		0.690
C3			0.828		0.705
D1	0.765				0.606
D2	0.788				0.636
D3	0.777				0.627
D4	0.838				0.720
D5	0.811				0.668

Based on the findings of the EFA analysis above, 14 items were created and then classified into four factors/dimensions, as showed as followed Table 5.

Table 5.
the Needed skills of Career planning competences.

Dimensions	Statement Indicator
Self-awareness	Skill of understanding self's strengths, weaknesses, valued, interests and personality traits.
	Skill of recognizing personal goals and aspirations
	Skill of assessing self's skills and knowledge
Goal setting and Planning	Skill of setting clear, achievable, and measurable career goals
	Skill of developing strategic plan to achieve career goals
	Skill of identifying the necessary steps and recourses for career goals
Interpersonal and communication skills	Skill of effective communication:
	Skill of building network and building relationships with professionals
	Skill of presenting oneself and one's ideas with confidence
Information seeking and decision-making	Skill of seeking information with technologies for different career paths, industries and job market
	Skill of logical analysis
	Skill of evaluating information
	Skill of identifying potential obstacles
	Skill of decision making

5. Discussion

The results have been categorized career planning competences of college students into four dimensions such as self-awareness, goal setting and planning, interpersonal and communication skills

and information seeking and decision-making, this result align with existing research on the key competencies required for effective career planning.

In the dimension of self-awareness, skills such as understanding personal strengths and weaknesses, recognizing aspirations, and assessing one's skills and knowledge are fundamental to developing a solid career foundation. Soeprijanto, et al. [6] emphasized the critical role of self-awareness in shaping career planning. Students who have a clear understanding of their abilities and interests are more likely to set realistic career goals and choose career paths that align with their personalities. Moreover, reflective practices, such as self-assessment tools and career counseling, have been shown to significantly improve students' ability to articulate their strengths and identify areas for development [9].

The dimension of goal setting and planning highlights the necessity of skills such as setting measurable goals, strategic planning, and identifying resources. These findings align closely with Goal-Setting Theory, which underscores that specific, challenging, and attainable goals improve motivation and performance. The inclusion of building professional networks and presenting oneself with confidence in this dimension also reflects modern career demands [34].

In the dimension of Interpersonal and communication skills, including networking and presenting ideas confidently, align with the studies by Ataulayeva [27] demonstrated the significance of social capital and networking in accessing job opportunities, with most of roles being filled through professional connections. Similarly, Pascariati and Ali [4] emphasize that confident self-presentation contributes significantly to career success by enabling individuals to effectively showcase their skills and value to employers. These results suggest that fostering networking and self-presentation skills, alongside traditional goal-setting strategies, equips students with comprehensive tools to navigate career pathways.

In the dimension of information seeking and decision-making, skills such as using technology to gather career-related information, logical analysis, and evaluating information are vital for making informed choices. Smaldone, et al. [30] underscored the importance of technological literacy in accessing labor market data, industry trends, and job openings in the digital era. Furthermore, logical analysis and information evaluation, as highlighted in this dimension, are critical in filtering credible and relevant information from the vast array of available resources [5]. The findings underscore the importance of equipping students with both technological and logical analysis skills to enhance their career readiness.

6. Conclusion

In this study, the researcher was successful in identifying self-awareness, goal setting and planning, interpersonal and communication skills and information seeking and decision-making as the dimensions of career planning competences for college students in this era. Furthermore, the analysis results provided a formulation of indicator adjustment with dimensions formed from the data provided by the respondents. The result is a set of needed skills of Career planning competences that researchers and practitioners can use to more accurately measure or improve college students' career planning competences in these complexities of current labor market.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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